

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, 1939



OTTAWA
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REPORT OF THE DEPARTMENT

OF

MINES AND RESOURCES

INCLUDING

REPORT OF SOLDIER SETTLEMENT OF CANADA

*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, 1939.

Respectfully submitted,

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

To His Excellency the Right Honourable James T. Stewart, Esq.
G. M. M. C. H. Secretary-General and Government Agent of the
Department of Finance

Dear Sir:

The undersigned has the honor to acknowledge the receipt of your letter of the 14th inst. in relation to the above-mentioned matter. The undersigned has the honor to acknowledge the receipt of your letter of the 14th inst. in relation to the above-mentioned matter.

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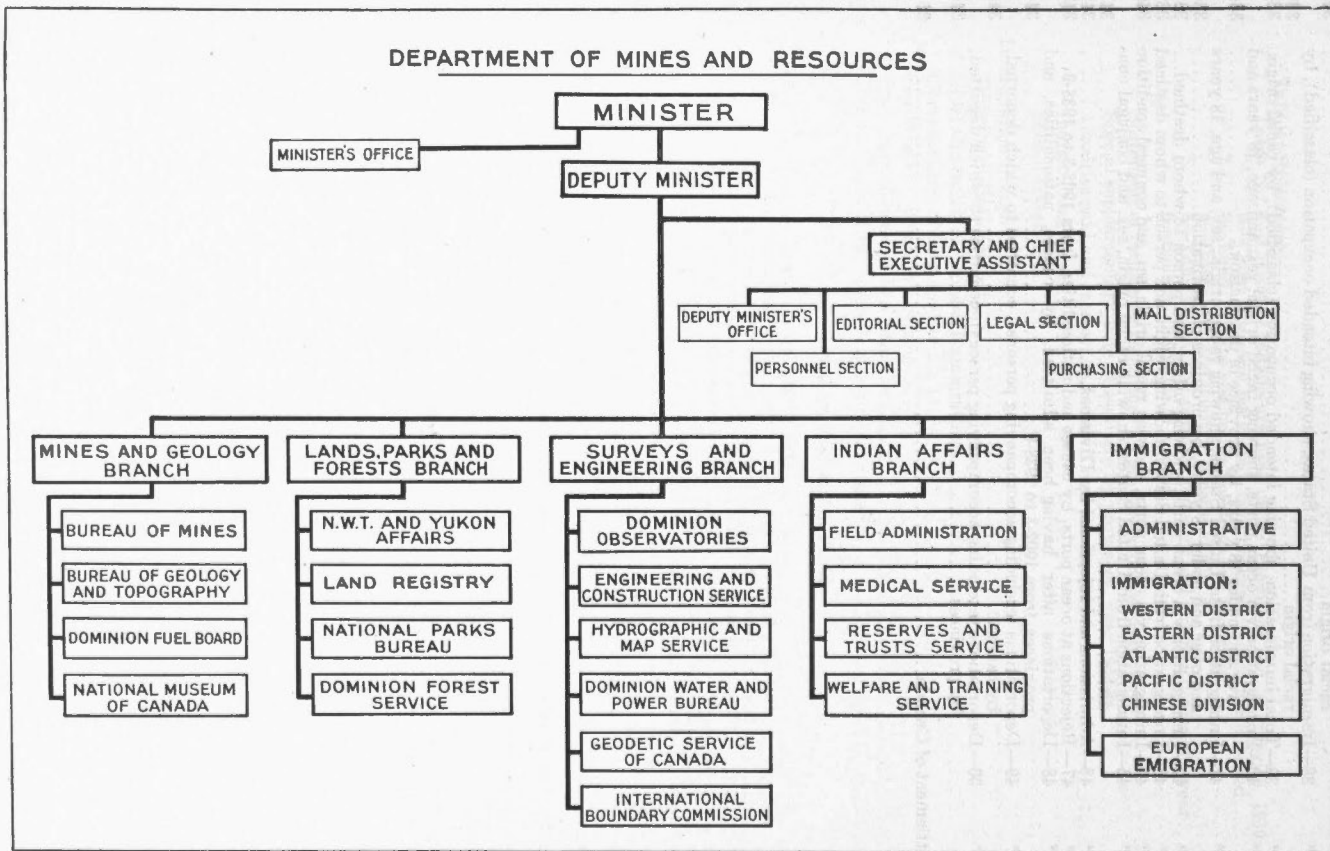
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REPORT
OF THE
DEPARTMENT OF MINES AND RESOURCES
INCLUDING
REPORT OF SOLDIER SETTLEMENT OF CANADA
FOR THE FISCAL YEAR ENDED MARCH 31, 1939

The Honourable T. A. Crerar,
Minister of Mines and Resources,
Ottawa.

SIR,—

I have the honour to submit the third Annual Report of the Department of Mines and Resources.

While collection of revenue is not a primary function of the Department, an effort has been made to increase revenue, particularly from those receiving special services or privileges not rendered to or enjoyed by the country at large. It has been possible to report progressive increases each year since amalgamation in 1936-7. The summary of revenue and expenditure which follows shows that departmental revenue increased over the previous year by close to \$200,000.

The Special Supplementary Votes of the Department were increased substantially by Parliament and added to the administrative responsibilities of certain divisions. A new vote of \$1,750,000 was provided to assist the provinces in the improvement of tourist highways. One hundred and eighty separate tourist road projects were approved during the year. Extra funds made available for medical services for Indians enabled the Department to proceed beyond the investigatory stage of the plan agreed upon in consultation with leading authorities throughout the Dominion for the control and treatment of tuberculosis. A larger appropriation was voted for forest conservation work. Assistance to the mining industry was continued on much the same basis as in 1937-8. Other changes in the levels of departmental votes were made, upwards and downwards, and the manner in which the various appropriations were utilized is dealt with in the reports of the different Directors.

There were no abnormal changes in staff during the year.

DEPARTMENT OF MINES AND RESOURCES

SUMMARY OF REVENUE AND EXPENDITURE FOR FISCAL YEAR 1938-9

	Revenue	Expenditure		Total
		Ordinary	Special	Expenditure
<i>General Administrative Branch</i>	\$	178,619 71		\$ 178,619 71
<i>Mines and Geology Branch—</i>				
Branch Administration.....	\$	31,820 10		
Bureau of Mines.....	\$	9,731 77	455,074 60	
Bureau of Geology and Topography....	14,779 33	757,397 46	\$ 47,458 82	
National Museum of Canada.....		67,364 38		
Dominion Fuel Board.....	1,568 88			
Administration.....	\$ 28,354 74			
Coal Subventions....	1,867,405 23			
Domestic Fuel Act payments.....	53,724 87			
		1,949,484 84		
Assistance in improving transportation facilities into mining area.....	565 26		\$1,186,351 11	
	\$ 16,645 24	\$ 3,261,141 38	\$ 1,233,809 93	
				\$ 4,494,951 31
<i>Lands, Parks and Forests Branch—</i>				
Branch Administration.....	\$	21,051 11		
Dominion Lands, Ordnance Lands, etc. \$	35,742 53	80,368 27		
National Parks and Historic Sites....	366,223 97	1,419,870 06	\$ 783,523 13	
Forestry.....	11,693 59	352,397 63	197,412 92	
Northwest Territories.....	197,992 28	283,776 11		
Yukon Territory.....	92,644 48	111,168 93		
Development of Tourist Highways.....			\$1,542,932 56	
	\$ 704,296 85	\$ 2,268,632 11	\$ 2,523,868 61	
				\$ 4,792,500 72
<i>Surveys and Engineering Branch—</i>				
Branch Administration.....	\$	21,447 03		
Dominion Observatories.....	\$ 54 80	140,979 56		
Water and Power Bureau.....	32,239 47	245,257 15		
Geodetic Service.....	224 19	160,319 69		
International Boundary Commission....	155 39	30,283 88		
Engineering and Construction Service...	5,285 59	132,881 43	\$ 598,509 12	
Hydrographic and Map Service.....				
Hydrographic and Map Service.....	\$412,811 14	5,807 22		
Legal Surveys and Map Service.....	181,665 32	9,620 68	594,476 46	
	\$ 53,387 34	\$ 1,325,645 20	\$ 598,509 12	
				\$ 1,924,154 32
<i>Indian Affairs Branch—</i>				
Branch Administration.....	\$	46,270 28		
Indian Agencies Administration.....	\$ 1,956 10	709,905 98		
Reserves and Trusts—Administration..	15 00	51,932 57	\$ 44,715 21	
Indian Education.....	150 00	1,951,336 98		
Medical Services.....	789 82	1,289,883 78		
Welfare of Indians.....	7,543 94	1,004,813 55		
Miscellaneous Statutory Items (Indian Annuities).....		253,189 00		
Miscellaneous Revenue—not including revenue accruing to Indian Band funds.....	7,634 53			
	\$ 18,089 39	\$ 5,307,332 14	\$ 44,715 21	
				\$ 5,352,047 35

SUMMARY OF REVENUE AND EXPENDITURE FOR THE FISCAL YEAR 1938-39—*Cont.*

	Revenue	Expenditure Ordinary	Special	Total Expenditure
<i>Immigration Branch—</i>				
Administration of the Immigration Act and the Chinese Immigration Act.....	\$ 160,290 06			
Field and Inspection Service—Canada.....	1,042,435 30			
Field and Inspection Service—Abroad.....	124,194 46			
Relief of Distressed Canadians outside Canada.....		1,923 67		
Investigations of Aliens in B.C.....		5,880 55		
Miscellaneous Revenue.....	\$ 16,557 71			
Miscellaneous Statutory Items.....		823 38		
	<u>\$ 16,557 71</u>	<u>\$ 1,335,547 42</u>		<u>\$ 1,335,547 42</u>
Totals for Department.....	<u>\$ 808,976 53</u>	<u>\$13,676,917 96</u>	<u>\$ 4,400,902 87</u>	<u>\$18,077,820 83</u>

In addition to the foregoing the following expenditures were made by other departments from funds transferred out of votes of the Department of Mines and Resources—

Department of Public Works—

Vote 530—To assist in provision of transportation facilities into mining areas Northwest Territories.....	\$	26,589 70	
Vote 534—Development of tourist highways— Province of Quebec.....		159,326 72	

Department of National Defence—

Vote 532—Historic Sites— Provinces of Quebec and Nova Scotia.....		326,314 28	
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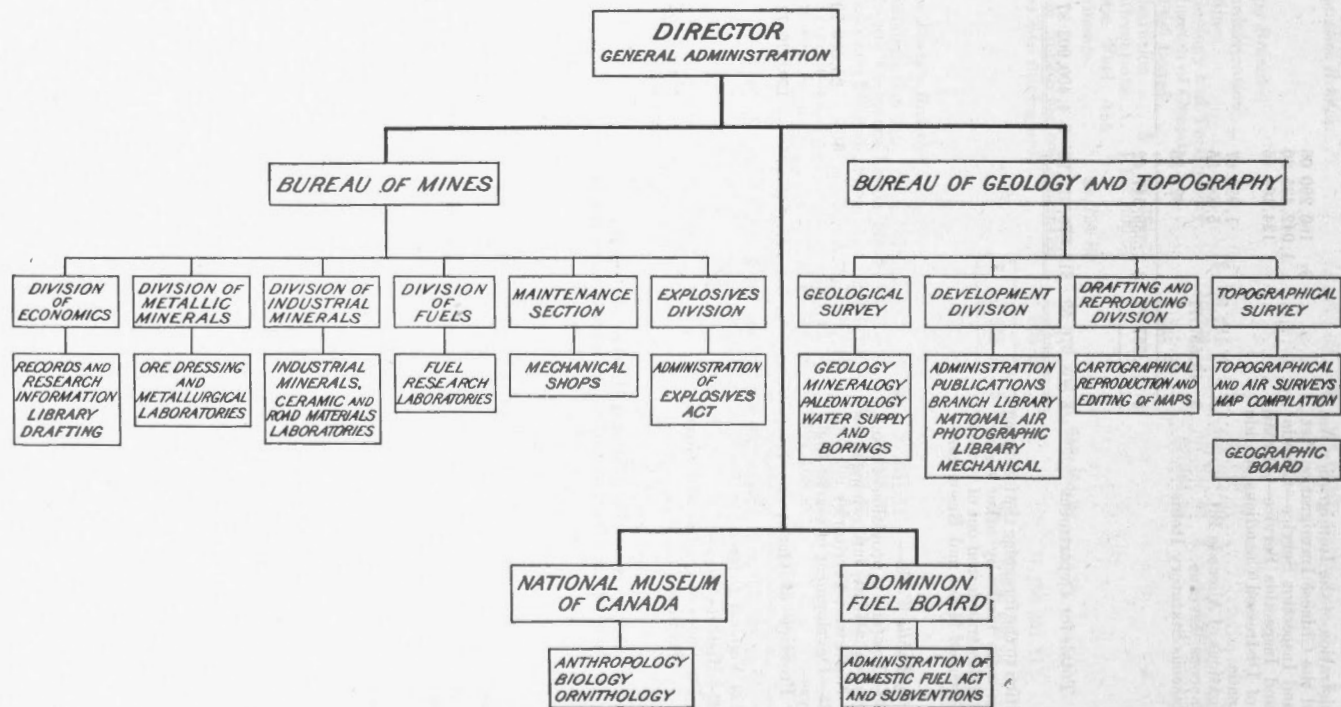
NOTES—(1) Includes revenue of National Museum of Canada.

(2) Includes contributions to Provinces for work on roads.

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 mineral industry of Canada is surpassed in total annual value of production only by agriculture. Output in 1938 was valued at \$441,823,237, an amount that was slightly less (3 per cent) than that for the record year, 1937. However, the quantity of output of several important mineral products showed a noticeable increase. Thus gold showed an increase in quantity of 15 per cent, to 4,725,117 fine ounces; copper 10 per cent, to 285,600 short tons; lead 1.7 per cent, to 209,500 short tons; the platinum group of metals 13 per cent, to 292,200 ounces; and zinc 3 per cent, to 190,800 short tons. Coal showed a drop of 10 per cent, to 14,294,718 short tons, but the production of crude petroleum increased 137 per cent, to 6,966,084 barrels. Dividends from the mining industry at \$101,000,000 were down about five millions from the record year, 1937.

The year 1938 witnessed marked progress in many fields of activity. Great headway was made in the development of new gold mines, especially in Porcupine, Kirkland Lake, and Larder Lake areas of Timiskaming District, in the Patricia section of Kenora District, and near Opeepeesway Lake, Sudbury District, all in Ontario; in the Cadillac-Malartic and adjoining areas in western Quebec; in the Yellowknife River area in the Northwest Territories, where two gold mines are now in steady production; near Lake Athabaska, in Saskatchewan, where the 1,000-ton mill of Consolidated Mining and Smelting Company is nearing completion; and in the Zeballos River area, on the west coast of Vancouver Island, British Columbia. Additions to plant and equipment were made at several of the older producing properties.

In the non-ferrous base metal industry, the new records established in the output of copper, lead, and zinc in 1938 were in contrast with world production of these metals, which was about 8 per cent lower than in 1937. The production of nickel, which amounted to 105,300 short tons, was about 6 per cent below the record output of 1937, largely because of the industrial recession in the United States, normally the leading consumer of the metal.

Base metal developments in Quebec were featured by the discovery at Waite-Amulet of a deep-seated ore-body, estimated to contain 3,393,000 tons of ore averaging 6.4 per cent of copper and 4.6 per cent of zinc, and containing 0.05 ounce of gold and 1.62 ounces of silver a ton. The capacity of the copper refinery at Montreal East was increased by 6,000 tons, to 81,000 tons of refined metal annually.

In Ontario, the capacity of International Nickel Company's 12,000-ton a day concentrator was increased, and metal losses were reduced as a result of metallurgical improvements. The large-scale operations at the Frood open-pit began in July 1938. Falconbridge Nickel Mines increased the capacity of its treatment plant to about 15,000 tons of nickel-copper matte. Exploration and development work increased considerably the tonnage of ore of the mines in the Sudbury area.

In Manitoba, Hudson Bay Mining and Smelting Company extended its main shaft to the 2,750-foot level, and started preparations for the sinking of a new south main shaft at its Flin Flon copper-zinc property.

In British Columbia, Granby Consolidated Company, which resumed operations in the summer of 1937, operated its copper mine and concentrator near Princeton at capacity. Consolidated Mining and Smelting Company made further improvements in the metallurgical treatment of lead-zinc ores at its

Sullivan concentrator near Kimberley, and in the near future mining operations will be started in the block of ore below the 3,900-foot level of the Sullivan mine.

No iron ore for blast furnace use has been mined in Canada since 1923. Algoma Steel Corporation, through its subsidiary Algoma Ore Properties, Limited, continued work on the opening up of the New Helen mine in Michipicoten area, Ontario, and is expected to bring the property into production in the early summer of 1939. The deposit is estimated to contain some 100,000,000 tons of carbonate ore averaging about 35 per cent iron. To fit it for use in the blast furnace a roasting and sintering plant capable of treating 2,000 tons of ore a day is being built. The iron deposits of Steeprock Lake, north of Atikokan, about 135 miles west of Port Arthur, were discovered in the winter of 1937-8 by diamond drilling through the ice, and exploration to date, mainly by diamond drilling, has shown the existence of a very large body of high-grade hematite ore.

Canada's production of non-metallic minerals, including the fuels and structural materials, reached a value of \$118,748,083 in 1938, a decrease of \$2,583,521 as compared with 1937, and of \$37,648,107 as compared with 1929, the record year. New records were established in the output of petroleum, natural gas, salt, and nepheline syenite, but the output of most of the principal minerals of the group was appreciably lower than in 1937, chiefly as a result of the lack of any real improvement in the building and construction industries.

The most important development in the petroleum industry in 1938 was the greatly increased production from the Turner Valley field, Alberta. During the year, thirty-eight producing wells were drilled into the Palæozoic limestone at the south end of the field, which now has a proved length of about 5 miles and a width of $1\frac{1}{2}$ miles. The product is a light crude oil that ranges from 40 degrees to 50 degrees A.P.I. gravity, very different from the naphtha produced from the limestone in the central part of Turner Valley. Alberta produced 6,751,312 barrels of crude petroleum in 1938, or 97 per cent of the total Canadian production of the fuel.

The continued high rate of activity in the mining industry has imposed corresponding demands on the facilities of the Mines and Geology Branch. Forty geological parties were in the field in 1938. These parties were engaged chiefly in examining areas that appeared promising for prospecting and in obtaining information to aid in the development of mineral deposits. The Bureau of Geology and Topography continued to issue reports on the results of its geological field investigations as soon as possible after their completion. During the year five memoirs, sixteen preliminary geological reports, and fifty-six maps were published.

The Topographical Survey had parties working in Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Quebec, and Nova Scotia. The large number of visits to the National Air Photographic Library by engineers, prospectors, geologists, timber operators, etc., indicated the important part played by aerial photography in the development of our natural resources. Some 55,000 new photographs were added to the library during the year, bringing the total now available for examination to about 784,500 prints.

The National Museum conducted field investigations in biology in British Columbia, in ornithology in Manitoba, and in botany and archæology in Ontario.

The Bureau of Mines, through its various divisions, correlated and made available for industry and the public, information pertaining to the production, marketing, and use of the mineral resources of the Dominion. Visits were made to many of the mining areas to collect up-to-date information. In addition, it carried on investigations to determine the best method of treating ores and products, both metallic and non-metallic. During the year two new

buildings were completed on the Booth Street property of the Bureau, one to house the staff and equipment of the Industrial Minerals Division and the other an ore dressing laboratory for housing crushing and sampling equipment and for conducting continuous tests and mill runs.

Investigative work was continued on coals, cokes, crude oils, and natural gas with the object of extending the home markets for Canadian fuels. This included physical and chemical surveys of coals from various collieries; field tests on chemical treatment for prevention of spontaneous combustion of coal in storage, high-pressure hydrogenation tests for the conversion of coals and peat to oil, and the continuation of the investigation in co-operation with the Forest Products Laboratories of wood-burning stoves of Canadian and European manufacture.

Branch officers contributed papers and addresses to technical publications and scientific societies, in some cases making available to the public information of interest well in advance of its appearance in printed reports of the Branch.

The activities of the Branch are reviewed in more detail in succeeding pages.

MINING ROADS DIVISION

ASSISTANCE TOWARD MINING TRANSPORTATION

The Branch administered a special vote by Parliament of \$1,310,000 to continue assistance in improving transportation facilities into mining areas. The vote provided in the previous year for this purpose amounted to \$1,400,000. Mining road work was carried out largely in parts of the provinces that are not fully served by regular highways, and this work has continued to reduce transportation costs in many areas where high traffic rates were retarding the development of new properties. During the calendar year 1938, twenty-two mining properties commenced gold production in areas that have been assisted by mining road construction.

Agreements were again entered into with the provinces concerned, whereby construction work was to be carried on under the direction of the Provincial Governments on the understanding that two-thirds of the construction costs would be borne by the Dominion Government and one-third by the province. The projects in the Yukon and Northwest Territories were completely financed and carried out by the Dominion Government, with the exception of a winter road in Yellowknife district on which the work was undertaken and part of the cost was paid by a mining company. In several of the provinces, too, mining interests contributed to the costs of certain projects.

Construction work was continued throughout the fiscal year from April 1938 to March 1939, and during this period work was carried out on 178 projects.

Among the more important construction activities of the year were the following projects: completion of the Bowsman-The Pas highway in Manitoba, work on the Rose Lake winter road in Quebec, the Berens River-Favourable Lake winter road in Manitoba and Ontario, and the opening of a winter tractor road in Alberta and the Northwest Territories from the Peace River district to Great Slave Lake. An all-weather road was constructed from Goldpines to the Confederation Lake area in Ontario, and considerable progress was made on the road from Fort St. James to the Manson Creek placer area in British Columbia, and on the York River road leading to an area in which mineral prospecting and development is taking place in Gaspé Peninsula, Quebec.

The maximum number of workers employed on all projects in the peak month was 4,300, and the total man-days of work amounted to 272,000. Additional employment was provided in organizations concerned with the supply of construction materials and with the provisioning and equipping of camps.

Direct employment alone resulted in the disbursement of \$940,000 in salaries and wages, the work having been given chiefly to persons classified as relief and needy cases.

Maximum expenditures provided for under the agreements with the provinces and by appropriations for work in the Northwest and Yukon Territories were as set out hereunder:

Mining Roads	Maximum Dominion Contribution	Maximum Provincial Contribution	Total Expenditures Provided for
	\$	\$	\$
Nova Scotia.....	25,000	12,500	37,500
Quebec.....	250,000	125,000	375,000
Ontario.....	250,000	125,000	375,000
Manitoba.....	230,000	115,000	345,000
Saskatchewan.....	125,000	62,500	187,500
Alberta.....	35,000	17,500	52,500
British Columbia.....	240,000	120,000	360,000
Northwest Territories ¹	53,250	.....	53,250
Yukon Territory.....	50,000	.....	50,000
	1,258,250	577,500	1,835,750

¹ Includes \$14,000 for improvement of navigation on Athabaska River in Alberta.

Some of the funds were required, however, for settlement of 1937-8 accounts unpaid at the close of the previous fiscal year, and after providing for these accounts, approximately \$1,807,000 of Dominion and Provincial funds remained available for new construction in the 1938-9 fiscal year. It is estimated that after complete settlement of accounts, \$1,732,692 of Dominion and Provincial funds will be required for works executed in 1938-9.

Tabulated hereunder are the values of the works executed by provinces and territories in the fiscal years 1936-7 and 1937-8 and the approximate value of works done in the fiscal year 1938-9, all figures being exclusive of administrative costs of the Dominion and the provinces:

Mining Roads	Value of Works Executed 1936-7 ¹	Value of Works Executed 1937-8 ¹	Approximate Value of Works Executed 1938-9 ¹
	\$	\$	\$
Nova Scotia.....	37,001	36,972	36,751
Quebec.....	525,000	448,080	368,277
Ontario.....	487,533	520,000	351,000
Manitoba.....	329,666	315,961	342,554
Saskatchewan.....	80,576	149,785	161,726
Alberta.....	.....	.....	34,000
British Columbia.....	363,664	328,872	341,595
Northwest Territories.....	32,044	13,319	49,000 ²
Yukon Territory.....	19,712	62,234	47,789
	1,875,196	1,875,223	1,732,692

¹ The values herewith reported are those of works financed from Dominion and Provincial funds exclusive of works paid for by mining interests.

² Includes expenditure for improvement of navigation on Athabaska River in Alberta.

MINING TRANSPORTATION PROJECTS, 1938-9

Nova Scotia

Beaver Dam Mine road	Millar Lake Mine road
Moose River-Mooseland Mines road	Otter Lake Mine road
Caribou Mine road	Forest Hill Mine road
Killag Mine road	Mountain Mine-Country Harbour road
Montague Mine road	Goldenville Mine road
Oldham Mine road	Molega Mine road
Renfrew Mine road	Whiteburne Mine road
Antimony Mine road	Mount Uniacke Mine road
Manganese Mine road	South Uniacke Mine road
Leipsgate Mine road	Withrow Mine road
Lacey Mine road	Higgins and Lawlor Mine road
Seal Harbour Mine road	Lake Catcha Mine road

Quebec

Rose Lake winter road	York River road
Rose Lake winter road extension	York River road extension
Lacoma Mine winter road	East Malartic Mine road
Perron Mine road	Waite Mine road
Francoeur Mine road	Canadian Malartic Mine road
Arntfield Mine road	Isle-Verte peat bog road
Aldermac Mine road	Bellehumeur Mine road
Waite-Amulet Mine road	St. Jude Mine road
Cameron Mine road	Cassels-Duval Mine road
Stadacona Mine road	Abbeville Mine road
Dalquier township road	

Ontario

New Helen Mine road	Tracy Rapids bridge and approaches
Back road to Timmins	Upper Canada Mines road
Goldpines-Uchi road	Houston Lake-Westree road
Madsen-Red Lake road	Hawk Junction-Regnery-Murray Algoma roads
Berens River Mine road	Minnehaha Lake-Goldrock road
Cobalt-Gillies Limit road	Timmins-Naybob Mine road
Canadian Lorrain Mine road	De Santis Mine road
Gogama-Three Duck Lake road	Augite Mine road
Naughton-Lebel Oro road	Kenwell-Bankfield Mine road
Delnite Mine road	Red Lake Wharf road
Gooderham-Nepheline road	North Shores Mine road
Nezah-Sturgeon River Mine road	Straw Lake Beach Mine water route
Canada Flint and Spar road	Yorkshire Cobalt Mine road
Canadian Nepheline road	McKenzie Island road
Calabogie-Black Donald Mine road	Yama Mine road
Afton Mine road	Preston-East Dome Mine road
Goudreau-Algold Mine road	Ramsay-Opeepeesway Lake road
Beardmore-Sand River Mine road	Hiawatha Mine winter road
Gowganda Westerly road	
Atikokan-Steepprock road	

Manitoba

Bowsman-The Pas highway	Berens River Mine road
Flin Flon-Channing road	Lac du Bonnet-Bird River road and Pinawa Channel bridge
Sherridon-Cold Lake road	Pine Falls-Lac du Bonnet road
Channing-Lake Ministikwan road	Long Lake-Gunnar road
Gurney Gold Mines road	Government Landing-Caribou Landing road
Regina Lake Airport road	Manitogagan-English Brook Dam road
Wabowden-Nelson House-Southern Indian Lake winter road	Derry Mine road and extension
Cranberry Portage road	Sunbeam-Kirkland Mine road
Ilford-Gods Lake-Sachigo winter road	Clearwater Lake road
Herb Lake road	Rahls Island road
Grassy River dam	Norway House-Cross Lake winter road
Aiken River dam and Assean Lake port-ages	Great Falls-Gunnar winter road

Saskatchewan

Flin Flon-Beaver Lake road
 Flin Flon Gold Mines road
 Waskesiu-Montreal Lake road

Montreal Lake-Lac La-Ronge road
 Prince Albert Airport dam

Alberta

Great Slave Lake winter tractor road

Navigation improvements on Athabaska
 and Clearwater Rivers

British Columbia

Manson Creek road
 Quesnel-Barkerville road
 Cariboo-Hudson Mine road
 Yanks Peak road
 A.M. Mine road
 Zeballos road
 Zeballos road extension
 Ashloo Mine road
 Beaton-Ferguson-Eight Mile road
 Battlement Creek road
 Big Missouri road
 Hedley Mine road
 Telegraph Creek-Dease Lake road
 Copper Mountain road
 American Creek trail
 Bayonne Mine road
 Williams Lake-Likely road
 Silver Lake trail
 Hixon Creek road
 Dolly Varden railway
 Upper Kitsault River trail
 Germansen road
 Vidette Mine road
 Pender Harbour road
 Grand Vizar trail
 Priority Mine road
 New Denver-Three Forks road and extension

Unuk River trail
 O'Donnell River road
 Takla Landing-Old Hogem road
 Driftwood Creek road
 Aiken Lake winter road
 Zeballos-Nomash trail
 Lemon Creek road
 Redstone-Kleena Kleena road
 Mud Creek Mine road
 Quesnel-Hydraulic road
 Windpass Mill road
 Silver Standard Mine road
 Hobson Creek trail
 Dease Lake-Boulder Creek winter road
 Jo Jo Mine road
 Premier Mine road
 Leech River road
 Hunter Basin trail
 Highland Surprise Mine road
 Sheep Creek road
 Inland Empire Mine road
 Havilah Mine road
 Spud Valley Mine road
 Kennedy Lake road
 Kennedy Mine road
 Bedwell River bridge

Northwest Territories

Roads and wharves at Fort Smith
 Road at Yellowknife
 Seaplane bases at Fort Smith, Yellowknife,
 and Simpson

Winter landing fields at Fort Smith,
 Resolution, Fitzgerald, and Wrigley
 Yellowknife-Thompson Lake winter road

Yukon

Sulphur-Dominion Creek roads
 Silver King road

Mayo-Minto road

DEVELOPMENT OF TOURIST HIGHWAYS IN MANITOBA AND SASKATCHEWAN

In addition to administering the vote for mining transportation assistance, the facilities of the Branch were utilized in connection with the administration of part of a special vote by Parliament of \$1,750,000 for the development of tourist highways. The mining roads division was called upon for administrative duties concerning \$565,000 of the funds devoted to construction and improvement of tourist roads in Manitoba and Saskatchewan. Maximum expenditures provided for under agreements with the two provinces were as set out hereunder:

	Maximum Dominion Contribution	Maximum Provincial Contribution	Total Expenditures Provided for
	\$	\$	\$
Manitoba.....	390,000	890,000	1,280,000
Saskatchewan.....	175,000	1,575,000	1,750,000

Construction work by the Governments of Manitoba and Saskatchewan was carried out on 149 projects, employing at the peak some 8,600 workmen. The total man-days of work amounted to 248,500 and salaries and wages to over \$900,000, employment being given mainly to persons of the needy and unemployed class.

The 55 projects in Manitoba included 81 miles of hard-surfacing work on the Trans-Canada highway east and west of Winnipeg and 14 miles on the main road to Winnipeg Beach. Other projects included grading, gravelling, stabilization, and other improvement work on more than 400 miles of important provincial highways, the gravelling and stabilization amounting to about 255 miles.

The 94 projects in Saskatchewan included as a main feature the gravelling work undertaken to provide for all-weather travel on provincial highways, over 40 projects being in this category. Besides 14 miles of hard-surfacing work done on the Regina Airport, Regina North, and Saskatoon West roads, almost 1,000 miles of highways received improvement, 645 miles having been gravelled. In addition, six reinforced concrete bridges and two steel bridges were erected.

The basis of assistance to the programs in the two provinces was such that the provincial expenditure in each case was on a much greater scale than that of the Dominion. To the Manitoba projects the Dominion contributed approximately 30.46 per cent and to the Saskatchewan projects 10 per cent, the approximate total value of works executed under the agreements being as shown hereunder:

	Approximate Value of Works Executed 1938-9 \$
Manitoba	1,275,000
Saskatchewan	1,706,000
	2,981,000

BUREAU OF GEOLOGY AND TOPOGRAPHY

The Bureau of Geology and Topography 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.

Forty geological parties were in the field in 1938, nine of which were in British Columbia; two in Alberta; four in Saskatchewan; five in Manitoba; four in Ontario; six in Quebec; three in New Brunswick; two in Nova Scotia; one in Yukon; and four in the Northwest Territories. These parties were chiefly engaged in examining areas that appear promising for prospecting, and in obtaining information that will be of aid in the development of mineral deposits. During the year five memoirs, sixteen preliminary geological reports, and fifty-six maps were published.

The Topographical Survey had parties working in British Columbia, Alberta, Yukon, Northwest Territories, Saskatchewan, Quebec, and Nova Scotia.

GEOLOGICAL SURVEY

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 geological maps published or in varying stages of progress are listed in the report of the Draughting and Reproducing Division. The reports published

are listed in the section on publications. 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.

FIELD WORK

The Geological Survey carried out field work in many parts of Canada. The field officers in addition to preparing maps and reports for publication, have dealt with many requests for information and advice regarding mineral occurrences and allied subjects.

YUKON

H. S. Bostock commenced the study and mapping of the geology of Mayo map-area (latitude 63° to 64° , longitude 134° to 136°), and also collected information for an annual report on the mineral industry of Yukon.

NORTHWEST TERRITORIES

J. F. Henderson completed the study and mapping of the geology of Beaulieu River map-area (latitude 62° to 63° , longitude 112° to 114°), and commenced the study and mapping of the geology of Gordon Lake South map-area (latitude $62^{\circ}30'$ to 63° , longitude 113° to $113^{\circ}30'$).

A. W. Jolliffe continued the study and mapping of the geology in the vicinity of Yellowknife River (latitude $62^{\circ}15'$ to $63^{\circ}15'$, longitude 114° to $114^{\circ}30'$).

C. S. Lord commenced the study and mapping of the geology of Snare River map-area (latitude 63° to 64° , longitude 115° to 117°).

J. T. Wilson studied and mapped the geology of Fort Smith map-area (latitude 60° to 61° , longitude 110° to 112°).

BRITISH COLUMBIA

J. E. Armstrong and J. G. Gray commenced the study and mapping of the geology of Hazelton map-area, west half (latitude 55° to 56° , longitude 127° to 128°).

E. D. Kindle examined mineral properties tributary to the Canadian National Railways in the vicinity of Hazelton.

A. H. Lang commenced the study and mapping of the geology of Smithers map-area, east half (latitude 54° to 55° , longitude 126° to 127°).

C. H. Crickmay studied and mapped the geology of Quesnel Lake map-area, west half (latitude $52^{\circ}30'$ to $52^{\circ}45'$, longitude $121^{\circ}15'$ to $121^{\circ}30'$).

H. M. A. Rice completed the study and mapping of the geology of Nelson map-area, east half (latitude 49° to 50° , longitude 116° to 117°).

W. E. Snow continued the study and mapping of the geology of Hope map-area, west half (latitude 49° to 50° , longitude 121° to 122°).

M. F. Bancroft studied the geology and mineral deposits of Zeballos area, Vancouver Island.

F. H. McLearn completed stratigraphical and faunal studies in Peace River district.

ALBERTA

B. R. MacKay commenced the study and mapping of the geology of the Cardinal River map-area (latitude $52^{\circ}45'$ to 53° , longitude $116^{\circ}30'$ to $116^{\circ}45'$), the Blackstone map-area (latitude $52^{\circ}30'$ to $52^{\circ}45'$, longitude $116^{\circ}15'$ to $116^{\circ}30'$), and the Southesk map-area (latitude $52^{\circ}30'$ to $52^{\circ}45'$, longitude $116^{\circ}30'$ to $116^{\circ}45'$).

G. S. Hume completed the study and mapping of the geology of Turner Valley, and of Fish Creek map-area (latitude $50^{\circ}45'$ to 51° , longitude 114° to $114^{\circ}30'$).

SASKATCHEWAN

D. L. Downie completed the mapping of the geology of Clearwater Lake map-area, east half (latitude 57° to 58° , longitude 108° to 109°), Mudjatic map-area (latitude 56° to 57° , longitude 106° to 108°), and Cree Lake map-area (latitude 57° to 58° , longitude 106° to 108°).

M. L. Keith mapped the geology of MacKay Lake map-area (latitude $55^{\circ}15'$ to $55^{\circ}30'$, longitude $104^{\circ}45'$ to 105°).

W. C. Howells mapped the geology of Windrum Lake map-area (latitude 56° to $56^{\circ}15'$, longitude 104° to $104^{\circ}15'$).

L. J. Weeks mapped the geology of Reindeer Lake North map-area (latitude 57° to 58° , longitude 102° to 104°).

MANITOBA

T. L. Tanton completed the study and mapping of the geology of Flinflon map-area (latitude $54^{\circ}45'$ to 55° , longitude $101^{\circ}45'$ to 102°).

C. O. Hage studied and mapped the geology of Gurney gold area.

R. C. McMurchy examined mineral properties in Island Lake area.

C. H. Stockwell studied and mapped the geology of Beresford Lake area (latitude $50^{\circ}35'$ to 51° , longitude $95^{\circ}30'$ to the provincial boundary).

R. T. D. Wickenden commenced the study and mapping of the geology of southwestern Manitoba.

ONTARIO

J. F. Caley studied and mapped the geology of Brantford map-area (latitude 44° to Lake Erie, longitude 80° to 81°).

H. C. Cooke commenced the study and mapping of the geology of Wanapitei map-area (latitude $46^{\circ}30'$ to $46^{\circ}45'$, longitude $80^{\circ}45'$ to 81°).

A. E. Wilson commenced the mapping of the geology of Cornwall map-area (latitude 45° to $45^{\circ}30'$, longitude 74° to 75°).

L. F. Kindle completed the study and mapping of the Ignace area (latitude 49° to 50° , longitude 90° to 91°).

QUEBEC

G. W. H. Norman completed the study and mapping of the geology of Opemisca map-area, west half (latitude $49^{\circ}45'$ to 50° , longitude $74^{\circ}45'$ to 75°).

H. H. Beach completed the study and mapping of the geology of Mechamego Lake map-area (latitude $49^{\circ}45'$ to 50° , longitude $75^{\circ}15'$ to $75^{\circ}30'$).

G. Shaw completed the study and mapping of the geology of Waconichi Lake map-area (latitude 50° to $50^{\circ}15'$, longitude 74° to $74^{\circ}15'$).

B. C. Freeman commenced the detailed study and mapping of the geology of an area in Vassan and Malartic townships.

H. C. Gunning studied and mapped the geology of an area in Bousquet and Joanne townships.

J. W. Ambrose commenced the study and mapping of the geology of Clericy map-area, west half (latitude $48^{\circ}15'$ to $48^{\circ}30'$, longitude $78^{\circ}45'$ to 79°).

NEW BRUNSWICK

F. J. Alcock commenced the study and mapping of the geology of Teta-gouche River map-area (latitude $47^{\circ}30'$ to $47^{\circ}45'$, longitude 66° to $66^{\circ}30'$), and continued the study and mapping of the geology of Bathurst map-area (latitude $47^{\circ}30'$ to $47^{\circ}45'$, longitude $65^{\circ}30'$ to 66°), Belledune map-area (latitude $47^{\circ}45'$ to 48° , longitude $65^{\circ}30'$ to 66°), and Benjamin River map-area (latitude $47^{\circ}45'$ to 48° , longitude 66° to $66^{\circ}30'$).

J. S. Stewart commenced the mapping of the geology of Sussex map-area (latitude 64°30' to 64°45', longitude 65°30' to 65°45').

B. Rose completed investigations in the Tobique district of northern New Brunswick.

NOVA SCOTIA

W. A. Bell studied and mapped the geology of the Pictou coalfield, and completed the detailed study of the Sydney coalfield.

J. C. Sproule commenced the study and mapping of the geology of Cobequid Bay map-area (latitude 45°15' to 45°30', longitude 63°30' to 64°).

PALÆONTOLOGICAL SECTION

The following presentations were made to the Geological Survey and have been added to the palæontological collections:

J. D. Cleghorn, Peter Redpath Museum, McGill University: sample of marl with freshwater shells, from Mount Royal, Quebec.

W. R. Fulton, Drumheller, Alberta: fossil seeds from the Edmonton formation, near Drumheller, Alberta.

Dr. Dorothy Hill, University of Brisbane, Australia: Silurian and Devonian corals; by exchange.

Calgary Zoological Society, Calgary, Alberta: a nearly complete skeleton of a young duck-billed dinosaur; by exchange.

MINERALOGICAL SECTION

Much of the time of the staff was given to the routine work involved in the examination of specimens, etc., but in addition various mineralogical and chemical investigations were made. During the year 6,100 specimens of minerals and rocks from various parts of Canada were examined and reported upon in the form of memoranda, and more than 3,000 specimens submitted by visitors were examined and reported on verbally.

E. Poitevin continued to co-operate in the research work on silicosis being carried on by the Ontario Department of Health.

During the year 1,686 educational sets, containing 62,953 specimens, were distributed throughout Canada as follows:

Province	Standard	Grade 2	Grade 3	Grade 4	Miscel- laneous	Prospector's	
						Minerals	Rocks
Yukon.....							
British Columbia.....	0	0	2	0	17	64	33
Alberta.....	0	2	0	0	12	17	11
Saskatchewan.....	3	1	3	0	17	95	48
Manitoba.....	0	0	2	0	7	35	10
Ontario.....	0	0	2	0	23	94	52
Quebec.....	1	0	3	1,000	19	47	29
Maritimes.....	0	0	0	0	0	12	12
Foreign.....	0	0	0	0	5	5	3
	4	3	12	1,000	100	369	198

The following presentations were made to the Geological Survey and have been added to the mineralogical collections:

E. O. Matthews, Parral, Mexico: specimens of ores and minerals from various localities in Mexico.

G. A. Reynolds, Rochester, N.Y., U.S.A.: gold ore, Avon Gold Mines, Limited, Oldham, Nova Scotia.

WATER SUPPLY AND BORINGS SECTION

The number of samples of rock cuttings from oil, gas, and water wells received was greater than in any former year, the total being 58,760. Samples from 121 wells in Alberta numbered 35,508, and were received through the courtesy of the Petroleum and Natural Gas Division, Department of Lands and Mines, Alberta. Samples from 6 wells in Saskatchewan numbered 259, and were received through the courtesy of E. Swain, Supervisor of Mines, Department of Natural Resources, Saskatchewan. Samples from 2 wells in Manitoba numbered 78, and were received through the courtesy of G. W. Cole, Director of Mines, Department of Mines and Natural Resources, Manitoba. Samples from 196 wells in Ontario numbered 21,499, and were received through the courtesy of R. B. Harkness, Natural Gas Commissioner, Department of Mines, Ontario. Samples from 9 wells in New Brunswick, numbered 1,216, and were received through the courtesy of A. Creighton, Manager, New Brunswick Gas and Oilfields, Limited, Moncton.

Through the courtesy of Canadian Industries, Limited, all cores recovered from the test hole on Thunder Hill, Saskatchewan, were received.

Records of 225 wells drilled for water in Saskatchewan were received through the courtesy of Professor F. H. Edmunds, University of Saskatchewan.

BRITISH COLUMBIA OFFICE

The use made by the public of the services offered by the British Columbia office increased over that of the preceding year. A total of 4,116 visitors seeking information registered at the office, and a large number of inquiries were handled by mail and by telephone. A total of 4,379 reports and 2,932 separate maps were distributed.

TOPOGRAPHICAL SURVEY

The duties of the Topographical Survey are: to carry out original surveys for ground and air mapping, and to prepare maps therefrom; and to compile and prepare base maps for development of the mineral and other resources.

The Topographical Survey has three main sections. The Topographical Mapping Section undertakes field surveys and office computations and compilations from ground methods. The Air Survey Section undertakes control surveys and office computations and compilations from air photographs. Maps compiled in the Topographical Mapping and Air Survey Sections are cleared to the Map Compilation Section, where they are prepared with all necessary data for transmittal to the Draughting and Reproducing Division. The Map Compilation Section also carries out the preparation from assembled material of all base maps for the Geological Survey for transmittal to the Draughting and Reproducing Division, and of preliminary geological and advance topographical maps for blue-printing and distribution.

During the year field work for ground mapping and control for mapping from the air was carried out in British Columbia, Alberta, Saskatchewan, Ontario, Quebec, and Nova Scotia, as well as in the Yukon and Northwest Territories. Sixty-one maps were transmitted to the Draughting and Reproducing Division. Seventy-two maps were prepared for preliminary editions and progress was made on 164 other maps. Investigations in physical geography and the work in connection with the Geographic Board were carried on as usual. A list of the topographical maps published may be found under Draughting and Reproducing Division, pages 39-47.

Brief reports of the work of the several sections of the Topographical Survey follow.

TOPOGRAPHICAL MAPPING

Yukon

A. C. Tuttle commenced the topographical mapping of the McQuesten sheet (115 P), latitudes 63° to 64° , longitudes 136° to 138° . Field work was by photo-topographical reconnaissance methods for publication on a scale of 1 inch to 4 miles, with 500-foot contours. Vertical and horizontal control were extended by triangulation from the Carmacks and Mayo areas. A total of 2,144 square miles of the field work was completed.

British Columbia

C. H. Smith and R. J. Parlee continued the mapping of the Tatlatui sheet (94 D), latitudes 56° to 57° , longitudes 126° to 128° , and the Nass River sheet (104 A), latitudes 56° to 57° , longitudes 126° to 128° . This work is for publication on a scale of 1 inch to 4 miles, with 500-foot contours. Field work was by photo-topographical reconnaissance methods. The triangulation control is based on the British Columbia-Alaska boundary triangulation and on existing stations in the net of the British Columbia Department of Lands. The Tatlatui sheet, and approximately 2,383 square miles of the Nass River sheet were completed.

H. A. S. West carried out the field work for the mapping of the east half of the Nelson sheet (82 F/6), latitudes $49^{\circ}15'$ to $49^{\circ}30'$, longitudes $117^{\circ}00'$ to $117^{\circ}15'$. This is for publication on a scale of 1 inch to 1 mile, with contour interval 100 feet. Photo-topographical methods, supplemented by plane-table traverses, were used. Horizontal control was extended from the Salmo area and vertical control was based on Geodetic bench marks in the area. The mapping of the area was completed.

Alberta

R. C. McDonald and K. G. Francis were engaged on the field work for the mapping of Jasper Park. A considerable part of this important area had never been mapped, and the completion of the map has been urgently requested. The work during the season was confined to the unmapped area of 730 square miles on the south side of the railway. It is planned to continue this work in 1939 with the object of preparing a complete map of the park.

J. A. Macdonald and F. P. DuVernet carried out topographical mapping in the following areas:

Cardinal River, east half (83 C/15, E. $\frac{1}{2}$), latitude $52^{\circ}45'$ to $53^{\circ}00'$, longitude $116^{\circ}30'$ to $116^{\circ}45'$.

Blackstone River, west half (83 C/9, W. $\frac{1}{2}$), latitude $52^{\circ}30'$ to $52^{\circ}45'$, longitude $116^{\circ}15'$ to $116^{\circ}30'$.

Southesk River, east half (83 C/10, E. $\frac{1}{2}$), latitude $52^{\circ}30'$ to $52^{\circ}45'$, longitude $116^{\circ}30'$ to $116^{\circ}45'$.

This work is for publication on a scale of 1 inch to 1 mile, with 100-foot contours. Plane-table traverse methods were used with ground photography where required. Horizontal control was from a triangulation net established in 1921. Vertical control was from this net together with levels along the eleventh base line north of township 40. Three hundred and twenty-three square miles were completed.

Topographical maps in hand at March 31 are as follows:

Yukon

McQuesten, 115 P.

British Columbia

Tatlatui, west half, 94 D
Nass River, east half, 104 A
Nelson, east half, 82 F/6

Alberta

Moose Mountain, 82 J/15 (west half)
 Maligne Lake sheet
 Sunwapta sheet
 Whirlpool sheet
 Southesk sheet
 Medicine Lake sheet
 Miette sheet
 Blackstone River, west half, 83 C/9
 Southesk River, east half, 83 C/10

} Jasper Park

Nova Scotia

Sydney-Glace Bay 1 mile

AIR SURVEY

FIELD WORK FOR AIR MAPPING PROJECTS

Northwest Territories

John Carroll and E. S. Fry carried out astronomical observations for latitude and longitude for control of the compilations from oblique air photography in the following map-sheet areas:

Map-sheet		Positions Established
Indin Lake.....	86 B	2
Fort Enterprise	86 A	6
Lac de Gras	76 D	2
Aylmer Lake	76 C	4
—	76 B/NW.	1
Contwoyto Lake	76 E	2

A. M. Perry carried out stadia and triangulation surveys for controlling the compilation of vertical air photography covering the following map-sheet areas:

Gordon Lake South.....	85 I/14
Gordon Lake.....	85 P/3
Muir Lake.....	85 P/6

Saskatchewan

B. H. Segre and John Carroll carried out stadia surveys for controlling compilation from vertical air photographs in the following map-sheets:

Crackingstone	74 N/7
Goldfields	74 N/8
Beaver River	74 O/5, NW. $\frac{1}{4}$
Forget Lake	74 N/9, E. $\frac{1}{4}$
Nevins Lake	74 O/12, W. $\frac{1}{4}$

Mr. Carroll also obtained control astronomical observations for latitude and longitude in each of sheets Crackingstone 74 N/7 and 74 N/10.

Ontario

W. B. Dingle carried out transit and chain surveys to control compilations from vertical air photographs in the following map-sheets:

Chalk River	31 K/3, W. $\frac{1}{2}$
Point Alexander	31 K/4, E. $\frac{1}{2}$
Stonecliffe	31 K/4, W. $\frac{1}{2}$

Quebec

W. B. Dingle carried out transit and chain surveys for controlling the compilations from vertical air photographs covering the following map-sheets:

McGillivray Lake	31 K/3, E.	$\frac{1}{2}$
Rowanton	31 K/5, E.	$\frac{1}{2}$
Sucker Lake	31 K/5, W.	$\frac{1}{2}$
Schyan Lake	31 K/6, E.	$\frac{1}{2}$
St. Patrick Lake	31 K/6, W.	$\frac{1}{2}$

H. N. Spence made transit and stadia surveys to control compilations from vertical air photographs in the following map-sheet areas:

Lac Arcand	31 I/NW., E.	$\frac{1}{2}$
St. Michel	31 I/NW., W.	$\frac{1}{2}$
Steamboat Rock Lake	31 P/3, E.	$\frac{1}{2}$
Big Eagle Lake	31 P/3, W.	$\frac{1}{2}$
Lac Brehaut	31 P/4, E.	$\frac{1}{2}$
Clear Lake	31 P/4, W.	$\frac{1}{2}$
Wickenden Lake	31 P/5, E.	$\frac{1}{2}$
Mondonak Lake	31 P/5, W.	$\frac{1}{2}$
Harper Lake	31 P/6, E.	$\frac{1}{2}$
Lac Boucher	31 P/6, W.	$\frac{1}{2}$

J. W. Spence carried out tape and transit surveys for controlling the compilations from vertical air photography in the following map-sheet areas in Gaspé:

Grosses Roches	22 B/14, E.	$\frac{1}{2}$
Ste. Félicité	22 B/14, W.	$\frac{1}{2}$
St. Vianny	22 B/11, W.	$\frac{1}{2}$
St. Denis	22 B/11, E.	$\frac{1}{2}$

Nova Scotia

S. Hunt carried out tape and transit surveys required for controlling compilations from vertical air photography in the following map-sheet areas:

Londonderry	11 E/5, E.	$\frac{1}{2}$
Bass River	11 E/5, W.	$\frac{1}{2}$
Kennetcook	11 E/4, E.	$\frac{1}{2}$
Rawdon	11 E/4, W.	$\frac{1}{2}$
Middle Musquodoboit	11 E/3, E.	$\frac{1}{2}$
Shubenacadie	11 E/3, W.	$\frac{1}{2}$

MAP COMPILATIONS FROM AIR PHOTOGRAPHY

The following is a list of manuscript maps completed during the fiscal year in the Air Survey Section and cleared to the Map Compilation Section. The name, number, compilation scale, area of sheet in square miles, and type of air photographs—oblique or vertical—employed are given in each case:

Name	Number	Oblique or Vertical	Scale	Area Square Miles
NORTHWEST TERRITORIES				
Camsell River	NE. $\frac{1}{4}$, 86 F/NE.....	Oblique.....	1 inch to 1 mile	987
	NW. $\frac{1}{4}$, 86 F/NW....	Oblique.....	1 inch to 1 mile	987
	SE. $\frac{1}{4}$, 86 F/SE.....	Oblique.....	1 inch to 1 mile	1,006
	SW. $\frac{1}{4}$, 86 F/SW....	Oblique.....	1 inch to 1 mile	1,006
Leith	NW. $\frac{1}{4}$, 86 E/NW....	Oblique.....	1 inch to 1 mile	987
	NE. $\frac{1}{4}$, 86 E/NE.....	Oblique.....	1 inch to 1 mile	987
	SE. $\frac{1}{4}$, 86 E/SE.....	Oblique.....	1 inch to 1 mile	1,006
	SW. $\frac{1}{4}$, 86 E/SW....	Oblique.....	1 inch to 1 mile	1,006

Name	Number	Oblique or Vertical	Scale	Area Square Miles
NORTHWEST TERRITORIES—Cont.				
Wecho River.....	NW. $\frac{1}{2}$, 85 O/NW....	Oblique.....	1 inch to 1 mile	1,062
	NE. $\frac{1}{2}$, 85 O/NE....	Oblique.....	1 inch to 1 mile	1,062
	SW. $\frac{1}{2}$, 85 O/SW....	Oblique.....	1 inch to 1 mile	1,081
	SE. $\frac{1}{2}$, 85 O/SE....	Oblique.....	1 inch to 1 mile	1,081
Artillery L.....	NW. $\frac{1}{2}$, 75 O/NW....	Oblique.....	1 inch to 1 mile	1,062
	SW. $\frac{1}{2}$, 75 O/SW....	Oblique.....	1 inch to 1 mile	1,081
	SE. $\frac{1}{2}$, 75 O/SE....	Oblique.....	1 inch to 1 mile	1,081
	NE. $\frac{1}{2}$, 75 O/NE....	Oblique.....	1 inch to 1 mile	1,062
Hanbury.....	NW. $\frac{1}{2}$, 75 P/NW....	Oblique.....	1 inch to 1 mile	1,062
	NE. $\frac{1}{2}$, 75 P/NE....	Oblique.....	1 inch to 1 mile	1,062
	SW. $\frac{1}{2}$, 75 P/SW....	Oblique.....	1 inch to 1 mile	1,081
	SE. $\frac{1}{2}$, 75 P/SE....	Oblique.....	1 inch to 1 mile	1,081
Gordon Lake South...	85 I/14.....	Vertical.....	1 inch to $\frac{1}{2}$ mile	274
SASKATCHEWAN				
Crackingstone.....	74 N/7.....	Vertical.....	1 inch to $\frac{1}{2}$ mile	170
Goldfields.....	74 N/8.....	Vertical.....	1 inch to $\frac{1}{2}$ mile	80
Beaver River.....	74 O/5, NW. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	55
SASKATCHEWAN AND MANITOBA				
Flinflon.....	63 K/13, W. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	177
Schist Lake.....	63 K/12, W. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	175
MANITOBA				
Mikanagan Lake.....	63 K/13, E. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	177
Beresford Lake.....	52 L/14 (part)....	Vertical.....	1 inch to $\frac{1}{2}$ mile	170
Gurney Gold Mines, part.....	63 K/11, 63 K/14...	Vertical.....	1 inch to 1,200 feet	50
ONTARIO				
Windigo Lake.....	53 B, E. $\frac{1}{2}$	Oblique.....	1 inch to 1 mile	2,918
North Caribou Lake...	53 B, W. $\frac{1}{2}$	Oblique.....	1 inch to 1 mile	2,918
Capreol.....	41 I/NE., W. $\frac{1}{2}$	Vertical.....	1 inch to 1 mile	820
Gull Lake.....	41 I/NE., E. $\frac{1}{2}$	Vertical.....	1 inch to 1 mile	820
Verner.....	41 I/SE., E. $\frac{1}{2}$	Vertical.....	1 inch to 1 mile	827
Stokely Creek.....	41 K/16, W. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	205
QUEBEC				
Mishagamish Lake...	32 K, E. $\frac{1}{2}$	Oblique.....	1 inch to 1 mile	3,047
Soskumika.....	32 K, W. $\frac{1}{2}$	Oblique.....	1 inch to 1 mile	3,047
Lac Assinica.....	32 J, W. $\frac{1}{2}$	Oblique.....	1 inch to 1 mile	3,047
Brook River.....	32 J, E. $\frac{1}{2}$	Oblique.....	1 inch to 1 mile	3,047
Lac Charette.....	32 C/NE., E. $\frac{1}{2}$	Vertical.....	1 inch to 1 mile	789
Cuvillier.....	32 C/NE., W. $\frac{1}{2}$	Vertical.....	1 inch to 1 mile	789
Grosses Roches.....	22 B/14, E. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	125
St. Félicité.....	22 B/14, W. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	175
St. Denis.....	22 B/11, E. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	198
St. Vianny.....	22 B/11, W. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	198
Joliette (part revised)..	31 I/SW., E. $\frac{1}{2}$	Vertical.....	1 inch to 1 mile	135
Rawdon (part revised)..	31 I/SW., W. $\frac{1}{2}$	Vertical.....	1 inch to 1 mile	135
Mistawak Lake				
Block G.....	32 E/8, E. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	195
" M.....	32 E/11, W. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	194
" N.....	32 E/11 E. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	194
" O.....	32 E/10, W. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	194
" P.....	32 E/10, E. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	194
" Q.....	32 E/9, W. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	194
" R.....	32 E/9, E. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	194
NOVA SCOTIA				
Londonderry.....	11 E/5, E. $\frac{1}{2}$	Vertical.....	1 inch to $\frac{1}{2}$ mile	210

ALBERTA AND BRITISH COLUMBIA

Strips of vertical air photographs of about 100 miles in length, covering valley routes in map-sheets 94 D, 104 A, 104 H, and 83 C, were compiled at a scale of approximately 1 inch to 2,000 feet, to supplement phototopographic surveys in these areas.

Following is a list of compilations being made from air photographs, which at the end of the fiscal year had not been completed.

Name	Number	Oblique or Vertical	Scale	Area Square Miles	Est. p.c. Completed
NORTHWEST TERRITORIES					
Carp Lakes.....	NW. $\frac{1}{4}$, 85 P/NW.	Oblique....	1 inch to 1 mile	1,062	30
	SW. $\frac{1}{4}$, 85 P/SW.	Oblique....	1 inch to 1 mile	1,082	0
	NE. $\frac{1}{4}$, 85 P/NE.	Oblique....	1 inch to 1 mile	1,062	5
	SE. $\frac{1}{4}$, 85 P/SE.	Oblique....	1 inch to 1 mile	1,082	0
McKay Lake.....	NW. $\frac{1}{4}$, 75 M/NW.	Oblique....	1 inch to 1 mile	1,062	95
	SW. $\frac{1}{4}$, 75 M/SW.	Oblique....	1 inch to 1 mile	1,082	0
	NE. $\frac{1}{4}$, 75 M/NE.	Oblique....	1 inch to 1 mile	1,062	90
	SE. $\frac{1}{4}$, 75 M/SE.	Oblique....	1 inch to 1 mile	1,082	90
Aylmer Lake.....	NW. $\frac{1}{4}$, 76 C/NW.	Oblique....	1 inch to 1 mile	1,025	0
	SW. $\frac{1}{4}$, 76 C/SW.	Oblique....	1 inch to 1 mile	1,044	5
	NE. $\frac{1}{4}$, 76 C/NE.	Oblique....	1 inch to 1 mile	1,025	0
	SE. $\frac{1}{4}$, 76 C/SE.	Oblique....	1 inch to 1 mile	1,044	5
Lac de Gras.....	NW. $\frac{1}{4}$, 76 D/NW.	Oblique....	1 inch to 1 mile	1,025	0
	SW. $\frac{1}{4}$, 76 D/SW.	Oblique....	1 inch to 1 mile	1,044	3
	NE. $\frac{1}{4}$, 76 D/NE.	Oblique....	1 inch to 1 mile	1,025	0
	SE. $\frac{1}{4}$, 76 D/SE.	Oblique....	1 inch to 1 mile	1,044	3
Fort Enterprise....	NW. $\frac{1}{4}$, 86 A/NW.	Oblique....	1 inch to 1 mile	1,025	0
	SW. $\frac{1}{4}$, 86 A/SW.	Oblique....	1 inch to 1 mile	1,044	40
	NE. $\frac{1}{4}$, 86 A/NE.	Oblique....	1 inch to 1 mile	1,025	0
	SE. $\frac{1}{4}$, 86 A/SE.	Oblique....	1 inch to 1 mile	1,044	3
Red Rock Lake....	NW. $\frac{1}{4}$, 86 G/NW.	Oblique....	1 inch to 1 mile	987	90
	SW. $\frac{1}{4}$, 86 G/SW.	Oblique....	1 inch to 1 mile	1,006	90
Resolution.....	NW. $\frac{1}{4}$, 85 H/NW.	Oblique....	1 inch to 1 mile	1,137	90
	SW. $\frac{1}{4}$, 85 H/SW.	Oblique....	1 inch to 1 mile	1,155	90
	NE. $\frac{1}{4}$, 85 H/NE.	Oblique....	1 inch to 1 mile	1,137	90
	SE. $\frac{1}{4}$, 85 H/SE.	Oblique....	1 inch to 1 mile	1,155	90
Hill Island Lake....	NW. $\frac{1}{4}$, 75 C/NW.	Oblique....	1 inch to 1 mile	1,173	3
	SW. $\frac{1}{4}$, 75 C/SW.	Oblique....	1 inch to 1 mile	1,191	3
	NE. $\frac{1}{4}$, 75 C/NE.	Oblique....	1 inch to 1 mile	1,173	0
	SE. $\frac{1}{4}$, 75 C/SE.	Oblique....	1 inch to 1 mile	1,191	3
Indin Lake.....	NE. $\frac{1}{4}$, 86 B/NE.	Oblique....	1 inch to 1 mile	1,025	5
	NW. $\frac{1}{4}$, 86 B/NW.	Oblique....	1 inch to 1 mile	1,025	90
	SE. $\frac{1}{4}$, 86 B/SE.	Oblique....	1 inch to 1 mile	1,044	90
	SW. $\frac{1}{4}$, 86 B/SW.	Oblique....	1 inch to 1 mile	1,044	90
Gordon Lake.....	85 P/3.....	Vertical....	1 inch to $\frac{1}{2}$ mile	271	96
Muir Lake.....	85 P/6.....	Vertical....	1 inch to $\frac{1}{2}$ mile	269	75
SASKATCHEWAN					
Forget Lake.....	74 N/9, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	147	96
Nevins Lake.....	74 O/12, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	147	96
MANITOBA					
Manigotagan Lake, parts	52 L/13 and 52 M/4	Vertical....	1 inch to $\frac{1}{2}$ mile	100	50
ONTARIO					
Fort Hope.....	42 M, W. $\frac{1}{2}$	Oblique....	1 inch to 1 mile	2,983	10
Martin Falls.....	42 M, E. $\frac{1}{2}$	Oblique....	1 inch to 1 mile	2,983	10
Burwash.....	41 I/SE, W. $\frac{1}{2}$	Vertical....	1 inch to 1 mile	820	(revision)
Searchmont.....	41 K/16, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	200	75
Batchawana Bay...	41 K/15, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	70	85

Name	Number	Oblique or Vertical	Scale	Area Square Miles	Est. p.c. Com- pleted
ONTARIO AND QUEBEC					
Chalk River.....	31 K/3, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	207	65
Port Alexander.....	31 K/4, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	207	55
Stonecliffe.....	31 K/4, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	207	55
QUEBEC					
Lac Arcand.....	31 I/NW., E. $\frac{1}{2}$	Vertical....	1 inch to 1 mile	820	65
St. Michel.....	31 I/NW., W. $\frac{1}{2}$	Vertical....	1 inch to 1 mile	820	70
Steamboat Rock Lake.....	31 P/3, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	204	20
Big Eagle Lake.....	31 P/3, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	204	20
Lac Brehaut.....	31 P/4, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	204	25
Clear Lake.....	31 P/4, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	204	25
Wickenden Lake.....	31 P/5, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	203	25
Mondonak Lake.....	31 P/5, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	203	25
Harper Lake.....	31 P/6, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	203	20
Lac Boucher.....	31 P/6, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	203	20
McGillivray Lake.....	31 K/3, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	207	90
Rowanton.....	31 K/5, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	206	25
Sucker Lake.....	31 K/5, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	206	25
Schyan Lake.....	31 K/6, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	206	25
St. Patrick Lake.....	31 K/6, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	206	25
Causapsca.....	22 B/6, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	199	10
St. Benoit.....	22 B/6, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	199	10
St. Alexis.....	22 B/3, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	200	5
Meadowbrook.....	22 B/3, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	200	5
NOVA SCOTIA					
Bass River.....	11 E/5, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	130	95
Kennetcook.....	11 E/4, E. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	211	5
Rawdon.....	11 E/4, W. $\frac{1}{2}$	Vertical....	1 inch to $\frac{1}{2}$ mile	211	5

Miscellaneous Work

Technical instructions for fourteen air photographic operations for mapping purposes were prepared, together with flight maps for use in the aircraft. These were transmitted to the Royal Canadian Air Force through the Interdepartmental Committee on Air Surveys and Base Maps for the season of 1938 work. The instructions called for vertical air photography over areas aggregating 20,285 square miles, and for oblique air photography over areas totalling 26,228 square miles. Vertical air photographs of a total area of 12,400 square miles were indexed on maps. Strip plots on linen were made of about 1,200 lineal miles of flight, and copies were supplied to the Royal Canadian Air Force to assist in photographing gap areas. Compilations from vertical air photographs were made of about 800 square miles for field use and for flight maps.

Preparatory work for the 1939 air photographic program involved the compilation of the following reconnaissance maps:

	Scale
Coppermine-Back River, N.W.T.	1 inch to 8 miles
Hanbury-Back River, N.W.T.	1 inch to 8 miles
Reindeer Reserve, N.W.T.	1 inch to 8 miles
Hay River, N.W.T.	1 inch to 4 miles
Rupert River, Quebec.	1 inch to 6 miles

Forty additional grids for graphically rectifying oblique air photographs were constructed.

The Section co-operated with the R.C.A.F. in instructional work in air mapping methods for the training of new personnel and, to a limited extent, gave similar service to others.

The staff of the Air Survey Section totalled twenty-eight, two of whom were on loan part time to the Bureau of Northwest Territories and Yukon Affairs and to the Federal District Commission.

MAP COMPILATION

Manuscript Maps Completed and Transmitted to the Draughting and Reproducing Division

No.	Name	Sheet No.	Publication Scale
BRITISH COLUMBIA			
1	Keithley Creek.....	93 A/14, W. $\frac{1}{2}$	1 inch to 1 mile
2	Little River.....	93 A/14, E. $\frac{1}{2}$	1 inch to 1 mile
3	Tyaughton Lake.....	Parts of 92 J/14 and 15 and 92 O/2 and 3.....	1 inch to 1 mile
ALBERTA			
4	Bragg Creek.....	82 J/15, E. $\frac{1}{2}$	1 inch to 1 mile
5	Dunmore.....	72 E, E. $\frac{1}{2}$ and part 72 L, E. $\frac{1}{2}$	1 inch to 4 miles
6	Edmonton.....	83 H/W. $\frac{1}{2}$	1 inch to 4 miles
7	Foremost.....	72 E, W. $\frac{1}{2}$ and part 72 L/W. $\frac{1}{2}$	1 inch to 4 miles
8	Hardisty.....	73 D/W. $\frac{1}{2}$	1 inch to 4 miles
9	Morley.....	82 O/2, W. $\frac{1}{2}$ and part 82 O/3.....	1 inch to 1 mile
10	Pekisko Creek.....	82 J/8, W. $\frac{1}{2}$	1 inch to 1 mile
11	Red Deer.....	83 A/W. $\frac{1}{2}$	1 inch to 4 miles
12	Ribstone Creek.....	73 D/E. $\frac{1}{2}$	1 inch to 4 miles
13	Stettler.....	83 A/E. $\frac{1}{2}$	1 inch to 4 miles
14	Stimson Creek.....	82 J/8, E. $\frac{1}{2}$	1 inch to 1 mile
15	Taber.....	82 H/E. $\frac{1}{2}$	1 inch to 4 miles
16	Tofield.....	83 H/E. $\frac{1}{2}$	1 inch to 4 miles
MANITOBA			
17	Gurney Gold Mines.....	Part of 63 K/11 and 14....	1 inch to 1,500 feet
18	Halfway Lake— Beresford Lake, Sheet 1.....	Part 52 L/14.....	1 inch to 1,000 feet
19	Beresford Lake, Sheet 2.....	Part 52 L/14.....	1 inch to 1,000 feet
20	Beresford Lake, Sheet 3.....	Part 52 L/14.....	1 inch to 1,000 feet
ONTARIO			
21	Casselman.....	31 G/SW., E. $\frac{1}{2}$	1 inch to 2 miles
22	McInnes Lake.....	53 C/W. $\frac{1}{2}$	1 inch to 4 miles
23	North Spirit Lake.....	53 C/E. $\frac{1}{2}$	1 inch to 4 miles
24	Nepean.....	31 G/SW., W. $\frac{1}{2}$	1 inch to 2 miles
25	Watcomb.....	52 G/W. $\frac{1}{2}$	1 inch to 4 miles
QUEBEC			
26	Bousquet, E. $\frac{1}{2}$	Part of 32 D/1, 2, 7, and 8	1 inch to 1,500 feet
27	Bousquet, W. $\frac{1}{2}$	Part of 32 D/2 and 7.....	1 inch to 1,500 feet
28	Gale River.....	32 E/SE., E. $\frac{1}{2}$	1 inch to 2 miles
29	Joliette.....	31 I/SW., E. $\frac{1}{2}$	1 inch to 2 miles
30	Landrienne, E. $\frac{1}{2}$	32 C/NW., E. $\frac{1}{2}$	1 inch to 2 miles
31	Landrienne, W. $\frac{1}{2}$	32 C/NW., W. $\frac{1}{2}$	1 inch to 2 miles
32	Michwacho Lake.....	32 G/14, E. $\frac{1}{2}$	1 inch to 1 mile

*Manuscript Maps Completed and Transmitted to the Draughting and
Reproducing Division—Concluded*

No.	Name	Sheet No.	Publication Scale
QUEBEC—Concluded			
33	Mistawak Lake.....	32 E/SE., W. $\frac{1}{2}$	1 inch to 2 miles
34	Mechamego Lake.....	32 G/14, W. $\frac{1}{2}$	1 inch to 1 mile
35	Opemisca, W. $\frac{1}{2}$	32 G/15, W. $\frac{1}{2}$	1 inch to 1 mile
36	Rawdon.....	31 I/SW., W. $\frac{1}{2}$	1 inch to 2 miles
37	Rochebaucourt.....	32 C/11, W. $\frac{1}{2}$	1 inch to 1 mile
38	Waconichi.....	32 J/1, E. $\frac{1}{2}$	1 inch to 1 mile
NEW BRUNSWICK			
39	Canoose River.....	21 G/6, W. $\frac{1}{2}$	1 inch to 1 mile
40	Rolling Dam.....	21 G/6, E. $\frac{1}{2}$	1 inch to 1 mile
41	St. Andrews.....	21 G/3, E. $\frac{1}{2}$	1 inch to 1 mile
42	St. Stephen.....	21 G/3, W. $\frac{1}{2}$	1 inch to 1 mile
NOVA SCOTIA			
43	Ecum Secum.....	11 D/16, E. $\frac{1}{2}$	1 inch to 1 mile
44	Hopewell.....	11 E/7, E. $\frac{1}{2}$	1 inch to 1 mile
45	Liscombe.....	11 E/1, E. $\frac{1}{2}$	1 inch to 1 mile
46	Lake Mulgrave.....	11 E/2, E. $\frac{1}{2}$	1 inch to 1 mile
47	Lochaber.....	11 E/8, E. $\frac{1}{2}$	1 inch to 1 mile
48	Melopsketch.....	11 E/1, W. $\frac{1}{2}$	1 inch to 1 mile
49	Moose River.....	11 E/8, W. $\frac{1}{2}$	1 inch to 1 mile
50	Owls Head.....	11 D/10, W. $\frac{1}{2}$	1 inch to 1 mile
51	Port Dufferin.....	11 D/16, W. $\frac{1}{2}$	1 inch to 1 mile
52	Sherbrooke Lake.....	21 A/10, E. $\frac{1}{2}$	1 inch to 1 mile
53	Springfield.....	21 A/10, W. $\frac{1}{2}$	1 inch to 1 mile
54	Ship Harbour.....	11 D/15, W. $\frac{1}{2}$	1 inch to 1 mile
55	Tangier.....	11 D/15, E. $\frac{1}{2}$	1 inch to 1 mile
56	Upper Musquodoboit.....	11 E/2, W. $\frac{1}{2}$	1 inch to 1 mile
57	West River.....	11 E/7, W. $\frac{1}{2}$	1 inch to 1 mile
NORTHWEST TERRITORIES			
58	Nonacho Lake.....	75 F.....	1 inch to 4 miles
59	Prosperous Lake.....	85 J/9.....	1 inch to 1 mile
60	Quyta Lake.....	85 J/16.....	1 inch to 1 mile
61	Yellowknife Bay.....	85 J/8.....	1 inch to 1 mile

Preliminary Geological and Topographical Maps Prepared

BRITISH COLUMBIA			
1	Big Bend.....	Parts of 83 M and N.....	1 inch to 4 miles
2	Keithley Creek, E. $\frac{1}{2}$	93 A/14, E. $\frac{1}{2}$	1 inch to 1 mile
3	Keithley Creek, W. $\frac{1}{2}$	93 A/14, W. $\frac{1}{2}$	1 inch to 1 mile
4	Mineral Occurrences, Fort Fraser, E. $\frac{1}{2}$	93 K/E. $\frac{1}{2}$	1 inch to 2 miles
5	Nelson, E. $\frac{1}{2}$ (Geol.).....	82 F/E. $\frac{1}{2}$	1 inch to 2 miles
6	Nelson, E. $\frac{1}{2}$ (Topo.).....	82 F/E. $\frac{1}{2}$	1 inch to 4 miles
7	Tatlatui, E. $\frac{1}{2}$	94 D/E. $\frac{1}{2}$	1 inch to 4 miles
8	Tyaughton Lake.....	Parts of 92 J/14 and 15 and 92 O/2 and 3.....	1 inch to 1 mile

Preliminary Geological and Topographical Maps Prepared—Continued

No.	Name	Sheet No.	Publication Scale
ALBERTA			
Cross-section of Turner Valley structure			
9	(A-A, B-B, C-C).....		1 inch to 1,000 feet
10	(A-A, B-B, C-C) (revised).....		1 inch to 1,000 feet
11	(D-D, E-E, F-F).....		1 inch to 1,000 feet
12	(D-D, E-E, F-F) (revised).....		1 inch to 1,000 feet
13	(G-G, H-H).....		1 inch to 1,000 feet
14	(G-G, H-H) (revised).....		1 inch to 1,000 feet
15	(J-J, K-K).....		1 inch to 1,000 feet
16	(L-L, M-M).....		1 inch to 1,000 feet
17	Fallentimber.....	82 O/10.....	1 inch to $\frac{1}{2}$ mile
18	North Half of Turner Valley.....	Parts of 82 J/9, 10, 15, and 16.....	1 inch to 1,320 feet
19	South Half of Turner Valley, Map A.....	Parts of 82 J/7, 8, 9, and 10.....	1 inch to 1,320 feet
20	South Half of Turner Valley, Map B.....	Parts of 82 J/7, 8, 9, and 10.....	1 inch to 1,320 feet
21	Turner Valley, Fig. 1.....		
22	Turner Valley, Fig. 2.....	Parts of 82 J/7, 8, 9, and 10.....	1 inch to 1,320 feet
23	Turner Valley, Fig. 3.....	Parts of 82 J/7, 8, 9, and 10.....	1 inch to 1,320 feet
24	Turner Valley, Fig. 4.....		1 inch to 440 feet
25	Turner Valley, Fig. 5.....		1 inch to 440 feet
26	Turner Valley, Fig. 6.....		1 inch to 440 feet
SASKATCHEWAN			
27	Goldfields.....	74 N/8.....	1 inch to 1 mile
28	Oliver Lake.....	64 D/W. $\frac{1}{2}$	1 inch to 2 miles
29	Wapus Lake.....	64 D/E. $\frac{1}{2}$	1 inch to 2 miles
ONTARIO			
30	Burwash.....	41 I/SE., W. $\frac{1}{2}$	1 inch to 2 miles
31	Capreol.....	41 I/NE., W. $\frac{1}{2}$	1 inch to 2 miles
32	Gull Lake.....	41 I/NE., E. $\frac{1}{2}$	1 inch to 2 miles
33	Verner.....	41 I/SE., E. $\frac{1}{2}$	1 inch to 2 miles
QUEBEC			
34	Duvernay, E. $\frac{1}{2}$	32 C/12, E. $\frac{1}{2}$	1 inch to $\frac{1}{2}$ mile
35	Duvernay, W. $\frac{1}{2}$	32 C/12, W. $\frac{1}{2}$	1 inch to $\frac{1}{2}$ mile
36	Mistawak, E. $\frac{1}{2}$	32 E/SE., E. $\frac{1}{2}$	1 inch to 1 mile
37	Mistawak, W. $\frac{1}{2}$	32 E/SE., W. $\frac{1}{2}$	1 inch to 1 mile
38	Montgay, W. $\frac{1}{2}$	32 C/11, W. $\frac{1}{2}$	1 inch to $\frac{1}{2}$ mile
39	North Half Bousquet Township.....	Parts of 32D/7 and 8.....	1 inch to 1,500 feet
40	Opawica, E. $\frac{1}{2}$	32 G/12, E. $\frac{1}{2}$	1 inch to $\frac{1}{2}$ mile
41	Opawica, W. $\frac{1}{2}$	32 G/12, W. $\frac{1}{2}$	1 inch to $\frac{1}{2}$ mile
42	Opémisca, W. $\frac{1}{2}$	32 G/15, W. $\frac{1}{2}$	1 inch to $\frac{1}{2}$ mile
NOVA SCOTIA			
43	Guysborough County.....	Parts of 11 F/3, 4, 5, and 6.....	1 inch to 1 mile
YUKON TERRITORY			
44	Mayo.....	105 M.....	1 inch to 4 miles

Preliminary Geological and Topographical Maps Prepared—Concluded

No.	Name	Sheet No.	Publication Scale
NORTHWEST TERRITORIES			
45	Artillery Lake, NE.....	75 O/NE.....	1 inch to 2 miles
46	Artillery Lake, SE.....	75 O/SE.....	1 inch to 2 miles
47	Artillery Lake, NW.....	75 O/NW.....	1 inch to 2 miles
48	Artillery Lake, SW.....	75 O/SW.....	1 inch to 2 miles
49	Beaulieu.....	85 I.....	1 inch to 2 miles
50	Hanbury, NE.....	75 P/NE.....	1 inch to 2 miles
51	Hanbury, SE.....	75 P/SE.....	1 inch to 2 miles
52	Hanbury, NW.....	75 P/NW.....	1 inch to 2 miles
53	Hanbury, SW.....	75 P/SW.....	1 inch to 2 miles
54	Hardisty Lake, NE.....	86 C/NE.....	1 inch to 2 miles
55	Hardisty Lake, SE.....	86 C/SE.....	1 inch to 2 miles
56	Hardisty Lake, NW.....	86 C/NW.....	1 inch to 2 miles
57	Hardisty Lake, SW.....	86 C/SW.....	1 inch to 2 miles
58	Leith, NE.....	86 E/NE.....	1 inch to 2 miles
59	Leith, SE.....	86 E/SE.....	1 inch to 2 miles
60	Leith, NW.....	86 E/NW.....	1 inch to 2 miles
61	Leith, SW.....	86 E/SW.....	1 inch to 2 miles
62	Marian River, NE.....	85 N/NE.....	1 inch to 2 miles
63	Marian River, SE.....	85 N/SE.....	1 inch to 2 miles
64	Marian River, NW.....	85 N/NW.....	1 inch to 2 miles
65	Marian River, SW.....	85 N/SW.....	1 inch to 2 miles
66	Prosperous Lake.....	85 J/9.....	1 inch to $\frac{1}{2}$ mile
67	Parts of Con, P. and G., and Negus Groups, Yellowknife Bay.....	Part of 85 J/8.....	1 inch to 200 feet
68	Walmsley Lake, NE.....	75 N/NE.....	1 inch to 2 miles
69	Walmsley Lake, SE.....	75 N/SE.....	1 inch to 2 miles
70	Walmsley Lake, NW.....	75 N/NW.....	1 inch to 2 miles
71	Walmsley Lake, SW.....	75 N/SW.....	1 inch to 2 miles
72	Yellowknife Bay.....	85 J/8.....	1 inch to $\frac{1}{2}$ mile

Base Maps in Varying Stages of Progress

BRITISH COLUMBIA			
1	Big Bend.....	Parts of 82 M and N.....	1 inch to 4 miles
2	Hudson Bay Mountain.....	Part 93 L/13.....	1 inch to 1 mile
3	McConnell Creek.....	94 D/E. $\frac{1}{2}$	1 inch to 4 miles
4	Spanish Creek.....	93 A/11.....	1 inch to 1 mile
ALBERTA			
5	Black Diamond.....	92 J/9, E. $\frac{1}{2}$	1 inch to 1 mile
6	Grave Flats.....	83 C/15, W. $\frac{1}{2}$	1 inch to 1 mile
7	Midnapore.....	82 J/16, E. $\frac{1}{2}$	1 inch to 1 mile
8	Priddis.....	82 J/16, W. $\frac{1}{2}$	1 inch to 1 mile
9	Pembina Forks.....	83 C/15, E. $\frac{1}{2}$	1 inch to 1 mile
10	Turner Valley.....	83 J/9, W. $\frac{1}{2}$	1 inch to 1 mile
SASKATCHEWAN			
11	Beaver River.....	74 O/5 (NW. $\frac{1}{2}$).....	1 inch to 1 mile
12	Crackingstone.....	74 N/7.....	1 inch to 1 mile
13	Etomami River.....	63 D/E. $\frac{1}{2}$	1 inch to 4 miles
14	Goldfields.....	74 N/8.....	1 inch to 1 mile
15	Mackay Lake.....	73 P/7, W. $\frac{1}{2}$	1 inch to 1 mile
16	Reindeer Lake.....	64 E/E. $\frac{1}{2}$	1 inch to 4 miles
17	Spalding Lake.....	64 E/W. $\frac{1}{2}$	1 inch to 4 miles
18	Upper Clearwater R.....	74 F/E. $\frac{1}{2}$	1 inch to 4 miles

Base Maps in Varying Stages of Progress—Continued

No.	Name	Sheet No.	Publication Scale
MANITOBA			
19	Beresford Lake, Sheet 1.....	Parts of 52 L/14, and 52 M/3	1 inch to 1 mile
20	Beresford Lake, Sheet 2.....	Parts of 52 L/11, and 52 L/14.....	1 inch to 1 mile
MANITOBA AND SASKATCHEWAN			
21	Flinflon.....	63 K/13 (W. $\frac{1}{2}$).....	1 inch to 1 mile
22	Schist Lake.....	63 K/12, W. $\frac{1}{2}$	1 inch to 1 mile
23	Swan River.....	63 C/W. $\frac{1}{2}$	1 inch to 4 miles
ONTARIO			
24	Burwash.....	41 I/SE., W. $\frac{1}{2}$	1 inch to 2 miles
25	Capreol.....	41 I/NE., W. $\frac{1}{2}$	1 inch to 2 miles
26	Dunville.....	30 L/13.....	
27	Fort Erie.....	Parts 30 L/15 and 30 M/2..	
28	Grimsby.....	30 M/4.....	
29	Gull Lake.....	41 I/NE., E. $\frac{1}{2}$	1 inch to 2 miles
30	Kitchener.....	40 P/E. $\frac{1}{2}$	1 inch to 4 miles
31	North Caribou Lake.....	53 B/W. $\frac{1}{2}$	1 inch to 4 miles
32	Niagara.....	30 M/3.....	
33	Port Dover.....	40 I/E. $\frac{1}{2}$	1 inch to 4 miles
34	Stokely Creek.....	41 K/16, W. $\frac{1}{2}$	1 inch to 1 mile
35	Toronto-Hamilton.....	30 M/W. $\frac{1}{2}$ and part 30 L/W. $\frac{1}{2}$	1 inch to 4 miles
36	Verner.....	41 I/SE., E. $\frac{1}{2}$	1 inch to 2 miles
37	Welland.....	30 L/14.....	
38	Windigo Lake.....	53 B/E. $\frac{1}{2}$	1 inch to 4 miles
QUEBEC			
39	Assinica Lake.....	32 J/W. $\frac{1}{2}$	1 inch to 4 miles
40	Brock River.....	32 J/E. $\frac{1}{2}$	1 inch to 4 miles
41	Lac Charette.....	32 C/NE., E. $\frac{1}{2}$	1 inch to 2 miles
42	Cuvillier.....	32 C/NE., W. $\frac{1}{2}$	1 inch to 2 miles
43	Clericy.....	32 D/7, W. $\frac{1}{2}$	1 inch to 1 mile
44	Joannes, E. $\frac{1}{2}$	Parts of 32 D/2 and 7.....	1 inch to 1,500 feet
45	Joannes, W. $\frac{1}{2}$	Parts of 32 D/2 and 7.....	1 inch to 1,500 feet
46	Mishagamish Lake.....	32 K/E. $\frac{1}{2}$	1 inch to 4 miles
47	Noranda, Sheet 1.....	Parts of 32 D/2 and 3.....	1 inch to 1,500 feet
48	Noranda, Sheet 2.....	Part 32 D/3.....	1 inch to 1,500 feet
49	Noranda, Sheet 3.....	Parts of 32 D/3 and 6.....	1 inch to 1,500 feet
50	Noranda, Sheet 4.....	Parts of 32 D/2, 3, 6, and 7.....	1 inch to 1,500 feet
51	Quebec 16 mile.....		1 inch to 16 miles
52	Sisacoe.....	Parts 32 C/4 and 32 D/1.....	1 inch to 1,500 feet
53	Soskumika Lake.....	32 K/W. $\frac{1}{2}$	1 inch to 4 miles
NEW BRUNSWICK			
54	Albert.....	21 H/10, E. $\frac{1}{2}$	1 inch to 1 mile
55	Alma.....	21 H/10, W. $\frac{1}{2}$	1 inch to 1 mile
56	New Brunswick 8 mile.....		1 inch to 8 miles
57	St. John.....	Parts of 21 G, 1 and 8.....	1 inch to 1 mile
NOVA SCOTIA			
58	New Glasgow.....	Part of 11 E/10.....	1 inch to 1 mile

Base Maps in Varying Stages of Progress—Concluded

No.	Name	Sheet No.	Publication Scale
YUKON			
59	Mayo.....	105 M.....	1 inch to 4 miles
NORTHWEST TERRITORIES			
60	Artillery Lake.....	75 O.....	1 inch to 4 miles
61	Camsell River.....	86 F.....	1 inch to 4 miles
62	Gordon Lake South.....	85 I/14.....	1 inch to 1 mile
63	Hanbury.....	75 P.....	1 inch to 4 miles
64	Hardisty Lake.....	86 C.....	1 inch to 4 miles
65	Leith.....	86 E.....	1 inch to 4 miles
66	Marian River.....	85 N.....	1 inch to 4 miles
67	South Nahanni River.....	Part of 95 L/3 and 4.....	1 inch to 1 mile
68	Walmsley Lake.....	75 N.....	1 inch to 4 miles
69	Wecho River.....	85 O.....	1 inch to 4 miles

Preliminary Geological and Topographical Maps in Varying Stages of Progress

ALBERTA			
1	Grave Flats.....	83 C/15, W. $\frac{1}{2}$	1 inch to 1 mile
2	Pembina Forks.....	82 C/15, E. $\frac{1}{2}$	1 inch to 1 mile
3	Pekisko Hills Area.....	Part of 82 J/8.....	1 inch to 1,320 feet
SASKATCHEWAN			
4	Crackingstone, Map A.....	74 N/7, E. $\frac{1}{2}$	1 inch to 1 mile
5	Crackingstone, Map B.....	74 N/7, W. $\frac{1}{2}$	1 inch to 1 mile
6	Nevins Lake, Map B.....	Part of 74 O/5.....	1 inch to 1 mile
7	MacKay Lake.....	Part of 73 P/7, W. $\frac{1}{2}$	1 inch to $\frac{1}{2}$ mile
NORTHWEST TERRITORIES			
8	Camsell River, NE.....	86 F/NE.....	1 inch to 2 miles
9	Camsell River, NW.....	86 F/NW.....	1 inch to 2 miles
10	Camsell River, SE.....	86 F/SE.....	1 inch to 2 miles
11	Camsell River, SW.....	86 F/SW.....	1 inch to 2 miles
12	Gordon Lake South.....	85 I/14.....	1 inch to 1 mile

The Section prepared all map projections for the Topographical Mapping and the Air Survey Sections. These were as follows:

Compilation Section.....	92
Topographical Mapping Section.....	10
Air Survey Section.....	72
Total.....	174

The Compilation Section also prepared tracings of seventy map compilations for use of the Geological Survey and for the general use of the mineral industry.

PHYSICAL GEOGRAPHY

D. A. Nichols again joined the *Nascopie* on her annual trip to the Eastern Arctic. Field work consisted of reconnaissance studies in the vicinity of Lake Harbour, southern Baffin Island. The terrain was examined for about 25 miles on each side of Lake Harbour and for about 15 miles up Soper River. The relationship of the rocks to the topographic forms was studied, and further attention was given to the raised beaches examined in previous seasons. Geological and mineralogical specimens were collected, among which was the first reputed occurrence of lapis lazuli in Canada. This was found about 12 miles up Soper River in a belt of crystalline limestone, several bands of which occur in the vicinity. On the return of the *Nascopie* to Lake Harbour, he rejoined the boat and his work of previous seasons in the examination of the ports of call was extended.

During the winter the assembly of a large relief map of Canada was completed. The model is built in exact proportion to the actual curvature of the earth. The horizontal scale is 1 inch to 23.7 miles, and the vertical scale is exaggerated fifteen times. Oceanic depths and the subaerial relief are shown. The map will remain as a permanent exhibit in the rotunda of the Museum and will be of great assistance to students and teachers as well as an attraction to casual visitors.

Other office work comprised the providing of data for the usual requests for physiographic information, and the preparation of a report on the physical features of the Eastern Arctic.

GEOGRAPHIC BOARD OF CANADA

The Geographic Board of Canada was created by Order in Council of December 18, 1897. The order directs that all questions concerning geographical names in the Dominion that arise in the departments of the public service shall be referred to the Board, and that all departments shall accept and use in their publications the names and orthography adopted by the Board.

By Order in Council of December 14, 1899, each province was invited to appoint a representative on the Board; all provinces are now represented. All names are submitted to the provincial representatives concerned for advice and report before they are dealt with by the Board.

The present personnel of the Board is as follows: W. H. Boyd, Chairman; F. C. C. Lynch, G. A. Young, F. H. Peters, A. M. Narraway, A. Dickison, N. J. Ogilvie, D. L. McKeand, Department of Mines and Resources; J. E. Lyon, Department of National Defence; and E. E. Gagnon, Department of Transport. The provincial representative members are: British Columbia, G. G. Aitken; Alberta, H. F. Brownlee; Saskatchewan, J. R. Hill; Manitoba, S. E. McColl; Ontario, C. H. Fullerton; New Brunswick, A. S. McFarlane; Nova Scotia, Harry Piers; Prince Edward Island, Hon. Bradford W. LePage. J. H. Corry is Secretary.

During the past year many controversial questions relating to place names in Canada were investigated and ruled upon by the Board, and some thousand place names were carefully considered and passed as satisfactory for some sixty-seven map-sheets. Many inquiries were also received and answered from local, foreign, and departmental sources regarding the location of geographical features in Canada; the authentic names for the same and also the history and origin of the names.

DEVELOPMENT DIVISION

The Development Division is organized to carry out the general executive and administrative work of the Bureau; to make investigations designed to assist development relating to mineral resources; to maintain the centralized aerial photographic services; and to administer the general services required by the Bureau as a whole, and the National Museum.

NATIONAL AIR PHOTOGRAPHIC LIBRARY

The important part played by aerial photography in the development of our natural resources was evidenced during the past year by the wide use made of aerial photographs by different agencies. This was particularly reflected in the large number of visits to the Library by engineers, prospectors, geologists, timber operators, etc., to examine photographs covering areas in which they were interested.

Some 55,268 new photographs were added to the Library during the year, bringing the total now available for examination to about 784,500 prints. These cover an area of approximately 840,000 square miles well distributed over the different provinces. Index maps showing the extent of the areas photographed in the different provinces are supplied by the Library on request. During the year over 41,000 plotting prints were also received in the Library for the use of the Topographical Division.

Large numbers of photographs were loaned to the Dominion Forest Service for use in the Forest Inventory being undertaken by them. The Geological and Topographical Divisions also were supplied with a considerable number of photographs.

Over 38,700 prints of aerial negatives were purchased through the Library to satisfy requests received either through correspondence or personal visits. Index maps, where necessary, were always supplied with the prints.

The following is a list of the larger areas photographed by the Royal Canadian Air Force during the year:

	Square Miles
Drought areas in Saskatchewan and Alberta.....	18,800
Vancouver Island area, B.C.....	5,000
Map-sheets west of Aylmer Lake, N.W.T.....	21,500
Owen Sound area, Ontario.....	4,200
Lac Dumoine and Grand Lake Victoria areas, P.Q.....	4,500
Truro map-sheet, Nova Scotia.....	1,650

Some 18,800 square miles of the drought areas in Saskatchewan and Alberta were photographed. Of the resulting 14,480 prints some 10,000 have been indexed, interpreted, and assembled in municipality folders, of which 112 have been forwarded to the western authorities. This work involves a detailed analysis of the air photographs, in which land classification and utilization, natural drainage, water storage, and possibilities of irrigation are studied. It is carried on by the Department of Agriculture, but is supervised by the Bureau in close co-operation with the Department of Agriculture and the western authorities.

Various engineering problems were studied by aerial methods during the year. These included the Yellowknife and Cameron River storage; Reindeer Lake storage; Fitzgerald-Fort Smith road location; Grimshaw-Hay River road location; Kingsmere parkway; and winter road, Rouyn district. The work of this section also included secretarial duties for the Interdepartmental Committee on Air Surveys and Base Maps and the issuing of technical instructions for air photography on behalf of the committee.

PHOTOGRAPHIC SECTION

The following is a summary of the work:

Contact prints, 4 by 5 to 36 by 48.....	13,905
Bromide enlargements, 4 by 5 to 40 by 72.....	3,264
Exposures developed, 1 by 1½ to 5 by 7.....	6,298
Dry plate negatives, 4 by 5 to 20 by 24.....	570
Wet plate negatives, 8 by 10 to 24 by 30.....	139
Zinc plates etched, 11 by 14 to 24 by 30.....	4
Lantern slides, 3½ by 4.....	672
Photos, labels, and maps mounted.....	3,199
Total	28,051

LIBRARY

The Library now has about 75,000 volumes. It also possesses large collections of valuable pamphlets, maps and charts, photographs, and lantern slides, which, though primarily for reference and research by the staff of geologists, topographers, and museum officials, are also available for the use of scientific workers and students throughout Canada.

Accessions to the Library include:

Books (by purchase)	160
“ (complete unbound volumes by purchase)	228
“ (by gift)	238
“ (complete unbound volumes by gift or exchange)	594
Total	1,220
Pamphlets and reprints	417
Canadian Government documents	913
British and Foreign Government documents	1,339
Canadian periodicals	506
British and foreign periodicals	2,028
Scientific institutions, bulletins, proceedings, and transactions (by exchange)	2,473
Subscriptions to periodicals and annuals (including 21 periodicals for the B.C. office)	229
Maps	470

Five hundred volumes were bound. The recorded loans were 7,871, an increase of 300 over the preceding year. Inter-library loans amounted to 425, and 135 books were borrowed from other libraries. Cards added to the catalogue numbered 4,879, of which 106 were bibliographical entries. The analysing of important monographs and other significant material in serial publications added 756 new titles to the catalogue. Pamphlets catalogued amounted to 170, lantern slides catalogued to 441, and 820 photographs were classified and filed. The library collections of maps, photographs, and lantern slides are in increasing demand for consultation in the Library and as loans to students and to scientific and educational institutions.

The work of the Library involved some 1,208 items of correspondence. Members of the library staff rendered noteworthy reference and bibliographical service to the scientific staff, to inquirers in other branches of the Government, and to correspondents outside of Ottawa.

Eighty-seven new periodicals and continuations were added to the list currently received, these additions having been acquired chiefly by exchange or gift. Among notable gifts to the Library may be mentioned 19 volumes from the Carnegie Institution of Washington, 7 from the Government of Sweden, “New Sweden Tercentenary Publications,” 13 volumes from the German East Asian Society of Natural Sciences, 6 volumes of Bergens Museum Skrifter, 10 volumes of Archiv för Botanik from the Royal Swedish Academy of Science; a collection of books and pamphlets from Mr. Faribault, 13 volumes from Mr. James Francis, and gifts of one or two volumes each from Mr. Jenness, Miss Alice Wilson, Mr. Camsell, Mr. Kindle, and Mr. E. D. Ingall.

MECHANICAL SECTION

This section provides the Bureau and the National Museum with blue-printing, photostat-printing, carpentry, electric, and lapidary services, and also handles the maintenance and issue of scientific and surveying instruments. The blue-printing of maps for preliminary reports was an important feature of the year's activities and involved some 390,000 square feet of blue-printing. During the year a method of making blue line-prints from photostat negatives was successfully developed, and is being used for the rapid and economical reproduction of preliminary maps and plans.

The instrument section has assisted the Topographical Survey in the design of several new instruments for use in mapping from ground and air photographs. Minor repairs and adjustment of instruments are carried out by the staff of the section.

GEOLOGICAL INFORMATION AND DISTRIBUTION

During the year 103,252 publications of the Bureau of Geology and Topography and of the National Museum, exclusive of French editions, were distributed. Of these 19,148 were sent to addresses on the regular mailing lists, and 84,104 were distributed in compliance with written and personal requests for named publications, or requests for general or specific information. The French publications, which are distributed by the Editorial Division, numbered 8,885.

DRAUGHTING AND REPRODUCING DIVISION

Maps Published April 1, 1938, to March 31, 1939

Publication Number	Title	Remarks
NORTHWEST TERRITORIES		
466A	Taltson Lake sheet, District of Mackenzie; scale 1 inch to 4 miles.....	Topography. For separate distribution.
467A	Fort Smith sheet, District of Mackenzie; scale, 1 inch to 4 miles.....	Topography. For separate distribution.
YUKON		
450A	Freegold Mountain area; scale, 1 inch to 1,000 feet.....	Geology. For Memoir 214, by J. R. Johnston, and separate distribution.
BRITISH COLUMBIA		
371A	Fort Fraser sheet (east half), Coast District; scale 1 inch to 4 miles.....	Topography. For separate distribution.
396A	Cranbrook sheet, Kootenay District; scale, 1 inch to 1 mile.....	Geology. For Memoir 207, by H. M. A. Rice, and separate distribution.
407A	Ashcroft sheet (east half), Kamloops District; scale, 1 inch to 4 miles.....	Topography. For separate distribution.
408A	Ashcroft sheet (west half), Kamloops, Lillooet, and Yale Districts; scale, 1 inch to 4 miles.....	Topography. For separate distribution.
420A	Kettle River sheet (west half), Similkameen and Osoyoos Districts; scale, 1 inch to 4 miles..	Topography. For separate distribution.
421A	Hope sheet (east half), Yale, Kamloops, and Similkameen Districts; scale, 1 inch to 4 miles....	Topography. For separate distribution.
422A	Hope sheet (west half), Yale and New Westminster Districts; scale, 1 inch to 4 miles.....	Topography. For separate distribution.
430A	Gun Lake area (Bridge River), Lillooet District; scale 1 inch to $\frac{1}{2}$ mile.....	Geology. For Memoir 213, by C. E. Cairnes, and separate distribution.

Maps Published April 1, 1938, to March 31, 1939—Continued

Publication Number	Title	Remarks
<i>BRITISH COLUMBIA—Continued</i>		
431A	Cadwallader Creek area (Bridge River), Lillooet District; scale, 1 inch to $\frac{1}{2}$ mile.....	Geology. For Memoir 213, by C. E. Cairnes, and separate distribution.
—	Figure 2, Geological Plan of an area including Bralorne and Pioneer mines.....	Geology. For Memoir 213, by C. E. Cairnes, and separate distribution.
446A	Manson River sheet (east half), Cassiar District; scale, 1 inch to 4 miles.....	Topography. For separate distribution.
447A	Manson River sheet (west half), Cassiar District; scale, 1 inch to 4 miles.....	Topography. For separate distribution.
448A	Hazelton sheet (east half), Cassiar District; scale, 1 inch to 4 miles.....	Topography. For separate distribution.
449A	Hazelton sheet (west half), Cassiar District; scale, 1 inch to 4 miles.....	Topography. For separate distribution.
479A	Nelson sheet (east half), Kootenay District; scale, 1 inch to 4 miles.....	Topography. For separate distribution.
<i>SASKATCHEWAN</i>		
433A	Foster Lake sheet (east half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
434A	Foster Lake sheet (west half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
489A	Fort Pitt sheet (east half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
490A	Fort Pitt sheet (west half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
491A	Battleford sheet (east half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
492A	Battleford sheet (west half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
<i>MANITOBA</i>		
423A	Norway House sheet (east half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
424A	Norway House sheet (west half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
426A	Berens River sheet (east half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
427A	Berens River sheet (west half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
429A	Hecla sheet (east half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
458A	Rice Lake-Gold Lake area (Sheet 1); scale, 1 inch to 500 feet.....	Geology. For Memoir 210, by C. H. Stockwell, and separate distribution.

Maps Published April 1, 1938, to March 31, 1939—Continued

Publication Number	Title	Remarks
<i>MANITOBA—Continued</i>		
459A	Rice Lake-Gold Lake area (Sheet 2); scale, 1 inch to 500 feet.....	Geology. For Memoir 210, by C. H. Stockwell, and separate distribution.
460A	Rice Lake-Gold Lake area (Sheet 3); scale, 1 inch to 500 feet.....	Geology. For Memoir 210, by C. H. Stockwell, and separate distribution.
461A	Rice Lake-Gold Lake area (Sheet 4); scale, 1 inch to 500 feet.....	Geology. For Memoir 210, by C. H. Stockwell, and separate distribution.
462A	Rice Lake-Gold Lake area (Sheet 5); scale, 1 inch to 500 feet.....	Geology. For Memoir 210, by C. H. Stockwell, and separate distribution.
463A	Rice Lake-Gold Lake area (Sheet 6); scale, 1 inch to 500 feet.....	Geology. For Memoir 210, by C. H. Stockwell, and separate distribution.
464A	Rice Lake-Gold Lake area (Sheet 7); scale, 1 inch to 500 feet.....	Geology. For Memoir 210, by C. H. Stockwell, and separate distribution.
465A	Rice Lake-Gold Lake area (Sheet 8); scale, 1 inch to 500 feet.....	Geology. For Memoir 210, by C. H. Stockwell, and separate distribution.
—	Figure 3, Isometric diagram of part of the San Antonio mine, Rice Lake-Gold Lake area...	Geology. For Memoir 210, by C. H. Stockwell.
<i>MANITOBA AND ONTARIO</i>		
425A	Deer Lake sheet (west half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
428A	Carroll Lake sheet (west half); scale, 1 inch to 4 miles.....	Geology. For separate distribution.
451A	Stull Lake sheet (east half); scale, 1 inch to 4 miles	Geology. For separate distribution.
452A	Stull Lake sheet (west half); scale, 1 inch to 4 miles	Geology. For separate distribution.
<i>ONTARIO</i>		
291A	Espanola sheet, Sudbury District; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
292A	Copper Cliff sheet, Sudbury District; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
338A	Shebandowan area (provisional edition), Thunder Bay District; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
351A	Manitoulin Island, Manitoulin District; scale 1 inch to 4 miles.....	Geology. For separate distribution.
411A	Hearst-Kapuskasing area (east sheet), Cochrane and Algoma Districts; scale, 1 inch to 4 miles..	Geology. For separate distribution and Ontario Department of Mines.

Maps Published April 1, 1938, to March 31, 1939—Continued

Publication Number	Title	Remarks
<i>ONTARIO—Concluded</i>		
412A	Hearst-Kapuskasing area (west sheet), Cochrane and Algoma Districts; scale, 1 inch to 4 miles..	Geology. For separate distribution and Ontario Department of Mines.
432A	Quetico sheet (east half), Thunder Bay and Rainy River Districts; scale, 1 inch to 4 miles.....	Geology. For separate distribution.
468A	Haliburton sheet (east half), Haliburton and Hastings Counties and Nipissing District; scale 1 inch to 2 miles.....	Topography. For separate distribution.
469A	Haliburton sheet (west half), Haliburton County, Muskoka and Nipissing Districts; scale, 1 inch to 2 miles.....	Topography. For separate distribution.
470A	Bobcaygeon sheet (east half), Peterborough and Haliburton Counties; scale, 1 inch to 2 miles..	Topography. For separate distribution.
471A	Bobcaygeon sheet (west half), Victoria, Haliburton, and Peterborough Counties; scale, 1 inch to 2 miles.....	Topography. For separate distribution.
<i>QUEBEC</i>		
395A	Lake Etchemin area, Dorchester and Beauce Counties; scale 1 inch to 1 mile.....	Geology. For Memoir 199, by Carl Tolman, also French edition, and separate distribution.
401A	Opemisca sheet (east half), Abitibi Territory; scale, 1 inch to 1 mile.....	Geology. For Paper 37-11; also memoir by G. W. H. Norman, and French edition, and separate distribution.
415A	Thetford sheet (east half), Megantic, Beauce, and Frontenac Counties; scale, 1 inch to 1 mile....	Geology. For Memoir 211, by H. C. Cooke, also French edition, and separate distribution.
416A	Thetford sheet (west half), Megantic County; scale, 1 inch to 1 mile.....	Geology. For Memoir 211, by H. C. Cooke, also French edition, and separate distribution.
417A	Disraeli sheet (east half), Wolfe and Frontenac Counties; scale, 1 inch to 1 mile.....	Geology. For Memoir 211, by H. C. Cooke, also French edition, and separate distribution.
418A	Disraeli sheet (west half), Wolfe, Megantic, and Frontenac Counties; scale, 1 inch to 1 mile....	Geology. For Memoir 211, by H. C. Cooke, also French edition, and separate distribution.
419A	Warwick sheet (east half), Wolfe and Arthabaska Counties; scale, 1 inch to 1 mile.....	Geology. For Memoir 211, by H. C. Cooke, also French edition, and separate distribution.
.....	Diagram showing Cadastral subdivisions referred to in "Memoir 211"; Thetford, Disraeli, and Eastern Half of Warwick Map-areas.....	For Memoir 211, by H. C. Cooke, also French edition.
441A	Rouyn area, Rouyn Township, Témiscamingue County; scale, 1 inch to 800 feet.....	Topography. For separate distribution.

Maps Published April 1, 1938, to March 31, 1939—Continued

Publication Number	Title	Remarks
<i>QUEBEC—Concluded</i>		
442A	Amulet area, Duprat, Dufresnoy, Rouyn, and Beauchastel Townships, Abitibi and Témiscamingue Counties; scale, 1 inch to 800 feet...	Topography. For separate distribution.
443A	Waite area, Duprat and Dufresnoy Townships, Abitibi County; scale, 1 inch to 800 feet.....	Topography. For separate distribution.
444A	Newbec area, Dufresnoy Township, Abitibi County; scale, 1 inch to 800 feet.....	Topography. For separate distribution.
445A	Dufault area, Dufresnoy and Rouyn Townships, Abitibi and Témiscamingue Counties; scale 1 inch to 800 feet.....	Topography. For separate distribution.
454A	Amulet area, Duprat, Dufresnoy, Rouyn, and Beauchastel Townships, Abitibi and Témiscamingue Counties; scale, 1 inch to 800 feet.	Geology. For memoir by M. E. Wilson, also French edition, and separate distribution.
455A	Waite area, Duprat and Dufresnoy Townships, Abitibi County; scale, 1 inch to 800 feet....	Geology. For memoir by M. E. Wilson, also French edition, and separate distribution.
456A	Newbec area, Dufresnoy Township, Abitibi County; scale, 1 inch to 800 feet.....	Geology. For memoir by M. E. Wilson, also French edition, and separate distribution.
457A	Dufault area, Dufresnoy and Rouyn Townships, Abitibi and Témiscamingue Counties; scale, 1 inch to 800 feet.....	Geology. For memoir by M. E. Wilson, also French edition, and separate distribution.
480A	Perron-Rousseau sheet (east half), Abitibi Territory and Abitibi County; scale, 1 inch to 1 mile.....	Topography. For separate distribution.
481A	Perron-Rousseau sheet (west half), Abitibi Territory and Abitibi County; scale, 1 inch to 1 mile.....	Topography. For separate distribution.
482A	Perron-Rousseau sheet (east half), Abitibi Territory and Abitibi County; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
483A	Perron-Rousseau sheet (west half), Abitibi Territory and Abitibi County; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
485A	Landrienne sheet (east half), Abitibi County; scale, 1 inch to 2 miles.....	Topography. For separate distribution.
486A	Landrienne sheet (west half), Abitibi County; scale, 1 inch to 2 miles.....	Topography. For separate distribution.
487A	Duvernoy sheet (east half), Abitibi County; scale, 1 inch to 1 mile.....	Topography. For separate distribution.
488A	Duvernoy sheet (west half), Abitibi County; scale, 1 inch to 1 mile.....	Topography. For separate distribution.

Maps Published April 1, 1938, to March 31, 1939—Concluded

Publication Number	Title	Remarks
NEW BRUNSWICK		
402A	Petitcodiac sheet (east half), Kings, Westmorland, and Albert Counties; scale, 1 inch to 1 mile.	Topography. For separate distribution.
403A	Petitcodiac sheet (west half), Kings and Westmorland Counties; scale, 1 inch to 1 mile.....	Topography. For separate distribution.
472A	Nipisiguit Lake sheet (east half), Northumberland and Restigouche Counties; scale, 1 inch to 1 mile.....	Topography. For separate distribution.
473A	Nipisiguit Lake sheet (west half), Northumberland and Restigouche Counties; scale, 1 inch to 1 mile.....	Topography. For separate distribution.
NOVA SCOTIA		
337A	Springhill sheet, Cumberland and Colchester Counties; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
409A	Oxford sheet (east half), Cumberland and Colchester Counties; scale, 1 inch to 1 mile....	Geology. For separate distribution.
410A	Oxford sheet (west half), Cumberland and Colchester Counties; scale, 1 inch to 1 mile....	Geology. For separate distribution.
435A	Malaga Lake sheet (east half), Queens and Lunenburg Counties; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
436A	Malaga Lake sheet (west half), Queens and Lunenburg Counties; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
437A	Kejimikujik Lake sheet (east half), Annapolis and Queens Counties; scale, 1 inch to 1 mile....	Geology. For separate distribution.
438A	Kejimikujik Lake sheet (west half), Digby, Annapolis, and Queens Counties; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
439A	Liverpool sheet (east half), Queens and Lunenburg Counties; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
440A	Liverpool sheet (west half), Queens County; scale, 1 inch to 1 mile.....	Geology. For separate distribution.
.....	Figure 1, Part 1, Vertical ranges of species in the Morien series.....	Geology. For Memoir 215, by W. A. Bell.
.....	Figure 1, Part 2, Vertical ranges of species in the Morien series.....	Geology. For Memoir 215, by W. A. Bell.

Maps in Process of Lithographing and Printing, March 31, 1939

ONTARIO		
266A	Kenora sheet; scale, 1 inch to 8 miles.....	Geology (second edition). For separate distribution.

Maps in Process of Lithographing and Printing, March 31, 1939—Concluded

Publication Number	Title	Remarks
ONTARIO AND QUEBEC		
413A	Ottawa sheet (east half), Carleton and Hull Counties; scale, 1 inch to 1 mile.....	Geology. For memoir, also French edition, and separate distribution.
414A	Ottawa sheet (west half), Carleton and Hull Counties; scale, 1 inch to 1 mile.....	Geology. For memoir, also French edition, and separate distribution.
QUEBEC		
453A	Rouyn area, Rouyn Township, Témiscamingue County; scale, 1 inch to 800 feet.....	Geology. For memoir by M. E. Wilson, also French edition, and separate distribution.
NEW BRUNSWICK AND QUEBEC		
259A	New Brunswick-Gaspe sheet; scale, 1 inch to 8 miles.....	Geology (reprint). For separate distribution.

Other Map-work in Varying Stages of Progress

—	Title	Remarks
NORTHWEST TERRITORIES		
1	Taltson Lake, District of Mackenzie; scale, 1 inch to 4 miles.....	Geology.
2	Nonacho Lake, District of Mackenzie; scale, 1 inch to 4 miles.....	Geology.
3	Prosperous Lake, District of Mackenzie; scale, 1 inch to 1 mile.....	Topography.
4	Yellowknife Bay, District of Mackenzie; scale, 1 inch to 1 mile.....	Topography.
5	Quyta Lake, District of Mackenzie; scale, 1 inch to 1 mile.....	Topography.
6	Nonacho Lake, District of Mackenzie; scale 1 inch to 4 miles.....	Topography.
BRITISH COLUMBIA		
7	Keremeos, Similkameen District; scale, 1 inch to 1 mile.....	Geology.
8	Kettle River, Similkameen and Osoyoos Districts; scale, 1 inch to 4 miles.....	Mineral localities.
9	Kettle River, Similkameen and Osoyoos Districts; scale, 1 inch to 4 miles.....	Geology.
ALBERTA		
10	Ribstone Creek; scale, 1 inch to 4 miles.....	Geology.
11	Hardisty; scale, 1 inch to 4 miles.....	Geology.
12	Stettler; scale, 1 inch to 4 miles.....	Geology.
13	Red Deer; scale, 1 inch to 4 miles.....	Geology.
14	Tofield; scale, 1 inch to 4 miles.....	Geology.
15	Edmonton; scale, 1 inch to 4 miles.....	Geology.

Other Map-work in Varying Stages of Progress—Continued

—	Title	Remarks
ALBERTA—Concluded		
16	Fallentimber (east half), west of fifth meridian; scale, 1 inch to 1 mile.....	Geology.
17	Fallentimber (west half), west of fifth meridian; scale, 1 inch to 1 mile.....	Geology.
SASKATCHEWAN		
18	Wapus Lake, Northern Saskatchewan; scale, 1 inch to 4 miles.....	Geology.
19	Oliver Lake, Northern Saskatchewan; scale, 1 inch to 4 miles.....	Geology.
MANITOBA		
20	Halfway Lake-Beresford Lake (Sheet 1), South-eastern Manitoba; scale, 1 inch to 1,000 feet.....	Geology.
21	Halfway Lake-Beresford Lake (Sheet 2), South-eastern Manitoba; scale, 1 inch to 1,000 feet.....	Geology.
22	Halfway Lake-Beresford Lake (Sheet 3), South-eastern Manitoba; scale 1 inch to 1,000 feet.....	Geology.
ONTARIO		
23	North Spirit Lake, Kenora District, Patricia Portion; scale, 1 inch to 4 miles.....	Topography.
24	McInnes Lake, Kenora District, Patricia Portion; scale, 1 inch to 4 miles.....	Topography.
25	Quetico (west half), Rainy River District; scale, 1 inch to 4 miles.....	Geology.
QUEBEC		
26	Mistawak Lake, Abitibi Territory and Abitibi County; scale 1 inch to 2 miles.....	Topography.
27	Michwacho Lake, Abitibi Territory; scale, 1 inch to 1 mile.....	Topography.
28	Duverny (east half), Abitibi County; scale, 1 inch to 1 mile.....	Geology.
29	Duverny (west half), Abitibi County; scale, 1 inch to 1 mile.....	Geology.
30	Mistawak Lake, Abitibi Territory and Abitibi County; scale, 1 inch to 2 miles.....	Geology.
NEW BRUNSWICK		
31	Rolling Dam, Charlotte County; scale, 1 inch to 1 mile.....	Topography.
32	Canoose River, Charlotte County; scale, 1 inch to 1 mile.....	Topography.
33	Loch Lomond (east half), Saint John and Kings Counties; scale, 1 inch to 1 mile.....	Geology.
34	Loch Lomond (west half), Saint John and Kings Counties; scale, 1 inch to 1 mile.....	Geology.
35	St. Andrews, Charlotte County; scale, 1 inch to 1 mile.....	Topography.
36	St. Stephen, Charlotte County; scale, 1 inch to 1 mile.....	Topography.
37	Salmon River, Saint John County; scale 1 inch to 1 mile.....	Topography.
38	Point Wolf, Albert, Kings, and Saint John Counties; scale, 1 inch to 1 mile.....	Topography.
39	Waterford, Kings and Saint John Counties; scale, 1 inch to 1 mile.....	Topography.

Other Map-work in Varying Stages of Progress—Concluded

—	Title	Remarks
NOVA SCOTIA		
40	Sherbrooke Lake, Lunenburg and Kings Counties; scale, 1 inch to 1 mile.....	Topography.
41	Springfield, Annapolis, Lunenburg, Kings, and Queens Counties; scale, 1 inch to 1 mile.	Topography.
42	Hopewell, Pictou, Guysborough, Colchester, and Halifax Counties; scale, 1 inch to 1 mile.....	Topography.
43	West River, Pictou, Colchester, and Halifax Counties; scale, 1 inch to 1 mile.....	Topography.
44	Liscomb, Guysborough and Halifax Counties; scale, 1 inch to 1 mile.....	Topography.
45	Melopseketch, Guysborough and Halifax Counties; scale, 1 inch to 1 mile.....	Topography.
46	Lake Mulgrave, Halifax and Guysborough Counties; scale 1 inch to 1 mile.....	Topography.
47	Upper Musquodoboit, Halifax and Colchester Counties; scale, 1 inch to 1 mile.....	Topography.
48	Lochaber, Guysborough, Pictou, and Antigonish Counties; scale, 1 inch to 1 mile.....	Topography.
49	Moose River, Pictou and Guysborough Counties; scale, 1 inch to 1 mile.....	Topography.
50	Ecum Secum, Guysborough and Halifax Counties; scale, 1 inch to 1 mile.....	Topography.
51	Port Dufferin, Halifax County; scale, 1 inch to 1 mile.....	Topography.
52	Tangier, Halifax County; scale, 1 inch to 1 mile..	Topography
53	Ship Harbour, Halifax County; scale, 1 inch to 1 mile.....	Topography.
54	Sherbrooke Lake, Lunenburg and Kings Counties; scale, 1 inch to 1 mile.....	Geology
55	Springfield, Annapolis, Lunenburg, Kings, and Queens Counties; scale, 1 inch to 1 mile.....	Geology.
56	Owls Head, Halifax County; scale, 1 inch to 1 mile.....	Topography.

In addition to the foregoing, some preliminary work has been done on about thirty maps; also one hundred and twenty-seven map and other drawings were prepared for reproduction by zinc-cut process, for illustrating reports, papers, memoirs, and museum bulletins.

Other draughting and related work necessary for staff and public use amounted to eighty items.

NATIONAL MUSEUM OF CANADA

The field work of the National Museum in 1938 consisted of biological investigations in the vicinity of Bella Coola, on the west coast of British Columbia, and in the national parks of the Rocky Mountains; ornithological studies in the vicinity of Dauphin, Manitoba; a botanical survey of the Michipicoten area on the north shore of Lake Superior; and archæological excavations at Waubauskene, Ontario.

Good progress was made in the reorganization of the exhibits in the Hall of Anthropology. The musk-ox habitat group in the Hall of Biology was set up, and a third large booth on the south side of the hall was built to accommodate a beaver habitat group. An attractive mineralogical exhibit was completed by the Geological Survey, and a striking relief map model of Canada was set up in the main rotunda by the Topographical Survey.

EDUCATIONAL WORK

Educational work is one of the most important of the Museum activities in that it reaches all classes of people in every province of the Dominion. Motion pictures, lantern slides, and biological and anthropological specimens are lent to museums, educational institutions, scientific societies, and other organizations, and the demand for motion picture films is much greater than can be met. Films lent during the year were projected before 151,219 people and lantern slides before 12,935. Loans of specimens for teaching purposes exceeded 600 in number.

Attendance at the two series of lectures totalled 27,660. The exhibition halls are open to the public daily except Christmas, and were visited by 90,000 people exclusive of thousands of school pupils, who came in groups to carry on specific studies under the direction of their teachers.

Not the least important phase of the educational work consists in supplying individual applicants with information in letters, memoranda, and published reports, the identification of specimens of scientific interest, the delivery of lectures and radio talks by members of the staff, and the supplying of photographs for purposes of illustration.

ANTHROPOLOGICAL DIVISION

D. Jenness, Chief of the Division, continued the reorganization of the public halls. He prepared two brief reports on archæological collections brought back from the Canadian Arctic, and continued to work on an extensive report dealing with the Coast Salish Indians of British Columbia. During the summer he attended the International Congress of Anthropological and Ethnological Sciences in Copenhagen, and visited a number of European museums.

C. M. Barbeau examined and partly catalogued for the Dominion Archives an extensive collection of early documents in the Archives of the Seminary of Quebec. He prepared a report on the Arrow Sash, which has since gone to press, and assisted the National Parks Bureau in furnishing the birthplace of Sir Wilfrid Laurier at St. Lin, Quebec, which has now become the property of the Dominion Government.

W. J. Wintenberg partly excavated the site near Waubauskene, Ontario, which he had reconnoitred the previous summer, and determined that it conformed very closely to the description of the Indian mission, St. Ignace II, where the Jesuit fathers Lalemant and Brebeuf were massacred in 1649. He studied a collection of archæological specimens from Saskatchewan in the Royal Ontario Museum, and prepared a brief report on them for that institution; and he completed a report on his own discoveries at the Lawson Village site in Ontario.

Miss Frances Loring, of Toronto, modelled five life-sized Indian figures and one Eskimo figure for the exhibition halls.

BIOLOGICAL DIVISION

R. M. Anderson, Chief of Division, continued work on the systematic collection of mammals in the National Museum. He attended the 20th annual meeting of the American Society of Mammalogists at the Museum of Vertebrate Zoology, University of California, Berkeley, July 19-23, 1938, and made a careful examination of a large number of Canadian mammal specimens in several western museums. He also made investigations for the National Parks Bureau on the condition and relations of big game and predatory mammals in three of the large national parks in the Rocky Mountains.

Clyde L. Patch continued the rearrangement of the biological collections in the exhibition halls, and with the assistance of C. E. Johnson arranged

and installed a habitat group of six musk-oxen. Mr. Johnson prepared the painted background and ground accessories designed to show the physiography and ecological conditions of the Wager Inlet region northwest of Hudson Bay, where the specimens were obtained. Considerable work was done on the collection of reptiles and amphibians, and 121 specimens were added during the year.

A. E. Porsild continued his work on the botany of the western arctic and subarctic regions of Canada. This has entailed the classification of about 8,000 specimens, aggregating 40,000 herbarium sheets. One paper on the flora of Diomedé Island, Bering Strait, and a larger one dealing with the floras of Alaska and Yukon were completed and placed for publication outside of the Department. In addition, several important collections were named during the year and the specimens labelled, mounted, and inserted in the herbarium. Increasing use has been made of the herbarium during the past year by Canadian and foreign botanists, among whom were Dr. E. Hultén, University of Lund, Sweden, Dr. Gustaf Alm, University of Upsala, Sweden, and Dr. Hugh M. Raup of Harvard University, Cambridge, Mass.

Professor R. C. Hosie, University of Toronto, continued work on the flora of the north shore of Lake Superior. He established a collecting base at Michipicoten River, Ontario, and from June 17 to September 16 collected about 3,000 plants, representing over 600 species and varieties. Notes on the ecology of the area were made, and a report embodying the principal characteristics of the vegetation is being prepared.

Hamilton M. Laing made field collections in the Bella Coola region of western British Columbia from June 10 to September 15. He collected 373 mammals, 99 birds, 11 reptiles and amphibians, and 98 plants, all from a very interesting region that is not well represented zoologically in the collections of the National Museum of Canada.

ORNITHOLOGICAL DIVISION

P. A. Taverner, Chief Ornithologist, reports that a survey was made in the vicinity of Dauphin, Manitoba, by a party in charge of Angus Shortt. This survey completes a series of ornithological studies extending from Churchill along the Hudson Bay Railway to The Pas and southward through western Manitoba.

Collections of birds were made by H. M. Laing inland from Bella Coola on the west coast of British Columbia.

BUREAU OF MINES

The rapid growth of the mining industry during the past 5 years has been reflected in the increased demand for information relating to the mineral resources of the Dominion. These inquiries cover a wide field, and range from requests for technological assistance in the treatment of ores and the recovery of their mineral content to sources of supply and possible markets and uses.

The necessity of mineral resources in the industrial and economic life of nations is one of the problems that has been receiving widespread attention. Canada is to be regarded as one of the fortunate countries in respect to her known and developed resources of gold, silver, copper, lead, zinc, and nickel, and to her unprospected areas that are regarded as favourable for the occurrence of these and other metals. Nevertheless, the Dominion must at present still be regarded as being deficient in the equally essential metals, chromium, manganese, molybdenum, tungsten, and iron; it being necessary to import practically all of our domestic requirements of these metals.

The Bureau of Mines, through its various divisions, is making an effort to correlate and make available for industry and the public all information pertaining to the mineral resources of the Dominion, having in mind that true conservation consists in use without unnecessary waste.

Increased facilities for investigative work on ore dressing and the testing of fuels, and on the industrial minerals, have been made available by the completion of two new laboratories on Booth Street, and by the addition of new equipment to the Fuel Testing Laboratories. The more efficient use of solid, liquid, and gaseous fuels continues to be a major study of the Fuel Testing Laboratories, as the standards demanded by domestic and industrial users of these fuels become more exacting each year. For years these laboratories have analysed the coal purchased by the Department of Pensions and National Health and by the Penitentiaries Branch of the Department of Justice. In addition to work on fuels, the Division is pioneering in Canada an investigation on the hydrogenation of coal to produce oil and motor fuel.

The work of the Ore Dressing Laboratories of the Metallic Minerals Division is confined almost entirely to the devising of methods of treatment for various Canadian ores and products. A record total of 142 investigations were carried out during the year. Much time was given to problems involving the use of steel and alloys for the Departments of National Defence and Transport.

The Industrial Minerals Division is concerned almost entirely with the industrial, or non-metallic, minerals such as clay, gypsum, building stones, mica, feldspar, salt, and bentonite. Although the value of output of most of these minerals is small in comparison with that of our metals and fuels, nevertheless their importance to our every-day industrial life cannot be over stressed. Among the important investigations were those on brucite, large deposits of which have been discovered at Rutherglen, Ontario, and at Bryson, Quebec. These deposits represent a great potential source of basic refractories and of magnesium metal.

Increased mining activity has considerably added to the work of the Explosives Division. This Division administers the Explosives Act, and is directly concerned with the safety and regulations relating to the manufacture, transport, and storage of all explosives manufactured in or imported into the country. The work is carried out by a staff of inspectors who make periodic visits to explosives factories and magazines. They are assisted in their visits to magazines by the Royal Canadian Mounted Police.

The Economics Division acts as a general clearing house for all information relating to mineral resources. This information is supplied to the industry through the medium of private memoranda or published reports. As a result of such work information is being collected and compiled that will ultimately serve as a basis for an inventory of the mineral resources of the country.

ECONOMICS DIVISION

The Chief of the Division retired on leave on July 29, 1938, prior to superannuation and no successor had been appointed by the end of the fiscal year. In December, members of the Division, with the exception of the Draughting Section, which was moved back to Sussex Street, were transferred to the new Industrial Minerals Building, adjacent to the other laboratories.

Brief reviews for 1937 of sixty-four mineral products were compiled and printed for distribution, both as separates and in book form, as well as an illustrated edition for select distribution at the Glasgow Exhibition. A report on Petroleum Fuels in Canada, giving deliveries for consumption for the calendar year 1937, was also published, along with two lists of operators: Milling Plants in Canada, Part I (operators of concentrating mills treating metallic ores); and Metallurgical Works in Canada, Part II (non-ferrous and precious metals). A pamphlet descriptive of Canada's mineral industry was published in 1938 for general distribution at the Glasgow Exhibition.

The manuscript of Mining Laws of Canada, embodying recent changes in mining legislation, was prepared for publication at an early date. The following lists were submitted for printing: Coal Mines in Canada; Milling Plants in Canada, Part II (Industrial Minerals); Petroleum Refineries. The manuscript of the annual review of the Mineral Industry of Canada for 1938 was completed in March 1939. A booklet on the Mineral Industries of Canada is in course of preparation for distribution at the New York World's Fair in 1939.

Manuscripts for a number of newsletters and articles were prepared for publication in the technical press of Canada and Great Britain.

About twelve hundred inquiries for information on specific mining companies and mining properties, as well as on a great variety of mining subjects, were received and answered.

A large number of special articles, memoranda, and tabulations dealing with mineral production, trade, and consumption were prepared.

A number of special reports reviewing the histories of properties for the Income Tax Branch, in connection with applications of mining companies for exemption under Section 89, Income War Tax Act, were prepared. A new Mineral Map of Canada was prepared under the supervision of members of the Division.

Information was obtained in the field on current mining developments in New Brunswick, Nova Scotia, Quebec, and Ontario.

The annual survey of the utilization of fuel oil in the different provinces was continued. During July and August 41 days were spent in the field. Data for 1937 were completed and a bulletin thereon was issued in February 1939. A survey was also made of fuels used for bunkering in 1937 in Quebec, Ontario, and Manitoba, and information on this project was submitted in October 1938.

The following work was performed by the Draughting Section:

Five maps were prepared and drawn for reproduction. Ninety-nine charts, plans, and drawings were prepared and traced. The latter includes architectural and property drawings; also mechanical drawings for installation of equipment in the new Ore Dressing Mill and the Industrial Minerals Building.

Seventy-five title cards were prepared for the Glasgow Exhibition.

A new Mineral Map of the Dominion of Canada was prepared for the New York World's Fair, 1939.

Eleven charts were drawn for the Dominion Fuel Board, and forty-eight prints were hand-coloured and brought up to date.

Three thousand and seventy prints were made on the Rectigraph machine, and 1,100 negatives, black and white, and blue-prints were made on the blue-print machine.

The staff of the Draughting Section was moved from the Elgin Annex to the Bureau of Mines Building, Sussex Street.

In December 1938 the library was moved to the new Industrial Minerals Building, so that it might be more readily available to the technical members of the staff. Due to lack of space, textbooks and periodicals that were not greatly in demand were stored in the former building on Sussex Street.

Accessions to the Library

Books (by purchase)	160
Books (by transfer and gift).....	74
Bureau of Mines reports added to the circulating division.....	28
Canadian Government documents (by exchange and gift).....	2,190
British and Foreign Government documents (by exchange and gift).....	1,059
Scientific societies' bulletins, proceedings, and transactions (by exchange and gift)	1,567
Trade catalogues (by gift)	289
Periodicals and continuations subscribed for.....	228
Annuals, continuations, and periodicals (by gift).....	495
Volumes bound	100
Recorded loans (which include the circulating of 97 periodicals regularly received among 37 members of the staff).....	4,453

METALLIC MINERALS DIVISION

During the year the production of metals showed an increase in volume as compared with 1937, but the value, which amounted to \$323,075,154, declined about 3 per cent owing to a drop in the prices of base metals. Although the production of nickel was lower than in 1937 the output of the by-product platinum metals was higher. Similarly, in contrast with increases in the production of lead and zinc, the output of cadmium, which is recovered as a by-product in the treatment of these two metals, was lower than in 1937. Apart from nickel, new records were set in the volume of output of all of the principal metals, and gold established a new record in both the quantity and value of its output.

From events of the past year it seems probable that within the next 10 years Canada will again become an important producer of iron ore. Construction work at the New Helen mine in Michipicoten has been resumed and the mine and beneficiation plant will probably be in production before the end of 1939. Drilling carried out during the year at the Steeprock Lake mine, 135 miles west of Port Arthur, has indicated the presence of a large tonnage of high-grade hematite iron ore.

The new Ore Dressing Laboratory, the construction of which was started in the autumn of 1937, was completed and equipped ready for use by the end of 1938. It is one of the best of its kind in the world, and replaces the original laboratory built in 1912, which could no longer accommodate additional equipment. All equipment from the old building was reconditioned and erected in the new building. Experimental equipment, including a complete miniature cyanide mill capable of treating 1½ tons of gold ore a day, and a sampling plant capable of handling 3 to 5 tons of ore an hour, was also installed.

Although moving and reinstallation interfered seriously with the experimental work on ores and metallurgical products, a total of 142 investigations were completed, the number being higher than in any previous year. Milling tests were made on 71 gold, 2 chromium, 2 cobalt, 4 molybdenite, 1 radium, and 2 mercury ores, and on 30 miscellaneous ores, and 30 investigations were carried out on steel and alloy products. Three ores were tested from Nova Scotia, 27 from Quebec, 37 from Ontario, 4 from Manitoba, 14 from British Columbia, and 7 from the Northwest Territories.

To complete the above investigations required the making of 19,589 chemical analyses and assay determinations by the chemical staff; and 642 polished sections of the ores were made up and examined microscopically by the mineralogical staff.

Those members of the metallurgical staff working on the metallurgy of iron and steel and on non-ferrous physical metallurgical problems devoted more than a third of their time to problems involving the use of steel and alloys in connection with Air Force, Naval Service, and Ordnance branches of the Department of National Defence. Considerable work was done also for the Department of Transport.

Research other than that required in the solution of investigational work received from the industry had to be curtailed owing to the exceptional demands of the industry and to work on problems submitted by the Department of National Defence.

The following reports issued by the Division during the year, cover the results of laboratory investigations and of research on various products submitted by the industry.

Reports that are published in full in the semi-annual Reports of Investigations for 1938:

732, Mill products from the Naybob Gold Mines, Limited, Timmins, Ont.

733, Chromite from the Chromium Mining and Smelting Corporation, Limited, Collins, Ont.

- 734, Cone overflow from the Aldermac Copper Corporation, Limited, Arntfield, Que.
 735, Zinc concentrate from the Normetal Mining Corporation, Limited, Dupuy, Que.
 736, Gold ore from the Cariboo-Hudson Gold Mines, Limited, Wells, B.C.
 737, Gold ore from the Camlaren Mines, Limited, Gordon Lake, N.W.T.
 738, Gold ore from the Cochenour Willans Gold Mines, Limited, McKenzie Island, Ont.
 739, Gold ore from the East Malartic Mines, Limited, Amos, Que.
 740, Gold ore from the Kerr-Addison Gold Mines, Limited, Larder Lake, Ont.
 741, Gold-silver ore from the Berens River Mines, Limited, Favourable Lake, Ont.
 742, Gold-silver ore from the Negus Mines, Limited, Yellowknife River area, N.W.T.
 743, Concentrate from Montague Gold Mines, Limited, Halifax county, N.S.
 744, Silver-lead ore from the Anglo-Huronian property, Mayo area, Yukon.
 745, Gold ore from the St. Anthony Gold Mines, Limited, Sturgeon Lake, Ont.
 746, Gold-silver ore from the Privateer Mine, Limited, Victoria, B.C.
 747, Mill products from the Beattie Gold Mines, Limited, Duparquet, Que.
 748, Arsenical gold ore from the Gold Cup Mining Company, Rossland, B.C.
 749, Cinnabar ore from the Manitou Mining Company, Limited, Bridge River, B.C.
 750, Gold-silver-lead ore from the Consolidated Nicola Goldfields, Limited, Stump Lake, near Kamloops, B.C.
 751, Gold ore from the Uchi Gold Mines, Limited, Woman Lake area, Kenora District, Ont.
 752, Gold ore from the Upper Canada Mines, Limited, Kirkland Lake, Ont.
 753, Cinnabar ore from the Yalakom Quicksilver claim, Lillooet mining division, B.C.
 754, Gold ore from the Chesterville Larder Lake Gold Mining Company, Limited, Larder Lake District, Ont.
 755, Cobalt-silver-nickel ore from the Cobalt Products, Limited, Cobalt, Ont.
 756, Silver-lead-tungsten ore from the Regal Silver property, Revelstoke, B.C.
 757, Placer material from the Red Cedar Lake Gold Mines, Limited, Crilly, Ont.
 758, Cast steel grinding balls, Britannia Mining and Smelting Company, Limited, Britannia Beach, B.C.
 759, Copper-gold ore from the Chibougamau property of the Obalski Mining Corporation, Montreal, Que.
 760, Flotation concentrate from the Tombill Gold Mines, Limited, Empire, Ont.
 761, Gold ore from the Thompson Lundmark Gold Mines, Limited, Yellowknife, N.W.T.

Reports listed by title only in the semi-annual Report of Investigations for 1938, and which have been submitted only to the parties concerned:

- Gold-lead-zinc ore from the Cariboo-Hudson Gold Mines, Limited, Cunningham Creek, Barkerville District, B.C.
 Blanket tailing from San Antonio mine, Bissett, Man.
 Gold ore from Wingold Mines, Limited, Bissett, Man.
 Gold ore from Ashloo Gold Mines, Limited, Squamish, B.C.
 Gold ore from Arcadia Gold Mines, Limited, South Porcupine, Ont.
 Gold ore from the Hecla and Bareto claims, Westbridge, B.C.
 Copper ore from the British Columbia mine, Summit Camp, near Eholt, B.C.
 Gold ore from Cole Gold Mines, Limited, Cole, Ont.
 Gold-silver ore from the Bowhill mine, Heron Bay, Ont.
 Gold ore from the Alpine mine, Nelson, B.C.
 Gold ore from Madsen Red Lake Gold Mines, Limited, Red Lake, Ont.
 Arsenical gold ore from Manitoba and Eastern mine, Timagami, Ont.
 Gold-silver-lead-zinc ore from Calumet Island, Bryson, Que.
 Gold ore from Halliwell Gold Mines, Limited, Rouyn, Que.
 Arsenical gold concentrate from Montague Gold Mines, Limited, Montague, N.S.
 Gold ore from Senator-Rouyn, Limited, Rouyn, Que.
 Arsenical gold ore from Gold Cup Mining Company, Limited, Rossland, B.C.
 Gold ore from Moneta-Porcupine Mines, Limited, Timmins, Ont.
 Gold ore from Orelia Mines, Limited, Mine Centre, Ont.
 Graphite from C. H. Piggott, Griffith township, Renfrew county, Ont.
 Copper-gold-silver ore from Copper King mine, Kamloops, B.C.
 Gold ore from St. Jude Gold Mines, Limited, Duprat township, Que.
 Arsenical gold ore from Nugold Mining Corporation, Limited, Blockhouse, N.S.
 Gold ore from Hutchison Lake Gold Mines, Limited, Geraldton, Ont.
 Gold ore from Courmor Mining Company, Limited, Perron, Que.
 Gold ore from Chan Yellowknife Gold Property, Yellowknife District, N.W.T.
 Chalcopryrite-molybdenite ore from Regnery Metals, Hawk Junction, Ont.
 Gold ore from South Vermillion Gold Mines, Limited, Mine Centre, Ont.
 Gold ore from Gurney Gold Mines, Limited, Gurney Siding, Man.
 Copper-gold ore from Brooklyn mine, Greenwood, B.C.
 Report of laboratory investigation re the production of bright red oxide pigment from bog iron ore, Labelle county, Que. (John MacFarlane and Son, Limited).

- Tests on sample of steel rod (Department of National Defence).
 The electric smelting of nickel-chromium magnetite concentrate obtained from mine tailings (Canadian Johns-Manville Company).
 Tensile and impact tests on steel (Atlas Steels, Limited).
 An examination of a failed austenitic manganese steel crusher jaw plate (Sorel Steel Foundries, Limited).
 An examination of a failed austenitic manganese steel ball mill liner (Joliette Steel, Limited).
 An examination of a failed master rod from Tiger aircraft engine (R.C.A.F., Department of National Defence).
 An examination of two chromium molybdenum steel end liners (Sorel Steel Foundries, Limited).
 An investigation of the failure of a wing attachment aircraft fitting (Department of Transport).
 Tensile testing of four aircraft bolts (Department of National Defence, R.C.A.F.).
 An examination of three aluminium-silicon die castings (Department of National Defence).
 Historical identification of metal sliver found near Waubaushe, Ont. (Geological Survey).
 Magnetic concentration tests on treated Helen mine siderite (A.T. Stewart).
 An investigation of two carburizing steels (Canada Cycle and Motor Company, Limited).
 An examination of aluminium in defective gas tank (Department of National Defence).
 Carburizing five landing gear parts (Department of National Defence).
 Heat treatment of four steel bars (Department of National Defence).
 Examination of manganese steel bullet-proof hat (Department of National Defence).
 Tensile and hardness tests on steel (Department of National Defence).
 Impact test (Dominion Engineering Company, Limited, Montreal).
 Hardness tests (Hull Iron and Steel Foundries, Limited, Hull).
 An examination of two galvanized iron sheets (G. W. Benoit, St. Hyacinthe, Que.).
 Tensile test (Paxton Cooperage Company, Montreal).
 Investigation of the corrosion of piping installed at Banff Springs, Alta. (Parks Branch).
 Cleaning of 350 brass shells (Dominion Archives).
 Microscopic grain analysis of four products from Aldermac Copper Corporation, Arntfield, Que.
 Microscopic examination of two samples from Macassa Mines, Limited, Kirkland Lake, Ont.
 Microscopic examination of sample from the Nicholson mine property on the north shore of Lake Athabaska, Sask.
 Microscopic examination of gold ore from the No. 230 vein, Hard Rock Gold Mines, Limited, Geraldton, Ont.
 Gold ore from Ronda Gold Mines, Limited, Westree, Sudbury District, Ont.
 Molybdenite ore from Molydor Mines, Limited, Loon, Ont.
 Mill tailing from the Asbestos Corporation, Thetford, Que.
 Gold ore from Amm Gold Mines, Limited, Amos, Que.
 Gold ore from Magnet Consolidated (1936) Mines, Limited, township of Errington, Little Long Lac, Ont.
 Mill run for Canadian Wood Molybdenite Company, Quyon, Que.
 Molybdenite ore from Amorada Gold Mines, Limited, Dorothea township, Beardmore, Ont.
 Concentrate from Payore Gold Mines, Limited, Bourlamaque, Que.
 Gold ore from Cochenour Willans Gold Mines, Limited, McKenzie Island, Ont.
 Gold-quartz ore from Preston East Dome Mines, Limited, South Porcupine, Ont.
 Gold ore and mill products from Arntfield Gold Mines, Limited, Arntfield, Que.
 Gold ore and mill products from Sand River Gold Mining Company, Limited, Beardmore, Ont.
 Mill tailing from Orelia Mines, Limited, Rainy River District, northwestern Ontario.
 Gold ore from "Dugan Option" of Tyranite Mines, Limited, Gowganda, Ont.
 Asbestos tailing from Canadian Johns-Manville Company, Limited, Asbestos, Que.
 Gold ore from Dome Mountain mine, Smithers, B.C.
 Gold ore from Tyranite Mines, Limited, Gowganda, Ont.
 Gold ore from Hiawatha Gold Mines, Limited, Oba, Ont.
 Gold ore from Magpie Junction, District of Algoma, Sault Ste. Marie mining division, Ont.
 Silver ore from Coniagas mine, Cobalt, Ont.
 Gold ore from "Dugan Option" of Tyranite Mines, Limited, Gowganda, Ont. (supplementary).
 Gold ore from Slave Lake mine, Outpost Island, Great Slave Lake, N.W.T.
 Gold ore from Pan-Canadian Gold Mines, Heva River, Que.
 Cobalt ore from W. E. MacCreedy, Cobalt, Ont.

- Gold-silver-copper ore from Grotto mine, Usk, B.C.
- Gold ore from the townships of Kennebec and Barrie, Frontenac county, central Ontario.
- Gold ore from Alsac Mines, Limited, Beardmore, Ont.
- Mill product from Lapa Cadillac Gold Mines, Limited, Heva River, Que.
- Mill product from Tyrant Mines, Limited, Gowganda, Ont.
- Gold ore from Halcrow-Swayze Mines, Limited, township of Bryce, Ontario.
- Pitchblende from Eldorado Gold Mines, Limited, Great Bear Lake, N.W.T.
- Gold ore from Rochette Gold Mines Company, Limited, Launay township, north-western Quebec.
- Concentrate and ore from Hard Rock Gold Mines, Limited, Geraldton, Ont.
- Gold ore from Chesterville Larder Lake Gold Mining Company, Larder Lake District, Ont.
- An examination of the steel of the gratings of two low discharge tube mills (Lake Shore Mines, Limited).
- An examination of an austenitic manganese steel ball mill liner (Sorel Steel Foundries, Limited).
- A determination of the elastic properties of two austenitic stainless steels (Atlas Steels, Limited).
- An examination of two defective "Bronze" bolts from H.M.C.S. *Gaspe* (Department of National Defence).
- The testing of a wire hoisting cable (Lamaque Gold Mines, Limited).
- A determination of the elastic properties of three duraluminium test bars (Department of National Defence).
- An examination of two austenitic manganese steels of special analysis (Sorel Steel Foundries, Limited).
- An examination of three austenitic manganese steels (Sorel Steel Foundries, Limited).
- An examination of two austenitic manganese steels (Sorel Steel Foundries, Limited).
- Identification of worn numbers on bird bands (National Parks Branch, Department of Mines and Resources).
- Impact tests on steels (Canada Car and Foundry, Limited).
- Hardness tests on steel grinding balls (Hull Iron and Steel Foundries, Limited).
- The casting of thirty nickel-chromium steel heat resisting trays (Royal Mint).
- Microscopic examination of two aeronautical structural steels (Department of National Defence).
- A determination of the impact strength of a steel (Dominion Engineering Company, Limited).
- Microscopic study of products from Beattie Gold Mines, Limited, Duparquet, Que.
- Microscopic examination of specimens from Quebec Manitou Mines, Val D'Or, Que.
- Microscopic examination of magnetic product from Canadian Johns-Manville Corporation, Asbestos, Que.
- Examination of sample from Cape Breton Island, N.S.
- Examination of two specimens from Aldermac Copper Corporation, Arntfield, Que.
- Microscopic examination of sample of gold ore from Chan Yellowknife Gold Mines, Limited, Yellowknife, N.W.T.
- Grain analysis of pyrite concentrate from Aldermac Copper Corporation, Arntfield, Que.
- Microscopic examination of two mill products from Aldermac Copper Corporation, Arntfield, Que.
- Microscopic examination of sulphide ore from Hard Rock Gold Mines, Limited, Geraldton, Ont.
- Study of mode of occurrence of gold in a table concentrate from Sherritt-Gordon Mines, Limited, Sherridon, Man.
- Investigation of mode of occurrence of nickel in tailings from Canadian Johns-Manville Company, Asbestos, Que.
- Examination of five rock samples submitted by A. L. Wilson, Ignace, Ont.
- Investigation of the mode of occurrence of gold in froth from No. 1 thickener at Sullivan Consolidated Mines, Limited, Sullivan post office, Que.
- Microscopic analysis of pyrite concentrate from Aldermac Copper Corporation, Arntfield, Que.

INDUSTRIAL MINERALS DIVISION

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

Information is acquired through correspondence, field work, laboratory investigations, and from technical publications, on Canadian and world resources of the minerals and rocks used in the manufacturing and building industries;

their distribution and accessibility in Canada; methods of production, purification, and preparation for the market; the uses to which they are put; and the general technology of their utilization. This information is made available to the public: (1) through published reports in the form of monographs dealing with a specific mineral or mineral group; reports on some phase of the mineral industry, methods of production, or the technology of utilization; annual reviews of the industry, which cover recent discoveries, progress in development and production, and market trends; mimeographed memoranda on special subjects of immediate importance or for limited distribution; (2) by correspondence in reply to requests for information or guidance; (3) by direct consultation; (4) by the delivery of lectures; (5) by the presentation of papers before technical societies; and (6) by articles for publication in the technical press or items for newspapers.

The Division works in close co-operation with the Commercial Intelligence Service of the Department of Trade and Commerce, exchanging information relating to the sources of supply and the marketing of industrial minerals. Important service is also rendered in the furnishing of information and advice on minerals and mineral products to other Government departments. The many tests carried out on minerals and mineral products included tests of refractories for Government purchase.

The Industrial Minerals Laboratories Building, at the corner of Lydia and Rochester Streets, abutting the Industrial Minerals Milling Laboratories, was finished early in December, and the moving of the laboratory equipment and office furnishings from the Mines Building, Sussex Street, began December 11. The new building is intended primarily to house the ceramics laboratories and road materials laboratories as well as the offices of the Industrial Minerals Division, and is provided with additional space for future development of the Division. By converting some of the laboratory rooms into offices and a library stack room, temporary accommodation was made for the Bureau of Mines Library and for the staff of the Economics Division. The setting up of the laboratories occupied the attention of part of the staff until March 31. As part of the laboratory equipment was unavailable for use for almost 5 months, some of the investigational work was interrupted.

Owing to the resignation of one officer and the death of another following a long illness, only one engineer remained on the staff of the Ceramics Section. One of the vacancies was filled August 15 and the other February 1. Certain investigations that had been temporarily suspended have been resumed.

The Division contributed thirty-five sections, dealing with as many minerals or mineral products, for the annual mineral review, which is prepared in collaboration with the Economics Division.

Field work was continued on talc and associated minerals and a report entitled "Talc, Steatite, and Soapstone: Pyrophyllite" was completed. It is to be published as one of the monograph series of the Bureau, superseding a report "Talc and Soapstone in Canada," published in 1922.

The study of the occurrence and economic aspects of glauberite (sodium-calcium sulphate) found in the cores obtained from drill holes sunk by New Brunswick Gas and Oilfields, Limited, at Weldon, New Brunswick, was continued and a preliminary report of the results obtained, with photographs, maps, and diagrams, was completed for record. During the summer, another drill hole, sunk by the same company, revealed 60 feet of glauberite and 1,500 feet of sodium chloride (common salt). The cores of this well were studied and correlated with the cores from the previous wells to estimate the extent of the deposit of glauberite. The indications are that the deposit contains many millions of tons of this mineral, and so far as is known it is the largest deposit of glauberite in the world. Glauberite offers decided possibilities as a source of

sodium sulphate, which is used in large quantities by a number of manufacturing industries. Preliminary laboratory investigation has been conducted on methods of extraction and preparation for the market, with encouraging results.

Following the discovery of large deposits of brucite (hydrated magnesia) at Rutherglen, Ontario, and at Bryson, Quebec, by an officer of the Division, an investigation into the commercial aspects of these unusual deposits was begun. Though primarily concerned with devising methods of separating the brucite from the limestone with which it is associated, the investigation also included studies of the occurrence and properties of brucite and of the potential markets for the products. A method of extraction has been devised that will permit the marketing of the brucite in competition with magnesia from other sources. The brucite product possesses certain characteristics that give it great advantages over other materials used in the making of basic refractories and magnesium metal.

Work was continued on limestone, lime, magnesite, marble, rock-wool, and whiting substitute, and a large part of the report on the limestones of Western Canada was completed. Special studies were made of certain marble, limestone, and calcite deposits in Ontario, and visits were made to plants producing magnesite in Eastern Canada and in Vermont. Investigations were made on the weathering characteristics of Canadian marbles; on the practicability of making precipitated chalk from marl deposits; and on rock-wool materials in Nova Scotia and New Brunswick.

Field work was continued on many of the industrial minerals to obtain information for future reports.

A total of 134 samples of industrial waters were collected and analysed, five of which represented midwinter flow and five spring freshet condition. The samples were obtained from the western provinces, from the Great Lakes watershed between Port Arthur and Cornwall, and from points on Ottawa River. Interim Report No. 3, "Industrial Waters of Canada," dealing with waters of Western Canada and the northern mining and industrial areas of Ontario and Quebec was issued in mimeographed form.

A survey of soils and rocks was made between Pembroke and Huntsville in Ontario to determine their suitability for use in road improvement, more particularly for stabilized road bases and surfaces. Soil stabilization for road purposes has developed rapidly within the past few years. It is an attractive form of improvement for low-cost roads in that it permits of a wide choice of materials, thus reducing hauling costs. Rock occurrences susceptible of yielding a good aggregate for paving mixtures on quarrying and crushing were also investigated. About seventy samples were collected for laboratory testing. A report on road soil stabilization, dealing with requirements for soil stability, construction practice, and materials used, or suitable for use, in building road surfaces and bases was turned in for publication.

At the request of the Department of Transport, several samples of gravel, sand, and rock intended for use in the building of bases and surfaces for airport runways were tested in the road materials laboratory. Technical advice was given on materials suitable, and on construction procedure, for stabilized bases and surfaces, and also on grading requirements of materials to be used in different types of bituminous mixture for surfacing airport runways.

INDUSTRIAL MINERALS MILLING LABORATORIES

Tests were completed and reports were prepared on the following:

Nepheline syenite from central Ontario, one shipment from Canadian Nepheline, Limited, Peterborough, Ont., two from Wm. Morrison, Toronto, and one from N. B. Davis, Ottawa.

Concentration and abrasive paper test on garnet from Ashley township, Ontario, submitted by Damigo Mining Syndicate, Limited, Toronto.

Sand blasting tests with garnet from Seguin Falls, Ont., submitted by S. Mann, Toronto.

Concentration of rutile in ilmenite from St. Urbain, Baie St. Paul, Que., submitted by Mr. Boyer, Quebec Department of Mines, Que.

Heat resistance tests on mica from Thorne township, Pontiac county, Que., submitted by O. A. Letts, Ottawa.

Purification of clay, submitted by Looser Chemical Company, Toronto.

Testing of gypsum from Newport, N.S., submitted by Windsor Plaster Company, Limited, Windsor, N.S.

Flotation tests with klorapine, a product of the Canadian Aniline and Extract Company, Limited, Hamilton, Ont.

Flotation tests with lauramine, a product of Yocum Faust, Limited, London, Ont.

Crushing tests on dolomite, submitted by Dominion Steel and Coal Corporation, Sydney, N.S.

Purification of iron oxide from Lacoste, Que., submitted by Iron Oxide Products Company, Limited, Montreal, Que.

Purification of sandstone from Nelles Corners, Ont., submitted by Canada Crushed Stone Corporation, Limited, Hamilton, Ont.

Concentration of asbestos rock from Kilmar, Que., submitted by Canadian Refractories, Limited.

Sand blasting of silicon, submitted by St. Lawrence Alloy and Metal Company, Beauharnois, Que.

Fusion point test on bentonite, submitted by Manitoba Steel Foundries, Limited, Selkirk, Man.

In addition to the above tests, 60 tons of sandstone was crushed and washed for the Experimental Farm; a number of small tests were made on glauberite from Weldon, N.B., and about 275 samples were ground for analysis. A large number of small tests were made on brucite from Rutherglen, Ont.; four bags of asbestos were treated wet for the National Research Council; two small samples and two main lots of 3,300 and 3,600 pounds of flux were ground for G. D. Peters and Company of Canada, Limited, Montreal. Several large-scale tests were made on brucite from Bryson, Que.; 1,000 pounds of calcite from Perth, Ont., was ground and air separated; 11 small samples of various minerals were subjected to tests and 29 small samples were crushed.

CERAMICS LABORATORIES

Physical Properties of Canadian Brick.—Compilation of the vast amount of data has progressed to the point where the preparation of the report can be undertaken in the near future.

Sodium Uranate.—Further work was carried out in co-operation with the research chemist of Eldorado Gold Mines, Limited, in an effort to produce uranium salts and black oxide of a quality thoroughly satisfactory to the ceramic trade. The work involved glaze tests on about forty-five experimental samples prepared in the laboratories of the company at Port Hope. Control methods that should ensure the production of uniformly satisfactory products have been evolved and are to be adopted at the plant.

Refractories.—Following tests conducted on fireclay shapes, made by a large Canadian firebrick manufacturing company for use in the Naval Service, recommendations were made that the grain size of the raw materials be altered. Further tests showed that a substantial improvement in the quality of the product had been effected as a result of this advice.

Four samples of firebrick, twelve samples of high-temperature cements, and nineteen samples of insulating brick were tested and reported upon.

Petrographic Work.—Petrographic studies, undertaken at the request of the National Research Council, in connection with the investigation on the

production of basic refractories from Canadian magnesitic dolomite and brucite were continued. A large number of thin sections and powdered samples were examined microscopically, and reported upon. Thirty-one samples of serpentine submitted by the National Research Council were also examined under the petrographic microscope to determine their nature and purity.

Thirty-five identifications by petrographic methods were made on various mineral samples.

Physical Properties of Canadian Hollow Building Tile.—Conferences were held with various Canadian tile manufacturers, architects, and other interested persons, and plans were formulated for the carrying on of this investigation.

Terra Sigillata.—An investigation was undertaken and satisfactory progress was made on the development of improved colour and surface texture of structural clay products by a method that yields results somewhat similar to the ancient terra sigillata.

Miscellaneous.—A report entitled "Improving the Properties of Clays and Shales" was published. It gives the results of a number of investigations conducted in the Ceramics Laboratories.

At the request of the Ontario Research Foundation, 200 bricks were made from two samples of clay to test the effectiveness of de-airing on these materials.

Thirty-eight samples of clay, shale, and other industrial minerals were tested and reported upon.

Five samples of building brick were also tested.

A further service to the National Research Council was the sawing of a very large number of refractory bricks and the preparation of test samples by means of the diamond drill. The hot-load test furnace was placed at the disposal of the Council during the first 9 months of the year.

DIVISION OF FUELS

The Chief of the Division, and senior technical officers, visited collieries in the eastern and western producing fields and discussed problems under investigation. They also attended committee meetings in Ottawa with other Government departments, and in the United States, relative to testing and research work on Canadian coals, petroleum oils, and natural gas. Four Bureau of Mines' reports on fuels were prepared: comparative burning tests of various domestic fuels; tests on wood in different kinds of wood-burning stoves; gasoline analyses surveys for 1937 and 1938, and the hydrogenation of typical Canadian coals for the production of motor fuels. Papers were prepared and published in technical journals on oil-shales of Canada, and on the hydrogenation of Canadian coals with special reference to the oil yields, as the coals varied in rank from medium volatile bituminous to lignite.

COAL CLASSIFICATION AND METHODS OF TESTING

Technical officers of the Division co-operated in the work of the Associate Committee of the National Research Council on Coal Classification and Analysis. The Committee has adopted the standard specifications for the classification of coals by rank and by grade of the American Society for Testing Materials and has recommended their use by other Government departments for the classifying of Canadian coals. This recommendation is made in "Report of the A.S.T.M. Standard Specifications for Classification of Coals by Rank and by Grade, and Their Application to Canadian Coals," which will be published by the National Research Council.

Special small-scale apparatus for testing the plasticity and ignitability of coals was added to the equipment of the Fuel Research Laboratories. This consisted of the "Gieseler," "Davis," and "Layng-Hawthorne" plastometers, and a "Sebastian-Meyers" ignitability-reactivity apparatus. A study was made of the "size distribution" and "absolute size" constants of Rosin and Rammler laws, and of their application to the size composition of Canadian coals as run-of-mine coal and at various stages of handling, including the examination of size stability by the drop shatter test. A report on the "grindability indices of typical Canadian and other coals and the relation of grindability to friability" is in the course of preparation for publication. These studies have a bearing on investigations of the handling properties of Canadian coals and their suitability for use as pulverized fuel for steam raising.

The relationship of the agglomerating and coking properties of certain imported Welsh coals low in volatile matter, and the effect of weathering on the plasticity of Sydney, Nova Scotia, coal were studied. Other small-scale laboratory investigations comprised: experimental tests in "dustiness" apparatus; the efficiency of apparatus for mechanical sampling; capacity moisture of Canadian coals in relation to their classification; calorific value corrections for fuels of varying sulphur contents when burned in nickel- and gold-lined bombs; and the effect of change of temperature during the determination of the ash of wood in the presence and in the absence of carbonates.

PURCHASE OF COAL BY SPECIFICATION

Samples submitted by the Department of Pensions and National Health, and by the Penitentiaries Branch, Department of Justice, incident to the purchase of their coal supplies according to specification, were analysed as in the previous years. The services of the staff of the Fuel Research Laboratories were also utilized by the Departments of Public Works, Transport, and National Defence in checking the quality of coal deliveries.

Technical officers of the Division co-operated in the activities of the recently formed subcommittee on the Solid Fuels of the Canadian Government Purchasing Standards Committee (National Research Council) in regard to the formulation of standardized procedure for the purchase of coal according to specifications of rank, size, and analysis.

COMBUSTION ENGINEERING INVESTIGATIONS

Test work in co-operation with the Forest Products Laboratories on the burning of wood and wood waste in domestic appliances was continued throughout the year. The results of the work of the previous year were calculated and reported on. Six tests were conducted to determine the relative efficiencies of two wood-burning European domestic boilers in comparison with a typical Canadian domestic boiler. The results of these tests were calculated and reported.

An investigation was carried out with a sawdust-burning unit attached to a domestic hot-water boiler. The fuel burned was sawdust of various contents of moisture, which was supplied by the Forest Products Laboratories. Twenty-one tests were conducted in the course of this investigation. Five burning tests were made in the experimental domestic hot-water boiler installation on five special samples, namely, two samples of coal submitted by the Canadian National Railways, two samples of coal from Nova Scotia, and one sample of lignite from Alberta. The results were reported to the parties concerned.

A complete report of all the hand-fired burning tests that have been carried out and completed in the experimental domestic boiler installation since 1929 was prepared, and is now in the course of publication. Two of the staff engaged on the above work were appointed members of the Canadian Engineering Standards Association and the National Building Code Committee. These two committees are sponsored by the National Research Council to draw up a National "Model" Building Code. The routine work on the collection and plotting of data on the Degree Day heating load for Ottawa was continued. The performance of a new type of domestic coke burning stoker installed in a private residence was observed during the winter months.

COAL BENEFICIATION, CARBONIZATION, AND BRIQUETTING

Field investigations and laboratory tests were conducted on problems concerning coal preparation and storage. The physical and chemical survey for Nova Scotia was completed, with the preparation of reports for the eleven remaining collieries, the samples for which were collected during the previous year's field work. The purpose of this survey is to study the coal as produced from the various seams and operating collieries with a view to assisting the operators in the improvement of coal preparation for the market. The first of a series of bulletins for the several producing coal areas of Canada is being prepared.

The survey was extended to the Minto area, New Brunswick, where, during July and August, seventeen producing mines were sampled. The laboratory investigation of these samples has been completed for eight of the locations. Western coalfields were also visited and samples of coal from the Crowsnest Pass area were obtained, together with data on the preparation plants at the collieries. A detailed study of the coal cleaning and preparation operations on Vancouver Island was also completed.

An investigation on the effect of chemical treatment of coal subject to spontaneous combustion during storage was carried out at the mines at Inverness, owned and operated by the Nova Scotia Government. The oxidation of Nova Scotia coals during storage, and its effect on the clinkering properties of the coals when burned, is being investigated in special equipment designed for the purpose.

Studies on the carbonization of coals were continued with the investigation of coal expansion properties in a new type of test furnace. A series of standard coal samples was also tested in collaboration with the American Society for Testing Materials. These tests are being made to obtain sufficient data from the various laboratories engaged in this special work to permit this important test to be standardized. Several coke and gas plants were visited during the year, among which was the first plant of the Curran-Knowles system of carbonization to be erected in Canada. This plant is located at Owen Sound, Ontario. An investigation was carried out in co-operation with the Forest Products Laboratories of the creosoting properties of the tar produced during the carbonization of coal in these ovens.

The Division is also interested in the preparation of a standard specification for foundry coke, and in order to obtain the necessary information and data to permit such specifications to be prepared, a questionnaire was circulated to the Canadian foundry operators.

HIGH PRESSURE HYDROGENATION

Liquefaction tests on a series of coals covering a wide range of rank were continued. The samples tested were: sub-bituminous coal from the Black

Diamond mine at Clover Bar in Edmonton district, Alberta; lignite from Bienfait in the Souris area, Saskatchewan; lignite from the Onakawana district, Ontario; and peat from the Alfred area, Ontario. These tests on the low rank coals completed the series devoted to the study of the effect of rank on amenability to hydrogenation. A report on the results obtained has been prepared. A paper on the subject was also presented to the American Chemical Society.

A sample of char produced by heating Alfred peat at 300° to 350° C. was tested, and further work was begun on coals from Inverness, N.S., and Pittsburgh, Pa.

In addition to the regular investigational work outlined above, a new method of carrying out tests was developed. With this method it is possible to obtain approximate data on a large number of samples at the same time. The method was employed in a study of catalysts, but it is also considered suitable for testing different coals.

To keep the Division in touch with similar work being conducted elsewhere, visits were made to the hydrogenation laboratory of the United States Bureau of Mines at Pittsburgh, Pa.; the hydrogenation laboratories of the University of Wisconsin at Madison, Wis.; and the development laboratories of the Universal Oil Products Company at Riverside, Ill.

PETROLEUM OILS, BITUMEN, MINE AIR, NATURAL GAS, AND EXPLOSIVES

Studies were made of petroleum and natural gas developments in Alberta, Saskatchewan, and Ontario. An intensive study was made of drilling procedure and engineering practice in Turner Valley, and considerable information was collected on the refining of Alberta oils. Laboratory studies of the aviation gasoline and fuel oil that could be produced from Turner Valley crude oil were carried out, and refinery products from the Ribstone area were investigated. The progress being made in the utilization of the bituminous sands of northern Alberta was also followed. A preliminary investigation of petroleum refinery gases was made and several samples were analysed. Samples of natural gas from various parts of the country were analysed and the helium content of most of them was determined. Samples of mine air, mainly from British Columbia and Alberta, were analysed and reported upon, the object of the work being to reduce the risk of fire and explosion in mines and underground workings. The investigational work on sulphur was expanded in order to develop a rapid and satisfactory method of determination that could be adapted to the study of sulphur in various forms of fuel. The annual survey of gasoline sold in Canada during the year was completed and a report thereon was published. Special research and analytical work on various explosives was carried out at the request of the Chief Inspector of Explosives.

The Division has been called upon frequently for assistance and advice by other Provincial and Dominion Government departments, independent companies, and private individuals. Co-operation in the work of the Canadian Government Purchasing Standards Committee and of the Dominion Fire Marshals' Association was continued.

ROUTINE CHEMICAL LABORATORY WORK

As is shown below, a total of 6,851 samples of solid, liquid, and gaseous fuels were analysed, the examination of which involved some 25,000 separate chemical and physical determinations of the different items of analysis. The total number of samples includes 119 samples of explosives, submitted by the Explosives Division, and 393 samples of mine air.

		Number of Samples	Per Cent of Total
1	Samples pertaining to investigations of the Fuels Division:		
	Solid fuels.....	3,442	50.2
	Coals.....	3,313	
	Cokes, chars, peat, wood, and miscellaneous....	129	
	Liquid fuels.....	124	1.8
	Gasoline and other motor fuels.....	74	
	Crude oils, and miscellaneous.....	50	
	Gases.....	2,848	41.6
	Natural gas.....	41	
	Mine air.....	393	
	Flue gas.....	2,312	
	Manufactured gas and miscellaneous.....	102	
2	Samples from other divisions of the Department of Mines and Resources:		
	Mainly from Explosives Division.....	124	1.8
3	Samples from outside the Department:		
	Department of Pensions and National Health—coals.....	61	0.9
	Department of Justice (Penitentiaries Branch)—coals.....	78	1.1
	Departments of National Defence and Transport—coals, lubricating oils, fuel oils, and (aviation) gasolines.....	74	1.1
	Other Government departments—coals.....	33	0.5
	Provincial Governments and public institutions.....	7	0.1
	Commercial firms and private individuals.....	60	0.9
	Total.....	6,851	100.0

EXPLOSIVES DIVISION

FACTORIES

A total of 36,500 tons of commercial explosives were made during the year. This is exclusive of military explosives, ammunition, safety fuse, and fireworks.

Ten factories were licensed to manufacture the explosives listed below:

- 1, commercial blasting and military explosives
- 3, commercial blasting explosives only
- 1, sporting ammunition, detonators, track torpedoes, and blasting supplies
- 1, safety fuse
- 3, fireworks (two factories operated intermittently)
- 1, toy caps and toy pistols

Further improvements were made in the factories producing commercial explosives to obtain greater manufacturing and storage facilities. A very efficient system of ventilation has been installed in buildings where the fumes of nitroglycol and nitroglycerine are encountered. This adds greatly to the comfort and well-being of the employees.

Inspectors of the Division made 36 visits of inspection to factories.

ACCIDENTS

There were no accidents in manufacture that resulted in loss of life or injury to personnel, buildings, or equipment.

In the Annual Report of the Division is given a detailed analysis of the accidents involving explosives that occurred during the year.

Accidents of all kinds reached a total of 163, including 53 fatalities and injury to 146. Most of these accidents occurred in the use of explosives in mines, quarries, and elsewhere, but 46 accidents, which killed two people and injured fifty, were caused by playing with detonators and other explosives.

There was a fatal accident in the use of explosives for each 715 tons manufactured, and an injury for each 405 tons.

MAGAZINES

A total of 344 licensed magazines were in use during the year, and 240 were operated under temporary magazine licence.

Inspectors of the Division made 384 visits of inspection to magazines and 288 inspections were carried out by the Royal Canadian Mounted Police. Conditions generally were found to be satisfactory.

AUTHORIZATION OF EXPLOSIVES

Two applications for authorization of high explosives for which samples were submitted were refused, and one provisional authorization was, after examination, changed to authorization.

A complete list of all explosives authorized for manufacture or importation is given in the Annual Report of the Division.

IMPORTS OF EXPLOSIVES

Approximately 750 tons of explosives to be used in the manufacture of other explosives, in the making of lacquers, and for other industrial purposes were imported. About 282 tons of manufactured fireworks were imported, along with a number of commodities that are enumerated in the Annual Report.

MISCELLANEOUS

A large quantity of deteriorated explosives was destroyed, some by officers of the Division, a larger quantity by the company manufacturing explosives, and some by officials of a Provincial Mines Department. In all, about 33½ tons of explosive, 17,000 detonators, and 2,300 units of fireworks were destroyed.

Close to 4 tons of explosives and 6,200 detonators were reported to have been stolen, and of this about half was recovered by the police.

Inspectors and deputy inspectors made 3,100 visits of inspection to unlicensed premises.

Proceedings were taken in seven cases for violation of the Explosives Act. Convictions were obtained and fines were imposed. A number of more serious charges were also laid under the Criminal Code and offenders were sentenced to long terms of imprisonment.

An automobile in which fireworks were being smuggled was confiscated and the owner fined.

DOMINION FUEL BOARD

The functions of the Dominion Fuel Board remained substantially unchanged during the year. The permanent staff of the Board is chiefly engaged in the administration of the Orders in Council providing assistance to the coal industry of Canada, and of the Domestic Fuel Act (1927) under which assistance is provided to certain coking plants utilizing Canadian coal. The Board also continues to act in an advisory capacity to the Fuel Sub-Committee of the Cabinet and maintains a close watch on all conditions affecting the industry both in Canada and abroad.

The routine administrative work in connection with the granting of assistance under the Orders in Council continued to increase. The number of applications dealt with was 55 per cent greater than in the previous year and 62½ per cent greater than in 1936, despite a lower coal consumption. This increase was due partly to the change in the method of administration of the movements from Alberta to Ontario under P.C. 740 on June 1, 1938, which brought the procedure in line with the system followed under the other Orders in Council.

The coal consumed in Canada for industrial purposes was 19 per cent below that for the previous year, owing to the decrease in requirements by industrial and railway consumers. Imports of bituminous coal were 21 per cent less, production in Canada was 14 per cent less, and, as a corollary, the movements of Canadian coal under assisted rates to markets in Central Canada also decreased by 23 per cent.

The movements under assisted rates amounted to 2,023,094 net tons at a cost to Government of \$1,867,405, as compared with 2,616,991 net tons in 1937-8 and a cost of \$2,459,436. The provision of this assistance by Government undoubtedly helped to prevent a serious unemployment situation in the coal mining districts. The sums expended provided employment for some 4,000 men, or the equivalent of 850,000 man-days of work, approximately one-sixth of the total employment in the Canadian coal industry. Without this assistance, Canadian coals would have lost a considerable market in central Canada to the cheaper imported coals.

Payments under the Domestic Fuel Act declined by 10 per cent, being \$53,725 on 53,725 net tons of Canadian coal used at the three coke plants operating under the Act at Halifax, Quebec, and Vancouver. The usual inspections of these plants, required under the Act, were carried out by the technical officers of the Board, in collaboration with local auditors allocated by the Comptroller of the Treasury. Assisted movements of coal under Order in Council P.C. 944 for processing in by-product coke plants continued on approximately the same basis as in 1937-8.

Conditions in the United States bituminous coal fields, from which Canada imports the bulk of the industrial coal requirements of the central provinces, continued unsettled pending the projected establishment of minimum prices under the National Bituminous Coal Commission. Towards the latter part of the summer, prices dropped markedly, resulting in a curtailment of shipments of Nova Scotia coal to Ontario. To retain for Canadian coal a fair proportion of the business that it had enjoyed for some years in Ontario, the Government, through an Order in Council passed on November 8, 1938 (P.C. 2789), increased the rates of assistance to Canadian coal movements to compensate in some degree for the lower prices of imported coal.

Towards the end of the year, meetings were held both in Ottawa and Washington between committees appointed by the United States and Canadian Governments to discuss the marketing of bituminous coal in Quebec and Ontario. The general situation was reviewed in the hope that closer co-operation might be obtained in the distribution of bituminous coal throughout this area after the establishment of minimum prices in the United States. It is the expressed desire of both Governments to effect a more orderly marketing arrangement, under which the dumping of low price imported coals will be obviated and the present market for our own coals maintained at reasonable competitive levels.

During the summer months, the Secretary made a comprehensive survey of the western coalfields and effected the adjustment of many administrative matters with western operators and distributors. The industry in the West is undergoing a period of readjustment consequent upon widespread wage scale alterations. The possible effects upon the coal industry of developments in western oil and gas fields are being closely watched. In January, by Order in

Council P.C. 3286, subvention privileges similar to those established for Alberta coals in 1928 for shipments to central Ontario were extended to mines in the Crowsnest area of British Columbia.

The construction during the year of several new coal cleaning and preparation plants is an indication of the keen competition between operators to maintain their positions during periods of reduced demand and to meet the more critical requirements of users.

The annual survey of operating costs and revenues of Canadian coal mining districts was continued, and the results were published in the form of a coloured graph showing the trend for the 5-year period, 1933 to 1937, inclusive.

The Board's resident inspector in Winnipeg continued his check on the distribution of subvention coal in that district.

Delegations representing the coal industry of Nova Scotia and New Brunswick, who requested further aid in the marketing of their coal, were received by the Government. As a result of these submissions special memoranda were prepared for the information of the Fuel Committee of the Cabinet.

Co-operation with the Tariff Board with respect to coal and coke hearings was continued. On several occasions officers of the Board were called upon for consultation and technical advice with respect to the coal and coke industries.

At the request of the Minister of Labour, the Secretary attended Conciliation Board hearings at Calgary in connection with wage scale matters of the western bituminous coal miners. A further meeting was attended at the request of the Provincial Government of New Brunswick, at which certain recommendations relating to the coal industry suggested by the New Brunswick Government were reviewed.

A survey was made of the fuel consumption and distribution in northern Ontario and Quebec where Alberta coal is finding an increasing market, and other investigations were continued on a wide variety of problems affecting the industry.

The Board again wishes to acknowledge the cordial co-operation received from Government departments, and the coal industry both in Canada and the United States.

PUBLICATIONS

MINES AND GEOLOGY BRANCH

English Publications

Report No.

Annual Report for the Fiscal Year Ending March 31, 1938.

BUREAU OF GEOLOGY AND TOPOGRAPHY

English Publications

- 2444 Memoir 210. *Rice Lake-Gold Lake Area, Southeastern Manitoba*—by C. H. Stockwell.
 2439 Memoir 215. *Fossil Flora of Sydney Coalfield*—by W. A. Bell.
 2447 Memoir 216. *Geology of St. John Region, New Brunswick*—by F. J. Alcock.
 2449 Memoir 217. *Laberge Map-area, Yukon*—by H. S. Bostock and E. J. Lees.
 2450 Memoir 218. *Mining Industry of Yukon, 1937*—by H. S. Bostock.
 2293 *Summary Report 1930, Part C* (Reprint).
 2296 Memoir 169. *Geology and Mineral Deposits of a Part of Southeastern Manitoba*—by J. F. Wright (Reprint).
 39-1 *Beaulieu River Area, Northwest Territories*—by J. F. Henderson.
 39-4 *Stratigraphy and Structure of Turner Valley, Alta.*—by G. S. Hume.

Mimeographed Reports

- 38-11 *West Half Opémisca Map-area, Abitibi Territory, Que.*—by G. W. H. Norman.
 38-16 *Keithley Creek Map-area, Cariboo District, B.C.*—by A. H. Lang.
 38-17 *East Half Nelson Map-area, B.C.*—by H. M. A. Rice.
 38-18 *Mistawak Map-area, East Half, Que.*—by J. T. Wilson.
 38-19 *Mistawak Map-area, West Half, Que.*—by J. T. Wilson.
 38-21 *Yellowknife Bay, Prosperous Lake Area, N.W.T.*—by A. W. Jolliffe.

Mimeographed Reports—Concluded

Report No.

- 32-22 *The Stratigraphy and Structure of Southern Turner Valley, Alta.*—by G. S. Hume.
 32-23 *Fallentimber Map-area, Alta.*—by B. R. MacKay.
 32-24 *North Half of Bousquet Township, Qué.*—by H. C. Gunning.
 32-25 *Duvernay, East Half, Abitibi County, Qué.*—by L. J. Weeks.
 32-26 *Duvernay, West Half, Abitibi County, Qué.*—by L. J. Weeks.
 32-27 *Montgay, West Half, Abitibi County, Qué.*—by L. J. Weeks.

French Translations

- 32-11 *Région d'Opémisca, moitié-ouest, Territoire d'Abitibi, Qué.*—par G.-W.-H. Norman.
 32-18 *Région de Mistawak, moitié-est, Qué.*—par J.-T. Wilson.
 32-19 *Région de Mistawak, moitié-ouest, Qué.*—par J.-T. Wilson.
 32-24 *Canton de Bousquet, moitié-nord, Qué.*—par H.-C. Gunning.

NATIONAL MUSEUM OF CANADA

English Publications

- Bulletin 90. *The Sarcee Indians of Alberta*—by D. Jenness.
 Bulletin 91. *Annual Report of the National Museum for the Fiscal Year 1937-38.*
 Museum Leaflet No. 4. *Plains Indians.*

French Translations

- Bulletin 91. *Rapport du Musée national sur l'année financière 1937-38.*
 Feuillet N° 1. *La Famille Algonquine.*
 Feuillet N° 3. *Indiens du Fleuve Mackenzie.*
 Feuillet N° 4. *Indiens des Plaines.*

BUREAU OF MINES

English Publications

- Separates 725-730* (Investigations in Ore Dressing and Metallurgy, July-December, 1937).
Separate 731 (Investigations in Ore Dressing and Metallurgy, July-December, 1937).
Separates 732-747 (Investigations in Ore Dressing and Metallurgy, January-June, 1938).
Separates 748-754 (Investigations in Ore Dressing and Metallurgy, July-December, 1938).
 Folder. *A Glimpse of Canada's Mineral Industry.*
 781 *Limestones of Canada Part IV, Ontario*—by M. F. Goudge.
 785 *Combined Report of Investigations in Ore Dressing and Metallurgy, January-June, 1937.*
 790 *Comparative Pulverized Fuel*—by C. E. Baltzer and E. S. Malloch.
 791 *Canadian Mineral Industry in 1937.*
 793 *Improving the Properties of Clays and Shales*—by J. G. Phillips.
 794 *Petroleum Fuels in Canada, 1937*—by J. M. Casey.
 796 *Gasoline Surveys for 1937 and 1938*—by P. V. Rosewarne and H. McD. Chantler.

Mimeographed Reports

- 68 *Industrial Waters of Canada* (Interim Report No. 3).
 69 *The Concentration of Canadian Molybdenite Ores.*
 70 *Grindability Indices of Typical Canadian and other Coals and the Relation of Grindability to Friability.*
 71 *Fusion Point of Coal Ash Determinations.*
 72 *Industrial Waters of Canada* (Interim Report No. 4).

EXPLOSIVES DIVISION

English Publications

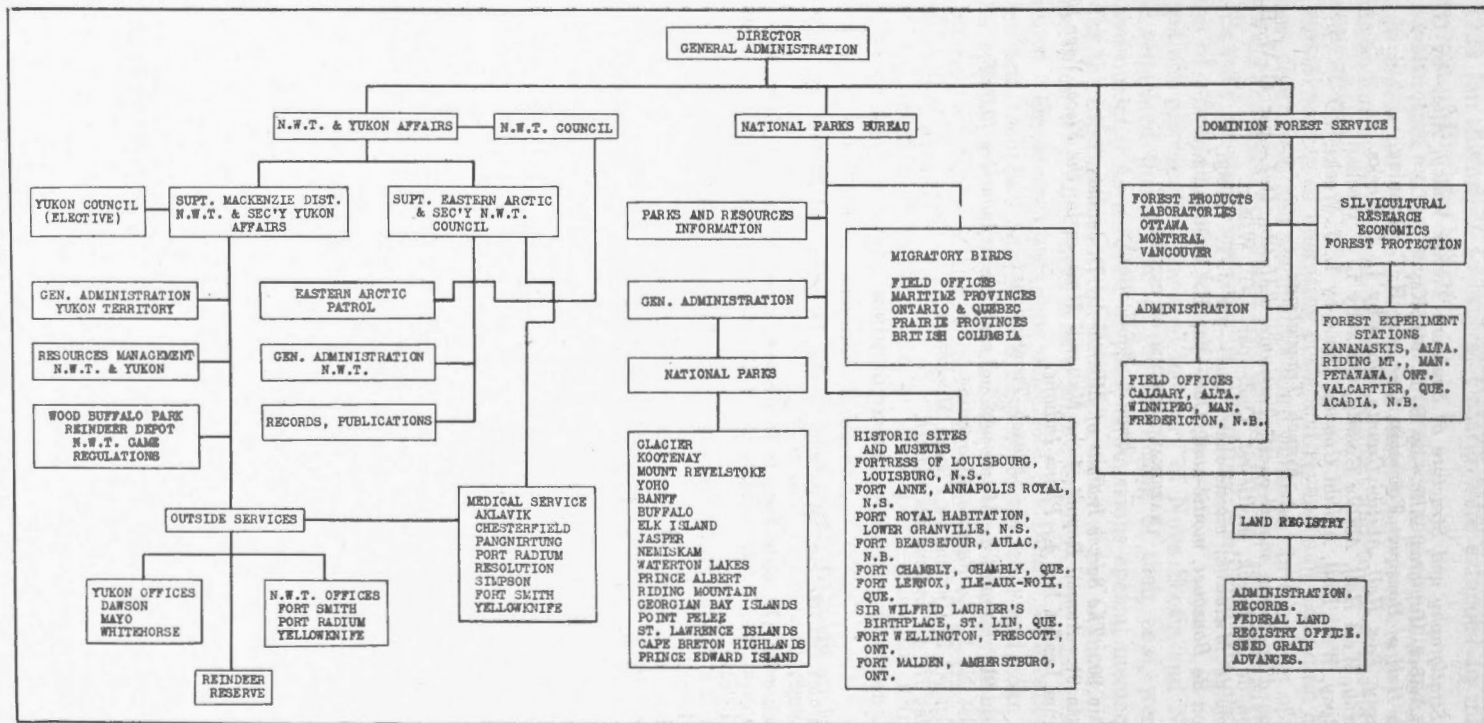
- The Storage of Explosives.*
 43 *Annual Report for the Calendar Year, 1937.*

French Translation

- 44 *Rapport de la Division des Explosifs pour l'année civile, 1937.*

LIST OF MINES AND MINE OPERATORS

- List No. 1-1, *Metallurgical Works in Canada Part II.*
 List No. 1-2, *Milling Plants in Canada Part I.*
 List No. 4-1, *Coal Mines in Canada.*



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 resources of the Northwest and Yukon Territories, and deals also with any business arising from the local government of the two Territories. It administers the National Parks of Canada and gives a lead in the conservation of wild life, marks historic sites of national importance, and assists in the encouragement of travel. It conducts scientific investigations relating to the safeguarding, management, and maximum utilization of the forest resources of the Dominion, maintaining forest experiment stations and forest products laboratories. A Land Registry Office, which deals with land owned by the Dominion in the various provinces, is also maintained.

The Branch comprises four main bureaux or services and the chart herewith indicates the plan of organization. The activities of the Branch extend to every province and territory of the Dominion.

BUREAU OF NORTHWEST TERRITORIES AND YUKON AFFAIRS

NORTHWEST TERRITORIES

The Northwest Territories comprise that portion of the mainland of Canada lying north of the Provinces of Manitoba, Saskatchewan, and Alberta, and east of Yukon Territory, 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. However, due to the mining activity which has developed in the Mackenzie District during recent years, the white population has considerably increased, the estimated total being 2,000.

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.

Deputy Commissioner—R. A. Gibson.

Members of Council—A. L. Cumming, K. R. Daly, H. W. McGill, O. D. Skelton, S. T. Wood.

Secretary—D. L. McKeand.

WORK OF COUNCIL

Twelve regular sessions of Council were held during the year and several important matters came up for consideration.

Assent was given to an ordinance in respect of businesses, callings, trades and occupations and the issue of licences thereunder. Separate ordinances were approved in connection with chemists and druggists (pharmaceutical) and insurance agents. Some consideration was given to draft legislation for the control, regulation and sale of liquor and for the administration of purely local affairs at Yellowknife. The Committee on the revision of the Northwest Territories Ordinances reported progress and several obsolete ordinances were repealed. An amendment to the Northwest Territories Act was recommended to authorize the inspection of baggage in transit as a means of preventing illegal transportation of fur.

The organization and itinerary of the annual Eastern Arctic Patrol was arranged.

A number of applications for permits to make exploratory and scientific investigations in the Northwest Territories under the terms of the Scientists and Explorers Ordinance were dealt with and reports of expeditions considered.

Various measures were considered in reference to game conservation of which the following might be specially noted: limitation of the issue of hunting and trapping licences; creation of Mackenzie Mountains Game Preserve; wolf bounty; restriction of aeroplanes in trapping operations; muskrat conservation development in Wood Buffalo Park and other suitable locations; inclusion of tidal water areas in Hannah Bay Waterfowl Sanctuary, Ontario, and Northwest Territories; creation of Twin Islands Game Sanctuary in James Bay; development of eiderdown industry. Other questions dealt with included: sanitation and pure water supply at settlements in Mackenzie District; public works improvements, including Grimshaw-Great Slave Lake road; aids to navigation; radio services; forest conservation; hospitals and medical services; administration of justice; freight rates to Northwest Territories; establishment of liquor store at Yellowknife; grant to school at Yellowknife; reindeer affairs; operation of trading posts; new post offices; agricultural development; water power.

An inspection trip to Fort Smith and the Yellowknife Mining District was made by Dr. Charles Camsell in the summer of 1938, and Mr. R. A. Gibson and Mr. A. L. Cumming inspected various settlements and mining areas in the Mackenzie District.

A committee was formed to study conditions of employment in the Northwest Territories.

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 of the Northwest Territories. 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 by the water route from the south. This officer is also Superintendent of Wood Buffalo National Park, Dominion Lands Agent, Crown Timber Agent, and Mining Recorder, as well as Stipendiary Magistrate and Sheriff. To facilitate the administration of justice a qualified barrister was also appointed Stipendiary Magistrate and stationed at Fort Smith during the year preparatory to being assigned to Yellowknife. A member of the Royal Canadian Mounted Police at Port Radium is Dominion Lands Agent, Mining Recorder, and Crown Timber Agent. A member of the Force also acts as Sub-Mining Recorder at Yellowknife.

MEDICAL OFFICERS

Medical Officers employed by the Department are stationed at Fort Smith, Resolution, Simpson, Norman, Aklavik, Port Radium, Yellowknife, Chesterfield, and Pangnirtung. To facilitate medical administration, the Territories have been divided into medical districts over which the resident Medical Officers have jurisdiction. They are responsible for the general health and welfare of the native population. Extensive patrols are made to outlying areas when conditions permit, and contact is maintained at all times of the year by means of the radiotelegraph service. All doctors have been appointed coroners, and also act as Medical Health Officers in order to enforce the sanitary regulations. They also supervise the various mission hospitals, residential schools, and industrial homes.

HOSPITALS

During the year, a new Roman Catholic Mission hospital was opened at Resolution, bringing the total of such institutions up to eight, exclusive of the hospitals operated by the mining companies at Yellowknife and Port Radium. The regular hospitals are situated within the principal settlements and are operated by the Anglican and Roman Catholic Missions. An arrangement has been in effect with the Mission authorities for the treatment of indigent whites, Eskimos, and half-breeds, at a rate of \$2.50 per diem. Payment to the hospitals totalled \$23,042.50, representing 9,217 days' treatment. In addition the sum of \$3,670.70 was paid for the maintenance of mental or other patients in provincial institutions. Industrial homes, where the aged and infirm are cared for and taught native handicrafts, are operated in conjunction with the hospitals at Chesterfield and Pangnirtung. The Department pays for the care and maintenance of each inmate on the basis of \$200 per annum. The sum of \$2,419.25 was expended under this heading. These figures do not include the amounts paid by the Indian Affairs Branch for Indians.

SCHOOLS

Residential and day schools are maintained by the Roman Catholic and Anglican Missions, assisted by grants from the Dominion Government. During the year 306 white, Eskimo, and half-breed children were enrolled in the residential schools and 134 attended the day schools. The sum of \$24,205.74 was expended for educational purposes in addition to a small amount for school supplies. This figure does not include the amounts paid by the Indian Affairs Branch for the maintenance and education of Indian children.

TRANSPORTATION

The Northwest Territories are reached by steamer via the Pacific and Atlantic Oceans and by the inland water routes. The aeroplane also plays a very important part in year-round transportation. The Grimshaw-Great Slave Lake winter tractor road is also providing a further means of access. During the past year the water transportation companies handled approximately 20,000 tons of freight in addition to that consigned to Eastern Arctic points. The aeroplane companies carried in excess of one million pounds of freight in connection with their Northwest Territories operations. Scheduled flights are maintained throughout the year except for a short time during the freeze-up and break-up periods. Chartered flights may be arranged to practically any part of the Territories. During the year winter aeroplane landing fields and seaplane bases were further improved to meet the increasing needs.

COMMUNICATIONS

As in previous years, the Northwest Territories and Yukon radio system operated by the Department of National Defence (Permanent Force) continued to serve a very useful and necessary purpose, likewise the wireless stations operated by the Department of Transport. The stations of the former are located at Edmonton, McMurray and Chipewyan, Alberta; Goldfields, Saskatchewan; Fort Smith, Resolution, Yellowknife, Simpson, Norman, Aklavik, Port Brabant (seasonal), Port Radium, and Thompson Lake, Northwest Territories; Dawson, Mayo, Whitehorse, and Burwash Landing, Yukon Territory. The wireless, meteorological and direction-finding stations operated by the Department of Transport are located at Coppermine, Chesterfield, and Nottingham and Resolution Islands, N.W.T.; Churchill, Manitoba; Port Harrison and Cape Hopes Advance (seasonal), P.Q. Mail for the Mackenzie District and Western Arctic is carried under contract by an air transportation company. The greater portion of the mail consigned to points in the Eastern Arctic is conveyed by the R.M.S. *Nascopie*. The mail service is further supplemented by non-scheduled patrols by the Royal Canadian Mounted Police, missionaries, and other travellers. During the past year the scheduled mail flights to Fort Smith totalled 94 with a lesser number to more northerly points.

LAW AND ORDER

Law and order in the Territories are enforced by the Royal Canadian Mounted Police. Detachments have been established at the more important settlements and extensive patrols are made to outlying areas. The Departmental Agent stationed at Fort Smith, has been appointed Sheriff of the Northwest Territories. To facilitate the administration of justice four Stipendiary Magistrates have been appointed.

VITAL STATISTICS

The Vital Statistics Ordinance of the Northwest Territories has been in force since January 1, 1927. A system of record similar to that adopted by the provinces was set up at that time to deal with whites, Eskimos, half-breeds, and non-Treaty Indians. Later the system was extended to include Treaty Indians. The information gathered under this system is furnished the Dominion Bureau of Statistics for inclusion in the Vital Statistics of the Dominion. The Director of the Branch is Registrar General for the Northwest Territories.

LIQUOR PERMITS

The Northwest Territories Act, Chapter 142, R.S. 1927, authorizes the importation of intoxicating liquors to eligible persons under permit issued by the Commissioner. During the past year 1,332 such permits were issued covering 2,406½ gallons of spirituous liquors, 11 gallons of wine, and 70½ barrels of beer. With the discovery of precious metals, particularly in the Yellowknife-Great Bear Lake area, the white population of the Mackenzie District has steadily increased. These new residents, the majority of whom formerly resided in provinces where they were privileged to purchase spirituous liquors, wines, and beer, petitioned the Commissioner to extend this privilege to Yellowknife Settlement. The matter was under consideration at the close of the fiscal year.

AIDS TO NAVIGATION

This work was carried out by the Department of Transport under the direction of our Agent, Mr. Meikle. Existing aids were maintained at all points between the delta of Athabaska River and Great Bear Lake.

LAND AND TIMBER

Lands are disposed of by sale in some of the surveyed settlements to transportation companies, mining companies, traders, and missions in connection with their several undertakings and to settlers for residential purposes. In other surveyed settlements, such as Port Radium and Yellowknife, surface leases are granted for the same purposes. At Port Radium there are 19 leases in force.

A reservation of land for a settlement at Yellowknife, which lies about 615 miles almost due north of Edmonton, was made by Order in Council P.C. 968 of May 3, 1938. A survey was commenced and, during the summer, 9 blocks were laid out, 7 of which were subdivided into 126 lots. Surface leases for five-year periods are being granted, and, up to the end of the year, 92 such leases had been issued.

Small parcels of unsurveyed land suitable for agricultural and fur-farming purposes, as well as tracts with water frontage suitable for transportation and shipping interests, are leased under the provisions of Chapter 113, R.S.C. 1927. The number of such leases in force is 21. There are also 4 grazing leases in force and, during the year, 9 hay permits were issued under which 84 tons of hay were cut.

The number of timber permits issued, exclusive of those granted in connection with timber berths, was 96, authorizing the cutting of 37,108 lineal feet of timber, 23,000 feet board measure of saw timber, 20 fence posts, 105 roof poles, and 8,750 cords of wood. Twenty-six of these permits were issued free of dues to educational, religious, and charitable institutions; to settlers for domestic use, and to Government departments. Eighteen timber permit berths were granted. The revenue derived from lands, timber, grazing, and hay was \$11,771.45, being an increase of \$5,540.08 over the previous year.

MINING

The year under review was exceptionally active in the Yellowknife area where gold was discovered in 1935. In 1936 a discovery of gold was made at Gordon Lake and in 1937 gold was found at Moberly Lake and at Snare River. Further discoveries of gold-bearing quartz were made in 1938 at Sunset Lake (Beaulieu River), Murray Lake, McDonald Lake, Thompson Lake, Pensive Lake, and Wray Lake, and exploration and development work were conducted in these several areas.

The "Con" claims were staked near Yellowknife Bay in the autumn of 1935, the "Negus" property being staked in the same area in January, 1936. The start of actual gold production was signalized on September 5, 1938, when the first gold brick, weighing 72½ pounds, was poured at the "Con" mine of the Consolidated Mining and Smelting Company. By the end of March, 1939, gold valued at more than \$400,000 had been produced from this mine. The first gold brick was poured at the "Negus" mine owned by Negus Mines, Limited, on February 21, 1939, since which time production has continued at the rate of more than \$50,000 monthly.

The pitchblende-silver property of Eldorado Gold Mines, Limited, at Labine Point, Great Bear Lake, has been developed to a depth of 890 feet, with seven levels opened. The mill on the property handled about 100 tons daily, producing an average of 80 tons of concentrates monthly. These concentrates were shipped to the company's refinery at Port Hope, Ontario, for treatment—radium, silver, and uranium by-products resulting from such treatment. Additions to the plant included two new Diesel engines and a new 70,000-gallon fuel oil storage tank. The mine now has a storage capacity of 250,000 gallons of fuel oil.

Miners' licences issued during the year numbered 1,158 and 620 such licences were renewed. Entries were granted for 4,584 quartz mining claims

and a large number of claims were renewed by the owners obtaining certificates of work, the number in good standing at the end of the year being 7,585. Final leases have been issued comprising an area of 7,476.35 acres. The total revenue obtained from fees payable under the Quartz Mining Regulations amounted to \$65,602.90, including \$13,606 collected as licence fees.

Placer Mining.—Of more than 300 claims staked and recorded in the South Nahanni and Liard River districts since 1934 only 25 are now in good standing. Placer mining fees amounted to \$291.

Coal.—Six coal mining leases are in force, comprising an area of 536.60 acres. The total revenue derived from fees, rentals, and royalties in connection with coal mining rights during the year amounted to \$439.36.

Petroleum and Natural Gas.—Petroleum and natural gas leases affecting lands in the Northwest Territories comprise a total area of 3,173.33 acres. Petroleum produced from the wells of Northwest Company, Limited, below Norman on Mackenzie River, amounted to 24,067.9 barrels during the year. Most of the oil was shipped to the Great Bear Lake, Yellowknife, and Gordon Lake mining fields. Revenue from petroleum and natural gas locations totalled \$1,791.36. Two oil and gas permits were issued during the year, comprising in all an area of 5,120 acres.

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. Rental paid on this lease during the year amounted to \$50.

NORTHWEST GAME ACT AND REGULATIONS

During the past year several amendments to the Northwest Game Regulations were made with the object of conserving the wild life for the native population.

Order in Council P.C. 976, dated May 3, 1938, established the Mackenzie Mountains Game Preserve situated to the west of Mackenzie River and north from Liard River to the boundary of the Peel River Preserve, comprising 69,440 square miles.

Order in Council P.C. 977, dated May 3, 1938, limits the issue of hunting and trapping licences to—

1. Residents of the Northwest Territories as defined by the Game Regulations who, on May 3, 1938, held hunting and trapping licences and who continue to reside in the Northwest Territories.
2. The children of those who have had their domicile in the Northwest Territories for the past four years, provided such children continue to reside in the Northwest Territories.

Order in Council P.C. 1708 dated July 20, 1938, provides for the payment of a bounty of \$10 on each mature wolf and \$5 on each wolf pup killed in the Northwest Territories or in the Wood Buffalo Park on and after October 1, 1938.

Order in Council P.C. 2470 dated October 4, 1938, prohibits the use of aircraft as a means of transportation to or from or within the Mackenzie Mountains Game Preserve in connection with hunting or trapping operations.

Up to March 31, 1939, a total of 583,997 square miles had been set aside as game preserves, in which only natives were permitted to hunt and trap. Wood Buffalo Park, 17,300 square miles, Thelon Game Sanctuary, 15,000 square miles, and the Reindeer Grazing Preserve, 6,600 square miles, are additional reservations which have been established in the interests of the wild life.

Wood Buffalo Park.—During the winter of 1938-9 the wardens carried out patrols in the southern part of the park with the intention of obtaining an estimate of the buffalo population. They were unable to make a detailed survey of this large area (6,300 square miles) and climatic conditions, especially heavy snowfalls, were factors which precluded the possibility of securing a satisfactory estimate of the buffalo in that district. A further effort is to be made during the winter of 1939-40. This investigation will be extended to cover the whole of the park as time permits.

Under the supervision of the park superintendent the wardens continued their efforts to exterminate undesirable predatory animals and twenty-one wolves were taken by them during the winter of 1938-9. Further progress was made in the construction of cabins and additional fire control equipment was installed.

Mr. J. L. Grew was engaged for part of the year to make an investigation of the wild life conditions in Wood Buffalo Park and to determine the feasibility of effecting improvements to restore the water levels in certain areas which, in former years, produced a good yield of mink and muskrats. Mr. Grew, after consultation with the park superintendent, carried out an investigation in the southern area of the park with the aid of the warden staff. He recommended immediate action upon construction of dams and retaining walls to impound the waters of the Murdock Creek drainage area during the spring run-off of 1939. Authority was granted to proceed with this work and it was completed by winter, except for some minor details in connection with the dam.

During 1938 the sum of \$6,714.13 was expended in connection with the Murdock Creek conservation project. This included the cost of tools and materials in addition to providing for the payment of wages for labour for a total of 11,424 man-hours.

The natives have been notified that they will not be allowed to trap muskrats in the Murdock Creek area until the muskrat population has increased to an extent that would justify trapping operations.

Mr. Grew also investigated the possibilities of improving conditions for wild life in the Buffalo Lake area, which is in the northwesterly sector of the park, and he also examined the Egg Lake, Dempsey Creek, and Horse Island areas in the southerly part of the park. He has recommended that fur conservation projects be undertaken in each of these areas.

Arrangements were made for park warden M. J. Dempsey to investigate wild life conditions in the district between Fort Smith and Simpson and to report upon certain representations made to the Department urging changes in the game regulations. He left Fort Smith on January 7, 1939, and reached Simpson on February 12, returning to Fort Smith on March 23. He interviewed a total of 122 fur traders and trappers en route, who completed questionnaires giving their observations upon the wild life situation.

A number of persons requested the payment of a higher bounty for the destruction of wolves and an increase in the bag limit for beaver. The majority of the residents, however, considered the game regulations to be generally satisfactory. Park Warden Dempsey's report indicated that marten are very scarce in the greater part of the district which he investigated and that there is a shortage of beaver in the area lying between Slave River and Taltson River. His recommendations are being considered by the Department.

Fur and Game.—The returns from a number of outlying posts have not as yet been received, therefore, complete game statistics for the fiscal year ended March 31, 1939, are not available. The following statement has been prepared from the returns for the licence year ended June 30, 1938, received in the Department to date.

Preliminary statement of pelts of fur-bearing animals taken during year ended June 30, 1938.

Bear, black	65	Fox, red	5,658
Bear, brown	7	Fox, silver	344
Bear, grizzly	2	Fox, white	49,159
Bear, white	140	Lynx	936
Beaver	12,466	Marten	6,195
Coyote	53	Mink	3,523
Ermine	15,986	Muskrat	413,362
Fisher	22	Otter	323
Fox, blue	499	Skunk	45
Fox, black	12	Wolverine	137
Fox, cross	2,428	Wolf	1,389

Preliminary statement of big game animals and birds taken during licence year ended June 30, 1938.

Deer	42	Grouse	324
Caribou	18,071	Prairie chicken	817
Moose	1,205	Ptarmigan	7,619
Sheep	162	Wild duck	11,359
Partridge	1,108	Wild goose	1,391

Buffalo.—Climatic conditions during the past year appear to have been favourable to the buffalo. According to the reports of the wardens there were no unusual losses to the herds. In accordance with the customary practice thirty surplus buffalo were slaughtered during the winter season. The meat of the animals was allotted to missions and hospitals and to the Indian Affairs Branch for distribution to needy native families in districts adjacent to the park.

Caribou.—Reports indicate that in the majority of districts within the range of the barren ground caribou these animals were fairly plentiful during the past year. At a number of isolated points, however, the natives experienced difficulty securing sufficient for their needs. Investigations were made into the alleged excessive slaughter of caribou in the Burnside River and Red Rock Lake districts referred to in the annual report of last year and, following a study of the reports, the Advisory Board on Wild Life Protection recommended that the efforts of the Department to educate the natives to conserve this wild life resource be continued. Many of the Eskimos living in the districts mentioned depend upon caribou for food throughout the year.

A scarcity of woodland caribou and moose was reported from a number of points and residents of the district to the north of Great Slave Lake reported that the many large fires which have taken place in that area during recent years are largely responsible for the shortage of these animals.

Musk-ox.—No reports upon the condition of the animals in the Thelon Game Sanctuary were received during the year. The Royal Canadian Mounted Police have re-established the post at Baker Lake and the officer in charge planned to make a journey to the east end of the Thelon Game Sanctuary during the months of February and March, 1939, to investigate the activities of the natives in that area. The report on this patrol will not be available until August, 1939.

The natives of the Beverley Lake district make a practice of entering the sanctuary for the purpose of securing wood for building sledges, etc. The Royal Canadian Mounted Police have obtained an aeroplane to assist the field officers in supervising the game laws, and special consideration will be given to the situation existing at the eastern end of the Thelon Game Sanctuary.

Moose.—A total of 1,205 moose was taken during 1937-8 as compared with 1,289 for the previous year. There has been a steady decline in the number of moose taken during recent years.

Beaver.—The open season—March 1 to May 31—established in 1937, appears to be satisfactory. The regulations under which male residents over eighteen years of age may be granted a permit to take fifteen beaver during the open season remained in effect. The number of beaver permits issued was 1,306 and 12,466 beaver were taken. Since the adoption of the beaver regulations in 1932 the average annual yield of beaver pelts has been approximately 11,500 pelts.

Fox.—There was a considerable increase in the yield of white fox pelts for the season of 1938, indicating that the cycle is following its normal trend. The returns of fox pelts taken during the past five years were as follows:—

Year ended June 30	White fox	Red fox	Cross fox
1934.....	52,467	8,763	3,668
1935.....	52,615	11,789	4,875
1936.....	25,897	9,556	4,074
1937.....	19,854	5,988	2,976
1938 (preliminary report).....	49,159	5,658	2,428

In addition the preliminary returns for 1937-8 show 12 black, 499 blue, and 344 silver fox.

Marten.—The yield was 6,195 pelts, which approximates the average number taken each year for the past ten years. The establishment of the Mackenzie Mountains Game Preserve will, it is hoped, eventually result in a greater yield of marten pelts because it embraces a large part of the habitat of the marten in the Mackenzie District and trapping will be better controlled in that area under the preserve regulations.

Mink.—The number of mink pelts taken was 3,523. This is the lowest yield since 1922, from which time accurate records of the fur yield have been maintained. The mink is subject to violent fluctuations in numbers and for the year ended June 30, 1933, the yield of mink pelts was 18,715. It would appear that the period of low production during the present cycle has now been reached.

Muskrat.—A total of 413,362 pelts was taken, as compared with 218,923 for the previous year. The normal open season for muskrat extends from March 1 to May 31 in the district south of the Arctic Circle. Due to a scarcity of other forms of wild life in the southern part of the Mackenzie District it was necessary to extend the open season for muskrats to cover the period January 15 to May 31 in this area, as a relief measure. This additional trapping only partially accounted for the increase in the number of muskrat pelts because there was a corresponding increase in the Mackenzie River Delta where the extended open season did not apply.

Wolf.—In consequence of representations made to the Department, the regulations were amended to provide for the payment of a bounty of \$10 on and after October 1, 1938, on each mature wolf and \$5 on each wolf pup killed in the Northwest Territories or in the Wood Buffalo Park. A total of \$10,505 was paid for the destruction of 1,817 wolves during the fiscal year ended March 31, 1939.

Fur Export Ordinance.—The sum of \$97,760.92 was obtained as revenue under the Fur Export Ordinance during the year ended March 31, 1939, compared with \$57,061.68 for the previous year. The increase in the yield of white fox and muskrat pelts was largely responsible for the improvement in the revenue.

Licences.—Licences were issued during the licence year ended June 30, 1938, as follows:—

Hunting—	
Resident	505
Non-Resident British	1
Non-Resident Non-British	3
Non-Resident Bird Licence	7
Trading—	
Resident	145
Non-Resident British	8

Infractions of Game Laws.—There were twenty-four prosecutions and twenty-one convictions for infractions of the game laws.

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

To establish trading posts	23
To take mammals for propagation purposes.....	2
To hunt and trap in Wood Buffalo Park.....	365
To render Migratory Birds permits operative in N.W.T. (Counter-signed)	13
To take specimens of mammals and non-migratory birds for scientific purposes	8
To take fifteen beaver	1,306

Revenue.—The revenue collected under the Northwest Game Act and the Fur Export Ordinance for the fiscal year 1937-8 was as follows:—

Hunting licences	\$ 1,632 32
Trading licences	1,644 14
Bird licences	35 00
Fur-farm licences	13 00
Trading post permits	23 00
Sale of furs	514 43
Fur Export Tax	97,760 92
Fines and forfeitures	145 00
	<hr/>
	\$ 101,767 81
Revenue under Businesses, Callings, Trades, and Occupations	
Licence Ordinance	2,542 50
	<hr/>
Total	\$ 104,310 31

General.—Reports by departmental field officers and Royal Canadian Mounted Police officials from practically all points extending from the Eastern Arctic to the Mackenzie District indicate that generally speaking the natives of the Northwest Territories have enjoyed good health and satisfactory hunting conditions have prevailed.

REINDEER

The Government reindeer enterprise in the northern Mackenzie District continued to make progress. At the round-up on Richards Island in midsummer 1938, there were more than 4,500 deer. The official count of fawns for the year was 1,281 head. The round-up was attended with unusual difficulty on account of high winds which interfered with the driving of the deer to the corrals and also endangered water craft used in the transportation of men and supplies.

The reindeer were reported to be in excellent condition and as usual the round-up was taken as an occasion to balance the herd in regard to male and female stock and to select surplus animals for slaughter in the autumn. The round-up also afforded an opportunity to demonstrate to visiting natives the handling of the deer.

During the last week in September, shortly before freeze-up, 286 deer, consisting of mature steers and aged females, surplus to herd requirements, were slaughtered for meat purposes. The allotments to the Anglican and Roman

Catholic Missions in the Mackenzie Delta area were increased from 65 head in previous years to 80 head for each Mission. These were mainly old females of an average dressed weight of 130 pounds, the average weight of the steers being 167 pounds. The remaining deer slaughtered at this time provided meat for camp use, medical officer (Aklavik), relief, and sale. Six of the carcasses were disposed of in lieu of wages for extra help required at the round-up. Subsequent slaughter during the winter increased the total for the year to more than 300 head. The number of carcasses sold to the end of the fiscal year was 61, providing a total revenue of \$1,526.

In September, 1938, one of the remaining Laplanders brought from Norway in 1931 returned to his home, leaving only one Laplander at the Reindeer Station. He was assisted by two experienced Eskimos from Alaska and four native apprentice herders. The entire herding staff was under the direction of the General Foreman and a supervising officer at the field camp. Dr. J. A. Urquhart, who has had general supervision over the Reindeer Station for several years, was transferred from Aklavik to Fort Smith, his supervisory duties being assumed by the General Foreman.

The communication facilities between the Reindeer Station and Aklavik were improved by the installation of two-way radiophone equipment at the Reindeer Station, operating in conjunction with the Signals Station of the Department of National Defence at Aklavik. This has proved a valuable link with the Administration office at Ottawa. Improvements have been effected in warehouse facilities and herder's cabins at the Reindeer Station.

An important development in December, 1938, after the movement of the reindeer herd from Richards Island to the winter range on the mainland, was the separation of a part of the herd comprising about 950 deer and the movement of this smaller herd across the Eskimo Lakes to a location in the vicinity of Anderson River about 150 miles east of the reserve. This herd has been established under native management with the departmental chief herder in charge. The natives entrusted therewith are Charlie Rufus, trained as an apprentice herder, and his father, Rufus Kalealuk. The conditions under which the deer are loaned to the natives are set forth in an agreement which conforms with the arrangements discussed between Dr. Urquhart and the natives. Provision is made for reclaiming the herd if not properly handled and for the return eventually of a herd similar in size and composition to the one loaned.

The Interdepartmental Reindeer Committee met on May 30 and October 28, 1938, and February 27, 1939.

EASTERN ARCTIC PATROL

The annual patrol to the Eastern Arctic on board the R.M.S. *Nascopie* of the Hudson's Bay Company was again a feature of Government administration during the year. The Commissioner of the Northwest Territories was shown over the vessel prior to its departure from Montreal and was afforded an opportunity to inspect the ship's equipment and personnel. The *Nascopie* sailed from Montreal on July 9 and returned to Halifax on September 19, after completing a successful voyage.

Major D. L. McKeand, Superintendent of the Eastern Arctic, was again Officer in Charge of the Government party and representative of the Department of Mines and Resources in the northern archipelago. The party included Dr. Keith Rogers, medical officer and ship's doctor; F. R. E. Sparks, of the Post Office Department; D. A. Nichols, physiographer; T. M. Shortt, ornithologist; F. H. Varley, artist; J. J. Bildfell, special investigator; Corporal MacBeth, of the Royal Canadian Mounted Police; and Mrs. Marion Grange, historian. Superintendent T. B. Caulkin, of the Royal Canadian Mounted Police, joined the patrol at Churchill. Although the Government party was smaller than

usual, considerable administrative and scientific work was accomplished. Regular meetings were held to discuss topics of interest and to co-ordinate activities at the various ports of call.

Hebron on the Labrador Coast, where the *Nascopie* made its first call to discharge mail and supplies, had been selected as an advance base instead of Port Burwell. The change proved a decided advantage. Subsequent calls included the regular posts at which Government of Hudson's Bay Company officials are located, and a trip was also made to Thule, Greenland, where there was an exchange of courtesies with representatives of the Danish Government. Advantage was taken of this opportunity to discuss questions of mutual interest in reference to administration, health of natives, game resources, etc. A small party of Eskimos, men and women, was taken on board at Thule for two years' employment with the Royal Canadian Mounted Police at Craig Harbour.

With the increased number of private commercial radio stations now operating in the Eastern Arctic, and improved equipment used on the patrol vessel combined with other favourable conditions, it was found possible to shorten the previously estimated time of the entire voyage by eleven days. The four and a half days saved at Churchill was attributed mainly to improved facilities available for loading coal. While the vessel was at Chesterfield the Officer in Charge, through the courtesy of the Hudson's Bay Company, was enabled to make an aeroplane flight to Baker Lake where the Royal Canadian Mounted Police are re-opening a post.

The patrol provided the usual opportunity for the Officer in Charge to confer with Government officials, traders, missionaries, and others engaged in various activities in the Eastern Arctic. Observations were made in regard to the general welfare of the natives and the economic conditions affecting their means of livelihood. The medical officer studied health conditions of the natives, and the remaining members of the Government party were afforded opportunities to pursue their investigations and make any observations required.

While at Cape Dorset, southern Baffin Island, arrangements were made for the transportation of several Eskimo families who desired to join relatives at Arctic Bay and Fort Ross.

The supplies carried with the Patrol as Government freight represented about one-third of the general cargo. They included requirements for medical and surgical purposes, food supplies, household equipment, coal, fuel, and lubricating oil. The distribution thereof was as follows: Lake Harbour, 28½ tons; Eskimo Point, 21½ tons; Chesterfield, 113½ tons; Baker Lake, 24 tons; Craig Harbour, 8½ tons; Pond Inlet, 24½ tons; Pangnirtung, 87½ tons; total, 306½ tons.

At Churchill a quantity of green salted buffalo, elk, and moose hides was taken on board for distribution to Eskimos in the Northwest Territories and in northern Quebec.

The temperature during the voyage was much colder than usual although the weather was generally fair. Ice conditions were normal but favourable winds on several occasions kept the vessel's course free from ice.

PUBLIC IMPROVEMENTS

Grimshaw-Great Slave Lake Winter Tractor Road.—Under an agreement with the Provincial Government of Alberta a winter tractor road was constructed between Grimshaw, Alberta, and Hay River, Great Slave Lake, N.W.T., a distance of approximately 400 miles. This road may be later extended to Yellowknife via Providence. A tractor train hauling 120 tons of freight left Grimshaw, Alberta, on March 9 and proceeded to Yellowknife, Northwest Territories, a total distance of approximately 580 miles. This distance was covered in 32 days.

Main Road to Waterfront at Fort Smith.—As a result of the landslide which took place in the autumn of 1937 the main road leading to the waterfront at Fort Smith was completely destroyed. A new and more direct road was constructed during the past year.

Fort Smith Waterfront Road.—In order to give access to the seaplane anchorages this road was constructed parallel to Slave River and to connect with the highway leading to the main docks.

Fort Smith Dock.—This dock is used to facilitate the trans-shipment of passengers and freight to and from air and water craft. During the year it was further improved and strengthened.

Yellowknife Townsite Road.—This road was constructed to facilitate transportation within the settlement of Yellowknife.

Yellowknife Bay-Thompson Lake Winter Tractor Road.—A winter tractor road extending from Yellowknife Bay to Thompson Lake, a distance of approximately 30 miles, was constructed by Thompson-Lundmark Gold Mines Limited under an agreement with the Department. This road will serve the mining operations in the general vicinity of Thompson Lake.

Winter Aeroplane Landing Fields and Seaplane Bases.—The following improvements were made during the year:—

The Fort Smith winter field was further cleared and levelled. All buildings in the vicinity of the runways were moved back to facilitate the movement of aircraft.

At Fort Smith seaplane base, 4 floating docks were constructed, and 2 similar docks built previously were anchored in Slave River. The main stationary dock was faced and further strengthened. The shore opposite the floating docks was cleared and levelled and steps installed to provide access from the floating docks to the land level. The floating docks were removed immediately before freeze-up.

The main runway at Resolution winter field was further extended and improved. A second runway at right angles to the first was constructed. Brush was removed and other general improvements carried out.

A wharf 61 feet by 8 feet was constructed at Yellowknife seaplane base and made available for the use of seaplanes. The cabin erected previously was moved to a more accessible location. This cabin was later destroyed by fire.

At Rae seaplane base, the harbour was buoyed and all obstacles marked. The Providence winter field was further conditioned, fences removed, and other small improvements made.

A floating dock 20 feet by 8 feet was constructed at Simpson seaplane base and anchored parallel to the shore with a sidewalk 20 feet by 4 feet extending from the dock to the shore. This dock was removed in the autumn.

The Wrigley winter field consists of 2 small lakes which have been connected by the removal of trees, mounds and other obstacles. During the year further levelling was done, sunken logs removed, and trees slashed to facilitate the movement of aircraft.

The Norman winter field was found to be in satisfactory condition to meet immediate requirements. The work done during the year consisted of maintaining existing facilities. At the seaplane base, the floating dock constructed previously was launched in the spring and removed in the autumn.

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; 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). There has been an increase lately in the white population due to revival of mining activities.

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, incorporation 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.

Territorial Council

Controller Yukon Territory—G. A. Jeckell, Dawson

Seat of Government—Dawson, Y.T.

The following is the Yukon Council, elected August 27, 1937: Dawson District, John A. McDonald; Whitehorse District, George Wilson; Mayo District, Ernest J. Corp.

WORK OF COUNCIL

The Yukon Council met on April 25, 1938. This was the first session of the eleventh wholly Elective Council of the Territory. The Council was pro-rogued on May 2, 1938.

The Game Ordinance was repealed and a new Game Ordinance enacted which is more concise and embodies amendments. Many provisions of the Northwest Game Act have been included and the new Ordinance conforms with the Migratory Birds Convention Act and Regulations. There is a greater measure of control over hunting and trapping, trading and trafficking in fur, and the use of aircraft in trapping operations. Amendments were made to the Sale of Beer Ordinance, Assessment Ordinance, Dental Ordinance, Ordinance respecting Insane Persons, Marriage Ordinance and the Workmen's Compensation Ordinance. A Deserted Wives Maintenance Ordinance was passed.

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 \$573,127.47 during the past fiscal year and the revenue collected in the Yukon amounted to \$351,410.33. For local purposes the Territorial Government raised \$154,134.57, of which amount \$95,000 represented the profit from the operation of Government liquor stores.

LANDS AND TIMBER

Five sales of land were made and one homestead entry, two agricultural leases, three permits to occupy, two waterfront leases, and four hay permits

were granted. One assignment was registered. There are now in force 23 homestead entries, 8 agricultural leases, 24 waterfront leases, 2 miscellaneous leases, and 15 permits to occupy. The revenue derived from lands amounted to \$5,803.07.

One hundred and twenty-three timber permits were issued authorizing the cutting of 671,576 feet board measure of saw timber, 600 lineal feet of timber, and 17,888 cords of wood. Two permits to cut wood for mining purposes were issued free of dues. One licence timber berth was cancelled, leaving 33 in force. Four timber seizures were made. The total revenue collected from timber was \$7,480.83.

MINING

A marked increase in placer gold production was noticeable during the past year. Placer mining operations produced 90,509.51 ounces of gold, the total value of which, at \$35 per ounce, is \$3,167,832.85. This is an increase of 31,969.50 ounces as compared with the previous year, mainly due to the production of Yukon Consolidated Gold Corporation, Limited, which rose from 36,849.65 fine ounces in 1937 to 60,055.76 fine ounces in 1938.

An interesting development in lode mining was the beginning of production in the Freegold Mountain area, Carmacks District, where gold deposits were discovered in 1930.

Production from the mines on Galena Hill in the Mayo District continued steadily and a large tonnage of ore was treated in the mill at the Elsa mine. A number of small operators also shipped silver-lead ore from this district.

Entries were granted for 148 placer and 88 quartz mining claims staked and applied for during the year, and 3,216 such claims were renewed for another year. One quartz mining lease was issued, comprising an area of 25.37 acres, making a total of 4,952.74 acres held under lease.

Gold Royalty.—The total amount collected for royalty on gold obtained from placer deposits up to March 31, 1939, was \$5,156,593.63 of which amount \$33,941.23 was collected during the fiscal year. (For the purpose of calculating royalty, the gold is valued at \$15 an ounce, and a rate of 2½ per cent charged pursuant to Section 83 of the Yukon Placer Mining Act.)

Dredging.—Three leases to dredge for minerals in the beds of rivers in the Territory are now in force, comprising a total river stretch of about 14½ miles. The total rental from this source up to March 31, 1939, amounted to \$210,058.86. These leases comprise portions of the bed of Klondike River. For the purpose of gold recovery there are 10 dredges engaged in mining in Yukon Territory, all but one of which are being operated by hydro-electric 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 \$203,798.50 have been collected on account of such locations, the amount received during the fiscal year being \$2,765.

Placer Mining

The total number of placer claims in good standing at the close of the year was 2,573, most of which are held by the Yukon Consolidated Gold Corporation Limited. Nine dredges were operated by this company during the year, and these produced 60,055.76 fine ounces of gold and 14,411.98 fine ounces of silver. The company employed an average of 423 men, the peak

during the operating season reaching 678, and expended \$1,071,000 for salaries, wages, and power. A further sum of \$949,183 was expended for equipment, supplies, and freight.

The greater part of the 90,509.51 ounces of gold produced during the year was from the Dawson District, the Mayo District producing 733.35 ounces and the Whitehorse District 730.89 ounces.

Lode Mining

Dawson District.—While entries for only 15 quartz claims staked during the year were granted, development work was conducted on 383 claims previously staked. A 10-ton mill was installed in the Mount Freegold area and by the end of the year a brick weighing 84 ounces of crude gold was produced. This was the initial production of the area and the first gold produced in Yukon from a lode gold property in many years. It is the intention to enlarge the capacity of this mill to 25 tons per day.

Mayo District.—Operations in this area are conducted mainly by the Treadwell Yukon Corporation Limited. The production in silver-lead concentrates from its "Silver King," "Elsa" and "Hector" groups, Galena Hill, was maintained. Operations on these groups produced 60,240 tons of ore, of which 59,090 tons were milled, 5,988.12 tons of concentrates resulting. The total production was 6,747.39 tons, containing 3,061,763 ounces of silver and 4,075,424 pounds of lead. The total tonnage shipped by the corporation yielded 1,064.8 ounces of gold, 2,872,824.7 ounces of silver, and 5,365,686 pounds of lead, having a gross value of \$1,533,912.31. The company employed an average of 179 men throughout the year, the largest number employed during the busy season being 235. The average wage was \$8.22 per day, the total wages paid amounting to \$510,215.72. An expenditure of \$616,466.14 was incurred for equipment and supplies. There are 729 quartz claims in good standing in this district, a decrease of nine as compared with the previous year.

Grants and Leases

Prospecting Leases.—Prospecting leases representing a total of 98 miles were issued during the year on the following watercourses: All Gold, Haggart, Geary, Moose, Duncan, Clear, Ruby, Canadian, Left Fork Clear, Bullion, Sixtymile, Selwyn, Black Hills, Sheep, Little Gold, Britannia, Gold Bottom, Hunker, Victoria, Ten Mile, Barker, Big Gold, Hight, Bedrock, Shorty, Eleven Pup, Green Gulch, and Dublin Gulch.

Water Rights.—There are now in force 43 grants to divert water for mining purposes, under the provisions of the Yukon Placer Mining Act, which grants aggregate 15,050 miner's inches.

Coal.—One coal mining lease is in force, comprising an area of 40 acres on the south fork of Coal Creek.

Assay Office

The Assay Office was maintained as usual at Keno by the Territorial Government. A total of 1,282 samples of rock for assay was received from all parts of the Territory, and 1,925 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, 1,282; lead, 633; copper, 7; and molybdenum, 3.

ROADS AND BRIDGES

Expenditures on the maintenance of the road system out of Territorial funds were \$53,378.41, a decrease of \$3,120.02 from the previous year. The operations were confined to maintenance of the roads most used. Some new road equipment was purchased, and all working equipment was repaired and kept in good condition.

A special grant of \$50,000 was received from the Federal vote for mining roads, and the net expenditure from this grant was \$47,789.13. All of this amount was expended on roads. Highway work consisted of the following: Improvements to sections of the Sulphur-Dominion Creek roads, such as ditching, installing culverts, renewing bridges, and surfacing with best gravels available. Completion of the Silver King road in the Mayo District, and repairing road equipment. Construction of a winter truck road from Mayo to Minto on the Yukon River for twenty-six miles on the Mayo end, and twenty miles on the Minto end, which was approximately one-half of the total distance between Mayo and Minto.

DEVELOPMENT OF AIRCRAFT LANDING FACILITIES

Expenditures on landing fields from Territorial funds were very limited. The landing field at Mayo was improved by removing a ridge at the eastern end of the east and west runway. By an arrangement with the owner of the adjoining farm the Dawson airport runway may be extended in the future. The landing fields at Mayo and Dawson were dragged and rolled during the winter. The White Pass and Yukon Route and the Pacific Alaska Airways attended to this work at the Whitehorse airport at their own expense. There was a very marked increase in aeroplane traffic in the Territory during the year.

GENERAL

Agriculture.—The summer season was very favourable and good crops of vegetables and hay were secured. The season was favourable for cutting and curing the hay and grain fodder crops.

Fur and Game.—The net collections made under the Fur Export Tax Ordinance amounted to \$10,837.60, a decrease of \$34.53 from the previous year's collections. An increase is shown in the number of beaver, marten, muskrat, otter, weasel, coyote, and wolf pelts taken. The most marked decrease was in red and white fox, lynx, and mink. A total of 1,727 coyote pelts and 637 wolf pelts were presented for payment of export tax. Revenue from fees for licences issued under the Game Ordinance amounted to \$4,144, a decrease of \$546 from the previous year.

Public Welfare.—The general health of the people of the Territory was good. Hospitals were operated at Dawson, Mayo, and Whitehorse, grants for their maintenance being provided by the Yukon Council. The number of hospital days of patients for the year were: Dawson 12,797; Mayo 2,514; Whitehorse 2,577. The number of hospital days for indigents were: Dawson 9,190; Mayo 54; Whitehorse 640.

Education.—Schools were maintained during the year at Dawson, Whitehorse, Carcross, Mayo, and at the "Elsa" camp on Galena Hill. The enrolment of pupils for the year was 214, which is an increase of 26 over the previous year.

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

LAND REGISTRY

The Land Registry maintains a Central Office of Record for lands owned or otherwise controlled by the Dominion; it administers Ordnance and Admiralty lands, Dominion owned public lands, and Soldier Settlement lands on which advances have been made; and it has charge of the adjustment of seed grain, fodder, and relief indebtedness. Where lands are disposed of by sale or otherwise, the Land Registry issues the letters patent.

CENTRAL OFFICE OF RECORD

The Central Office of Record is a convenient inventory and it is being increasingly used by the different Departments and the general public. At the end of the year 3,848 properties had been recorded.

ORDNANCE AND ADMIRALTY LANDS

Ordnance and Admiralty lands are those areas in the Maritime Provinces, Quebec, Ontario, and British Columbia, which were at one time, because of their strategic situation, reserved or acquired by purchase or otherwise by the Crown. When no longer required for such purposes they are transferred to the Department to administer. It is the policy of this Division to make these lands revenue producing, wherever possible, by placing them under occupation in the manner to which they are best suited. The work of administration requires investigations, appraisals, surveys, searches of titles, the preparation of plans, leases and reports, and collecting rentals. As a measure of economy the Soldier Settlement of Canada undertakes the field inspection work when one of its officers is in the vicinity. During the year investigations were made at Shelburne and Tufts Cove, in Nova Scotia; Fredericton, Grand Falls, Oromocto, Pomeroy Bridge, St. Andrews, and Saint John, in New Brunswick; Chambly, Chute à Blondeau, Jacques Cartier, Laprairie, Lauzon, Levis, Longueuil, and Sorel, in Quebec; Barbet Point, Burritts Rapids, Chaffeys Locks, Hogs Back, Nepean Township, Navy Island-Niagara River, Owen Sound, Penetanguishene, Prescott, St. Joseph Island, and Turkey Point, in Ontario. Under the provisions of Section 8 of the Railway Belt and Peace River Block Transfer Agreement, an Order in Council, P.C. 75, was passed on January 11, 1939, appointing C. H. Taggart, D.L.S. of the Department of Mines and Resources as representative of the Dominion to determine the location and boundaries of the Ordnance and Admiralty lands in British Columbia, and to act in collaboration with the representative of the Province appointed for that purpose. Progress reports received indicate that the work is well under way.

Surveys.—A resurvey of the Ordnance Reserve, Laprairie, P.Q., was made and a portion of the Longueuil Ordnance Reserve was surveyed.

Investigation of Titles.—Title to the Military Reserve at Laprairie, Quebec, has been established. Title to Royal Square, Sorel, P.Q., is being investigated but the work is not yet complete. Titles of certain water lots in Shelburne Harbour, N.S., were investigated and the areas placed under the administration of the Department of Transport.

One property, a portion of the Military Reserve at Levis, P.Q., was transferred to the Department to administer, and four properties were transferred by this Department to the control of other Departments. There were two properties sold and fifty-one leases issued. The revenue amounted to \$19,825.42.

PUBLIC LANDS

Lands of other Departments no longer required for the purpose for which they were obtained are transferred to the Department as Public lands. During the year five parcels were placed under the control of this Department and two areas were transferred to other Departments. Investigations were made at ten different points and five parcels were sold. The revenue amounted to \$8,122.90.

RAILWAY RIGHTS OF WAY AND ROADS

Information has been furnished on request on railway matters dealt with in the past. Six reservations were made for roads in letters patent issued.

SOLDIER SETTLEMENT CHARGED LANDS

The unpatented lands in the four western provinces against which charges are registered under the Soldier Settlement Act remain vested in the Dominion. There are 305 quarter-sections comprising approximately 48,800 acres thus administered. They are spread over the four provinces as follows: Manitoba, 47 parcels; Saskatchewan, 145 parcels; Alberta, 95 parcels; British Columbia, 18 parcels.

Letters patent for these lands are issued to those entrants who have completed the duties in accordance with the terms of the Dominion Lands Act, and who have paid in full their indebtedness to the Soldier Settlement of Canada. In cases where the entrants have completed their duties, but have not repaid the indebtedness to the Soldier Settlement of Canada, letters patent 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 amendment of 1931. During the fiscal year twenty applications for letters patent were received of which twelve were approved.

TIMBER AND GRAZING

Grazing.—During the year 10,695 acres were included in six annual grazing permits on quarantine reserves along the southern boundary of Saskatchewan and Alberta. This was a decrease in acreage of 37,439 acres as compared with last year, accounted for by the Department of Agriculture having taken over the control of grazing in Townships 1, Ranges 28 and 29, West of the 3rd Meridian, in connection with the Prairie Farm Rehabilitation Program. In the summer grazing season of 1938 there were 896 cattle, 338 horses, and 290 sheep grazing on lands covered by annual permits. The revenue, consisting of rent, amounted to \$213.90.

Timber.—Within the boundaries of national parks there are 11 timber berths, 2 in Manitoba and 9 in British Columbia, covering a total area of 65.90 square miles. During the year licences in duplicate were prepared for these 11 berths and the revenue collected amounted to \$3,761.13.

On the Dominion Government Coal Block near Hosmer, B.C., there are 2 timber berths under permit but no operations were conducted.

One settlers' timber permit was issued on a soldier grant homestead in the Province of British Columbia.

During the year 53 accounts, covering timber permits issued to homesteaders by the Dominion before the transfer of the natural resources, were verified for the western provinces.

Summary of Revenue Collected

Grazing permits, Saskatchewan.....	\$ 204 80
" " Alberta.	9 10
<i>Licence Timber Berths in National Parks</i>	
Ground rental	659 00
Interest on ground rental.....	5 04
Licence fees	22 00
Fireguarding.	191 09
Royalty dues	2,884 00
Settlers' timber permit, British Columbia.....	26 00
<i>Permit Timber Berths in British Columbia</i>	
Permit fees	2 00
Total.	\$ 4,003 03

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 725 cases. Their recommendations were ratified by Orders in Council and 400 discharges and releases of liens were issued, resulting in writing off the amount of \$49,056.65. There were 2,168 inquiries received from the Provinces for statements of indebtedness outstanding relative to the issue of land grants, and 151 certificates of indebtedness were issued to be attached to title. Gross collections for the fiscal year amounted to \$3,860.97.

The following summary shows the financial operations of the year ending March 31, 1939:—

	Principal	Interest	Total
<i>Debits—</i>			
Balance outstanding March 31, 1938..\$	2,842,253 43	\$ 3,035,788 15	\$ 5,878,041 58
Accrued Interest April 1, 1938, to March 31, 1939.....		168,348 45	168,348 45
<i>Credits—</i>	\$ 2,842,253 43	\$ 3,204,136 60	\$ 6,046,390 03
Net collections, April 1, 1938, to March 31, 1939	2,461 85	\$ 1,300 69	\$ 3,762 54
Amount written off as loss by Orders in Council (Sec. 2, Chap. 51, 17 George V).	17,700 47	31,356 18	49,056 65
Amount collected and retained by Province of Saskatchewan as commission*		20 33	20 33
	\$ 20,162 32	\$ 32,677 20	\$ 52,839 52
Amount outstanding March 31, 1939..\$	2,822,091 11	\$ 3,171,459 40	\$ 5,993,550 51

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

The situation with regard to this indebtedness may be briefly reviewed. There are outstanding approximately 10,000 accounts due the Federal Government amounting to over \$4,600,000. Of these accounts the Dominion is responsible for collecting those registered against lands that were patented at the time of the transfer of the natural resources in 1930, while the Province concerned looks after the collection of those accounts registered against lands not yet patented at the above date. In addition there are approximately 6,000 accounts due jointly on a 50-50 basis to the Federal Government and the various provinces amounting to over \$1,300,000. The duty of collecting the latter amounts rests with the Provinces.

In 1927, Parliament passed legislation (Chap. 51-17 Geo. V) giving the Governor in Council power to make regulations to apportion, adjust, release, or discharge such loans as might be considered equitable in the circumstances. As a result of this legislation Boards were appointed and many cases have been considered by them, the decisions either confirming the indebtedness in full, adjust-

ing it downward, or cancelling it completely. In view however of the large number of accounts still outstanding, it has been decided to undertake a survey of 1,000 cases in Saskatchewan to enable an estimate to be made of the amounts collectible. It is hoped that considerable progress will be made with these during next year.

LETTERS PATENT

During the fiscal year there were 46 Letters Patent issued, covering a total area of 5,507 acres, divided, according to provinces, as follows:—

	Patents	Acres
Manitoba.....	7	831
Saskatchewan.....	21	3,250
Alberta.....	10	1,275
Northwest Territories.....	2	21
Yukon Territory.....	6	130
	46	5,507

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

	Special*		Homestead†		Soldier‡		Sale		Railway	
	Patent	Acres	Patent	Acres	Patent	Acres	Patent	Acres	Patent	Acres
Manitoba.....	4	587	2	244					1	
Saskatchewan.....	20	3,089			1	161				
Alberta.....	7	1,114	1			160	1	1		
Northwest Territories.....							2	21		
Yukon Territory.....							6	130		

*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.

†Under these headings are included lands entered for by returned soldiers, affected by loans from the Director of Soldier Settlement of Canada, said loans having been repaid in full. Patents were issued direct to the settler.

There were 306 certified copies of Letters Patent issued during the fiscal year.

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 preparation and distribution of information of all types respecting National Parks and wild life, and the preservation, marking, and care of historic and prehistoric sites of national importance. The Bureau also administers the Migratory Birds Convention Act and Regulations. 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 at the close of the fiscal year included nineteen separate units, having a combined area of 12,403 square miles.

NATIONAL PARKS VISITORS

Visitors entering National Parks during the fiscal year 1938-9 numbered 954,120, compared with 1,008,690 in 1937-8. This decrease is due principally to the falling off in attendance at Point Pelee National Park. As usual, visitors by motor were in the majority, amounting to over 90 per cent of the total, and comprised 226,117 cars and 904,382 passengers. Estimated passenger rail traffic was 49,738.

Tourist figures by Parks for the fiscal year ended March 31, 1939, compared with returns for the preceding year are given in the following table:—

Visitors to National Parks

National Park	1938-9	1937-8
Banff.....	192,655	194,435
Buffalo.....	10,960	9,830
Cape Breton Highlands.....	20,500*	20,000*
Elk Island.....	73,056	63,040
Fort Anne.....	17,050	17,029
Fort Beausejour.....	15,405*	20,000*
Georgian Bay Islands.....	6,169*	7,110*
Glacier.....	1,200*	1,200*
Jasper.....	19,388	16,083
Kootenay.....	52,027	64,657
Mount Revelstoke.....	6,000*	8,271*
Nemiskam.....	20*	21
Point Pelee.....	203,180	296,338
Prince Albert.....	29,727	28,846
Prince Edward Island.....	10,000*	2,500*
Riding Mountain.....	124,459	117,253
St. Lawrence Islands.....	21,150*	22,000*
Waterton Lakes.....	86,517	59,520
Yoho.....	64,677	60,557
Total.....	954,120	1,008,690

*Estimated.

RECREATION

Remarkable opportunities for outdoor life and recreation are to be found in the National Parks of Canada. Motoring, riding, hiking, fishing, canoeing, swimming, golf, and tennis are among the many sports which may be enjoyed in summer, and in the winter ski-ing has become increasingly popular in some of the mountain parks.

Bungalow camps have been established by private enterprise, and public camp-grounds have been laid out at convenient places, which offer excellent opportunities for camping. 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 also available in some parks.

The open air swimming pools at the Banff Hot Mineral Springs, at Miette Hot Springs in Jasper Park, and at the Radium Hot Springs in Kootenay Park, were well patronized. Supervised bathing was also available at beaches in many of the parks.

Fishing continued to be one of the favourite sports, especially in the western parks, and many good catches were reported throughout the season. Dr. Rawson of Saskatchewan University is carrying on biological surveys. In order to assure good fishing in park waters, the policy of restocking was continued.

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. Two new links in Cape Breton Highlands and Prince Edward Island Parks are under construction, and it is expected that nine holes on each course will be in play before the end of next season. In addition courses operated by private enterprise are open to visitors at Banff and Jasper.

Ski-ing has become increasingly popular as a winter sport in Banff. Jasper, and Mount Revelstoke Parks, and the improved facilities now available for the comfort of skiers has helped to attract large crowds to these parks.

WILD LIFE CONSERVATION

Conservation of native mammals and birds continues to be a policy of the National Parks Bureau, and the sanctuary conditions provided by the National Parks have resulted in gratifying increases in animal and bird life. Bighorn sheep have shown a decided increase in those parks in which they are found, and according to reports of a recent survey carried out for the Department in the mountain parks, all species of game animals appear to be in a satisfactory condition.

To conserve animal species native to the plains of Western Canada, the Department has for some years maintained in Alberta, four wild animal parks. Three of these areas, namely, Buffalo, Elk Island, and Nemiskam are enclosed by fences. The fourth, Wawaskey, an unfenced area, originally established for the protection of prong-horned antelope, was abolished in June 1938. In recent years antelope have increased to such an extent on the prairies, that it was no longer considered necessary to maintain two reservations for antelope, and efforts to preserve a herd of these animals were centred at Nemiskam. Reports from the animal parks indicate that the herds of buffalo, elk and moose have increased steadily. A reduction of the number of animals in Buffalo and Elk Island Parks was again made by supervised slaughter.

A feature of interest is the colony of white pelicans and double-crested cormorants which nests on an island in Lavallee Lake, Prince Albert National Park. In August, two colonies of beaver, comprising 9 animals, were transferred to Cape Breton Highlands National Park and are reported to be doing well.

The exhibition herds maintained in the animal enclosures at Banff, Prince Albert, and Riding Mountain National Parks continued to be a source of interest to many visitors. Donations of animals made during the year, included one pair of buffalo and one pair of elk from Elk Island Park to the Wellington Zoological Gardens, New Zealand; and one pair of buffalo and one pair of yak from Buffalo Park to the Moose Jaw Wild Animal Park Society, Moose Jaw, Saskatchewan. Mounting specimens donated from Buffalo Park included one male buffalo to the New York Natural History Museum, New York; three elk to the Natural History Museum, Hamburg, Germany; and two male elk heads to the Hudson's Bay Company, for presentation to His Majesty the King.

Following is a census of wild animals in fenced enclosures in the National Parks, as at March 31, 1939:—

Animals in Fenced Areas

Animal	Banff Park Paddock	Buffalo Park	Elk Island Park	Nemis- kam Park	Prince Albert Park Paddock	Riding Mountain Park Paddock	Total
Buffalo.....	10	2,492	995	.....	10	59	3,566
Antelope.....	.....	.....	.....	100	.....	.....	100
Elk.....	.....	1,674	473	.....	.....	55	2,202
Hybrids (cattalo).....	.....	88	.....	.....	.....	.....	88
Moose.....	.....	137	99	.....	.....	4	240
Mule deer.....	.....	842	27	.....	.....	4	873
White-tailed deer.....	.....	.....	.....	.....	.....	5	5
Yak.....	.....	36	.....	.....	.....	.....	36
Rocky Mountain Sheep.....	4	.....	.....	.....	.....	.....	4
	14	5,269	1,594	100	10	127	7,114

FOREST FIRE CONTROL

The fire season of 1938 has been, on the whole, a very favourable one for the National Parks. In the western parks with the exception of Riding Mountain, no fires of any consequence occurred, and in the eastern parks only one small spot fire was reported. This satisfactory condition is largely attributable to favourable weather conditions, to better co-operation from the public, and improved methods of detection and suppression of fires.

The total number of fires during 1938 was 51 and the total area burned 2,864 acres, as compared with a total of 79 fires and 21,886 acres burned in 1937. The distribution of fires during 1938 was very similar to that which occurred in 1937, with 24 out of the total of 51 occurring in Riding Mountain and Prince Albert Parks, and burning over 2,847 acres. Fortunately the loss of valuable timber was again small, a large part of the burned area consisting of grassland and old burn.

Regular aeroplane patrols were carried out in Riding Mountain and Prince Albert Parks, and rendered valuable assistance in the detection and control of fires.

During the year considerable progress was made in the fire protection organization by the addition of new equipment and the adoption of improved methods of fire detection and suppression. In Riding Mountain and Prince Albert National Parks, the existing fire protection system was augmented by the erection of a series of steel and wooden lookout towers for fire detection purposes. The primary towers in this system were all linked up with the existing telephone system, so that tower observers were in direct communication with park headquarters. In addition, with a view to facilitating the transportation of men and equipment in case of fire, a considerable amount of work was done on construction and improvement of trails. The Department now has under consideration the establishment of fire weather recording stations in Prince Albert and Riding Mountain National Parks, and a fire hazard research station in the vicinity of Banff Park. Considerable work towards the establishment of these stations has already been undertaken.

Following is a summary of fires for the fiscal year 1938-9, indicating the number of fires, area burned, and cost of extinguishing:—

General Fires

Region	Fires	Area Burned	Cost of Extinguishing
	Number	Acres	\$ cts.
Banff National Park.....	16	17	1,282 94
Jasper National Park.....	3	Spot	29 00
Elk Island National Park.....	1	"	.....
Prince Albert National Park.....	8	67	480 45
Riding Mountain National Park.....	16	2,780	3,226 65
St. Lawrence Islands National Park.....	1	Spot	6 30
Yoho National Park.....	3	"	2 38
Total.....	48	2,864	5,007 72

Railway Fires

Banff National Park.....	3	Spot	.....
	3	.....	.....
Grand Total.....	51	2,864	5,007 72

PARK ROADS, TRAILS, AND TELEPHONE LINES

Construction of all-weather motor highways and secondary roads, trails, and telephone lines was continued in the National Parks during the year. New construction on the Banff-Jasper Highway was approximately 15 miles. A full description of the work undertaken will be found in the sections dealing with the individual parks.

The mileage of roads, trails, and telephone lines within the National Parks of Canada on March 31, 1939, is detailed in the following table:—

Means of Travel and Communication

Region	Roads			Trails	Tele- phone Lines
	Motor	Second- ary	Total		
	miles	miles	miles	miles	miles
Banff National Park (including Banff section of Banff-Jasper Highway).....	162.60	19.00	181.60	900.00	226.00
Buffalo National Park.....	2.00	25.00	27.00	57.00	36.00
Cape Breton Highlands National Park.....	10.50	46.50	57.00	10.05	.....
Elk Island National Park.....	16.00	2.00	18.00	3.75	16.00
Glacier National Park.....	.....	12.00	12.00	109.00	3.25
Jasper National Park (including Jasper section of Banff-Jasper Highway).....	141.50	10.00	151.50	624.00	340.50
Kootenay National Park.....	61.10	11.00	72.10	126.00	62.00
Mount Revelstoke National Park.....	19.00	.....	19.00	45.00	17.00
Point Pelee National Park.....	9.00	1.50	10.50	.....	6.00
Prince Albert National Park.....	63.00	75.80	138.80	390.00	151.00
Riding Mountain National Park.....	50.20	54.00	104.20	113.00	196.00
Waterton Lakes National Park.....	44.45	3.00	47.45	240.00	58.00
Yoho National Park.....	44.50	6.00	50.50	192.50	56.00
Prince Edward Island National Park.....	3.00	.....	3.00	.....	.....
Totals.....	626.85	265.80	892.65	2,810.30	1,167.75

ENGINEERING

Engineering work carried out in the National Parks during the year included the maintenance and operation of public services, such as electric lighting, telephones, water supply, and sewage systems; the construction and maintenance of highways, bridges, and buildings in the parks and at historic sites; and the maintenance of streets and sidewalks, disposal of refuse, and mosquito control in park townsites.

A description of the engineering work carried out in the National Parks during the year will be found in the sections dealing with the individual parks, and in the report of the Director of the Surveys and Engineering Branch.

UNEMPLOYMENT RELIEF

Unemployment relief work, which has been carried on in National Parks since 1930, was again provided during April and May, 1938, and January, February, and March, 1939, for permanent park residents with domestic responsibilities who proved that they were needy.

In Banff National Park, 4,401 man-days of work were provided for 123 individuals having 309 dependents, making a total of 432 park residents assisted. In Jasper National Park, 1,389 man-days of work were provided for 33 individuals having 79 dependents, making a total of 112 park residents assisted.

Activities carried out for the relief of unemployment included collecting fuelwood for camp-grounds and government buildings, clearing and burning brush for mosquito control, improvement and maintenance of roads, removing snow from townsite streets, and thinnings and sanitation cuttings.

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 \$366,223.97 for the fiscal year 1938-9, as compared with \$325,674.12 for the fiscal year 1937-8, an increase of \$40,549.85.

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

<i>National Park</i>	<i>Revenue</i>
Banff	\$ 153,339 77
Buffalo	32,578 16
Cape Breton Highlands	239 86
Elk Island	20,012 42
Fort Anne	90 00
Georgian Bay Islands	119 00
Glacier	118 55
Jasper	51,010 16
Kootenay	17,607 18
Point Pelee	6,615 10
Prince Albert	13,576 89
Prince Edward Island	117 35
Riding Mountain	43,820 16
St. Lawrence Islands	200 00
Waterton Lakes	16,860 67
Wawaakesy	40 00
Yoho	4,240 80
Mount Revelstoke	1 00
Historic Sites	391 20
Head Office	11 29
	360,989 56
Less refunds	665 27
	360,324 29
Fines and forfeitures	\$ 1,190 71
Casual revenue	3,856 39
Migratory Birds Convention Act	850 03
Premium and Exchange	2 55
	5,889 68
	\$ 366,223 97

PUBLICITY AND INFORMATION

During the year the Publicity and Information Division was active in the promotion of tourist travel to the National Parks, and in directing attention to the scenic, recreational, and educational advantages of these great national possessions. This was accomplished by the preparation and careful distribution of press articles, illustrated descriptive literature, maps, and photographs; by lending motion picture films, lantern slides, line-cuts, and half-tones; by radio talks and addresses; by participation in exhibitions, and by correspondence. Close contact was maintained with organizations associated with the promotion of tourist travel, including the Canadian Travel Bureau, which were supplied with timely press articles, photographs, and literature. Through the release of press articles and by other media special efforts were made to attract visitors from the British Isles and the United States.

A total of 115 articles descriptive of the attractions of the National Parks and Historic Sites of Canada was given a wide distribution to leading newspapers, magazines, and other publications. More than 200 short articles were circulated by means of the Canadian Resources Bulletin. By special arrangement with the Commissioner of Emigration, London, England, articles and photographs featuring the National Parks were published in newspapers of the British Isles.

To meet the ever increasing demand for printed literature descriptive of the National Parks and Historic Sites, 381,870 copies of publications were printed

and delivered during the year. Included was an attractive new pamphlet, printed in two colours, descriptive of Jasper National Park, Alberta. A complete list of publications issued follows:—

Annual Report, National Parks Bureau (contained in the separate report of the Director, Lands, Parks and Forests Branch).....	500
Banff National Park, General Information, (Folder).....	25,000
Canada's Maritime Playgrounds (Descriptive Booklet).....	25,750
Canada's Mountain Playgrounds (Descriptive Booklet).....	100,000
Catalogue of National Parks Motion Picture Films (Third Edition)	1,000
Fort Chambly, Guide to (English Edition).....	5,750
Fort Chambly, Guide du (French Edition).....	10,000
Fort Lennox, Guide du (French Edition).....	10,000
Jasper National Park, General Information (Folder).....	25,000
Jasper National Park (Descriptive Booklet).....	50,000
Kootenay, Yoho, Glacier, and Mount Revelstoke National Parks, General Information (Folder).....	25,000
National Historic Sites (Reprint from Canada Year Book) (English Edition).....	2,000
Sites Historique du Canada (Reprint from Canada Year Book) (French Edition).....	1,000
National Parks of Canada, The (Descriptive Booklet) (Second and Third editions).....	75,420
Riding Mountain National Park (Descriptive Booklet).....	25,450

Numerous requests for educational and descriptive material were received from tourist agencies, travel companies, boards of trade, automobile associations, and similar organizations, as well as from individuals, which were met with a total distribution of 21,079 copies of Immigration literature, and 359,646 copies of Parks literature, in addition to approximately 10,500 copies of maps and other pamphlets.

Wide circulation of National Parks motion films was continued during the year. The library now contains 84 subjects in 35-mm. size and 87 in 16-mm. size, comprising a total of 1,817 prints descriptive of the scenic, recreational, and wild life aspects of Canada. During the year, 4,700 feet of new kodachrome colour film, 7,132 feet of new 35-mm. negative film, and 122,199 feet of positive film were purchased. The above included 315 prints. A total of 30 worn out prints of various sizes were discarded.

New film subjects produced and released during the year included the following: *Playground Sanctuary; Where Cohoes Play*. Film subjects which were re-edited during the year included: *Pilgrims of the Wild; Strange Doings in Beaverland; The Beaver Family*. Five other film subjects were produced for other branches of the Department.

The continued demand for National Parks films during the fiscal year is indicated by the following comparative figures: 1935-6—3,293; 1936-7—3,884; 1937-8—4,026; 1938-9—3,980. Prints were circulated in the United States, Great Britain, Australia, South Africa, Roumania, Norway, Alaska, and New Zealand, as well as in different parts of Canada. The estimated attendance at showings of National Parks films during the year was 2,540,000.

Additions to the photographic library included 413 negatives of various sizes, and 13,439 photographic prints and enlargements. A total of 8,479 photographs and enlargements were distributed for publicity purposes. A total of 517 half-tones, line-cuts, and stereotypes were lent during the year to editors, publishers, and writers.

The lantern slide library, which contains several thousand subjects depicting the scenery, fauna, and flora of the National Parks, also experienced a steady demand for this type of visual educational material. During the year 4,662 slides, accompanied by lecture notes, were lent and the library stock was augmented by 1,284 new slides. Following a survey of the slide library, a large number of slides were retouched and remounted. A total of 42 photographic enlargements and 51 translikes were coloured during the year.

The Superintendent of Publicity and Information delivered a number of addresses in different parts of Canada.

The National Parks Bureau was represented by an attractive exhibit in the Railway Building at the Canadian National Exhibition, Toronto. The exhibit occupied a space of more than 3,000 square feet, and embraced mounted specimens of wild animal and bird life native to the National Parks, photographs, oil paintings, and coloured translights in electrically illuminated cases. The exhibit was awarded a gold medal by the Exhibition Association. Photographs, translights, and mounted wild life specimens were also shown during the year at the following exhibitions: The Empire Exhibition, Glasgow, Scotland; Greater North Dakota Tourist Association, Fargo, North Dakota; American and Canadian Sportsmen's Show, Cleveland, Ohio; Pacific Northwest Tourist Association; Peace Exhibition Contest held at Provincial Exhibition, Regina, Saskatchewan; Canadian Wilderness Exhibition held in connection with the New England Sportsmen's Shows at Boston, New York, Indianapolis, and Detroit; and the International Travel Exposition, Chicago, Illinois.

NATIONAL PARKS OF CANADA

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: the scenic and recreational parks, situated in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, and Prince Edward Island; the wild animal parks or reserves, situated in Alberta; and 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 162.6 miles and secondary roads 19 miles in addition to which there are 900 miles of trails and numerous motor camp-grounds. The park is a big game sanctuary and a year round sports centre; recreations include motoring, riding, climbing, hiking, golf, tennis, boating, swimming, skiing, skating, and curling.

During the past year visitors to Banff Park showed a slight decrease from the previous year. Banff, Kootenay, and Yoho Parks being linked together by standard highways, it is necessary when compiling tourist traffic to give due consideration to traffic originating in these areas.

Following is a table showing the total number of visitors, how these figures are made up, and comparative figures for the previous year.

Visitors to Banff National Park

Route	Motor Vehicles		Passengers	
	1938-9	1937-8	1938-9	1937-8
<i>Westbound—</i>				
Via Banff Park (Eastern Gateway Entrance).....	44,125	44,192	142,155	148,981
<i>Eastbound—</i>				
Via Kootenay Park (Radium Hot Springs entrance—75% eastbound traffic).....	5,466	6,593	16,573	20,773
Via Yoho Park (Leancoil entrance, 66½% eastbound traffic).....	1,260	1,562	3,907	4,681
Tourists for Banff Park by rail—east and west (estimated).....			30,000	20,000
Totals.....	50,851	52,347	192,635	194,435

The Information Bureau opened on May 15 and closed on September 30, during which period 29,809 inquiries of all descriptions were dealt with.

Licences and permits issued during the year totalled 19,426 compared with 20,209 during the previous year. In addition 328 building permits having an estimated property value of \$88,485 were issued. The great increase in the number of building permits was due to the large number of improvements to existing cabins.

Health conditions during the year were generally good. Milk and water supplies were regularly tested, and constant supervision maintained over all matters relating to public health.

A total of 38,285 persons passed through the turn-stile at the Cave and Basin bath-house, as compared with 40,144 last year. The total number of people making use of the Upper Hot Springs bath-house was 46,840 as compared with 42,338 last year.

The public camp-grounds continued to be popular, and although a considerable decrease was noted in the number of campers, the length of stay was increased. Registration at the Tunnel Mountain camp-ground was 2,341 cars and 8,871 campers, a decrease of 8,652 persons from last year. The number of person-days spent in camp was 22,308 or an average of 2.51 days per person. Improvements included planting of some 200 spruce and balsam trees, at Tunnel Mountain. At Banff bungalow camp 43 cabins were in operation from May 5 to October 6, and at the camp on the Trans-Canada Highway east of Banff 12 cabins were open from July 4 to October 6. All bungalow camps in the park were well patronized throughout the season. Sites were chosen for camp-grounds at Bow Summit and near the Waterfowl Lakes, and for three new picnic grounds, eleven miles east of Banff at Hillside and at Baker Creek.

New construction was confined to a new two-room cabin at Healy Creek, one section being for the use of the warden and the other as an emergency shelter for trail riders, hikers, and skiers. In addition the following improvements were undertaken: five cabins were reroofed, three houses and two cabins were painted, material from the abandoned relief camp on Spray River was moved to Mount Norquay Ski Camp for use as a shelter; a new stove, benches and table were placed at the picnic grounds at Massive and Baker Creek.

New construction was confined to 9 miles on the Banff end of the Banff-Jasper Highway, which brings the total mileage constructed to 45.84 miles, and leaves 23.8 miles still to be done. Hard surfacing of the Trans-Canada Highway was completed from the east boundary to Mile 9 west of Banff. All main and secondary roads were maintained in good condition and oil-treated where conditions warranted. Nine miles of fire-road were constructed towards Ptarmigan Lake and 4 miles along Healy Creek, and 2 miles were cleared along Goat Creek. In addition, 30 miles of existing fire-roads were graded. The bridge over the Bow River at Massive was rebuilt and three new rustic bridges were constructed in Johnson Canyon. Three miles of revision were carried out on the Ptarmigan trail and 900 miles of existing trails maintained.

Six miles of new telephone line were constructed and 5 miles revised along the Trans-Canada Highway west of Banff. All existing lines were maintained in good order.

During the season a total of 19 fires occurred. All of these fires were confined to small areas, burning over a total of approximately 18 acres consisting mostly of grassland.

The park museum was open from March 1 to October 31, and attracted a total of 17,212 visitors.

Reports from all districts indicate that wild animals are in good condition, with noticeable increases in elk, moose, and wolverine. Predators are scarce. With the exception of grouse, in which there was a noticeable increase, bird life is scarce. The animal paddock now contains 10 buffalo, and 4 Rocky

Mountain sheep, all of which proved a great attraction to visitors. Fishing in park waters was generally good in the lakes, but rather poor in the streams. Distribution of fish from the Banff hatchery during the past year was as follows: In park waters: speckled trout, 105,000, rainbow trout 472,000; in provincial waters: speckled trout 590,000, cut-throat trout 349,000. Total 1,516,000.

In co-operation with the Forest Service some valuable work was undertaken in the control of mistletoe blight by segregating and removing infected trees. Periodic collections of forest insects were again made for the Dominion Department of Agriculture and forwarded to their laboratory at Kamloops, B.C. Some 200 small trees were planted at Tunnel Mountain camp-ground.

On February 5 the Calgary-Edmonton Inter-City Ski Meet was held on Mount Norquay and on February 19 the Alberta Provincial Championships were run off. The Banff Winter Carnival was held from February 16 to 19 and was one of the most successful carnivals ever held in the park.

The annual Indian Days Sports were held in Banff from July 20 to 24 and were attended by some 587 Indians. The Trail Riders of the Canadian Rockies held their annual ride from July 29 to August 2 with 43 trail-riders taking part in the ride.

Early in August a party of English and New Zealand school boys visited the park, under the auspices of the British Empire Council of Education and spent about a week under canvas at the Tunnel Mountain camp-ground. The success of this camp has resulted in a movement toward the establishment of a student centre in Banff National Park which could be used by students from all parts of the British Empire.

CAPE BRETON HIGHLANDS NATIONAL PARK

Cape Breton Highlands National 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 girdles the park. The park was established in 1936, and has an area of 390 square miles.

The park is traversed on the north by a motor road well known as the Cabot Trail, which connects with Nova Scotia's main highway system. Entrance may be made over an eastern route leading by way of Baddeck and North River or by way of Sydney 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.

During the past year, facilities were not available for accurately checking the number of visitors. However from the registrations at the local hotels, it was estimated that approximately 20,500 persons visited the park during the year. This is about the same as the previous year.

Construction of new buildings included a residence for the Superintendent, and an administration building. Work has progressed favourably on these buildings, both of which are still under construction. Grading was completed for the entrance gate at Ingonish, and for the new tennis courts. The area surrounding the bath-house sites was cleared and graded, a sand beach constructed on the freshwater lake, and plank walks laid across the barrachois, separating the freshwater lake and the sea. The athletic field and parking ground have been levelled and graded. All wooded areas surrounding the bath-house, tennis courts, and athletic field have been underbrushed and cleared.

Work on park roads included general maintenance, rebuilding of culverts, redecking bridges, widening curves and opening up drains. New construction included 9 miles of highway completed, 1½ miles 75 per cent completed, and 2 new bridges and 2 trestles completed. In addition the road right-of-way from the administration building to the athletic field was cleared and grubbed. All park trails were maintained in good condition.

The radio/telephone system worked very satisfactorily throughout the entire season. Two sets are in operation in the park, one 15-watt set at Ingonish and one 5-watt set at Cheticamp.

No forest fires were reported within the park. Several fires occurred outside the park, but were placed under control by park officers before they reached the boundary.

Wild life within the park is reported to be increasing, with white-tailed deer and snowshoe rabbit the most numerous. A few black bear and red fox have been seen, and there is evidence of a considerable number of lynx. The two colonies of beaver, which were placed in the park in August, have built two dams on Roper's Brook and appear to be doing very well. Ruffed grouse are plentiful.

Fishing in park waters was very good, with some good catches of salmon reported from Cheticamp River, and trout from Warren Lake. During the year 180,000 salmon fingerlings from the hatchery at Margaree, were distributed in Cheticamp River.

Early in August work was started on the construction of a golf course, and very favourable progress was made until November, when work was suspended for the season. At the time work was discontinued the first 9 holes were practically ready for seeding, and a start had also been made on the 5th, 6th, 7th, and 8th holes of the second half.

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. 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.

It is estimated that during the past year, 6,169 persons visited Beausoleil and Flowerpot Islands, as compared with 7,110 during the corresponding period last year.

Improvements carried out on Beausoleil Island included the construction of a new dock at Cardinal Cove, addition to main dock at park headquarters to accommodate small boats, construction of stove with shelter near Little Dog Channel, roof over stove at Shore Dining Point, and a flagstone walk 125 yards long from the beach to the dock at Rockview Beach. In addition the Lions Club of Toronto erected a recreation building, staff sleeping quarters, ice house, hospital, and open air council chamber at Cardinal Cove. A new dock was constructed at Seiners Point on Island No. 92.

During the summer a geological survey of Flowerpot Island was carried out by an officer of the Mines and Geology Branch of the Department.

An increase has been noted in the number of elk, and a small decrease in the number of white-tailed deer. Red fox and black squirrel are plentiful, and groundhog and rabbit are quite scarce. Bird life appears to be increasing and includes many varieties of land, shore, and water birds. Increases were particularly noted among swallows, hummingbirds, and ruffed grouse. Throughout the season patrols to the various islands were made by the park warden.

GLACIER NATIONAL PARK

This park with its snow-capped peaks, immense ice-fields, luxuriant forests, alpine flora, and subterranean caves, is typical of the Selkirk Mountain region. Secondary highways extend for 12 miles, in addition to which there are 109 miles of trails. The park was established in 1886 and has an area of 521 square miles.

Although Glacier National Park is not accessible by motor highway, it is a popular centre for alpine climbing, and during the year attracted an estimated total of 1,200 visitors. Some 90 members of the Mountaineers of Seattle, Washington, U.S.A., spent their annual outing in the park.

No new construction was undertaken during the year, work being limited to maintenance of cabins, trails, telephone lines, and the Nakimu Caves road. In co-operation with the Dominion Department of Agriculture, specimens of insects were collected.

No forest fires occurred within the park, although there were periods of high hazard. This favourable record is probably due to some extent to the lack of severe electrical storms which are one of the main causes of fires in this park.

All wild life is reported to be in good condition and thriving. Caribou have been seen in large herds and mule deer and Rocky Mountain goat are plentiful. The smaller fur-bearing animals are also numerous. Predators are scarce. Fishing in park waters was good.

JASPER NATIONAL PARK

This mountain wilderness on the eastern slope 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, Miette Hot Springs, Sunwapta Falls, Athabaska Glacier, and the Columbia Ice-field. The park is a big game sanctuary and alpine playground. Motor highways extend for 141 miles through the park, secondary roads for 10 miles, and trails cover 624 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 was again recorded. The following table gives the number of visitors during the past two years.

Visitors to Jasper National Park

Mode of Travel	Motor Vehicles		Passengers	
	1938-9	1937-8	1938-9	1937-8
<i>By Motor Vehicles—</i>				
Canadian.....	2,158	1,331	7,299	4,276
United States and foreign.....	168	122	551	376
<i>By Rail</i>			11,538	11,431
Total.....	2,326	1,453	19,388	16,083

The Information Bureau dealt with a total of 942 inquiries, an increase of 66 as compared with the previous year.

Licences and permits issued during the year totalled 3,549 as follows: chauffeur licences, 116; guide licences, 38; dog licences, 63; business licences, 75; camping permits, 590; building permits, 48; timber permits, 85; automobile licences (yearly), 312; automobile licences (transient), 1,740; provincial drivers' licences, 302; and miscellaneous, 180. This represents an increase of 1,304 over the corresponding period last year.

The bath-house at Miette Hot Springs was officially opened to the public on June 14, and proved a source of great attraction. During the season a total of 11,065 persons made use of the facilities provided. These bathers were made up as follows: swimming pool, 8,767, and plunge rooms, 2,298. Improvements carried out during the year included installation of two fans to ventilate the plunge bath rooms; a steel door fitted to control room; a steel sash with Murnese lights installed in the walls of the steam rooms; a chain link wire fence enclosing an area for stores in the basement, and two outside lights to light the entrance steps and parking area.

Four automobile camp-grounds, situated at Patricia Lake, Cottonwood Creek, Miette Hot Springs, and Medicine Lake, were open to the public throughout the season. Registrations at these points were as follows: Patricia Lake, 142 cars and 539 campers; Cottonwood Creek, 179 cars and 683 campers; Miette Hot Springs, 140 cars and 732 campers; Medicine Lake, 52 cars and 150 campers; combined total, 513 cars and 2,059 campers. The average stay per person was 5 days as compared with 4.57 last year.

Improvements carried out during the year included extension of the electric light system from Jasper townsite to Cottonwood Creek auto camp; and completion of open air kitchens, caretakers' cottages, and construction of sewage disposal system and streets at Miette Hot Springs auto camp.

All Government buildings were maintained and new construction included three shelter cabins, in Blue Creek Valley, on Mowitch Creek, and below Emperor Falls Hill.

All park roads were maintained in good condition, and road oil was applied on some sections. Improvements were carried out during the year on the Maligne Canyon, Mount Edith Cavell, Pyramid Lake, Jasper-Edmonton, and Pochontas-Miette Hot Springs roads. Construction of the Banff-Jasper Highway was advanced to Mile 79.5 in Banff Park, approximately 6.5 miles having been completed during the year. The highway was open to the public as far as the Athabaska Glacier, Mile 66 from Jasper.

Work on trails during the year was confined to general maintenance, and minor improvements to the Miette, Snake Indian, Pyramid Lake and Meadow Creek trails. Other trails were brushed out by the wardens in their respective districts.

All park telephone lines were reconditioned and maintained in good order. This work included resetting 9 miles of poles along the road between Jasper and Geikie, and 2 miles of line was relocated along Medicine Lake. The automatic telephone system in the townsite performed satisfactorily throughout the season. This service, which was first opened for public use in September, 1937, now has 23 paying subscribers.

Favourable weather conditions prevented any serious fire-hazard. During the year 3 small forest fires occurred, all of which were extinguished at a small cost without causing any damage. In addition 4 fires occurred within the townsite, all of which were extinguished before any serious damage was done.

All streets and sidewalks in Jasper townsite were maintained in good condition. Connaught Drive and Pyramid and Miette Avenues were improved. A parking space was constructed immediately to the rear of the administration building and approximately 3,000 plants set out in the grounds.

On the water system, the concrete retaining wall at the Cabin Creek dam was repaired, the bed of the stream leading into Cabin Lake was cleared over a distance of 1,410 yards, and one new 6-inch hydrant was installed at the south end of Block 7, making a total of 22 hydrants for the town. There are now 332 premises connected to the permanent water system. The electric light and power service was maintained to all connected buildings and street lights. The total number of connections to domestic, business, and Government premises was 376 at the end of March.

An intensive campaign was waged against mosquitoes in Jasper townsite and vicinity, with the gratifying result that very few mosquitoes were seen in the townsite or at Jasper Park Lodge.

According to reports all wild life in the park would appear to be in good condition. Elk, moose, caribou, Rocky Mountain sheep, and goat are plentiful. Elk have made the most noticeable increase, and according to reports are spreading outside of the park boundary. Mule deer and black bear are the only species that show any definite decrease in numbers. Grizzly bear are quite plentiful in most districts. Among the smaller fur-bearing animals,

beaver, marten, mink, weasel, and wolverine are plentiful, and a few families of otter have been seen in the Athabaska Valley and in the vicinity of the Valley of the Five Lakes. Predators have been more plentiful than usual, and the total number destroyed during the year included 63 coyotes, 23 cougars, and 4 wolves.

Museum specimens collected included one Rocky Mountain ram for the National Museum of Canada, and one male caribou for the Royal Ontario Museum of Zoology.

Fishing in Jasper Park waters continued to be good, and some excellent catches of trout were reported. The total number of permits issued for the Maligne-Medicine Lake area was 1,140, an increase of 13 over the previous season. The total number of fish taken was 8,248, or an average of 7.23 per permit. As compared with last year there was a decrease of 531 in the number of fish taken in the Maligne area, but the total weight increased by 134 pounds, indicating an average weight of 11.12 ounces as against 10.2 ounces last year.

In accordance with recommendations made by the Biological Board of Canada, stocking was continued, and during the season 451,333 rainbow trout fry from the Jasper Hatchery were distributed in park waters. Among the lakes and streams restocked during the year were the following: Dorothy, 40,000; Horseshoe, 20,000; Geraldine, 20,000; Pyramid, 116,333; Valley of the Five Lakes, 45,000; Lake Annette, 50,000; Adolphus, 10,000; Patricia, 60,000; Lake Edith, 70,000; Topaz, 10,000; and Blue Creek, 10,000. The latter two are waters not previously stocked.

Throughout the season the warden service co-operated with the Division of Entomology of the Department of Agriculture in the 1938 Forest Insect Survey. Specimens were collected periodically and forwarded to the Division of Entomology for identification. According to reports only the native species of saw-fly was found in the park. Approximately forty acres of land on the Maligne horse range was seeded to crested wheat grass.

Many opportunities for varied forms of recreation are found in Jasper Park, and full advantage was taken by visitors of the facilities available for golf, riding, fishing, hiking, tennis, climbing, and motoring in the summer and ski-ing in the winter. Ski-ing has become increasingly popular, and during the past winter the Jasper Ski Club held two successful meets in which contestants from Blue River, Edson, and Jasper took part. This club now has a total membership of 170 as compared with 37 last year. Development of a ski-ing area on the north slope of Whistler Mountain has made considerable progress during the year as follows: clearing and improving of slalom course, 2,000 feet; construction of a trail 20 feet wide for 2,670 yards to connect the slalom course and the Alplands ski camps, and a trail 12 feet wide and 700 yards long connecting the main ski run with the horse trail.

KOOTENAY NATIONAL PARK

This mountain park is on the western 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. Motor highways extend for 61 miles and secondary roads for 11 miles in addition to which there are 126 miles of trails. The park was established in 1920 and has an area of 587 square miles.

Tourist traffic showed a decrease from the previous year. A total of 15,295 motor vehicles and 52,027 persons entered the park, as compared with 20,205 motor vehicles and 64,657 persons last year. The decrease in traffic during the current year is doubtless due to some extent to the condition of the Columbia Valley Provincial highway, south to the International Boundary, which is being prepared for hard surfacing.

Following is a table giving a comparison of 1938-9 travel figures with those for the previous season:—

Visitors to Kootenay Park

Route	Motor Vehicles		Passengers	
	1938-9	1937-8	1938-9	1937-8
<i>Eastbound—</i>				
Via Radium Hot Springs	7,289	8,791	22,098	27,698
<i>Westbound—</i>				
Via Radium Hot Springs (estimated)	5,800	9,205	23,203	29,510
Via Vermilion Pass (estimated)	2,206	2,209	6,726	7,449
Totals.....	15,295	20,205	52,027	64,657

During the summer periodic inspections were made of all camps and public services, and constant supervision was maintained over all matters affecting public health.

A total of 24,147 persons made use of the bathing facilities at Radium Hot Springs, as compared with 25,856 during the previous year, a decrease of 1,709 persons.

The camp-grounds throughout the park again proved popular, but a marked decrease was noted in the number of campers. As usual the Radium Hot Springs (Red Rock) camp-ground attracted the greatest number of visitors, with a total registration of 1,376 persons. The average stay per person was 1.51 days, or a total of 2,078 person-days.

At Radium Hot Springs improvements at the bath-house included replacement of steps and diving board, repainting and rewiring of entire building. At the wash-house a new floor was laid, a concrete base constructed for the boiler, and a new electric washing machine purchased. In addition a new rock retaining wall was built above the pool and a wire fence erected.

The archway buildings at headquarters were treated, painted and cal-somined; a new kitchen shelter was built at Dolly Varden camp-ground; a new warden's cabin was constructed near the headwaters of Tumbling Creek; a new roof and several windows were added to the patrol cabin at Snow Creek, and the cellars at Kays and Marble Canyon cabins were re-timbered and some painting done.

The Banff-Windermere Highway which is the main artery of travel through the park, was opened for traffic on May 21. This road was maintained in good condition throughout the season. One new bridge was constructed to replace the old one leading from the highway to Marble Creek camp-ground.

Considerable improvement work was carried out on park trails, all of which were cleared out and put into good condition. The Ochre Creek trail in particular was practically re-built, and is now an important link in the fire protection system of the park. All telephone lines were maintained in good condition.

No forest fires occurred during the year, although the latter half of July and the whole of August was dry and hot, with hazard conditions high. Investigation of forest insects was again carried on by the Dominion Department of Agriculture assisted by the warden service. Reports indicate that the spread of the bark-beetle infestation near McLeod Meadows has been controlled and the beetle is rapidly being exterminated.

Wild life is reported to be thriving and in a healthy condition. Among the big game animals, moose, elk, sheep, and mule deer appear to be increasing. white-tailed deer remain unchanged, and bear are less plentiful than usual

The smaller fur-bearers appear to be increasing, with the exception of snowshoe rabbit which are normal and coyotes which are scarce. The number of willow (ruffed), blue, and Franklin grouse remain unchanged.

The tennis courts at Radium Hot Springs were very popular, and were in almost constant use.

MOUNT REVELSTOKE NATIONAL PARK

This park is situated on the alpine plateau that forms the summit of Mount Revelstoke, on the western slope of the Selkirk Mountains. A camp-ground has been laid out, and the chief recreations are fishing and hiking. Motor highways total 19 miles, and trails 45 miles. The park, established in 1914, contains an area of 100 square miles and is reached from Revelstoke by a spectacular motor highway.

As there is no resident superintendent, an actual check of visitors is not maintained. However, based on the registration at the lookout station, it is estimated that approximately 6,000 persons entered the park, a considerable decrease from the previous year. Cars shipped over the Canadian Pacific Railway line between Revelstoke and Golden numbered 701 as against 707 last year.

Work carried out on roads, trails, and telephone lines was confined to general maintenance, no new construction being undertaken.

No forest fires occurred in the park, although periods of high hazard were experienced, and fires were reported on provincial lands adjacent to the park boundary. Improvements included erection of one new water reservoir. There are now five large reservoirs in the park used to store water for fire protection purposes. In case of fire, hose is coupled directly to the reservoir and the water discharged by gravity.

All wild life is reported to be in good condition and plentiful. Bird life is abundant with a noted increase in grouse.

Mount Revelstoke maintained its popularity as a ski-ing centre, and was the scene of the Western Canada Ski Championship Meet, which was held at Revelstoke from February 9 to 12. It is estimated that over 5,000 people were in attendance including representatives from many parts of Canada and the United States.

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 the seasonal flights. There is a motor camp-ground in the park, and approximately 10 miles of motor roads and one-half mile of secondary road. During the year the Post Property, an extremely valuable area comprising some 170 acres situated near the extreme south end of the park, was purchased by the Department. The park was established in 1918 and has an area of 6.31 square miles.

There was a considerable decrease in tourist travel into the park as compared with the previous year. The tourist figures for 1938-9 are: Canadian motor vehicles, 22,132, carrying 77,461 passengers; United States motor vehicles, 35,920, carrying 125,719 passengers; a combined total of 58,052 motor vehicles, and 203,180 passengers, or a decrease of 93,158 persons from the previous year. A total of 901 camping permits were issued as against 1,035 last year. This was the first year it was possible to keep accurate check on the number of visitors, so that the decrease may not be as great as the figures would imply.

Improvements carried out during the year included: Completion of approximately 3 miles of new road on the east beach, construction of approxi-

mately 3,700 feet of timber groins to protect the east beach from erosion, and one additional gateway building. A new water system was installed consisting of 14 new wells located as follows: 1 at the park entrance, 1 at the newly-acquired Post property, 1 at the refreshment booth, and 11 to serve camping areas on the west shore between the cross roads and gateway entrance. These wells were built according to National Health Department specifications, and provision made for chlorination to ensure an adequate supply of pure drinking water. These new wells replace some 36 sandpoints formerly used, and which were found unsatisfactory from a health point of view.

The smaller mammals, including rabbit, squirrel, groundhog, racoon, fox, and muskrat, are thriving and appear to be increasing. Muskrat were particularly numerous, and it was agreed that in the best interests of the park, 3,000 should be removed. Point Pelee Park is also an important bird sanctuary, and during the migration period in the spring and autumn many kinds of water-fowl, including ducks, geese and swans, find a resting place. Due to the abundant supply of water in the marshes during the past few years waterfowl have been particularly numerous. Duck shooting permits sold during the year totalled 265. Among the land birds, quail are quite numerous and many species of smaller birds are abundant throughout the park.

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 a popular summer resort with an up-to-date camp-ground. Recreations are golf, tennis, fishing, bathing, canoeing, and boating. There are over 63 miles of motor highways and 75 miles of secondary roads in the park, and in addition 390 miles of trails. The park was established in 1927.

Registration of visitors at the park entrance gate surpassed all previous records. The figures follow: Canadian motor vehicles, 7,777, carrying 29,127 passengers; United States motor vehicles, 137, carrying 600 passengers. Combined total, 7,914 motor vehicles and 29,727 passengers as compared with 7,475 motor vehicles and 28,846 passengers during the previous year. Although the majority of these visitors were residents of Saskatchewan, tourists from six other Canadian provinces and 25 States of the United States were among those who registered at the park gateway.

Health conditions throughout the season were generally good, and no cases of contagious disease were reported. Tests of drinking water used in the townsite were carried out weekly and hypochloride of lime introduced into the water system. A new chlorinating plant has been purchased and will be installed prior to the opening of the 1939 season.

The camp-grounds continued to be a great source of attraction to the public, and at times all available space was occupied. Activities carried on under the direction of the camp-grounds caretaker included sing-songs, moving pictures, ping-pong and bridge tournaments, weiner and marshmallow roasts, softball games, and organized boat trips.

The number of visitors making use of the camp-grounds totalled 7,057, as compared with 5,250 during the previous year. Registrations at the various camp-grounds were as follows: Waskesiu, 6,874; Crean Lake, 140; Kingsmere Lake, 23, and Clearwater Lake, 20. Motor vehicles numbered 1,856, an increase of 609 over the corresponding period last year.

Construction during the year was as follows: New living quarters at Waskesiu for the resident engineer, a new warden's cabin at Crean Lake, a patrol cabin and stable at Beehive Lake, a patrol cabin on the third meridian in Sec. 1, Twp. 60, Rge. 1, a new comfort station in the Lakeview sub-division,

two brick chimneys in the bunkhouse at Meridian, and a brick chimney and furnace in Bittern Creek cabin. In addition the icehouse located at Camp No. 7 was moved to the permanent camp, the old warehouse at Crean Lake was moved to a new site and rebuilt, a building from MacKenzie Creek was moved to Silver Grove for a stable, and the wet well at Waskesiu was lined with concrete. Two small dams were constructed, one at the outlet of Crean Lake and one at the mouth of Kingsmere River.

All park roads and trails were maintained in good condition. Improvements carried out on the Prince Albert Park Highway included straightening of dangerous curves. One-quarter mile of highway and three and one-third miles of streets in the townsite were treated with oil. Construction and rebuilding of secondary roads totalled 41.7 miles as follows: Meridian Highway to Rabbit cabin, 8 miles; Rabbit cabin to Boundary cabin, 32 miles; and Prince Albert Park Highway to Summit tower, 1.7 miles.

Construction of new trails was as follows: German Crossing cabin to lookout tower, 3 miles; Boundary cabin to lookout tower, 3 miles, and Prince Albert Park Highway to Bluebell tower, 300 yards. In addition, old trails were improved as follows: Fifty-six trail, from Prince Albert Highway to Moose Cabin trail, 25 miles; Fifty-seven trail, from Boundary cabin to the Narrows Highway, 32 miles, and Moose Cabin trail, from Rabbit cabin to Fifty-six trail, 27 miles.

The bridge across Shoal Creek was completed, and smaller bridges and culverts replaced and constructed where necessary.

Additions to the forest fire protection system included erection of three 80-foot steel towers in districts Nos. 4, 6, and 9; construction of foundation and transportation of steel for one 80-foot tower in district No. 3; construction of four secondary wooden towers varying in height from 42 to 50 feet in districts Nos. 1, 2, 5, and 7, and preparation of timber for the erection of one secondary wooden tower in district No. 3.

Sub-normal rainfall resulted in fairly high fire-hazard conditions throughout the season. A total of 8 fires occurred within the park and burned over an area of 67 acres, as compared with 23 fires and 9,867 acres burned in 1937. Fortunately, very little valuable timber was lost, 94 per cent of the area burned being young growth and grassland. Aerial patrols proved of great assistance in helping to detect and control fires.

Approximately six and one-fifth miles of new telephone line was constructed to connect existing lines with the new fire lookout towers. All park lines were overhauled and maintained in good order throughout the season.

Considerable building was undertaken by private individuals. In the business section there was erected an addition to the laundry, one new store, and a new bungalow concession on which fourteen cabins were constructed of log siding. In the residential section at Prospect Point, one new residence was built. In addition, four blocks of the public camp-grounds were set aside for cottages of a cheaper type, and 20 cottages were erected and 7 new bungalows were added to the Waskesiu bungalow camp. Work undertaken by the Government included construction of a new barracks for the Royal Canadian Mounted Police and dredging of the area inside the breakwater, from which approximately 15,000 cubic yards of material was removed.

The park museum continued to be popular and attracted 10,529 visitors.

A program of mosquito control was carried out in the spring with very satisfactory results.

An increase has been noted in all species of wild life with the exception of moose, white-tailed deer, coyote, and bear. The greatest increases were among elk and beaver, with rabbits and muskrat also coming back. White-tailed deer, moose, and coyotes are not so numerous as in former years, and for some unknown reason bear have practically disappeared from Waskesiu

townsite and vicinity. The small herd of buffalo wintered well, and now numbers ten, an increase of three over the previous year. Bird life is plentiful with many species of ducks and pelicans particularly noticeable.

Stocking of Waskesiu Lake with small mouthed black bass was continued, and a shipment of 472 fish was released in June. Fairly good catches of lake trout were reported from Crean and Kingsmere Lakes, but great northern pike and pickerel do not appear to be as plentiful as in former years.

Under the supervision of the Dominion Forest Service, sanitation cuttings were carried out over a distance of 18 miles along the Heart Lakes and Narrows roads, for five miles along the Waskesiu-Prince Albert Highway from the museum to the Narrows road, and for 2½ miles from the park boundary to the buffalo paddock. In addition thinnings and release cuttings covering approximately 65 acres were carried out around Waskesiu townsite and on the Narrows road.

The golf course proved to be more popular than ever, with the number of permits issued passing all previous records. A total of 3,563 single-round tickets, as well as 127 daily, 85 weekly, 3 monthly, and 18 seasonal tickets were issued. The men's Provincial golf tournament was held early in July, and the Park annual golf tournament, known as the Lobstick golf tournament, was held early in August. Other sporting events of interest included the senior and junior tennis tournaments, the annual swimming meet, the annual regatta, and a girls' soft-ball tournament. Three boat trips were organized for boys and girls.

In May, the Superintendent in co-operation with the United States Highway 85 Association carried out a lecture tour in the United States. Park films were shown and literature distributed en route. A transcription of activities in and around Waskesiu was prepared by officials of the Canadian Broadcasting Corporation, and was broadcast on August 17.

PRINCE EDWARD ISLAND NATIONAL PARK

This park embraces a coastline strip, about 25 miles in length, on the north shore of Prince Edward Island, and includes some of the finest sand beaches in Eastern Canada. The park was established in 1936 with an area of 7 square miles. It is being developed as a recreational area in keeping with national park standards.

Although no official record of visitors was kept, it is estimated that approximately 10,000 persons visited the park during the year.

One business licence and 28 hay permits were issued during the year.

All areas known to be infested with poison ivy were sprayed with atlacide, with the result that practically all the plants were either killed or prevented from producing seed. During the summer season the bathing beaches were cleared of driftwood and debris.

New construction included the completion of two bath-houses at Dalvay and Cavendish, and the construction of one permanent and two portable bath-houses at Brackley. Improvements to existing buildings were as follows: At Dalvay House application of three coats of stucco, exterior decoration, reconstruction of veranda, and construction of toilet rooms; at Green Gables replacement of sills and floor joists, excavation for replacement of cement foundation under kitchen and repairs to stone foundation under main building, shingling kitchen walls and roof of main building, staining roofs, construction of one double dormer window and replacement of frames and sashes, construction and hanging of shutters, painting, erection of one partition, laying of floors, and excavation for septic tank. At the Superintendent's residence, reconstruction of foundation, construction of two dormer windows, fireplace, chimney, front entrance and closets, shingling and staining of roofs, plastering, laying new

floors, exterior and interior decoration, and installation of plumbing and electric wiring. In addition the moving of the old barn at Green Gables and three outbuildings at Dalvay has been completed. Plans were drawn up for the improvement and landscaping of grounds surrounding Dalvay House. Approximately 3·17 miles of boundary fence was erected. Two new wells were drilled, one at Dalvay House and one at Brackley Beach.

Roadwork was limited to maintenance of existing road and completion of approximately three miles of new road between the eastern entrance at Dalvay and the western extremity of the Dalvay-Stanhope section. One new bridge was constructed across the outlet of Long Pond.

Wild life in this area is fairly well limited to waterfowl, shore, and land birds. Several species of ducks, Canada geese, plover and snipe were seen frequently but were not present in large numbers, probably owing to the construction work which was being carried out in the vicinity. Ruffed grouse and Hungarian partridge wintered well and are reported to be increasing.

In general the waters in this area are suitable for trout, and although no official record was kept, some good catches were reported from the Lake of Shining Waters.

No recreational facilities have yet been provided, but the park beaches continued to be popular, and attracted many visitors. Construction of an 18-hole golf course in the Cavendish area was started in July. This work progressed very favourably throughout the season, and it is expected that the first nine holes will be ready for play by July, 1939, and the second nine before the end of the season.

RIDING MOUNTAIN NATIONAL PARK

This park is a rolling woodland on the summit of the Manitoba escarpment, dotted with many sparkling lakes. 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 small herds of buffalo and elk. The total length of motor highways is 50 miles and secondary roads 54 miles. In addition there are approximately 113 miles of trails. The park was established in 1929 and covers an area of 1,148 square miles.

Registration of tourists at the park gates showed a gratifying increase, and was as follows: Canadian motor vehicles, 31,983, carrying 119,628 passengers; United States motor vehicles, 1,229, carrying 4,831 passengers. Combined total, 33,212 motor vehicles and 124,459 passengers, compared with 29,864 motor vehicles and 117,253 passengers during the previous year. An increase was particularly noticeable in tourists from the United States, who numbered 4,831 as against 3,386 last year. It is worthy of note that a new high record has again been established for the park. The popularity of the park as a meeting place for conventions was maintained, with many social and professional organizations holding their meetings in the park.

During the year a total of 22,005 licences and permits were issued as follows: business licences, 193; building permits, 21; camping permits, 1,463; lot rentals, 220; grazing permits, 106; hay permits, 414; timber permits, 1,375; transient motor licences, 18,031; and miscellaneous, 182.

Registration of campers at Wasagaming camp-ground totalled 4,761 persons as compared with 6,774 last year. These visitors spent 48,658 person-days in residence, or an average stay of 10·2 days per person. The decrease in campers this year was attributed to the wet weather experienced during the month of August. Activities organized by the campers included concerts in the jamboree building, sing-songs, soft ball games, and a horseshoe pitching tournament. The Lake Katherine camp and picnic grounds, and the picnic grounds at Moon Lake were well patronized throughout the season as picnic spots, but very little camping was done at either.

New construction in the townsite by private enterprise, included an additional bungalow camp of ten units, a new lodge, and one new cottage. In addition considerable improvement work was done on a number of existing business places.

New construction undertaken by the Government included four tower-observer's cabins in the Dauphin, Kelwood, Elphinstone and Russell districts and three patrol cabins in the Kelwood, Russell, and Grandview districts. Improvements included remodelling of the staff quarters to provide additional accommodation, and minor improvements to the Superintendent's residence, administration office, and museum.

Two wooden lookout towers 20 feet in height were constructed for the use of tourists at lookout points on the Dauphin and Norgate highways. Parking areas were built at these points, and also on the Dauphin highway adjacent to the Clear Lake tower.

All park roads were maintained in good condition, the main roads being kept open for necessary communication during the winter. Bridges on the Lake Audy and Dauphin-Clear Lake roads were repaired and a considerable amount of new guard-rail constructed on the latter. New construction totalled 19½ miles of secondary road as follows: to Dauphin tower, 7 miles; to Kelwood tower, 1 mile; and to Rossburn tower, 11½ miles.

Considerable maintenance work was undertaken on park trails, and in addition approximately 14 miles of new trail was constructed running west from Lake Audy to Gunn Lake and two miles east from Gunn Creek crossing. Major improvements included construction of permanent bridges on the Birdtail Valley trail at Blackstone and Gunn Creek crossings.

General revision of the telephone system was undertaken, which included construction of 46 miles of new lines to connect up the various fire lookout towers, and temporary repairs to existing lines. An additional line was run from the North Gate to connect with the Manitoba Telephone System.

The existing fire protection system was extended by the erection of seven steel lookout towers varying in height from 40 to 100 feet. Five of these towers are located within the park and two on the plains outside the park boundary. All towers within the park are connected by telephone.

Forest fire conditions were more favourable than last year, the spring fire season being moderate with the worst periods of hazard developing in the autumn. Sixteen fires occurred which burned over a total of 2,780 acres, as compared with 36 fires and 11,919 acres burned during the previous year. Of the area burned during the current year approximately 20 per cent was grassland and 26 per cent old burn. Air patrols were again active during the spring and autumn fire seasons and proved of considerable value in the detection of fires.

Work carried on in the townsite included operation of municipal services, and maintenance of streets, walks, grounds, lawns, and flower beds, including those in the vicinity of the golf club-house and the "Wishing Well." Only two small fires occurred in the townsite, both of which were extinguished by the volunteer fire brigade before any serious damage was done. The park museum was open to the public daily throughout the season, and as usual attracted a large number of visitors.

All forms of wild life came through the season in good condition, and showed normal increases in numbers. Moose, elk, mule deer, and white-tailed deer are reported to be plentiful. Among the smaller animals a new colony of beaver has been seen northeast of Clear Lake; skunk are numerous, and rabbit and coyote are scarce. The animals in the enclosure at Lake Audy at the end of March numbered as follows: buffalo, 59; elk, 55; moose, 4; white-tailed deer, 5; mule deer, 4. Combined total, 127. The exhibition animals continued to be a source of interest to visitors, and during the season over 5,000 people visited the enclosure. In order to avoid congestion in the enclosure, 16 buffalo were

slaughtered in the autumn, and the meat and hides disposed of by auction. Bird life was plentiful, with a marked increase in migratory waterfowl, including many species of ducks, geese, whistling swans, and cormorants. A slight increase was noted in grouse.

During the year 31 prosecutions were instituted for infringement of the Game Act, and 30 convictions were secured, one case being withdrawn for lack of sufficient evidence.

The fish-rearing ponds which were constructed in 1936 continued to be a source of interest to park visitors. Early in May 250,000 rainbow trout fry were received from the provincial hatchery at Fort Qu'Appelle and transferred to the fish-rearing ponds. The fish remained in the ponds throughout the season and were distributed in Clear Lake in October. Improvement work carried out in the vicinity of the rearing ponds included laying out of walks, planting of shrubs and perennials, and sanitation cuttings.

Fishing in Clear Lake has shown a marked improvement over the past few years, many excellent catches of northern pike being reported. One 22-pound pike taken in Clear Lake was reported to be the largest caught in Manitoba during the season. The rainbow trout released in Clear Lake in 1937 are reported to be doing well and to have shown satisfactory growth. Lake Audy and Moon Lake also provided some good fishing.

Cutting of saw-timber and fuelwood in the park was again carried out under the annual budget plan adopted last year. In comparison with the fiscal year 1937-8, this year's cut showed a slight increase but was well within the limits allowed by the working plan.

Under the supervision of the Dominion Forest Service the following improvement work was carried out: sanitation cuttings and thinnings were made over an area of 1,423 acres bordering on the Dauphin and Norgate Highways, the North Shore Drive, the Lake Katherine road, and in the vicinity of Wasagaming townsite. Thinnings were confined to young stands, and sanitation cuttings applied to mature stands. All brush was burned, unmerchantable material was skidded back from the highway or burned, and the remainder utilized for fuel. The planting program included setting out of exotic species from Morden, Manitoba, at the three main gates and around the administration building and transplanting of white spruce from the Lake Audy nursery in the camp-grounds and at various points in the townsite. At the golf course white spruce and jack pine were planted in the vicinity of the greens and tees.

Many concerts conducted by the campers were held in the jamboree building and attracted a large attendance. Swimming and boating at Clear Lake continued to be popular and were under the supervision of a lifeguard. A regatta sponsored by the Wasagaming Board of Trade was put on in July. The girls' annual softball tournament was held in August with five teams competing. The sixth annual tennis tournament sponsored by the Wasagaming Board of Trade was held in August at Wasagaming, and attracted 250 players. The children's playground, which adjoins the tennis courts, was open throughout the season, and proved a great attraction to the youngsters.

The park golf course was maintained in good condition and continued to be one of the main sources of attraction. A total of 5,833 single-round tickets as well as 139 daily, 55 weekly, 3 monthly, and 8 seasonal tickets were issued. The Wasagaming Golf Club tournament was held in July and drew a record entry of 106.

ST. LAWRENCE ISLANDS NATIONAL PARK

St. Lawrence Islands National Park is composed of thirteen islands among the Thousand Islands of the St. Lawrence River, together with a small mainland area at Mallorytown Landing, Ontario. The islands include Cedar, near Kingston; Aubrey, Mermaid, Beau Rivage, Camelot, Gordon, and Endymion,

near Gananoque; Georgina and Constance, near Ivy Lee; Grenadier (portion) near Rockport; Adelaide, near Mallorytown Landing; Stovin, near Brockville; and Broder, near Morrisburg, Ontario.

These island parks are delightful recreational areas for campers and picnickers, and several of the large islands, notably Beau Rivage, are used extensively for 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, camp-stoves, 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 21,150 persons visited the island parks, a small decrease from the previous year. Improvements carried out during the year included erection of new flag poles on Cedar and Gordon Islands. All other work was of a general maintenance character.

WATERTON LAKES NATIONAL PARK

(Canadian Section, Waterton-Glacier International Peace Park)

Waterton Lakes Park is a mountain playground of unusual charm on the eastern 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, 3 miles of secondary roads, and 240 miles of trails. It was established in 1895 and has an area of 220 square miles.

The volume of tourist travel to the park, surpassing all previous records, was as follows: Canadian motor vehicles, 11,811, carrying 44,203 passengers; United States motor vehicles, 11,371, carrying 42,184 passengers; foreign motor vehicles, 41, carrying 130 passengers. Combined total, 23,223 motor vehicles and 86,517 passengers, as compared with 14,591 motor vehicles and 59,520 passengers during the previous year.

The Information Bureau was open from June 15 to September 15, during which time 13,010 inquiries were dealt with. This total was made up as follows: Canadian, 4,430; United States, 7,940; other foreign, 41; and miscellaneous, 599.

A total of 12,531 licences and permits were issued during the year as follows: general revenue receipts, 982; timber permits, 34; general licences, 89; camping permits, 431; transient motor licences, 10,921; and miscellaneous, 74. Revenue from this source showed an increase of 76.4 per cent over the corresponding period last year.

Throughout the year, health conditions in the community were generally good, with a total absence of communicable disease. All milk and water supplies were subjected to frequent tests, and constant supervision was maintained over all matters affecting public health.

Registration at the park camp-grounds showed a decided increase, totalling 1,709 persons, as compared with 1,422 during the previous year. A total of 431 camping permits were issued, covering a combined stay equivalent to 11,986 person-days. The average stay was 7.01 days per person. The camp-grounds at Cameron Lake and Red Rock Canyon continued to be popular and attracted many visitors.

In the townsite new construction was limited to the erection of a new dance hall, store, hotel, and three additional cabins at the auto bungalow camp. Work undertaken by the Government included completion of the fish ponds cabin, painting the shelter at the children's playground, and stuccoing and painting the exterior of the Administration building. Outside of the townsite a summer cabin was erected at Hell Roaring Creek, kitchen shelters were completed at Crandell, Bertha, and Crypt Lakes, and all warden's cabins were maintained in good repair. In addition the dining lodge and kitchen of the Lethbridge Y.M.C.A.

on Lower Waterton Lake was completed. Old relief camp No. 5 was dismantled. Two additions were made to the Government wharf and a new wharf was constructed by the Park Transport Company.

Road work was confined to general maintenance of park roads, including applications of oil on certain sections. On the Main Entrance road, widening was undertaken near Waterton cabin, above lower Waterton Lake and near Mile 0-10. On the Akamina road, 10 culverts were replaced and the decking and stringers renewed on the bridge near Mile 7. On the Pass Creek road, revisions were made at Miles 0-2, 0-6, 4-0, and 4-9; the decking and stringers were renewed on a bridge near Mile 5-8 and the abutments, timbers, stringers, hand rail, and wheel guard were all renewed on the Upper Pass Creek bridge. The road to the Prince of Wales Hotel was widened from 16 to 20 feet. All streets in the townsite and camp-ground roads were maintained in good condition, and a marked improvement resulted from a more liberal use of oil than in 1937. Work was commenced on rebuilding the Lower Cameron Creek bridge. The piers and abutments have been completed and stringers placed in preparation for the completion of the bridge.

All park trails were maintained in good condition, and in addition 4-25 miles of new construction was carried out as follows: Bow Lake trail, 1-25 miles; Goat Lake trail, 1-75 miles; from bath-houses at Lake Linnet around Prince of Wales Hotel to Pincher Creek, 0-75 miles, and from bath-houses around east side of Lake Linnet, 0-50 miles. In addition a new bridge was constructed across the outlet from Cameron Lake. It is interesting to note that the use of park trails by the visiting public has increased considerably during the past few years. Work on telephone lines was restricted to general maintenance of existing park lines.

Wild life in general is reported to be in good condition. Increases have been noted in elk, mule deer, sheep, beaver, otter, and snowshoe rabbit, and slight decreases have occurred in marten, mink, lynx, and weasel. White-tailed deer remain about the same. Among the predators, coyote are plentiful and two cougar were seen. However, it is not considered that the latter has its regular habitat in the park. Small birds appear to be on the increase, particularly in the vicinity of the townsite. Ruffed grouse are plentiful and have shown a marked increase, and sharp-tailed grouse have decreased slightly.

Fishing during the 1938 season continued to be good, with many excellent catches of fish reported. Several lake trout weighing over 20 pounds were taken from the main Waterton Lake, and good catches were also reported from Cameron, Bertha, Alderson, Carthew, and Crypt Lakes. Stream fishing was rather poor, although better catches than last year were reported from Belly River. In accordance with recommendations made by the Biological Survey, a concession was let to net whitefish in lower Waterton Lake, and a total of 1,421 pounds were taken during the season. During the year the following distribution of fry and fingerlings was made from the Waterton Hatchery: in park waters—salmon trout, 5,150; cut-throat trout, 1,260; rainbow trout, 7,463; total, 13,873; in provincial waters—rainbow trout, 201,128; cut-throat trout, 120,500; total, 321,628. Approximately 18,580 speckled trout eggs and 203,770 rainbow trout eggs were kept at the hatchery during the winter. Improvements included installation of some 900 feet of 8-inch wooden-stave pipe between the source and present intake of water supply.

No forest fires occurred in the park during the past season. One fire occurred in the townsite, which resulted in the complete destruction of a private residence.

Sixteen grazing permits were issued covering a total of 1,492 head of stock. This was a decrease of 92 head from the previous season. Approximately 75 tons of mixed timothy and brome hay were harvested, of which 55 tons were baled and distributed among the various warden stations and headquarters for feeding Government stock.

In accordance with recommendations made by the Dominion Forester and Dominion Entomologist, dying lodgepole pines in the vicinity of the townsite which were infested with bark beetles were cut down and burned. Throughout the summer season specimens of forest insects were collected by the warden service and forwarded each month to the Dominion Entomological Laboratory at Vernon, B.C., for purposes of identification.

The park golf course was maintained in good condition, with 18 holes in play throughout the season. Improvements included top dressing, seeding, and elevation of certain tees which were in need of adjustment. The annual golf tournament was held early in August, and attracted about 96 competitors, the largest number on record. The four tennis courts and children's playground were in constant use. The baseball diamond was kept in good condition, but was not as well patronized as in former years. The bathing beach at Lake Linnet was as usual well attended, and a life-guard was employed to supervise aquatics during July and August.

YOHO NATIONAL PARK

Yoho Park on the western 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 44 miles, secondary roads 6 miles, and trails 192 miles. Established in 1886, the park has an area of 507 square miles.

Tourist traffic showed a marked increase over the corresponding period last year. The number of cars entering the park showed only a slight increase, the main increase being accounted for by visitors travelling by rail. Traffic from Banff by way of Kicking Horse Pass, which is not registered at the Leancoil gateway, was again recorded by an automatic registration device installed west of the park boundary.

Tourist figures for the past 2 years are given in the following table:—

Visitors to Yoho National Park

Route	Motor Vehicles		Passengers	
	1938-9	1937-8	1938-9	1937-8
<i>Eastbound—</i>				
Via Leancoil Gate.....	1,990	2,343	5,861	7,021
<i>Westbound—</i>				
Recorded automatically (estimated four persons per car)	12,954	12,884	51,816	51,536
Visitors by rail (estimated).....			7,000	2,000
Totals.....	14,944	15,227	64,677	60,557

Health conditions in the townsite throughout the year were generally good, with no cases of infectious diseases being reported. Regular inspections were made of business premises and camp-grounds, and every effort was made to maintain them in a sanitary condition.

Registration of campers at the public camp-grounds showed a decrease from last year. A total of 1,051 motor vehicles and 4,117 persons used the various camp-grounds as follows: Kicking Horse camp-ground, 986 motor vehicles and 3,944 persons, and Chancellor Peak camp-ground, 65 cars and 173 persons. Because of flooding from the Kicking Horse River, the Field camp-ground was not in operation during the past season. The decrease in registration of campers is probably owing to the fact that this was the first year that automobile owners were charged a fee for camping privileges.

All chalets and bungalow camps opened on June 15, and with the exception of Alton's auto bungalow camp, which remained open until the end of October, all closed on September 13. Improvements to tourist camps included a new five-room cottage at Yoho Lodge, and four new cabins at Alton's auto bungalow camp.

Work on park roads was limited to general maintenance including application of oil for dust prevention. The Field-Golden Highway was opened on May 4, and the Field-Banff Highway on May 14. Branch roads were a few days later in opening. The Ottertail road was opened only as far as Boulder Creek ($3\frac{1}{2}$ miles west of Field), the old Boulder Creek bridge being considered unsafe for heavy traffic. Streets in the townsite were graded and oiled.

Work on trails was confined to general maintenance and the construction of two new bridges on the Beaverfoot trail. This trail is now passable for light cars from Leanchoil to the mouth of the Ice River.

All park telephone lines were maintained in good condition. Improvement work included replacing of the galvanized iron wire on the Stephen-Hector section with copperweld wire.

It is gratifying to note that only three small forest fires occurred, all of which were quickly extinguished without any loss. One fire occurred in the townsite which destroyed a private residence. This was the first fire to occur in the townsite over a period of 23 years.

Wild life is reported to be plentiful and has come through the season in good condition. Fur-bearers appear to be on the increase and predators are scarce. Fishing in the park continued to be popular, and many good catches were reported from Lakes Wapta and O'Hara and Cataract Creek. A total of 41,000 rainbow trout fry from the Banff Hatchery were placed in Lake O'Hara and Cataract Creek.

During the past winter a local ski club known as the Kicking Horse Ski Club was formed with a membership of forty-four.

Animal Parks

BUFFALO NATIONAL PARK

This enclosure, near Wainwright, forms the largest fenced wild animal preserve in Canada, and is the home of a large herd of plains buffalo, and smaller herds of moose, deer, elk, yak, and hybrids, the latter segregated for experimental cross-breeding purposes. There are 2 miles of motor highway, 25 miles of secondary roads, and 57 miles of trails in the park, which was established in 1908, and contains an area of 200.5 square miles.

During the year a total of 10,960 persons visited the park, as compared with 9,830 for the corresponding period last year.

Permits for 46 cords of dry wood and 8,500 willow fence posts were issued to settlers in the vicinity of the park.

Work on roads and trails was confined to general maintenance of the motor road and trails.

All park telephone lines were maintained in good condition, repair work including replacement of 36 poles, resetting of 48 old poles, and replacement of a number of side brackets. Maintenance and necessary repairs were carried out on approximately 120 miles of eight-foot, and 10 miles of ordinary fence, and included replacement of 1,904 fourteen-foot posts, 110 eight-foot posts, and resetting of approximately 2,500 old posts.

No fires occurred in the park during the year. As a measure of protection against fires originating outside the park, approximately 140 miles of 20-foot fireguard were ploughed on both sides of the main fence, and also across the park at intervals. Inspections of stovepipes and chimneys at the various buildings were made periodically.

New construction included a small registration booth at the home paddock entrance, a pump-house over Number 2 well in the main park, and a two-car garage in the home paddock. Alterations and repairs were made to the stock sheds in the cattalo enclosure; repairs and improvements to buildings at the abattoir and home paddock; improvements to the abattoir, including painting of the interiors of the killing room, men's washroom, office, and inspector's quarters. At Ribstone Meadow the interiors of the sleeping camps and cook and dining camps were painted, and at the farm the interior of the large granary was painted and repairs made to the driveway leading to the upper floor.

For the purpose of improving watering facilities in the main park, a change was made in the west boundary fence to provide access to a spring which had been outside the animal enclosure. In addition a small concrete dam was constructed across the outlet from Channell Spring, a catch basin installed and the head of the spring fenced to prevent trampling.

Approximately 430 acres were seeded to oats, of which 350 acres were threshed and 80 acres left for green feed. Returns from farming operations were as follows:— oats, 11,308 bushels; straw, 220 tons; green feed, 68 tons; brome grass seed, 5,600 pounds; hay (cultivated), 250 tons; (wild) 1,750 tons. As an experiment, about 3 acres were seeded to crested wheat grass. Owing to increased precipitation the hay crop was exceptionally good.

The herds of big game animals in the park, which include buffalo, moose, and mule deer, are all maintaining a satisfactory increase. In accordance with the policy of the Department, the herd was reduced by the slaughter of 1,226 buffalo and 485 elk. This work was carried out in the late autumn when the animals were in prime condition. Twenty-six buffalo carcasses were reserved for the use of the Department, and the remainder disposed of by contract. In the case of the elk, the carcasses and hides were shipped to various Indian Agencies, in Manitoba, Saskatchewan, and Alberta. At the end of the fiscal year the number of animals in the park was as follows: buffalo, 2,492; moose, 137; elk, 1,674; mule deer, 842; yak, 36; and mixed breeds, 88.

An epidemic of encephalomyelitis, which swept over the western provinces, was responsible for the death of many horses. However, the prompt action of park officials in having all park horses vaccinated, prevented losses in the park.

As a result of increased precipitation and more water in the small sloughs, there was a notable increase in waterfowl, which, owing to drought conditions which have prevailed during the past few years, had become quite scarce. A marked increase was also noted in sharp-tailed grouse.

Donations made during the year included one pair of buffalo and one pair of yak to the Moose Jaw Wild Animal Park Society, Moose Jaw, Saskatchewan; one male buffalo mounting specimen to the New York Natural History Museum, New York; three elk mounting specimens to the Natural History Museum, Hamburg, Germany, and two male elk heads to the Hudson's Bay Company.

The only recreational facilities provided are the picnic grounds and bathing beach at Mott Lake, both of which were well patronized throughout the season.

ELK ISLAND NATIONAL PARK

This park consists of a fenced enclosure near Lamont, Alberta, containing buffalo, moose, mule 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, secondary roads 2 miles, and trails 4 miles. The park was established in 1911 with an area of 51.2 square miles. Although originally intended as a big game preserve, this park has in recent years developed into a very popular recreational resort.

During the year tourist travel to the park was as follows: Motor vehicles 16,973, carrying 73,056 passengers, as compared with 17,380 motor vehicles and 63,040 passengers during the previous year.

Roadwork was restricted to general maintenance and included re-surfacing of approximately 8 miles with gravel, construction of 24 culverts, and one Texas gate. Existing fences were maintained in good condition by replacing and re-setting of posts.

New construction included a hide room, an extension to the cooler at the abattoir, a combined blacksmith shop and tool shed, a pump-house, and drilling of a new well at the abattoir. Improvements included relining the bunk-house, moving a building from headquarters to golf course to provide a barn, re-decorating interiors of golf club-house, office, gateman's cabin at north gate, warden's cabins and Superintendent's residence. Landscaping and planting of trees and shrubs were carried out at the Superintendent's residence, the golf club-house, the gateways, and at Sandy Beach; in addition an area adjacent to Sandy Beach was cleared to provide a new parking area, and the old refreshment booths moved to the south and west gates for the use of the gatekeepers.

Approximately 125 acres were sown to oats and yielded the following returns: 3,325 bushels of oats, 149 loads of oat sheaves, and a large quantity of straw. In addition approximately 450 tons of hay were harvested from Goose Lake Meadow.

One small fire occurred within the park. As a fire protection measure the Oster and Grassy Lake trails which divide the park east and west, were cultivated and graded, other fireguards were ploughed to a greater width, and where possible partially dried sloughs were cultivated parallel to the fence.

The big game animals in the park, which include buffalo, elk, moose, and mule deer, are generally in good condition. In accordance with the policy of the Department, a total of 1,035 animals were slaughtered for the Indian Affairs Branch and for other use, and included the following: 800 buffalo, 134 moose, and 101 elk. At the close of the fiscal year the number of the animals in the park were: buffalo 995, elk 473, moose 99, mule deer 27. During the year one pair of buffalo and one pair of elk were donated to the Wellington Zoological Gardens, New Zealand, and one buffalo cow was loaned to the Edmonton Zoological Society. An extensive survey of bird life was carried out, and for the purpose of obtaining migration information, 684 birds representing 60 species were banded.

The golf course was used extensively. Some 400 tons of top dressing were spread on the fairways, the pipe-line was extended to provide water for the tees, a new bunker and trap was constructed on No. 2 fairway, and a new tee on No. 4 fairway. At Sandy Beach an area was cleared to provide a baseball diamond. All recreational facilities provided by the park were well patronised.

NEMISKAM NATIONAL PARK

Nemiskam National Park, Alberta, is a fenced reserve, covering an area of 8.5 square miles. It was established in 1922 for the protection of prong-horned antelope, of which it has a herd of more than 100. Visitors to the park during the year numbered 20.

Range conditions were better than during the past few years, the hay crop being very good. Work carried out during the year included general maintenance of fences, clearing weeds from water courses, constructing a rock crossing across one of the creeks, and general repairs to barns and corrals.

WAWASKESY NATIONAL PARK

In 1914 an area of 54 square miles in southeastern Alberta, was reserved for the protection of the rapidly diminishing herds of prong-horned antelope. It was established as Wawaskesy National Park and included in the National Parks system in 1922.

No development work was carried on in the area. By 1938, the number of antelope in the district had greatly increased, thereby removing the need for the continued reservation of the park area. Consequently it was decided to abolish Wawaskesy National Park and allow the area to revert to the province. This was accomplished by Act of Parliament assented to on June 24, 1938.

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. Fort Anne National Park is one of the most notable of Canada's historic places. The fort to-day 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.

Registrations at the museum totalled 12,050 persons, as compared with 12,029 during the previous year. In addition it is estimated that 5,000 persons visited the grounds without going into the museum, making a combined total of 17,050. Several travel groups from the United States and Canada, including teachers and pupils from Canadian schools, were among those who visited the park during the season.

An interesting event celebrated in July was the bicentenary celebration of the organization of the first Masonic Lodge in Canada at Annapolis Royal in 1738.

Interesting acquisitions to the park museum included the following: Copies of reports of H.R.H. Prince Edward, made when he was stationed in Nova Scotia; sketch of Fort Anne made in 1828; plan of part of the garrison ground of Annapolis Fort, dated September 26, 1818; model of Habitation of Port Royal; full dress helmet of 63rd Rifles; an old cannon ball picked up at Fort Anne; photostat copies of plans drawn by Engineer Delabat who supervised the building of Fort Anne; copies of reports sent from Port Royal by Engineer Delabat, and a considerable number of old books and documents.

Improvements carried out during the year included painting the outside of the museum building, plastering the chimneys, and installing transoms over the east and west doors. All other work undertaken was of general maintenance character.

FORT BEAUSEJOUR NATIONAL PARK

The site of old Fort Beausejour, located on the long ridge between the Aulac and Missaguash Rivers, and overlooking Chignecto Bay, forms one of the most interesting historic places in New Brunswick. The construction of the fort was begun by the French in 1751, under de la Jonquiere, Governor of Canada, but before its completion it was taken by the English under Colonel Robert Monckton, in 1755, and renamed Fort Cumberland. Under British rule the defences of the fort were greatly strengthened, and during the American Revolution of 1776, it withstood an attack by a force under Colonel Jonathan Eddy.

In 1926, an area of 59 acres, containing what remained of the fort, was set aside as a National Historic Park, and the original name "Fort Beausejour" was adopted. Since that time the remains of the fort have been repaired, points of interest have been marked, foot-paths constructed, drinking water provided, and a rest pavilion and other facilities made available for visitors.

In 1935, a museum was erected near the entrance to the fort, the official opening taking place on August 1, 1936, in the presence of several thousand people. The museum contains an interesting collection of exhibits, relating chiefly to the civil and military history of Chignecto, and the neighbouring

Counties of Westmorland and Albert in New Brunswick and Cumberland in Nova Scotia. The exhibits were generously contributed by residents of these districts.

During the year over 15,000 persons registered at the museum and last autumn it was found necessary to add a new wing to the building in order to provide accommodation for the new exhibits that have been received. Other work carried out during the year includes the erection of a cottage, with garage, for the use of the caretaker; the repairing of the old British well; the construction of a concrete base and carriage for the cannon presented by Dr. J. C. Webster, and the levelling and re-sodding of the parking areas.

HISTORIC SITES AND MONUMENTS

The restoration, preservation, marking, and administration of historic sites of national importance and the commemoration of the public services of outstanding persons connected with the early history of Canada have been entrusted to the National Parks Bureau. The Bureau is assisted in this work by the Historic Sites and Monuments Board of Canada, an honorary, advisory body, comprised of a number of recognized historians representing 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., M.D., D.Sc., LL.D., F.R.S.C., Shediac, N.B.; Professor Fred. Landon, M.A., F.R.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.; Rev. Antoine d'Eschambault, D.S.T., D.J.C., St. Boniface, Man.; J. A. Gregory, M.L.A., North Battleford, Sask.; F. H. H. Williamson, Controller, National Parks Bureau, Ottawa.

The annual meeting of the Board was held in Ottawa from May 19 to 21, when a number of new sites were reviewed and a selection made therefrom for attention at a later date. Of the total number of sites considered by the Board to date 276 have now been suitably marked and 178 additional ones recommended for future attention.

During the year the following sites were marked:—

Mohawk Indian Fort, Annapolis Royal, N.S.—A bronze plate affixed to an iron pedestal was erected on lower St. George Street to mark the site of the fort built in 1712 by Mohawk Indians under Major Livingston. The tablet was unveiled on August 29, 1938, under the auspices of the Annapolis Royal Historical Association.

Battle of Grand Pre, Grand Pre, N.S.—A cut stone monument with tablet was erected adjacent to the Provincial Highway to commemorate the engagement which took place on February 11, 1747, when New England troops under Colonel Arthur Noble were surprised and defeated by French and Indians under Coulon de Villiers. The British commander was killed and the French leader died later of his wounds. The monument was unveiled on September 5, 1938.

Halifax-Castine Expedition, Halifax, N.S.—A cut stone monument with tablet was erected on the grounds of Dalhousie University to commemorate the British military and naval expedition from Halifax in September, 1814, under Lieutenant General Sir John Coape Sherbrooke and Rear Admiral Edward Griffith, which occupied the portion of Maine between the Penobscot and St. Croix Rivers. Major General Gerard Gosselin governed that district, from Castine, until April 26, 1815. The customs duties collected during this period

*Brig.-Gen. Cruikshank died June 23, 1939.

were utilized by Governor Dalhousie for the endowment of the Garrison Library and Dalhousie College. The monument was unveiled on August 16, 1938, under the auspices of the Dalhousie Reunion Committee.

First Pictou Academy, Pictou, N.S.—A cut stone monument with tablet was erected adjacent to Church Street to mark the site of the first Pictou Academy which was erected in 1818 and demolished in 1932. Under the leadership and example of Dr. Thomas McCulloch it opened the door of opportunity to a hitherto neglected element of the population of the Maritime Provinces and gave to Nova Scotia and the Dominion of Canada many men who became prominent in journalism, literature, science, theology, education, and government. The monument was unveiled on August 15, 1938.

Major Thomas Dixson, Fort Beausejour National Park, near Aulac, N.B.—A tablet was affixed to the outer wall of the museum building in honour of Major Thomas Dixson, who during the siege of Fort Cumberland by rebels under Jonathan Eddy in 1776, made a perilous journey to Halifax, securing the assistance of a force which helped to rout the enemy and to save Nova Scotia for the Empire. The table was unveiled on July 24, 1938.

Prehistoric Indian Portage, Baie Verte, N.B.—A cut stone monument with tablet was erected adjacent to the Aulac-Port Elgin Highway to mark the route from the Gulf of St. Lawrence to the Bay of Fundy which was the chief means of communication between Quebec, Isle Royale, and Chignecto. The portage connected the Baie Verte and Missaguash Rivers. The monument was unveiled on September 4, 1938.

First Postal Service in Canada, Montreal, P.Q.—A tablet was affixed to the outer wall of the new Postal Terminal building, St. James Street, to commemorate the establishment of this service. From 1693 couriers carried the mail between Quebec and Montreal. In 1763 Benjamin Franklin, then Deputy Postmaster General in North America established the first organized postal service in Canada.

Struggle for Hudson Bay, Ville Marie, P.Q.—A cairn with table was erected on the Court House grounds to commemorate the capture in 1686, of three Hudson's Bay Company forts on James Bay, by a French force under Chevalier de Troyes, assisted by Canadians under d'Iberville, journeying overland by way of Lake Temiscamingue. The French retained possession until the Treaty of Utrecht in 1713. The monument was unveiled on August 15, 1938.

Trent Valley Canal, Bobcaygeon, Ont.—A cut stone monument with tablet was erected near the bridge over the canal to commemorate the construction, in 1833, of the first Bobcaygeon Lock by the Inland Water Commission, appointed by Sir John Colborne, the beginning of the improvement of the natural waterway connecting Lake Ontario with Georgian Bay.

First Cheese Factory in Canada, Ingersoll, Ont.—A tablet was affixed to the Post Office building to mark the site of the first cheese factory in Canada, established in the County of Oxford in 1864. The widespread adoption of the co-operative factory system in this and other counties marked the beginning of the modern dairying industry in Eastern Canada.

Sir Arthur Currie, Sir George Ross, and the Hon. Edward Blake, London, Ont.—Bronze plates in memory of each of these outstanding persons were erected in the Court House. The unveiling ceremonies were held on November 21, 1938, under the auspices of the London and Middlesex Historical Society.

Battle of Lundy's Lane, Niagara Falls, Ont.—Three tablets bearing the names of the officers and men who were killed in this battle, which took place on July 25, 1814, were attached to the large monument erected some years ago by the Dominion Government.

First Oil Wells in Canada, Oil Springs, Ont.—A tablet was affixed to the outer wall of Community Hall to commemorate the discovery of oil in this locality. It was observed by early travellers and by the pioneer farmers who used it for medicinal purposes. In 1858, near Oil Springs, James M. Williams dug the first oil well in Canada and later established a refinery at Hamilton. In 1861, John Shaw, by drilling into the rock, opened the first flowing well, its situation being lot 18, concession 2, Enniskillen Township. From these beginnings developed one of Canada's most important industries. The tablet was unveiled on July 1, 1938.

Samuel Hearne, Churchill, Man.—A table was affixed to the outer wall of Fort Prince of Wales to commemorate the public services of Samuel Hearne, 1745-92. Travelling overland from Port Churchill in 1771 he succeeded, after two attempts, in discovering the Coppermine River. He became governor of Fort Prince of Wales in 1775 and was in charge in 1782 when it was captured by La Perouse.

Cumberland House, Cumberland Lake, Sask.—A cairn with tablet was erected near the Hudson's Bay Company post to mark the site of this important trading house. From 1670 to 1774 all the posts of the Hudson's Bay Company were on the shore of Hudson Bay; but in 1774, as a result of the advent of the Montreal traders, the company built its first inland post, Cumberland House. Its erection marked a new era in the fur trade and the commencement of the rivalry which continued until 1821.

Fort Assiniboine, near Barrhead, Alta.—A cairn with tablet was erected in the southwest quarter of section 1, township 62, range 6, west of the Fifth Meridian, to commemorate the improvement in the early transportation system of Western Canada. In 1825 the old route across the continent by way of the Churchill, Beaver, and Athabaska Rivers was changed to one by way of the North Saskatchewan as far as Edmonton, and thence by pack-train to the Athabaska at Fort Assiniboine. This change resulted in greater speed, decreased cost, and increased safety.

Kootenae House, near Invermere, B.C.—A cut-stone monument with tablet was erected on Lot 375, Kootenay District, to mark the place where in August, 1807, David Thompson of the North West Company built Kootenae House, the first trading post of the white man on the Columbia River or its tributaries.

The Canadian Pacific Railway, Port Moody, B.C.—A cairn with tablet was erected on the City Hall grounds to commemorate the completion of the Canadian Pacific Railway. The "Last Spike" of this railway was driven November 7, 1885, and on the following day the first transcontinental train reached the terminus at Port Moody. On July 4, 1886, the first regular passenger train arrived at Port Moody from Montreal, thus completing the bond of union and making Canada independent in the matter of railway transportation. The monument was unveiled on October 1, 1938.

PRESERVATION AND DEVELOPMENT WORK

Preservation and development work was carried out at the following larger sites:—

Fortress of Louisbourg, near Louisburg, N.S.—Situated three miles south of Louisburg, Cape Breton Island, and built by the French during the years

1720-40, the Fortress of Louisbourg was the scene of great struggles between the French and English. It has an area of 328 acres and was acquired in 1928. During the past year excavation of the walls and moat at the Governor's Quarters in the Citadel was continued from where work was left off in 1936. The walls were rebuilt in this area and a bridge was constructed across the moat at the main entrance to the King's Bastion. Three new concrete gun bases and gun carriages were constructed and cannon mounted in place. One large and two small anchors were placed on suitable concrete bases in front of the museum building. Repairs were made to the road, and the ditches and culverts cleaned out. The water supply line from the freshwater pond was completed, a pump-house erected and painted, and a pump pressure tank and intake installed. A distribution line was run to the basement of the museum building to provide a connection for the new toilets which have been installed there.

Prince of Wales Tower, Halifax, N.S.—It is situated in Point Pleasant Park and is the last of five such towers erected in Nova Scotia. It was acquired January 25, 1936, in view of its significance as a type of military architecture. During the past year the roof and parapet walls were waterproofed and outlet drains and chutes provided to carry the water clear of the outside walls of the tower.

Champlain's Habitation, Lower Granville, N.S.—Additional lands have been acquired and preliminary steps taken in regard to the proposed erection of a replica of the Habitation. The memorial cairn erected several years ago to mark this site has been taken down in order to make way for the new buildings.

Martello Tower, Saint John, N.B.—Situated on Lancaster Heights and built for the defence of Saint John during the War of 1812-14. The wooden roof of the tower was removed, waterproof concrete coping placed around the parapet wall and waterproofed concrete laid on the firing step and the deck of the roof. Two copper roof drains and chutes were installed. The stonework of the inside of the parapet wall and firing step was cleaned and the joints pointed with waterproof cement. A weatherproof vestibule was constructed at the head of the stairway leading to the roof and the treads of the stairway surfaced with concrete. The wooden steps leading to the main entrance were taken down, reset close to the outside wall, and a landing constructed at the doorway. Minor repairs were made to the pointing of the outside walls, and the vents through the basement walls were cleaned out and wire screens installed in them. The entrance road, parking lot and the area around the base of the tower was levelled and gravelled and all iron and woodwork in the building was painted.

Fort Chambly, Chambly, P.Q.—Situated about twenty miles southeast of Montreal, Fort Chambly was built of wood in 1665 as a defence post against the Iroquois. The fort was rebuilt of stone in 1709-11 to resist the advance of the British forces; was captured by United States troops in 1775, and the interior buildings were burned in 1776. It was restored in 1777 and abandoned in 1880. It has an area of 2½ acres and was acquired in 1921. During the past year a concrete retaining wall was constructed on the bed of the Richelieu River on the north side of the fort and the space between the wall and the fort filled in with stones laid to a uniform slope to form a rip-rap. The stone work of the north face of the boundary wall was flush pointed in cement mortar and rip-rap placed sloping back from the wall fronting the picnic grounds to prevent erosion during high water. The interior walls of the fort were pointed where necessary and a shelter was erected on the picnic grounds.

Fort Lennox, Ile-aux-Noix, P.Q.—Situated thirteen miles south of St. Johns in Richelieu River, it formed a gateway to Canada and an advance post against the Iroquois and other invaders. The island was fortified by the French

before 1759 and its defences were rebuilt by the British during the years 1812-27. It has an area of 150 acres and was acquired in 1921. During the past year a section of the floor on the second story of the Commissariat building was relaid and repairs made to the vaulting and walls. The interior walls of the second story of the guard-house were replastered and the roof of the men's barracks was painted. Sections of the kitchens and storehouses at the rear of the men's barracks were restored with concrete and a T-shaped floating dock was constructed and placed in position at the west boat landing.

Fort Wellington, Prescott, Ont.—This fort was constructed in 1812-13 as the main post for the defence of the communication between Kingston and Montreal. It has an area of 8½ acres and was acquired in 1923. Work of a general nature was carried out during the year on the buildings and grounds.

Murney Tower, Kingston, Ont.—Situated in Macdonald Park, it is one of four similar towers erected at Kingston by the Royal Engineers in 1840-6 for defence purposes. During the past year a new roof was put on this building.

Battlefield of Stoney Creek Monument near Hamilton, Ont.—A frame with heavy grille was installed at the landing to the balcony of this imposing monument, all loose plaster removed from the walls and ceilings of the chamber at the base, and replaced with cement mortar. The heavy cornice of the monument was pointed, all broken glass replaced in the windows and repairs made to the window sills and frames.

Fort Malden, Amherstburg, Ont.—Built in 1797-9 by the Second Battalion, Royal Canadian Volunteers, under Captain Hector Maclean. In 1812 it was the principal military station on the western frontier. During the past year a contract was placed for the building of a museum and excavation work was subsequently commenced.

Fort Langley, Langley, B.C.—The first trading post on the Pacific Coast, it was built by the Hudson's Bay Company in 1827 and later destroyed by fire. It was rebuilt in 1840 and is to-day in a good state of preservation. During the past year the entrance road leading to the fort was graded and levelled, a cement curb constructed around the grass plot at the door and improvements were made to the grounds in front of the building.

Prince of Wales Battery, Charlottetown, P.E.I.—Under the supervision of officials of the City of Charlottetown, restoration and improvement work was carried out on the site of this battery, which is located in Victoria Park.

Restoration Work at Halifax, N.S., Quebec, P.Q., and Levis, P.Q.—Under the supervision of officials of the Department of National Defence considerable restoration work was undertaken at the Citadel, Halifax, N.S., the Quebec walls and fortifications (including St. John's Gate), Quebec City, and at Fort Levis, Levis, P.Q.

Principal work done at Halifax Citadel during the fiscal year 1938-9 consisted of reconstruction of the roads to Citadel Hill and the circular drive around the fortifications. Other work involved minor repairs to walls but no actual restoration was possible with the funds available.

Substantial progress was made with the work of restoration of the walls at Quebec Citadel which comprised in large measure the re-setting of the stonework. The St. John's Gate was completely rebuilt during the year and a certain amount of work also was done to improve the motor drives on the grounds outside the fortifications.

The fortifications at Levis are composed of three forts all more or less constructed on the same plan. Work during the year centred principally on Fort No. 1. This work consisted of reconstruction and repointing the walls and

making necessary repairs on the old earthworks. At Fort No. 2—the central unit of the fortifications—work was confined to minor repairs to the walls, rebuilding the original chimneys of the building inside the fort which is now used as caretaker's quarters, and installing fixtures in same to provide ventilation to the casemates.

Old Barracks, Carillon, P.Q.—Extensive renovation work was carried out and the building is now being used by the Historical Society of Argenteuil County for museum purposes.

La Verendrye Monument, St. Boniface, Man.—A grant of \$5,000 was made to the La Verendrye Bi-Centenary Committee of Winnipeg to assist in the erection of a monument to the famous explorer Pierre Gaultier de Varennes, Sieur de la Verendrye. The monument was unveiled on September 11, 1938.

MIGRATORY BIRDS CONVENTION ACT

Responsibility 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 rests with the National Parks Bureau. Regulations covering the shooting of migratory birds remained practically the same with a continuation of the restrictions first imposed in 1936. A few alterations of a minor nature only were made with the concurrence of the provinces concerned.

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 numbers of wild ducks and geese have been greatly depleted of recent years chiefly owing to drought conditions, drainage caused by advance of agriculture, outbreaks of duck sickness, and changes in environment in the southern Prairie Provinces. This area is the most important breeding grounds, at least for many species of ducks, in North America, and it is gratifying that the picture for 1938 appeared less depressing than in any of the past ten years. It is the hope of conservationists that the long drought cycle is at last broken and that the future holds a brighter waterfowl outlook in this important duck nesting area. However even with a great increase of precipitation, years may pass before a beneficial effect is seen on the waterfowl supply of the continent. Water conservation work under the authority of the Prairie Farm Rehabilitation Act and by private interests has undoubtedly tended to improve waterfowl nesting conditions, and these efforts will be increasingly beneficial as the work is extended.

In the main, other parts of Canada showed some improvement over 1937 in the matter of waterfowl supply. However, the southward migration of Atlantic brant was dangerously low in the Maritimes, and wild geese did not make as good a showing in Ontario and Quebec in 1938 as did ducks, a notable decrease of blue and snow geese during autumn being caused apparently by

the failure of these birds to rear many young on their Arctic nesting grounds. Since no other seriously adverse conditions respecting waterfowl in the Northwest Territories were apparent in 1938, it seems reasonable to assume that this area otherwise maintained its usually satisfactory waterfowl population. British Columbia showed a general improvement over 1937.

The 1937 hunting season of approximately two months for ducks and geese in Canada was continued in 1938, with only a few minor adjustments, this relatively short season having been adopted in 1936 in an effort to restore the losses in the natural supply of migratory waterfowl of the continent. A strict daily and seasonal bag limit was imposed, the use of live decoys in hunting these birds continued barred, and prohibition of baiting waterfowl with grain remained in force. Continuing the policy of recent years, no open season was provided for wood ducks, and no hunting of Atlantic brant was permitted. Sale of waterfowl was prohibited except in the far north where special conditions prevail.

The Migratory Birds Regulations are adjusted annually by the Federal authorities in collaboration with the provincial game administrations. All of the provinces co-operated in the enforcement of this law and thus helped to conserve a national resource.

Restrictions on hunting waterfowl in the United States remained far more stringent than in Canada. Only a one-and-one-half months' open season was permitted in the United States, the season was completely closed for several species, and the hours of shooting, possession limits, and the like continued to be kept to the minimum.

Undoubtedly the reduced hunting of waterfowl in both Canada and the United States has tended to increase their numbers to some extent, but a continuation of the strictest possible hunting regulations is necessary if the waterfowl population is to be built up to where it was some twenty years ago, so great has been the depletion. Provision of bird sanctuaries and establishment of suitable water habitat for these birds are absolutely necessary, and these phases of bird protection and restoration work are being given close attention.

Many other kinds of migratory birds besides waterfowl are included within the protective terms of the Migratory Birds Convention Act. The public is kept informed of the economic value of these birds and adequate measures for their safeguard are being taken. The birds included in the terms of the migratory birds law of Canada, other than waterfowl, have not, except in the case of a few species, been faced with any serious threat of depletion and seem to be maintaining normal abundance. It is evident that the public is appreciative of Canada's wild birds and shows ever-increasing willingness to co-operate in conserving them both for economic reasons and on account of the aesthetic interest they arouse.

A total of 52 Dominion bird sanctuaries of various types are now reserved under the Migratory Birds Convention Act in Canada. The following new sanctuaries were established during the period covered by this report:—Dorval Island in the Province of Quebec, and Hannah Bay in the Northwest Territories, the latter being of great importance as a waterfowl refuge. Seal, Flat, Round, Mud, and Noddy Islands, formerly a Nova Scotia bird sanctuary, were dis-established as such.

As usual, the National Parks Bureau received the voluntary co-operation of Honorary Game Officers under the Migratory Birds Convention Act. There are 797 such officers throughout the Dominion, and a great deal of valuable educational work is performed by them.

The four District Migratory Bird Officers operating under the direction of the National Parks Bureau continued with the field administration of the Migratory Birds Convention Act. In addition to their regular work covering a wide variety of duties connected with the administration of bird protection, they co-operated with the Royal Canadian Mounted Police respecting law

enforcement matters, educational work, scientific study of the relation of mergansers to fishing interests on the Pacific Coast, and life history studies of other species in British Columbia. Conditions in the important prairie duck nesting area were studied closely; also inspections of bird sanctuaries and other reserves were continued. The regular annual patrol of important breeding areas on the north shore of the Gulf of St. Lawrence was completed and conditions affecting bird life in the Maritime Provinces were closely observed and necessary action taken as required. Attention was given to lecturing on the value of native wild birds and their conservation, and close co-operation with the provincial governments, game conservation societies, and other organizations in matters pertaining to bird conservation work was continued successfully.

The co-operative plan for the development of an eider-down industry on the north shore of the Gulf of St. Lawrence has continued between the Quebec Departments of Lands and Forests, and Game and Fisheries, and the migratory birds protection service of the National Parks Bureau. Twenty-three leases were in effect in the season of 1938. In addition to preventing waste of a useful natural resource and providing a source of revenue to people whose possible sources of income are limited, the inauguration of this industry has advanced the conservation of the American eider duck in the areas involved. Lessees in these eider-down producing areas protect the eider ducks from poachers and attract as many eiders as possible to nest on their leases, thus increasing measures for conserving this species.

Bird banding is a world-wide investigation of wild bird life and is being conducted in most of the important countries of North America and Asia, and in more than twenty countries of Europe. In North America the bird-banding project involves the fullest co-operation between the National Parks Bureau at Ottawa, and the United States Bureau of Biological Survey at Washington, D.C. This has proved to be a most satisfactory arrangement in view of the highly migratory habits of most species of North American wild birds which range freely over the continent and regularly migrate from one country to the other.

Practically all bird-banding operations in Canada are conducted by some 200 voluntary co-operators who are required to have a special knowledge of ornithology and are authorized to do the work by special bird-banding permits under the Migratory Birds Convention Act. The wild life unit of the National Parks Bureau has custody of all bird-banding data which relate to Canada.

During the calendar year 1938, 32,226 birds were banded in Canada, and 815 records of banded birds that have been captured, killed or found dead, were added to the rapidly accumulating mass of new and useful data now available for study by officials and organizations concerned with problems in the conservation of wild bird life.

Bird banding is the only means of completely solving such problems as summer and winter ranges, migration routes or fly-ways, concentration points, mortality rate, percentage of the take of game birds, fluctuations in abundance, longevity, and kindred subjects.

This effort has continued to expand and progress in Canada and at least four times the volume of bird-banding data is now being recorded as compared with ten years ago. The success of the work is largely dependent on the voluntary co-operation of the public in reporting any banded birds they may recover to the Controller, National Parks Bureau, Ottawa, who will advise the persons making the reports as to the complete banding histories of the birds involved.

The supply of eel-grass, a very important natural source of food for water-fowl on the Atlantic Coast in Canada, remained far below normal, and there was no improvement over the greater part of the area which formerly produced this important marine plant in great abundance. It has, however, come back to some extent in patches, fairly substantially in some localities, and this relatively slight improvement may be permanent in a few scattered places. No trace of

eel-grass can be found in many places where it formerly grew in thick beds prior to the blight which attacked this plant some years ago, and many areas of this kind are now covered with drifting sand. While there is no real certainty, reports give at least some hope that eel-grass will recover possibly a fraction of its former abundance.

Permits and licences issued under the Migratory Birds Convention Act, and valid during the year 1938 were as follows:

- 366 permits to collect specimens of migratory birds for scientific purposes.
- 200 permits for banding purposes.
- 112 permits allowing the destruction of certain birds when found injuring agricultural or fishery interests.
- 576 permits to possess birds for propagating purposes in the various provinces.
- 6 permits to take birds for propagating purposes in the various provinces.
- 23 permits allowing the collecting of eider-down.
- 52 permits to collect gulls' eggs in Saguenay County, P.Q.
- 5 permits to collect gulls' eggs on bird sanctuaries.
- 5 permits to possess firearms on bird sanctuaries.
- 10 permits to destroy herring gulls.
- 58 taxidermist's licences.

The following printed material was distributed during the year: Consolidations of the Migratory Birds Convention Act and Regulations, 6,048; abstracts of the Act, 19,557; posters, 48,440; pamphlets, 33,282; slides lent, 3,145.

Two hundred and five lectures were given by officers of the Bureau, and lecture material, including motion pictures and lantern slides, was lent freely to voluntary assistants.

The National Parks Bureau was represented at the following conservation and scientific conferences pertaining to wild life:—

The Summer Session of the American Association for the Advancement of Science, Ottawa, Ont., June-July, 1938.

The Fifty-sixth Stated Meeting of the American Ornithologists' Union, Washington, D.C., October, 1938.

The Fourth North American Wildlife Conference, Detroit, Michigan, February, 1939.

A conference of Provincial and Dominion game officials met at Ottawa, January 16, 17, and 18, 1939, and it is felt that this conference between Provincial and all Dominion Departments concerned with wild life conservation accomplished a great deal in promoting understanding of wild life problems. Because of these conferences important advances have been made toward the development of a national wild life policy for Canada.

Some fifteen resolutions were adopted and these relate to various conservation items as follows: a revision of the regulation prohibiting baiting; collection of birds for scientific purposes; an annual stamp tax on hunters of migratory game birds, the proceeds to be used for conservation purposes; prohibition of the use of the pump shotgun that has not been plugged to hold only one shell in the magazine; early adoption of Migratory Birds Regulations each year; uniform bag limits upon game birds; definition of "hunt" in the Migratory Bird Regulations; publicity pictures of hawks and owls with summaries of their economic status for educational purposes; restriction of the open season for eider ducks to two months; prohibition of a rifle or a shotgun loaded with a single bullet in hunting migratory game birds. Resolutions were also adopted approving, in principle, a Dominion Act in aid of provincial legislation to cope with illicit movement of wild life products from province to province; and dealing with research in connection with Canada's wild life resources. Although proceedings of the conference are not available to the public, copies of the resolutions passed by the conference are supplied on request.

Mr. Charles Elton, Director of the Bureau of Animal Population, Oxford University, Oxford, England, continued studies concerning the fluctuations in the population of the northern varying hare or snowshoe rabbit. Cycles of abundance and scarcity of this very important species have a pronounced effect on the status of other forms of wild life, and therefore take a prominent place in the economic structure of natural resources such as food and fur supply. The facts are gathered in Canada by the National Parks Bureau with the help of hundreds of voluntary observers, analysis of the data obtained in this way is made at Oxford, and the results are published in Canada.

The Royal Canadian Mounted Police continued co-operation in the enforcement of the law relating to the application of the Migratory Birds Convention Act. As usual, the force also assisted greatly in gathering reports concerning wild life in Canada, principally data on the abundance or scarcity of waterfowl, and in obtaining and reporting details of the recovery of many banded birds.

Mammal conservation work and kindred subjects in the National Parks, as well as in the Northwest Territories, was continued by the scientist employed for this purpose during the previous year. This work is expanding and progressing favourably and will help to solve many wild life problems.

ADVISORY BOARD ON WILD LIFE PROTECTION

Four meetings of the Board were held as follows: November 1 and 29, 1938; January 9, and March 31, 1939. A few of the subjects dealt with were collection of eider-down on Baffin Island and circumstances attending this activity; regulations, licences, game conditions of the Northwest Territories; Hannah Bay Bird Sanctuary, Northwest Territories; proposals for studying fluctuations in the populations of wild animals made by Mr. Charles Elton on the occasion of his recent visit to Ottawa; Akimiski Island, Twin Islands, Northwest Territories, and other areas proposed as wild life sanctuaries.

Changes in the personnel of the Board were as follows: D. J. Allan, Superintendent of Reserves and Trusts of the Indian Affairs Branch, and Dr. C. H. D. Clarke, mammalogist, Lands, Parks and Forest Branch, both of the Department of Mines and Resources, were appointed members of the Board.

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 June 29, 1938. Attendance during July was very poor, but picked up in August, with a total registration during the season of 221. Provinces and countries represented were as follows:—

British Columbia	19	United States.....	75
Alberta	61	Scotland	6
Saskatchewan	5	England	21
Manitoba	7	Wales	1
Ontario	12	New Zealand	1
Quebec	10	Hawaii	1
France	2		

(General Report compiled from the Gazette of the Alpine Club)

The thirty-third annual camp was held from July 16 to 31, near the foot of the Athabaska Glacier, in Jasper National Park, and opened up new climbing possibilities for members and their friends. One advantage of this camp was that members and their friends could avail themselves of motor transport direct to camp, instead of having to use the old pack-train.

A total of 160 persons, including the staff, were placed under canvas, representatives attending from the Alpine Clubs of England, America, France, Switzerland, and Mexico; the Ladies Alpine Club, the Ladies Scottish Climbing Club, the Royal Geographical Society, the Appalachian Mountain Club, B.C. Mountaineering Club, the Colorado Mountain Club, the Mazamas, the Mountaineers, the Sierra Club, the Obsidians, and the Yale Outing Club.

High-camp equipment was again in great demand, and this camp, pitched on the shoulder of Snow Dome at about 10,000 feet, provided some 50 people with the novel experience of sleeping and catering for themselves on the snow-fields. From here climbs were made of Columbia, North and South Twins, and Snow Dome. A fly camp was also placed at the foot of the Saskatchewan Glacier to which several members went. The annual meeting of the Club was held at the Columbia Icefield Camp, July 27, 1938.

DOMINION FOREST SERVICE

The Dominion Forest Service is maintained to further the protection, maximum production, and wise use of Canadian forest resources. It operates forest experiment stations to obtain basic knowledge of the best methods of managing woodlands and afforestation of waste lands, and forest products laboratories to aid in securing more efficient utilization. Research in forest-fire hazards facilitates protection, and special studies in interpretation of aerial photographs give valuable data for the stock-taking of our forest estate. Statistics of forest production and trade are analysed, market trends are noted, and the information derived is made available through publications issued. These activities are a Dominion contribution to forest conservation. They supplement the activities of the provinces, which, as the owners of the forests within their boundaries, are mainly responsible for forest administration in Canada.

The use value of our forests is not confined to the raw materials produced. Many indirect benefits accrue. With the rise of the tourist industry to a position of high importance, the recreational values of our woodlands must be given more intensive study. The Dominion Forest Service is playing its part in the development of the multiple-use policy as applied to the forest estate. In the national parks, for instance, special operations, termed "sanitation cuttings," are supervised by the Forest Service. The purpose of these cuttings is the improvement of the health and growing conditions of timber stands along main park highways, whose attractiveness to visitors will thereby be increased.

The national parks present also exceptional facilities for study of variations in the balance of wild life. Increase of herbivorous animals following destruction of predators, unless subject to planned control, may have harmful effects on forest growth.

The Dominion Forest Service also serves other branches and departments of the government service in a technical or advisory capacity. Timber-disposal policy on Indian reserves, military reservations, and Dominion lands in the Northwest Territories is reviewed, and sales are supervised and inspected on request.

A joint investigation of much promise is the tree-breeding and propagation study being conducted at the Petawawa forest experiment station in co-operation with the National Research Council. This work, organized under a special subcommittee of the Associate Committee on Forestry of the Council, may produce new knowledge which will lead to a revised technique in forest management. While the study is still in the preliminary stages, the possibilities of development are very interesting.

Special reference should be made to the provision of additional funds under Vote 535 of the special supplementary estimates for the improvement of protection and administrative facilities, and the conduct of silvicultural operations at forest experiment stations.

The \$200,000 thus made available enabled the Forest Service to complete a large amount of road and building construction and to conduct for the first time in Canada large-scale experiments on the economic feasibility of various methods of improvement cuttings and thinnings in second growth stands.

FOREST ECONOMICS

The Division of Forest Economics assembles and compiles all available information as to the forest resources of the Dominion, the depletion of these resources due to cutting, fire, and other causes, the production of the industries dependent on the forests for raw material, and the trade in forest products.

FOREST RESOURCES

The Forest Service has completed inventories of the forest resources in Manitoba and New Brunswick, and, though the inventories of Saskatchewan and Alberta are incomplete, a sufficient quantity of data has been collected to enable a preliminary estimate to be made. Reports on these surveys have been issued in Bulletin 85, "The Forests of Manitoba"; Bulletin 91, "The Forests of New Brunswick," and Bulletin 88, "Forests and Forest Industries of the Prairie Provinces." The Service is co-operating with the Province of Nova Scotia in a survey of its forests based primarily on information secured by aerial photography. The other provinces supply the latest data available. Since new surveys are being conducted each year, and the forests are constantly changing because of depletion and growth, it is necessary to revise the National Inventory from time to time. The latest compilation was published in Bulletin 92, "Economic Aspects of the Forests and Forest Industries of Canada, 1938."

This showed the forested area to be 1,223,522 square miles, 35.3 per cent of the total land area, as compared with 6 per cent which is under cultivation and pasture. Approximately 769,500 square miles are classified as accessible and productive forests; on 360,500 square miles of this area the timber is of merchantable size, and on the remaining 409,000 square miles there is young growth of various ages to supply future requirements.

The total stand of timber of merchantable size is estimated to contain 273,656 million cubic feet, of which 170,144 million cubic feet is considered accessible under present conditions. The accessible timber consists of 245,313 million feet board measure of timber suitable for the manufacture of sawn lumber and 1,107 million cords of smaller material that could be used for pulp-wood, fuel-wood, etc.

Conifers, or "softwoods," comprise 78 per cent of the merchantable timber, and broad-leaved, or "hardwood," species, 22 per cent.

Of the total forest area 91.5 per cent is Crown land, administered chiefly by the provincial governments. It is estimated that 15 per cent of the merchantable timber is on privately owned land and 40 per cent is held under cutting licences granted by the governments to companies and individuals.

The accessible timber is estimated to have a present or prospective stumpage value of about \$2,000,000,000—merchantable timber \$1,597,000,000, and young growth \$403,000,000.

DEPLETION

The average annual depletion of the forests during the ten years 1928-37 is estimated to amount to the equivalent of 3,930 million cubic feet of standing timber, classified as follows:—

Cut for use	2,579	million	cubic	feet
Merchantable timber destroyed by fire.....	325	"	"	"
Young growth destroyed by fire.....	326	"	"	"
Losses due to insects, fungi, etc.	700	"	"	"
Total	3,930	"	"	"

During each of the last three years for which records are available (1936-8) the loss of merchantable timber and young growth due to fire has been equivalent to about 1,000 million cubic feet. Whether this increase in fire loss was due more to weather conditions or to laxity in fire prevention and protection is difficult to determine.

INCREMENT

The extent to which the annual depletion is replaced by growth is unknown. A number of regional surveys has been made which indicate a satisfactory increment, but the data relating to the various forest sites and types are not sufficient to provide a reasonable basis for an estimate of the annual increment.

However, an annual depletion of 3,930 million cubic feet represents only about 8 cubic feet per acre on the 492,480,000 acres of productive forest land. The 2,579 million cubic feet of timber cut for domestic and industrial use make an average of only 5 cubic feet per acre. With proper protection and management this demand could be supplied indefinitely on one-fifth of the productive area in the Dominion, or one-half the productive area in the Province of Quebec.

FOREST INDUSTRIES

In 1937, the latest year for which statistics are available, the net value of production in the industries primarily dependent on wood was \$386,690,450. This figure represents the difference between the gross value of the products manufactured and the cost of the raw materials and the electric power and fuel used.

These industries provided employment on a man-year basis to 209,217 people; but, owing to the seasonal nature of the work, especially in the woods operations and the lumber industry, it is estimated that about 365,000 persons secured a substantial amount of employment in these industries during the year. The salaries and wages paid amounted to \$175,945,922, which comprises 45.5 per cent of the net value of the products.

Summary of Statistics of the Forest Industries, 1937

	Number of Employees	Salaries and Wages	Value of Products added by Manufacture
		\$	\$
Woods operations.....	100,000	60,000,000	163,249,887
Lumber industry.....	33,917	27,173,872	46,727,302
Pulp and paper industry.....	32,101	48,757,795	106,013,221
Wood-using industries.....	31,677	27,054,807	43,657,874
Paper-using industries*.....	11,522	12,959,448	27,042,166
Total.....	209,217	175,945,922	386,690,450

*Exclusive of printing trades.

The number of men employed in woods operations is indicative of the activity of the industries using wood as a raw material. Logging operations were restricted in the winter of 1938-9 owing to a surplus of pulpwood and logs having resulted from abnormal activity during the previous winter and uncertainty as to the markets for pulp, paper, and lumber in the coming year. The average

index of employment in logging was only 142·8 in 1938 as compared with 189·3 in 1937. This represented a decrease of about 25,000 men in the average monthly employment as compared with 1937.

LUMBER INDUSTRY

The lumber industry shows continued progress towards recovery from the depressed conditions of 1932, when the gross value of the products sank to approximately \$38,500,000. In 1937 they were valued at \$104,849,785 as compared with \$80,343,291 in 1936—a gain of 30·5 per cent.

PULP AND PAPER INDUSTRY

In 1937 the value of the products of the pulp and paper industry as marketed, including the pulpwood and pulp exported and the paper manufactured, was \$229,789,483, as compared with \$187,377,770 in 1936. These figures do not include a certain amount of pulp used in Canada for the manufacture of artificial silk, fibreware, and products other than paper; on the other hand, they do not include any duplication of values, and constitute a fair presentation of the net value of the industry in Canada.

The apparent total production of pulpwood in 1937 reached a record of 8,298,165 cords, an increase of 1,296,108 cords over the cut of 1936. Of the wood cut in Canada 1,705,031 cords were exported, chiefly to the United States, and 6,593,134 cords were used in Canadian mills; on the other hand, 20,505 cords were imported from the United States.

TRADE IN FOREST PRODUCTS

The exports of wood, wood products, and paper, exclusive of books and printed matter, were valued at \$210,663,280 in 1938, as compared with \$261,986,296 in 1937. The imports of these products were valued at \$16,866,000 in 1938 and \$19,509,990 in 1937; and the favourable balance of trade amounted to \$193,797,280 in 1938 and \$242,476,306 in 1937.

The recession in world economic conditions in 1938 was evidenced by a decrease of \$51,323,016 in the value of the exports of forest products in 1938 as compared with 1937. Decreases were recorded in all classes of products except raw materials, where increased exports of pulpwood to Europe caused a slight gain.

EXPORTS OF WOOD, WOOD PRODUCTS AND PAPER

(Exclusive of books and printed matter)

	Calendar Years	
	1937	1938
	\$	\$
Raw materials (logs, bolts, and pulpwood).....	17,106,941	17,734,535
Products prepared in woods (poles, hewn ties, etc.).....	3,517,643	2,055,620
Sawmill and planing-mill products (lumber, shingles, etc.).....	58,885,801	47,380,549
Manufactured wood products (doors, furniture, etc.).....	4,406,012	2,889,062
Pulp and paper and manufactures of these.....	177,979,899	140,603,514
Total.....	261,986,296	210,663,280

On the basis of value, the proportion of the exports of forest products going to British countries increased from 24·5 per cent in 1937 to 27·7 per cent in 1938. The United States continues to provide the largest market for these products.

PER CENT OF VALUE OF EXPORTS OF FOREST PRODUCTS TO THE PRINCIPAL IMPORTING COUNTRIES

	Calendar Years	
	1937	1938
United Kingdom	17.0	18.2
Australia.	4.3	6.0
New Zealand	0.8	1.1
British South Africa.....	1.0	1.0
Other British possessions.....	1.4	1.4
Total British.....	24.5	27.7
United States	68.3	66.4
China.	0.8	0.5
Japan	2.5	0.8
Argentina.....	1.0	0.8
Other foreign countries.....	2.9	3.8
Total Foreign.....	75.5	72.3

AERIAL FOREST SURVEYS

Continued progress has been made in the development of technique for the utilization of air photography for forest-survey purposes and in the practical application of the methods devised by the Division of Forest Economics.

During the fiscal year 1938-9, forest maps and volumetric estimates of the timber were made for 3,504 square miles as compared with 3,514 square miles during the preceding year. This included 1,410 square miles for the Saskatchewan forest inventory and 1,250 square miles for the inventory in Nova Scotia, including 390 square miles in the Cape Breton National Park. One-sixth of the area of Nova Scotia has now been covered. The forests on four Indian Reserves, totalling 179 square miles, were mapped and estimated for the Indian Affairs Branch, as were also 565 square miles of the Prince Albert National Park.

Timber estimates from air photographs were made of an area of 100 square miles in the Lièvre River watershed in Quebec as a demonstration of their value to industry in planning operations as well as for inventory purposes.

Through the co-operation with operating companies it has been possible to secure checks of air-photography estimates with intensive ground cruises and actual cuts. On an area of 280 square miles the air-photography estimate was 5 per cent greater than that of an intensive ground cruise and on another tract of 100 square miles it was 8 per cent greater than the actual amount cut. This degree of accuracy compares very favourably with ground surveys, since the degree of utilization is a factor which the estimator cannot determine.

The practicability of not only mapping the forest-type areas but of estimating the amount of timber without recourse to field work has now been demonstrated as far as purely inventory purposes are concerned. However, a limited amount of supplementary ground sampling is required to secure data as to the distribution of individual species, age, site, rate of growth, reproduction, defect, and other particulars, when such information is required for management purposes.

Co-operation with foresters in private employ has been secured to test the application of our methods to intensive volumetric timber estimating on relatively small areas, in order to show whether the degree of accuracy secured is sufficient for the exacting requirements of immediate logging operations.

It has been found that photographs taken in the winter, when the deciduous foliage is absent and there is snow on the ground, have distinct advantages over summer photographs for forest surveys. The development of colour photography promises to become a valuable aid in species identification, especially when the making of coloured prints on paper reaches an economically practicable stage. Significant advances have been made in improving photographic film and in the use of filters for the accentuation of the various colour tones in the forest cover.

A field investigation has shown that air photographs may be used to great advantage in site classification in conjunction with ground studies. The physiography as revealed under a stereoscope, together with the wealth of information in regard to the forest cover that may be obtained from the photographs, provides a means of extending intensive soil and ecological studies to adjacent areas.

Tuition in methods of forest interpretation has become an important feature of the work of the Division. During this fiscal year, foresters employed by five pulp and paper companies were detailed by these companies to the Forest Service for instruction for varying lengths of time, totalling about two months.

SILVICULTURAL RESEARCH

Silvicultural research is concerned with studies of methods of forest management to determine the method or methods likely to produce the most suitable forest crop in the shortest time, continuously and most economically, for each of the various conditions of soil and associations of tree species. Investigations of the extensive existing young stands, which must provide wood supplies in the near future, are the first consideration. Study of methods of cutting mature stands with a view to obtaining better growth, quality, and associations in the remaining stand, with satisfactory reproduction of desirable species, is second only in importance. Attention is also directed to the reforestation of waste lands, which in some sections of the country is a serious matter, affecting the control of drifting sands, regulation of stream flow, and prevention of erosion.

These problems involve studies of the more fundamental factors of soils, climate, and genetics. In addition, measurement units require the prosecution of mensuration studies. For the prosecution of these problems in silviculture, five forest experiment stations have been established, representing five different forest regions. In timber types and forest regions not represented on these stations, supplementary studies are conducted on selected provincial and privately owned lands in co-operation with the provincial authorities and the industries.

At the Petawawa (Ont.) station and at the Acadia (N. B.) station phenological records of the flowering and other activities of native trees, shrubs, and herbs were made. Meteorological records were also made, serving both silvicultural and fire-weather investigations.

A party of six men carried out an examination of certain cut-over and burned-over lands in northern Saskatchewan, for a study of growth and reproduction conditions; white spruce was the main species. More than 900 one-fifth-acre sample-plots were examined, and the data are now being analysed.

Following the reconnaissance survey of 1937, a field party collected data in balsam fir types of the upper Gatineau watershed in a search for some readily recognizable factor indicative of abnormal occurrence of rot in balsam fir. In this project the plant-pathology unit of the Dominion Department of Agriculture and the International Paper Company were co-operators. The data are now being analysed.

In 1914 the late Senator Edwards planted 16,000 red pine seedlings on farmlands at Rockland, Ontario. In co-operation with the present owner, Mr. S. H. Morris, this stand is being used for experimental purposes. It was moderately thinned and pruned so that the past rapid growth might be continued. Two permanent sample-plots were then established to record the development. Thinning reduced the stand from 900 to 600 trees per acre. At 27 years of age, the average diameter was 6.1 inches, the average height was 42 feet, and the total volume was 3,750 cubic feet per acre. The total cost of thinning was \$231; the return for thinning of saw-material in thousand feet board measure and 75 cords of fuel-wood was \$243, slightly more than the cost. A report of the project has been prepared for publication.

Research Notes.—The following research notes were issued in mimeographed form:

No. 54, Site as a Factor in Silviculture, by J. W. B. Sisam;

No. 55, Forest Development on the Goulais River Watershed, by J. W. B. Sisam;

No. 56, Forest Improvement. Cuttings in Canada, by G. A. Mulloy.

The Science Service of the Dominion Department of Agriculture is co-operating with the Dominion Forest Service in problems relating to forest insects and forest-tree diseases. At the Petawawa station the Entomological Division and the forest-pathology unit of the Division of Botany have established offices and have representatives throughout the season, as does also the Division of Entomology at Fredericton. The work of the latter relates particularly to the spruce saw-fly.

PETAWAWA FOREST EXPERIMENT STATION

The Petawawa Forest Experiment Station, Renfrew County, Ontario, an area of nearly one hundred square miles, on the upper Ottawa River, represents the white and red pine cover-type, and its associate fire-type species, white birch and poplar, characteristic cover-types of the Algonquin-Laurentides section of the Great Lakes—St. Lawrence forest region. The stands are almost entirely second growth, approaching maturity, and therefore are particularly suitable for primary silvicultural research. There are also occasional areas of lowland black spruce, as well as areas of white spruce and balsam fir.

Improvement Cuttings.—A series of young, overstocked stands was improved by release and sanitation cuttings and by girdling; this was done by relief labour. The purpose was to investigate the economic possibilities of thus improving the composition and growth-rate of stands. Detailed records of costs under various methods were kept; the benefits of improvement will be recorded by means of repeated measurements of transect sample-plots. Four blocks of thirty to fifty acres each were fully improved, each by a different method, as follows:—

Block 1.—All overtopping hardwoods, together with conifers of poor form, cut and utilized as sawlogs and fuel-wood; net cost, \$15.95 per acre.

Block 2.—The sawlog material and only the best fuel-wood trees cut; the remainder of the overtopping and defective trees girdled; net cost, \$20.70 per acre.

Block 3.—Stems hauled to the roadside and bucked into fuel-wood; net cost, \$8.30 per acre.

Block 4.—Sawlogs only taken; all other defective and suppressing material girdled; net cost, \$9.95 per acre.

In each block, 200 white pine trees per acre were pruned for one log-length at a cost of \$4.70 per acre. The cost of girdling was \$1.60 per hundred trees.

The results given above indicate that the more intensive treatments cannot be considered as economically feasible under present operating and market conditions. In view, however, of the greatly enhanced value of clear stock white pine (a spread of around \$50 per thousand feet board measure above common grades), it may be well worth while to spend up to \$5 per acre on pruning, and to girdle hardwoods interfering with the growth of final-crop trees.

Sample-plots.—A series of transect sample-plots was established in black spruce stands cut over under permit by various silvicultural methods; these represent three distinct site-types. All plantation areas were surveyed and re-measured, and the results have been analysed. Twenty-one permanent and transect sample-plots established at various dates since 1918 were re-measured; these represent thinning studies and reproduction studies following commercial cutting operations.

Other Work.—Extensive studies on the relative value of native and exotic species and in tree breeding and hybridization to improve desirable characteristics of pine, spruce, poplar, and basswood were continued; in these projects the National Research Council is co-operating. A comprehensive study of method and time of disposing of spruce slash to obtain maximum reproduction with minimum of fire-hazard is progressing. Throughout the growing season systematic records were taken of the development of flowers, leaves, buds, and fruits of representative plants, shrubs, and trees.

Throughout the year meteorological records were taken twice daily; these records supply silvical data as well as basic data for fire-hazard research. Nearly 5,000 cords of wood were removed in the prosecution of silvicultural cutting plans, which provided employment for sixty permittees and their labourers. The working-plan budget allows an annual cut up to 6,000 cords. Thirty miles of base line and tie lines were run and established by iron posts at twenty-chain intervals, completing the boundary and grid system for the station. Four miles of primary gravel road were constructed; and all tree-line telephone lines (twenty miles) were replaced by pole-line, metallic circuit.

The forestry and allied sections of the American Association for the Advancement of Science, comprising over 150 members, at a two-day session at the station (June 30 and July 1) reviewed the research projects under way there.

Activity in timber disposal for the year was high, the amount of timber removed almost reaching the allowable cut of 6,000 cords.

A total of 198 timber permits was issued, on which 336,000 feet board measure of sawlogs, 45,000 linear feet of telephone poles, and 3,500 cords of pulpwood and fuel-wood were cut. In addition, 146,000 feet board measure of sawlogs and 1,100 cords of fuel-wood were taken out as improvement cuttings, and 250,000 feet board measure of hemlock were removed for station requirements.

The stumpage return obtained through permits was \$4,185. The value of the material used at the station, that used by the Department of National Defence, and that still undisposed of at the end of the fiscal year amounted to an additional \$1,900.

ACADIA FOREST EXPERIMENT STATION

The Acadia Forest Experiment Station is filling a long-felt need for an area in the Maritime Provinces under Dominion Government control on which forest investigations may be carried out. The work of the station itself comprised investigations in nursery work and planting; in thinning and other cultural methods; in utilization; in phenological, entomological, and fire-weather studies, and in short popular courses in forestry. Co-operative studies were made with the New Brunswick Forest Service and with private concerns in silvicultural research, (thinning, girdling, and cutting), and with the Entomological Division of the Science Service of the Dominion Department of Agriculture in the use of parasites for controlling the spruce saw-fly (including the setting aside of an area for the permanent use of the entomologists in carrying on their studies).

Nursery investigations included the study of exotic coniferous species—to discover their adaptability to Eastern Canada, and to compare their growth with the native species—and of nursery and planting technique. The planting program carried out mainly along investigative lines, included (1) insect-control studies, (2) mortality studies, (3) underplanting for type conversion, and (4) species investigations.

Examination was made of twenty-four permanent sample-plots that had been established for the study of sucker and sprout control from which intolerant hardwoods had been cut, and of the permanent sample-plots established for the study of planting technique, and also for the study of the possibilities of direct seeding.

Because of the growing feeling that the future forest will depend on the young stands at present established, extensive work was carried out in an endeavour to solve some of the problems regarding the handling of young stands and to obtain information that might determine the minimum amount that could be spent per acre to give the most satisfactory growth and the greatest financial returns. The areas investigated are to be of a permanent nature, and detailed information was collected through the use of transect plots from which the final results of the investigation will be compiled. Treatments included the felling of large trees to release conifers, the removal of dead and defective trees from a pure hardwood stand, heavy thinning of hardwood stands in order to release conifers and augment the growth of the remaining stand, and clear-cutting. Costs of the various treatments ranged from \$1.40 to \$8 per acre. Approximately 370 acres were treated in these investigations. This program occupied most of the time of the staff.

Short Courses in Forestry.—During the season 1938-9 a six-weeks' course in practical forestry was given to groups of young men from each of the Maritime Provinces. The demand for these courses is continuing, and requests have been received for the complete possible time that can be utilized for this work during the coming autumn and winter. The work of the school covers the practical handling of the farm woodlot. Only sufficient theory is given to maintain the interest of the students.

Some distribution of surplus planting stock was made in response to requests received from all parts of the Maritime Provinces.

VALCARTIER FOREST EXPERIMENT STATION

The Valcartier Forest Experiment Station, area 7½ square miles, situated 17 miles northwest of Quebec city, is on the border between the northeastern coniferous section of the Boreal Forest Region and the Algonquin-Laurentides Section of the Great Lakes-St. Lawrence Region. The major cover-type is tolerant hardwood—yellow birch and maple—but black and red spruce, balsam fir, and white birch cover-types are also represented. The working plan provides for the cutting of 600 cords of tolerant hardwoods annually, for which a regular market has been arranged; trees for removal are being marked for light and heavy selection cutting, and for clear-cutting in strips. Salvaging operations were conducted in coniferous stands recently damaged by windfall. A series of ten permanent sample-plots and six transect sample-plots was established this year in areas cut over selectively in 1936. An examination of the station revealed that white pine blister rust is likely to cause damage to white pine plantations, indicating the need for protective measures. Nearly two miles of secondary road were constructed into the hardwood stands to facilitate utilization of wood products, and to improve fire protection. A section of the main trunk road was gravelled.

At the request of a large lumber firm, and with the approval of the Quebec Forest Service, a preliminary examination was made of certain limits in the Rimouski district with a view to preparing a working plan to provide a continuous supply of spruce for the sawmills.

KANANASKIS FOREST EXPERIMENT STATION

The Kananaskis Forest Experiment Station, representing the subalpine forest region of the east slope of the Rockies, is characterized by lodgepole pine forests with, in many places, an understory of Engelmann or Alberta spruce. Douglas fir also occurs in pure stands or in mixture with spruce and pine. The purpose of the station is to investigate the growth and development of these species.

Since the inception of the station in the late autumn of 1934, considerable progress has been made in the construction of improvements necessary for pro-

tection from fire, for administration, and for the silvicultural development of the area.

The working-plan survey has now covered approximately 18½ square miles of the more accessible part of the area, of which about 8 square miles was completed this year. The detailed topographical and timber-cover maps of the part of the area thus covered have now been completed, and the volumetric data partially compiled.

The research staff, continuing the study of thinning methods started last season, have laid out during the past year nine carefully selected plots of three acres each, in which it is proposed to study the effect of three methods of thinning, namely (1) the French method of thinning from below; (2) the German method of thinning from above, and (3) the experience method of selecting final-crop trees. One plot heavily thinned, one lightly thinned, and one control were prepared for each method—nine plots in all. The compilation of the data is largely completed.

Cultural treatment of stands on an extensive scale, started in 1934 by unemployed relief crews, was carried on again this year, some 160 acres of young stands having been thinned. In a stand of 45-year-old lodgepole pine a thinning by the experience method—200 trees being selected per acre for the final crop—was carried out on 141 acres at an average cost of \$5.20 per acre. Sixteen control plots of one-tenth acre each were established at regular intervals throughout the area, so that the improvement to the stand may be easily and accurately assessed in the future. In addition to this operation, a 70-year-old stand was heavily thinned by the German method, and sufficient material secured, although not yet sold, to recover most of the cost of the operation.

A logging operation was carried out in 26½ acres of overmature spruce and pine, which netted 248,000 feet board measure in the form of logs suitable for sawing into lumber. This operation was undertaken for the purpose of creating conditions similar to those left in ordinary commercial operations so that the effect of such cuttings may be studied in detail. The selection method of cutting was used, and there remains on the area a fairly good stand of spruce from which it is expected another cut can be made in fifteen to twenty years. The cost of this operation will be fully covered by the sale of the logs.

FORESTRY WORK IN NATIONAL PARKS

RIDING MOUNTAIN NATIONAL PARK

The forests of the Riding Mountain National Park, approximately 1,200 square miles, 200 miles northwest of Winnipeg, represent the mixedwood section of the Boreal Forest Region of Canada. An aerial survey working-plan made in 1937, supplemented by ground survey, shows the distribution of cover-types to be as follows:—

	Acres	Per Cent
<i>Hardwood</i> : Merchantable.	332,000	43.5
Small-growth.	94,000	12.4
<i>Sub-total</i>	426,000	55.9
<i>Mixedwood</i> : Merchantable.	90,000	11.7
Small-growth.	17,000	2.2
<i>Sub-total</i>	107,000	13.9
<i>Softwood</i> : Merchantable.	33,000	4.3
Small-growth.	12,000	1.6
<i>Sub-total</i>	45,000	5.9
Recent burn.	46,000	6.0
Muskeg.	15,000	1.9
Non-forested.	98,000	12.8
Water.	28,000	3.6
Total	765,000	100.0

The annual cutting budget, tentative until the working plan is completed, is 2.5 million feet board measure, which is being removed by selection system under permit to settlers. Sanitation cuttings, consisting of the removal of dead and down material, thinning of dense stands, and pruning of dead limbs for a height of ten feet, were made along each side of the main roads; approximately 4,000 cords of fuel-wood from 1,450 acres were thus obtained. A series of six steel lookout towers to form a fire-protection network was erected; in addition, two wooden towers were constructed on two of the main roadways to provide views for tourists as well as for protection purposes. All towers were connected by new or reconditioned telephone lines; this project required the reconditioning of 100 miles of ground-circuit line and the construction of 43 miles of new ground-circuit line and also 3 miles of new metallic-circuit line. For protection and utilization purposes, 26 miles of new roads were constructed, and 10 miles of old roads were improved. Eight buildings were erected to house patrolmen and tower observers.

PRINCE ALBERT NATIONAL PARK

The Prince Albert National Park, nearly 1,900 square miles in area, about 35 miles north of Prince Albert, Saskatchewan, is in the mixedwood section of the Boreal Forest Region similar to the section in which the Riding Mountain Park is located. Except for sanitation cuttings along main highways, covering 350 acres, work on this park was restricted to construction of towers, telephone lines, roads, and buildings for fire-protection purposes. Four steel and four wooden lookout towers were erected on strategic points. It was necessary to extend the existing system of telephone lines by six miles of new line to complete the hook-up of these towers. The main activity was road construction; this comprised the building of 36 miles of new road and the improvement of 95 miles of existing road. Two storage dams were constructed. New building construction consisted of three cabins, two storehouses, and one stable. In addition, three cabins were repaired.

FOREST PROTECTION

Research work in forest-fire protection is carried on by the Dominion Forest Service at forest experiment stations and also in co-operation with several of the provinces and with the National Research Council. The system developed by this Service in recent years for the daily measurement and forecasting of forest-fire hazard for the guidance of protective agencies is now widely used in Eastern Canada. Research work is carried on to improve methods, equipment, and technique for detecting and suppressing forest fires, and to increase the efficiency of fire-protective effort. The annual statistics of forest-fire losses in Canada are compiled by the Forest Service from information supplied by the provincial authorities.

Over Canada as a whole, the forest-fire losses for 1938 were considerably above the average of the past ten years. However, an examination of the statistics by regions shows that, though Alberta passed through the worst fire season on record and the losses in British Columbia were much above the average for the past ten years, the losses in the other provinces were considerably below normal. The total number of fires reported in Canada during 1938 was 6,647, compared with an average of 6,249 for the ten years 1929-38. Of these fires 16 per cent were attributed to lightning, and the remaining 84 per cent to human agencies. The total loss and damage, including cost of fire-fighting, was \$6,266,572, compared with an average of \$5,357,035 for the same ten-year period. The detailed statistics of forest-fire losses and causes for the ten-year period 1929-38 will be found in Tables 1 and 2. A description of the fire season and losses by regions follows.

FOREST FIRE STATISTICS

BRITISH COLUMBIA

The fire season of 1938 was the worst experienced in many years in British Columbia. In general, the season was characterized by a 50 per cent decrease in normal rainfall and a 4 per cent increase in normal temperature. This resulted in a general drought condition early in May, which reached a climax at the end of July and culminated in extreme fire-hazard conditions in all parts of the province except the northern interior. Fires caused by the carelessness of the general public show a tendency to increase. This tendency follows increased travel in, and use of, the forest by the public.

	1938	Average 1929-38
Total number of fires	2,412	1,808
Proportion caused by lightning, per cent.	30	26
Merchantable-timber area burned, acres.	92,385	84,775
Young-growth area burned, acres.	113,930	111,288
Cut-over area burned, acres	394,275	278,758
Non-forested area burned, acres.	111,228	45,600
Total area burned, acres.	711,818	520,422
Damage	\$2,230,767	\$1,150,205
Cost of fire-fighting.	\$487,708	\$247,238
Total damage and costs	\$2,718,475	\$1,397,443

ALBERTA

In respect of forest area burned and difficulty of fire suppression, the fire season of 1938 was the worst ever experienced in Alberta. This arose from a succession of dry years, a condition which continued throughout the season in the northern portions of the province. Seasonal vegetation ripened early, and provided additional hazard in the autumn. The ground was extremely dry, and many fires burned deeply, were almost impossible to extinguish, and flared up under strong winds in the autumn, spreading over large areas.

	1938	Average 1929-38
Total number of fires.	521	344
Proportion caused by lightning, per cent.	2	3
Merchantable-timber area burned, acres.	456,233	104,901
Young-growth area burned, acres.	415,288	133,538
Cut-over area burned, acres.	44,441	13,105
Non-forested area burned, acres.	842,384	153,466
Total area burned, acres.	1,758,345	405,010
Damage	\$2,090,676	\$659,534
Cost of fire-fighting	\$198,728	\$61,349
Total damage and costs.	\$2,289,404	\$720,883

SASKATCHEWAN

The 1938 spring season in Saskatchewan opened with every prospect for a repetition of the severe conditions which prevailed in 1937. However, reasonably frequent rains, together with cool nights and the absence of protracted periods of extreme heat, high winds, and dry lightning storms, tended greatly to curtail the outbreak of fires. After nearly five years of scanty precipitation, the water-levels in lakes and streams were very low, and smaller bodies of water such as swamps and sloughs were completely dry; fire-fighting was thus rendered difficult. This condition will continue until a series of wet years has replenished the natural water supply.

The worst periods of hazard occurred in May and June; good rains in July reduced the hazard for the rest of the summer. A threatening autumn fire situation was ended by rains early in October. Precipitation was generally low in the northern part of the province throughout the season, and fires burning in the ground were difficult to extinguish owing to lack of water.

During the year a reduction was made in the area given organized fire protection. In previous years a measure of organized protection was provided for 30,000,000 acres of forest lands. This year the area was reduced, and effective protection was provided for 11,000,000 acres of selected forest lands.

It was, however, frequently necessary to fight fires outside the protected areas, and these fires accounted for a considerable portion of the total area burned over.

	1938	Average 1929-38
Total number of fires.....	231	271
Proportion caused by lightning, per cent.....	4	4
Merchantable-timber area burned, acres.....	18,578	56,573
Young-growth area burned, acres.....	86,990	235,914
Cut-over area burned, acres.....	3,798	12,456
Non-forested area burned, acres.....	3,029	164,594
Total area burned, acres.....	179,961	469,537
Damage.....	\$36,404	\$297,364
Cost of fire-fighting.....	\$25,141	\$70,188
Total damage and costs.....	\$61,545	\$367,552

MANITOBA

The fire season of 1938 was an unusual one in Manitoba. The number of fires and the cost of fire-fighting were the highest since 1929, although the amount of damage done was not abnormal. The distribution of fires both as to time and locality were unusual. Fires in September and October made up 52 per cent of the whole, although normally fires at this season are relatively unimportant. There was an unusual concentration of fires in the north of the province at the end of June, and a similar concentration in the southeastern section during September and October.

The ground was very dry along the western border of the province when the freeze-up occurred in the autumn of 1937. This tended to produce an early spring fire-hazard in that region. A short period of extreme hazard which developed in the north during the latter part of June was ended by rains during the first week of July, and little serious hazard occurred anywhere in the province during July and August.

Low precipitation in the southeast led to a serious hazard in September and October that resulted in a large number of fires over a wide area.

	1938	Average 1929-38
Total number of fires.....	557	395
Proportion caused by lightning, per cent.....	2	14
Merchantable-timber area burned, acres.....	46,268	57,566
Young-growth area burned, acres.....	43,949	62,358
Cut-over area burned, acres.....	3,153	4,901
Non-forested area burned, acres.....	79,620	429,396
Total area burned, acres.....	172,990	554,221
Damage.....	\$115,192	\$239,973
Cost of fire-fighting.....	\$50,439	\$41,975
Total damage and costs.....	\$165,631	\$281,948

ONTARIO

Weather conditions were generally favourable, and particularly in the eastern part of the province an unusually small number of fires occurred. In September and October the weather was fairly dry, especially in the western part of the province. The only serious fires occurred in the Fort Frances district, and these accounted for over 70 per cent of the total area burned over. These fires, for the most part, started in the settled areas outside and spread into the fire district.

	1938	Average 1929-38
Total number of fires.....	1,292	1,668
Proportion caused by lightning, per cent.....	19	20
Merchantable-timber area burned, acres.....	47,355	193,741
Young-growth area burned, acres.....	49,704	101,370
Cut-over area burned, acres.....	23,402	34,924
Non-forested area burned, acres.....	17,784	128,113
Total area burned, acres.....	138,245	458,149
Damage.....	\$246,127	\$1,453,744
Cost of fire-fighting.....	\$90,682	\$303,910
Total damage and costs.....	\$336,809	\$1,757,655

QUEBEC

The forest-fire season of 1938 was slightly better than average in Quebec. There were a few more fires than in the normal season but the total damage and costs and the total area burned over were well below normal. The spring hazard period was most intense in the northwestern part of the province and in the Lake St. John region. The months of July and August were abnormally wet over most of the province. The autumn hazard period was very severe over the whole province. Settlers clearing land caused 49 per cent of all fires, and only 4 per cent were attributed to lightning.

	1938	Average 1929-38
Total number of fires.....	1,149	1,017
Proportion caused by lightning, per cent.....	4	5
Merchantable-timber area burned, acres.....	33,306	40,726
Young-growth area burned, acres.....	7,134	34,884
Cut-over area burned, acres.....	76,587	107,546
Non-forested area burned, acres.....	8,317	19,999
Total area burned, acres.....	125,345	202,501
Damage.....	\$ 402,827	\$ 499,383
Cost of fire-fighting.....	\$ 154,354	\$ 107,820
Total damage and costs.....	\$ 557,181	\$ 607,203

NEW BRUNSWICK

The early spring of 1938 was for the most part cold and wet. At the beginning of May the weather became warmer, and the spring fire-hazard developed, reaching a peak during the last week of that month. This period was terminated by rain during the first week in June, except in the northeast portion of the province, which remained extremely dry until June 26. July and succeeding months were wetter than usual, and well distributed rainfall kept the hazard within comparatively safe limits throughout the remainder of the season. Statistics show that settlers' fires during May and June were the most numerous and destructive.

	1938	Average 1929-38
Total number of fires.....	167	259
Proportion caused by lightning, per cent.....	6	4
Merchantable-timber area burned, acres.....	20,211	7,463
Young-growth area burned, acres.....	291	6,726
Cut-over area burned, acres.....	325	10,475
Non-forested area burned, acres.....	1,944	24,261
Total area burned, acres.....	22,771	48,924
Damage.....	\$67,523	\$ 81,243
Cost of fire-fighting.....	\$24,731	\$ 26,259
Total damage and cost.....	\$92,254	\$107,503

NOVA SCOTIA

In Nova Scotia the spring months were fairly dry, and 84 per cent of all fires occurred between March 28 and June 25. The weather during the summer months was generally wet and foggy, and fires were few and small.

	1938	Average 1929-38
Total number of fires.....	183	377
Proportion caused by lightning, per cent.....	16	16
Merchantable-timber area, burned, acres.....	726	1,572
Young-growth area burned, acres.....	1,317	6,093
Cut-over area burned, acres.....	327	1,579
Non-forested area burned, acres.....	2,603	12,557
Total area burned, acres.....	4,973	21,800
Damage.....	\$2,455	\$28,249
Cost of fire-fighting.....	\$5,532	\$25,013
Total damage and costs.....	\$7,987	\$53,262

NATIONAL PARKS

Forest protection in the National Parks is administered by the Dominion Government, and fires which occur in these areas are not included in the provincial statistics. The statistics for National Parks as a whole follow:

	1938	Average 1930-38
Total number of fires.....	51	74
Proportion caused by lightning, per cent.....	4	9
Merchantable-timber area burned, acres.....	769	2,484
Young-growth area burned, acres.....	670	5,810
Cut-over area burned, acres.....	785	663
Non-forested area burned, acres.....	640	6,450
Total area burned, acres.....	2,864	15,407
Damage.....	\$4,810	\$36,223
Cost of fire-fighting.....	\$4,640	\$11,715
Total damage and costs.....	\$9,450	\$47,939

INDIAN LANDS

Indian lands are widely scattered throughout Canada. The fire protection on these lands is administered by the Dominion Government. Particulars of fires are as follows:

	1938	Average 1930-38
Total number of fires.....	81	42
Proportion caused by lightning, per cent.....	11	12
Merchantable-timber area burned, acres.....	6,368	2,527
Young-growth area burned, acres.....	186	1,591
Cut-over area burned, acres.....	1,381	675
Non-forested area burned, acres.....	200	1,604
Total area burned, acres.....	8,135	6,397
Damage.....	\$24,150	\$12,007
Cost of fire-fighting.....	\$ 3,873	\$ 4,058
Total damage and costs.....	\$27,823	\$16,065

DOMINION FOREST EXPERIMENT STATIONS

Three fires are shown to have occurred on forest experiment station areas, none of which did any appreciable damage. Actually the only fire which reached any size occurred on cut-over land on the Valcartier Military Camp area adjoining the Forest Experiment Station, and is included in the statistics because it occurred on land administered by the Dominion.

	1938	Average (Excl. of 1933) 1930-38
Total number of fires.....	3	6
Proportion caused by lightning, per cent.....	...	17
Merchantable-timber area burned, acres.....	...	505
Young-growth area burned, acres.....	2	972
Cut-over area burned, acres.....	318	40
Non-forested area burned, acres.....	1	809
Total area burned, acres.....	321	2,325
Damage.....	\$ 4	\$6,922
Cost of fire-fighting.....	\$ 9	\$ 645
Total damage and costs.....	\$ 13	\$7,567

FOREST FIRE RESEARCH

The Dominion Forest Service system for measuring and forecasting forest-fire hazard, first developed at the Petawawa Forest Experiment Station, is now in daily use during the fire season throughout the Provinces of Quebec and New Brunswick, for the guidance of forest officers in the administration of fire protection. As a result of studies during the past year the existing fire-hazard tables have been improved and extended to include additional forest types and climatic regions.

At the Petawawa Forest Experiment Station the study of evaporation from the forest floor in relation to that from various types of evaporation-measuring

apparatus was advanced to the point where a beginning was made on the preparation of a bulletin on the subject. Studies were continued on seasonal variations in fire-hazard with a view to effecting refinements in existing fire-hazard tables and extending them to include additional forest types.

Performance tests were made on various types of forest-fire pumps and fire-nozzles, and some work was done on the sterilization of fire-guards against plant growth by the use of chemicals.

At the Valcartier Forest Experiment Station a four-year study was completed of fire-hazards in the cut-over pulpwood forests of this region. As in previous years, close co-operation was maintained with the Quebec Forest Protection Service in similar work at their Duchesnay station, and in the study of fire behaviour in relation to weather conditions as reported by their forest-weather stations throughout the province. The research records of some 50 forest-weather stations are checked and compiled at Quebec.

The New Brunswick Forest Service and large forest industries were assisted in the establishment of a network of reporting forest-weather stations throughout the province. The records from these stations, including the computation of the fire-hazard index at each, are checked by the New Brunswick Forest Service at the fire-hazard research station established in 1937 at Fredericton. Work at the latter station was continued and expanded during the past season. A large amount of useful data on fire behaviour was obtained from test fires conducted in co-operation with the forest industries. As a result of a study of all the factors contributing to fire danger on one of the timber limits, it was possible to develop fire-danger tables and a tentative fire-control plan for administration purposes, so as to show the specific action recommended at each degree of fire danger. Similar fire-danger tables of a more general nature have been prepared for the province as a whole.

In co-operation with the National Research Council, performance rating tests were carried out on all Canadian-made forest-fire pumping units. Tests were also carried out to determine the efficiency of various types of fire-nozzles, and to obtain precise figures for the friction losses in linen forestry hose. The data obtained at the Research Council Laboratories and those derived from tests at the Petawawa Forest Experiment Station were made the basis of a joint report issued by the National Research Council.

At the close of the year, and as a result of the year's work, six mimeographed papers were published. These comprise a report on fire-hazard studies in cut-over lands, fire-hazard tables for this type, fire-danger tables and fire-control plans for the New Brunswick limits of the Bathurst Power and Paper Co., a supplement to previous fire-hazard tables for use in New Brunswick, tables for estimating fire-hazard early in the day, and an article on the use of eastern fire-hazard tables in Manitoba and Saskatchewan.

TABLE 1

Statement of Forest Fires in Canada by Years for the 10-year Period 1929-38, with the Average for the Period

	Year										Totals	Average
	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938		
Fires under 10 acres.....								4,031	3,886	4,476		
Fires over 10 acres.....								1,915	2,063	2,171		
Total number of fires.....	6,712	6,805	6,965	6,298	6,298	5,911	4,955	5,946	5,940	6,647	62,486	6,249
Total area burned..... acres	6,028,551	2,670,188	2,093,922	2,463,923	1,008,558	1,475,117	856,183	3,026,646	4,271,431	3,125,768	27,020,287	2,702,029
Merchantable timber—												
Area burned..... acres	663,574	746,129	394,824	708,085	204,405	321,414	172,592	919,764	662,792	722,199	5,515,778	551,578
Timber burned..... M ft. b.m.	540,900	779,081	538,551	569,126	255,383	899,545	98,971	2,077,584	408,942	2,160,192	8,328,275	832,827
Timber burned..... cords	2,178,434	2,043,142	1,241,647	2,705,374	650,318	836,554	785,552	3,524,493	4,354,820	2,557,780	20,878,114	2,087,811
Estimated stumpage value... \$	2,803,952	4,452,046	1,715,113	5,063,577	1,199,305	1,754,882	1,254,981	4,646,726	2,082,018	2,777,882	27,750,482	2,775,048
Young growth—												
Area burned..... acres	1,092,086	577,980	590,234	586,141	220,620	242,101	191,940	739,701	2,035,830	719,461	6,996,094	699,609
Estimated value..... \$	2,004,050	1,456,135	1,215,682	1,209,063	454,648	573,455	326,423	1,284,102	1,161,861	1,286,512	10,971,931	1,097,193
Cut-over land—												
Area burned..... acres	720,912	427,285	535,418	772,625	331,614	562,446	258,964	303,348	188,385	548,792	4,649,789	464,979
Estimated value..... \$	338,434	275,578	219,776	615,605	187,308	246,031	262,725	66,253	155,276	328,737	2,695,718	269,572
Non-forested area burned.... acres	3,551,979	918,794	573,442	397,069	251,918	349,156	232,687	1,063,833	1,384,424	1,135,316	9,858,618	985,862
Other property burned, value \$	301,499	506,779	363,516	264,769	162,075	149,923	355,541	84,560	151,809	827,804	3,168,275	316,827
Total damage..... \$	5,447,935	6,690,538	3,514,087	7,153,014	2,003,331	2,724,292	2,199,670	6,081,641	3,550,964	5,220,935	44,586,407	4,458,641
Actual cost of fire-fighting... \$	1,237,689	1,135,909	931,504	683,650	509,939	827,451	526,743	1,206,863	878,563	1,045,637	8,983,948	898,395
Total damage and costs. \$	6,685,624	7,826,447	4,445,591	7,836,664	2,513,270	3,551,743	2,726,413	7,288,504	4,429,527	6,266,572	53,570,355	5,357,035

TABLE 2

Statement of Forest Fires in Canada by Causes for the 10-year Period 1929-38

Cause	Year																				Total No. Fires	Average	
	1929		1930		1931		1932		1933		1934		1935		1936		1937		1938			No.	%
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Camp-fires.....	1,347	20	1,265	18	1,481	21	1,329	21	1,202	19	1,111	19	875	18	1,185	20	1,235	22	1,390	21	12,420	1,242	20
Smokers.....	856	13	790	12	998	14	809	13	893	14	971	17	985	20	947	16	860	14	980	15	9,089	909	15
Settlers.....	769	11	954	14	1,097	16	1,385	22	1,265	20	946	16	1,143	23	567	9	973	16	1,154	17	10,253	1,025	16
Railways.....	1,014	15	731	11	625	9	354	6	312	5	255	4	192	4	176	3	232	4	176	3	4,067	407	7
Lightning.....	1,167	17	1,483	22	880	13	651	10	940	15	957	16	331	7	1,529	26	832	14	1,046	16	9,816	982	16
Industrial operations.....	222	3	137	2	133	2	91	1	94	1	198	3	123	2	132	2	190	3	176	3	1,496	150	2
Incendiary.....	387	6	522	8	674	10	746	12	511	8	349	6	400	8	608	10	383	6	558	8	5,138	514	8
Public works.....	80	1	98	1	97	1	47	1	56	1	104	2	35	1	42	1	88	1	57	1	704	70	1
Miscellaneous known.....	239	4	266	4	368	5	243	4	300	5	365	6	324	6	288	5	528	9	488	7	3,409	341	5
Unknown.....	631	10	559	8	612	9	643	10	725	12	655	11	547	11	472	8	628	11	622	9	6,094	609	10
Totals.....	6,712	100	6,805	100	6,965	100	6,298	100	6,298	100	5,911	100	4,955	100	5,946	100	5,949	100	6,647	100	62,486	6,249	100

WHITE-PINE BLISTER RUST

In fighting the destructive tree disease known as white-pine blister rust (*Cronartium ribicola* Fischer), it has been found that the only effective treatment lies in uprooting all currant and gooseberry bushes (i.e., the botanical genus *Ribes*), growing within infection distance of the pines to be protected. No dependence can be placed upon spraying with bluestone or other chemicals, which is the usual method of dealing with plant diseases.

This heteroecious rust has a most peculiar and complex life history. It attacks all five-needle pines, including two important commercial species in Canada—the white pine (*Pinus Strobus*) of Eastern Canada, and the western white pine (*Pinus monticola*) of British Columbia. It spreads each season by three kinds of wind-borne spores. One of these carries the disease only from ribes to ribes, one from pine to ribes, and one from ribes to pine. If the spores come from the leaves of the cultivated black currant (*Ribes nigrum*), these latter can transmit the disease to healthy pines standing fully a mile distant, but if they come from any other currant or gooseberry the infection range is not over 900 feet. Indeed, all things considered, the cultivated black currant is regarded as being ten times as dangerous and effective a rust-spreader as any other species of *Ribes*. Hence in any rust-control project, the first and most urgent step is to locate and destroy all cultivated black currants growing within infection distance of the pines to be protected.

The remaining stand of our eastern white pine is now largely centred in Ontario and western Quebec. Here the problem of blister-rust control is less difficult than in the pineries of either the Atlantic seaboard or the Pacific slope. The chief reasons for this are the relative dryness of the semi-continental Ontario climate, and the comparative absence of domestic black currant bushes on the largely unsettled Crown lands. Upon the whole, as a result of experimental rust-control field-work already done at the Petawawa Forest Experiment Station, it is known that the carrying on of such work in our eastern white-pine areas is a feasible operation—that is, when the unique value of white pine for purposes of both utility and beauty is duly considered. The estimated stand of eastern white pine in Canada is about 8,000 million board feet of saw material and 10 million cords of pole timber. The existing market value of this stumpage, together with the potential value of oncoming young growth, is such as to render its conservation a matter of concern to both government and industry.

During May, 1938, under co-operative Dominion-Ontario auspices, a survey was made in Algonquin Park and surrounding territory to determine the amount and the rate of spread of the blister-rust disease. This survey showed that on the average, in semi-settled districts, about 10 to 15 per cent of the remaining white pine is visibly infected, whereas in the park itself (devoid, or nearly so, of the cultivated black currant) only one per cent of the pines showed rust infection. The survey, therefore, furnished further evidence of the fact that the Ontario pineries are favourably located for rust-control operations.

In August, 1938, the Dominion Forest Experiment Station area at Valcartier, Quebec, comprising about eight square miles, was accorded initial rust-control treatment. In 1933, 1934, and 1935, 300,000 young white pines were planted here, which now average about three feet in height. In many old or abandoned farm gardens within a mile of these plantations, domestic black currants were growing, and these formed the chief local source of infection. The Forest Service now feels well assured that upon completion of this control project in about three years' time, no further loss from blister rust need be feared at this station.

FOREST PRODUCTS LABORATORIES

The processing of timber into lumber, pulp, paper, rayon, cellophane, wood-distillation products, veneers, plywood, furniture, planing-mill products, and a great assortment of minor products and parts involves many highly complicated mechanical and chemical processes. The Forest Products Laboratories function as a central organization in Canada seeking for new ideas and carrying out investigations to assist industry in improving existing manufacturing practices and in devising new uses for wood. A special feature of their work, on which increasing emphasis is being placed year after year, is the curtailment of waste occurring in the woods and the mills. This is particularly important, since Canada is a very large exporter of wood products and as such must maintain a competitive position in world markets.

The Laboratories carry out their work in close collaboration with industrial associations interested in pulp, lumber, and other wood products, with provincial governments, with other departments of the Dominion Government, and with Canadian Trade Commissioners and timber commissioners in other countries. Most of the problems which engage the attention of the Laboratories arise from the needs of the industry encountered in domestic and export markets.

The main laboratories are located in Ottawa, where all phases of wood utilization are dealt with excepting those relating directly to the manufacture of pulp, paper, and related products. Problems of the latter type are dealt with in the Pulp and Paper Division in Montreal, which works in close co-operation with the Canadian Pulp and Paper Association and McGill University. A branch laboratory is maintained in Vancouver on the university grounds to deal with such problems pertaining to British Columbia timbers as can be dealt with most effectively in a local laboratory.

The following is a brief description of the principal projects which have engaged the attention of the Laboratories during the past year:—

MAIN LABORATORIES (OTTAWA)

DIVISION OF WOOD PRESERVATION

Service Tests of Red-stained and Red-rotted Jack Pine Ties Treated and Untreated.—The ties in track were inspected in 1938 after 13 years' service. To date, the renewals of untreated ties through decay amount to 81.9 per cent for the ties infested with small pockets of red rot and 83.8 per cent for the clear ties. For the creosoted ties, the corresponding percentages were 3.0 and nil.

Service Tests of Treated and Untreated Timber.—In continuing the work referred to in previous reports, 94 additional tests were set up. This brings the number of tests now recorded and under observation to 543.

The timbers under observation include railway ties, telephone poles, piling, caps, stringers, and wharf-decking situated at points from Halifax to Vancouver. Completed tests on 7 installations of untreated spruce wharf-decking in Quebec and New Brunswick show an average life of 7½ years with 6 years minimum and 9 years maximum. Definite information on service life is required in order to estimate when and where more expensive treated timber with a longer life can be used to advantage.

Toxicity and Resistance to Leaching of Mixtures of Preservative Salts.—Tests were nearly completed on (1) zinc chloride, (2) a mixture of zinc chloride and sodium dichromate, (3) lead fluosilicate, and (4) zinc fluosilicate. Petri dish tests indicate that the fluosilicates are approximately three times as toxic as the zinc salts, but in wood-block tests there is little, if any, difference in toxicity.

Experimental Treatment of Poles.—There is a demand in Canada for a cheap preservative treatment for the butts of spruce and other species for telephone poles on lines erected in remote districts. Experiments were carried out, and a promising treating process has been developed. Longitudinal holes are bored close together in the butts of the poles near the circumference, and the holes are filled alternately with copper sulphate and sodium arsenite pastes and plugged. The poles are treated and set as soon after cutting as possible, and the bark is left on up to the ground-line. Evaporation of moisture from the tops of the poles draws the preservatives up the sapwood from the holes in the butt. The adjacent copper and arsenic salts are water-soluble; and would soon be exhausted, but, by diffusion, the slightly soluble cupric arsenite salt can be precipitated, and the treatment will provide protection for several years. Test poles in service five years are in good condition, but untreated controls are decayed at the ground-line.

The first commercial application is on 1,600 poles in a power-line to a mining camp in northern Ontario. The preservatives were taken in by aeroplane.

Treatment of Standing Poles.—In co-operation with a subcommittee of the Canadian Electrical Association, tests have been started for the purpose of studying the most effective methods of ground-line treatment of poles. At the present time there are approximately 10,000,000 untreated wooden poles in use in Canada. This has stimulated interest in treatments to arrest the progress of decay at the ground-line. In a pole treated before installation, a treated shell can protect a core of sterile wood, whereas in treatment after decay is established, the preservative must penetrate farther in order to check interior decay, and must be effective for a sufficient number of years to pay for the cost of treatment. The difficulty is that in wet locations creosote will not penetrate and water-soluble salts that can diffuse are not stable. In other locations, the moisture content of the poles is such that neither creosote nor water-soluble salts will penetrate to the depth of established decay.

Distribution of Zinc Chloride in Hemlock Ties after Nine Years' Service.—In ties removed from the main line of the Canadian Pacific Railway after nine years in service, only a small percentage of the zinc chloride remained in ties treated with an average of half a pound of zinc chloride per cubic foot. Decay was progressing under the rail-seat.

Creosote Treatment of Red Pine Poles.—Red pine sapwood is 3 to 4 inches wide, and two essentials in treating it are penetration of creosote and freedom from "bleeding" after treatment. Tests were started on pole sections treated at moisture contents of 30, 20, and 15 per cent in the sapwood with and without steaming. Results to date indicate that sapwood penetration is not complete when the poles are treated at 30 per cent moisture. Treatment at 20 per cent shows complete sapwood penetration and reduces checking in the heartwood when steamed. Information on the effect of steaming on bleeding will be available in 1939. The treatments at moisture contents of 15 per cent are made in order to confirm results obtained by reducing the moisture content from 30 to 20 per cent, the latter being about the lowest moisture content that can be obtained in service.

Co-operative Tests on Methods of Creosote Analysis.—Comparative tests were carried out in the testing laboratory of the Department of Public Works, in commercial laboratories, and at the Forest Products Laboratories of Canada, on the analysis of creosote, according to standard methods, in order to eliminate systematic or accidental errors on the part of the individual operators and obtain a greater measure of agreement.

Examination of Sections of Creosoted Piling from Pier D, Vancouver.—Sections of creosoted piling salvaged from this pier after the fire in 1938 were examined to determine the extent of attack by *Teredo* after twenty years' service. It was found that structurally sound and well-treated piles, showing a good depth of penetration and absorption of creosote, are resistant to attack, whereas piles having framing cuts, breaks, or checks, and those showing shallow penetration are liable to attack. Samples of creosote were extracted from the sections for examination, and the conclusion was that there had been little change during the period of service, though a sample of the original creosote was not available for direct comparison.

Calcium Borate as Wood-preservative.—Toxicity tests were carried out on wood blocks treated with calcium chloride and sodium borate, and a report prepared incorporating the results of the tests together with such information as could be obtained from the literature. The results indicated that the matter is worth further study.

Treatment of Plot Stakes.—A considerable number of stakes are used by the Forest Service to mark experimental plots in silvicultural studies. Untreated stakes decay in a few years. Since the tops of the stakes are painted, a treatment with zinc chloride, followed by a pressure treatment of the butts with creosote, was developed. Stakes so treated should last 25 years or more.

Treatment of Ties with Medium-temperature Tar.—One hundred ties supplied by the Canadian Pacific Railway Company were treated and installed in the test track at East Templeton, Que., for observation over a period of years.

Developments in tar and coal distillation produce creosotes and tars which differ from those used by the wood-preservation industry in the past, and this has been the case for the last 100 years. The particular type of tar referred to above has a very low viscosity, and penetration in the ties treated was equivalent to that usually obtained with a mixture of 70 per cent creosote and 30 per cent tar.

DIVISION OF TIMBER MECHANICS

Testing of Small Clear Specimens.—On account of suggestions that certain modifications be made in the methods employed by the principal forest products laboratories throughout the world for testing small clear specimens of wood, a series of tests was made upon specimens of varying size, in compression parallel to grain, to determine if change in size of the specimen affected the strength results obtained in tests. Tests were also made to show the effect, upon the recorded hardness of wood subjected to the ball test, of the presence of small quantities of lubricants upon the surface of the test piece. The results obtained disclosed the reducing effect of small quantities of oil, grease, wax, or graphite upon the recorded load.

Logging Sleighs.—The investigation of sleigh-runners of different widths, type of shoeing, and curvature of sweep to determine the effect of variables such as temperature, velocity, and loading was completed. A final report covering the whole of the logging-sleigh investigation was prepared. This report was distributed to the members of the Woodlands Section of the Canadian Pulp and Paper Association. A summary report including proposed standard designs for sleighs for one- and two-horse operation was prepared and submitted to the Committee on Logging Sleighs of the Woodlands Section, which now has under consideration the question of standard designs of logging sleighs.

Glues and Gluing.—The final report on animal glues was completed.

Strength of Dowel-joints.—Continuing the investigation into dowel-joints, butt joints were assembled and tested in tension and in static bending for comparison with dowel-joints. Further tests were made to increase the quantity of data upon which more accurate conclusions might be drawn. These tests included joints made with high-grade and low-grade animal glues and casein glues. From the results of this investigation a bulletin is being prepared for publication.

Plywood and Veneers.—The plywood-press equipment for experimental work on plywoods and veneers was erected, and the heating elements were tested. Temperature control within narrow limits has been satisfactorily maintained, and the apparatus has proved to be satisfactory for preparing hot-plate plywoods suitable for laboratory test purposes.

Holding Power of Nails.—As a result of previous tests it was apparent that impact stresses had a very definite effect upon the holding power of nails. The year's work consisted of the completion of the investigation into the effect of impact stresses. A final report giving an analysis of the work done under this project was prepared. A report was also made of the results of tests upon cement-coated nails used in box manufacture.

Strength of Canadian Cheese-boxes.—As a result of the preliminary testing of cheese-boxes carried out last year, it was believed that by some change in design improvements might be made in the strength of the box. The testing during the current year was directed towards such improvement with considerable success. A cheese-box was eventually developed which withstood three times as much handling as the ordinary type of cheese-box, at a very slight increase in cost. This work was carried out at the request of the Department of Agriculture, with particular reference to export boxes.

The Effect of Different Standards of Conditioning upon the Strength of Corrugated Board and Corrugated Containers.—This work is being carried out as a co-operative project at the request of Subcommittee IV (Shipping Containers) of Committee 6 (Paper and Paper Products) of the American Society for Testing Materials, and in co-operation with laboratories equipped for this purpose in the United States.

The project consists of securing dependable data on the moisture content of container grades of paper boards and of corrugated fibreboard containers, resulting from conditioning these products in accordance with several different procedures in order to determine whether moisture content can be eliminated as a variable by any of the proposed conditioning methods, and whether practical test methods can be evolved which can be duplicated by one or other of the proposed procedures laid down by the Committee. The standards to be used by the committee will be expressed in terms of conditioning at either 40 per cent or 65 per cent relative humidity. The work undertaken by this Division includes only a portion of the total investigation. This was commenced during the year.

Ring-connector Joints.—The introduction of the metal ring-connector in the construction of timber structures has resulted in revolutionary changes in design. One of the difficulties encountered in the use of timber has been to develop the tensile strength of the material at joints. This has in part been satisfactorily developed by means of the ring-connector. For purposes of design it is necessary that the increase in joint strength due to the use of ring-connectors of different types should be determined. The theoretical strength has been computed, and design formulae established. The work so far done by the Division has consisted of testing joints made with seven sizes of ring-connectors in two species of wood—Douglas fir and red pine. Further testing covering slant joints and some larger sizes of ring will be carried out, as well as tests on spruce timber.

Tests were also made upon plain bolted joints to determine the effect upon the strength of the joints of changes in bolt diameter and length. This information is necessary to determine the safe stresses which may be assigned to bolted joints in structures where the length of the bolt becomes an important factor in the strength of the joint.

General.—The following miscellaneous matters also received attention: The effect of blue stain upon the strength of pine lath; the relative merits of beech and white ash for tennis racquets; tests for the Aircraft Inspection Department of the Royal Canadian Air Force of Sitka spruce and other woods for aircraft construction or repair; the strength zones in the wing of an aeroplane involved in a fatal crash for the Civil Aviation Branch of the Department of Transport; the strength of western hemlock ladder stock affected with black streak; control tests for glues used in plywood and furniture manufacture, including casein, animal, and vegetable glues, and water-resistant glues for use in aircraft construction; tests on corrugated, fibreboard and wooden containers for box manufacturers and shippers, including tests and assistance in the design of export packages for electric refrigerators and washing machines.

DIVISION OF LUMBER SEASONING

Kiln-drying.—A study of the kiln-drying of white pine in commercial sizes and grades was begun, and ten charges were completed during the sawing season. These charges comprised No. 1 and 2 Common, No. 3 Common, and No. 1 and 2 Cuts (Shop). The object of the study is to obtain schedules for the different grades and sizes that will permit drying the material with a minimum of degrade in as short a period as is practicable.

The study was initiated at the request of the white pine industry in an effort to determine whether there is any economy in kiln-drying pine straight from the saw over the present air-seasoning practice. There are many obvious advantages to kiln-drying white pine, including the elimination of blue-stain and check, the availability for sale of dry lumber in the same year as it is sawn, a saving in transportation charges, and in yard space. There are, however, certain defects to which this wood is susceptible in ordinary kiln-drying, the most important of which are brown stain or kiln-burn, cupping of the boards, and loosening of black knots in the common grades. Because of the very high cost of the upper grades of white pine and the necessity of keeping down costs to meet competition, this study is being followed closely by the industry.

Drying of 3 inch \times 3 inch and 4 inch \times 4 inch white oak blanks was continued. These blanks require approximately three months drying and present a difficult drying problem.

Other items included in kiln charges during the year were birch and maple lumber in 1-, 2-, and 3-inch thicknesses, spruce lumber in 2- and 3-inch thicknesses, red pine lumber, and birch maul billets 6½ inches thick. In all, a total of 29 kiln charges were completed.

Shrinkage in Commercial Sizes.—Boards used for moisture control in kiln charges were measured across the tangential and radial surfaces each time they were weighed for the determination of moisture loss, in order to eventually make available shrinkage values of different species of woods for all stages of drying.

Air-Seasoning Studies.—Some work was carried out to determine the effect of the use of grooved crossers in hardwoods piled in seasoning yards, on crosser-stain and crosser-rot, particularly in sap maple and basswood. Crossers narrower than 4 inches are impracticable in Canadian yards, and in order to produce the effect of very narrow crossers the Laboratories recommended that trials be given a crosser with grooves, ¼-inch deep and 1 and 1½ inches wide, cut down the wide surfaces. Results obtained to date from test piles constructed with these grooved crossers gave promising indications. For certain uses,

notably natural-finish furniture, crosser-stain causes serious loss to lumber producers. The only method adopted previously to prevent crosser-stain was end-piling of the lumber, a method that is costly in labour and yard space.

Brown-stain in Pine.—All available data on chemical brown-stain were reviewed and collated. The stain is serious in the white pine industry, and is particularly likely to occur in lumber which has been in the pile for a long period. The stain, so far as is known, does not affect the durability of the wood, but disfigures it so badly that its sale value is substantially reduced.

Chemical Seasoning of Lumber.—Chemical seasoning is the seasoning of lumber, either in kilns or naturally in piles, after it has been treated with common salt, urea, or other chemicals. Lumber may be immersed in salt or other solutions, or dry salt may be spread over the boards, but in either case the moisture in the wood close to the surfaces diffuses the chemical and lowers the vapour pressure at the surface of the board, and the drying of the core or interior section of the lumber is facilitated. It is claimed for the practice that the drying of refractory woods and thick wide stock of all species is accomplished with a minimum of checking.

Considerable work was done on the chemical seasoning of 3-inch and 4-inch maple and 3-inch white pine. Sodium chloride or common salt was used in solution; the maple was kiln-dried, and the white pine was air-seasoned. It was found that treated maple kiln-dried under very severe conditions of temperature and humidity developed very few checks as compared with the untreated material. On the other hand, no discernible difference in drying rate was recorded. This is also true of the white pine being air-seasoned.

Numerous requests were received regarding lumber-drying problems from boat-builders, building contractors, cooerage firms, railways and manufacturers of railway cars, and manufacturers of doors, flooring, organs and pianos, sporting goods, aeroplanes, boxes, and other products.

These requests pertained to such matters as elimination of case-hardening, alterations to kiln structure, suitable drying schedules, piling, and stain prevention. Latterly, too, an increasing number were concerned with the drying of veneers and panel stock.

DIVISION OF WOOD CHEMISTRY

Effect of Immersion in Water on the Resin and Soluble Carbohydrate Content of Pine.—It is claimed by many lumbermen that pine logs which have been in the water for a considerable period yield lumber which holds paint better and is less susceptible to blue-stain and mould than lumber from logs which are sawn without any period of flotation. Work was begun on an analysis of red pine and white pine lumber in order to determine the relative amounts of resin and of carbohydrates in lumber from the two classes of logs.

The Distillation of Wood Tar Obtained from the Manufacture of Producer-gas from Wood and the Use of the Fractions so Obtained as Ore-flotation Agents.—Wood tar from a sawmill obtaining its power from a producer-gas engine operated on Douglas fir wood was submitted for analysis. After removal of the water the dry tar was distilled and the following fractions obtained:

Number of fraction	Boiling-point Range	Percentage of Wet Tar
1.....	0 to 220° C.	2.70
2.....	220 to 240° C.	3.03
3.....	240 to 260° C.	5.06
4.....	260 to 280° C.	5.86
5.....	280 to 300° C.	7.13
6.....	300 to 320° C.	7.31
Total.....		31.09

These fractions were tested as flotation agents by the Bureau of Mines, and all six were found to have properties which would make them suitable as "promoters," though they were found to be less efficient than the commonly used xanthates. They were found to have little value as "frothers," and could not be substituted for pine oil for this purpose.

Treatment of Cedar Fish-floats.—Cedar fish-floats for gill nets are used in large quantities, some of them in very deep water where the pressure is so high as to cause collapse of the wood structure and penetration of water to such an extent that the floats lose their necessary buoyancy. Experiments were carried out on treated floats of eastern white cedar and western red cedar to determine the effect of water pressure at depths of 50 and 90 fathoms on the absorption of moisture and on collapse. Very satisfactory results were obtained by special treatments with linseed oil of floats of western red cedar.

General.—A study was made of the uses, production, consumption, and cost of active carbon in Canada in connection with a proposal by a European firm to establish a plant in Canada for the manufacture of this product from sawdust.

At the request of the Comité International du Bois, of Brussels, a report was prepared showing the development in the use of producer-gas from wood and charcoal in Canada for power purposes.

Laboratory facilities were provided for a representative of the Dominion Department of Agriculture for a study of starch depletion in wood and its relation to insect attack. A revised report was prepared on cedar leaf oils.

DIVISION OF TIMBER PHYSICS

Reference Collection of Wood Sections.—Sections mounted permanently in balsam were made of glue joints stained suitably for making good photo-micrographic records of cassava glue, animal glues, casein glue, and phenol resin. The woods so prepared exhibited a wide range in hardness from soft pine to yellow birch and hard maple. In addition to sections of glued wood joints, sections of eight timber species were added to the reference collection.

Identification Key for Woods.—The structure of wood as shown under the microscope permits accurate distinction between timber species that is possible by no other means. A method was developed for identifying wood specimens by manipulation of a set of perforated cards, in accordance with the structural characters of the sample of wood to be identified.

Variability of Pulpwood.—The work on this investigation of the spruces and balsam fir in pulpwood stands of Eastern Canada has been summarized for publication as a bulletin. This report indicates the range in density of the wood investigated, and in the relationship between rate of growth and density gives a basis for estimating the pulp-producing quality of wood from measurements of rate of growth. Since density of wood in conjunction with form factor of trees permits computation of the true rate of growth, a better method of evaluating stands for pulpwood production and improved methods for estimating the pulp-producing capacity of wood are provided.

Study of Factors Affecting the Exudation of Fluid Resin in Softwood Lumber.—This investigation was undertaken as a result of numerous instances brought to the attention of the Laboratories in which resin exudation on the surface of finished woodwork such as doors, sashes, and interior trim caused the product to be defective. In some instances the fluid resin exuded through paint surfaces; and sometimes, in painted woodwork, it caused discolouration of light-coloured paint finishes without actual penetration of the paint film.

For investigation of the problems, 50 pine logs were obtained. Most of the logs were stored in water, and some logs were sawed into boards without soaking or previous flotation in order to obtain test material from wood that had not been water-driven. White paint and priming material analysed by the Testing Laboratory of the Department of Public Works and found to be of standard quality in accordance with Canadian Government Purchasing Standards is being used in painting all panels made for this investigation.

General.—Other matters which received attention included the decay of wood in dairy churns; the significance of black streaks in western hemlock ladder stock; variation in the quality and suitability of oak for whisky barrels; the identification of wood and of veneer, plywood, pulpwood, sawdust, wood flour, and other manufactured products; cause of failure in wine casks imported from Portugal; development of internal checks in edge-grain door stock; the reason for the failure of material shipped to the United Kingdom as rock elm; the cause of the occurrence of spots on paper from a certain Canadian mill.

DIVISION OF MARKETS AND ECONOMICS

Sawmill Investigation.—In August and September lumber dealers and representative sawmills manufacturing spruce lumber in eastern Quebec, New Brunswick and Nova Scotia were visited. Particular attention was directed towards the spruce industry because that species, together with balsam fir, constitutes about 70 per cent of the lumber output in Eastern Canada. This trip was undertaken primarily for the purpose of determining the conditions existing in the industry, particularly those affecting the marketing of spruce lumber in the United Kingdom.

Utilization of Sawmill Refuse.—From a study of selected spruce mills it was estimated that the volume of spruce and balsam fir slabs and edgings produced in Eastern Canada in an average year is equivalent to not less than 250,000 cords of pulpwood. Of this quantity, about 175,000 cords is burned at the mills, mainly in refuse burners. The only visible outlet for this huge volume of waste appears to be its use for chemical or other pulps. This form of use is already practised, but only on a very small scale. This situation has been drawn to the attention of the Canadian Lumbermen's Association and the Canadian Pulp and Paper Association, and both bodies have taken steps to co-operate with the Laboratories in finding means of curtailing this waste of raw material. Arrangements were made in co-operation with industry for a field party to study actual production of slabwood in representative mills during the summer of 1939. At the same time, all available information respecting established practice in this kind of waste utilization is to be collected and summarized.

Sawmill Equipment.—Plans and estimates for a portable sawmill to meet certain specified operating conditions were prepared for the information of the Indian Affairs Branch. Suggestions for the organization and operation of the proposed sawmill were also submitted for consideration.

Committees.—The chief of division acted as joint secretary of the Associate Committee on Forestry of the National Research Council, and served on subcommittees of that body.

Trade Inquiries.—A number of inquiries relating to supplies of wood of special quality were received by the Department of Trade and Commerce from Trade Commissioners, and referred to this Laboratory for attention. Miscellaneous inquiries from industry and from individuals, dealt with by this division, were mainly concerned with business opportunities, lumber grading, and profitable means for utilizing waste.

DIVISION OF TIMBER PATHOLOGY

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 *Fomes pini* (*Trametes pini*). This fungus attacks jackpine and other softwood trees; its continued growth reduces the firm red-stained wood to a stage known as red rot, in which condition the strength of the wood has been completely destroyed. The study being conducted is to determine whether *Fomes pini* continues to develop in red-stained wood so as to produce the red-rot stage under conditions obtaining in railway ties in service. During the year examination of cultures made from ties removed from the experimental track in 1937 was completed. It was concluded that during the eight-year service period of this experiment, *Fomes pini* and Fungus No. 2 (a second fungus found associated with reddish discoloration in green jack pine) have been gradually dying out in *untreated* ties. In their place, a large number of moulds and secondary wood-destroying fungi have entered. These ties showed for the most part advanced decay. Of the wood-rotting fungi, *Lenzites saepiaria* was the most frequent and active species.

It was found that creosote introduced by pressure has given excellent protection to the ties. Secondary wood-destroyers were isolated from 6 of the 20 ties analysed, but in every case the extent of the rot which they caused was slight. They entered in every case through checks which developed toward the middle of the upper surface of the tie.

Blue-stain in Softwoods.—A laboratory test was made to determine the efficiency of two new chemicals in controlling mould and stain development in pine. At the end of a four-week test period it was found that one of the chemicals offered no protection against stain, whereas the other gave excellent protection against stain, but was ineffective against mould.

Yard Sanitation: Distribution of Mould and Staining Fungi in the Seasoning Yard.—Arrangements were made for carrying on the work in two seasoning yards in the vicinity of Ottawa. During the summer, agar plates were exposed at bi-weekly intervals at thirteen points in each yard. The plates used were uniform in size, each giving an agar surface of approximately 10 square inches. They were exposed in duplicate. In sheltered places the plates were left uncovered for ten minutes; at more open points the exposure lasted for five minutes only. Exposures were made seven times in each yard from June 30 to September 29. After incubation at room temperature for four to five days a count was made of the circles of growth on each plate. It was found that spores had fallen on every plate exposed, the number per plate ranging from 3 to approximately 500. From the plates, transfers were made from the circles of growth to malt agar slants in culture tubes. An attempt was thus made to isolate as many as possible of the fungi which had established themselves on the plates, and to procure enough cultures to get some idea of the distribution of the different types in the yards. A study of these cultures is being made with a view to determining the prevalence and distribution of fungi injurious to lumber.

Relative Susceptibility to Blue-stain and Mould of Winter-felled, River-driven Pine and Summer-cut Pine Sawn Green from the Stump.—The opinion prevails among pine lumber manufacturers that lumber made from logs which have been river-driven or which have been stored for prolonged periods in water does not stain as readily as that made from logs which have not been subjected to the leaching action of water. To determine whether or not this opinion has a basis in fact, a test was carried out during the summer of 1938. Logs were obtained of red pine and white pine. Of each lot, some were summer-felled and delivered green from the stump; some were of the winter cut of

1936-7, river-driven and water-stored; the remainder, also river-driven and water-stored, were cut in the winter of 1937-8. The logs were converted to boards which were inserted in piles of green, common pine lumber in a seasoning yard in Ottawa. After seasoning for three months, the test boards were removed from the piles and examined for stain and mould. No mould was noted on any board. As regards stain, the results lend support to the prevalent opinion regarding the relative susceptibility to stain of river-driven pine and pine sawn green from the stump, but before final conclusions are drawn it is considered advisable to extend the experiment and carry it out with a larger amount of material.

General.—On request from industry, information was supplied on a variety of problems including sapwood stain and its control; fungal infection in pulp-mills; decay in buildings; the cause and control of brown-stain in pine; decay of logs in storage; the relative durability of composition boards; yellow-stain in fish-boxes; red-stain in jack pine; specific cases of decay in wooden articles in service; and the identification of fungi associated with decay.

DIVISION OF WOOD UTILIZATION

Use of Yellow Birch and Hard Maple for Spokes and Felloes of Artillery Wheels.—Although this project is specifically concerned with artillery wheels of yellow birch and hard maple, the data obtained are applicable to other types of wooden vehicle wheels that are now made chiefly of other woods. After four and a half years of service testing by the Department of National Defence the experimental wheels used in this project show no signs of mechanical failure, and it is, therefore, considered that they have proved their worth in this respect. No decay is yet apparent either in the chemically treated wheels or in those which are untreated. From the standpoint of manufacture, birch has proved somewhat superior to maple.

Wood Taint in Butter-boxes.—The British Columbia lumber industry has an export market for timber for butter-boxes, particularly in Australia. An important requirement for such material is that it does not impart taint to the butter. Western hemlock has given satisfaction in this regard, but it was desired to know whether certain other British Columbia species would prove satisfactory. In co-operation with the British Columbia Lumber and Shingle Manufacturers' Association and the Dominion Department of Agriculture, an experiment was undertaken in this connection.

Over two tons of butter were packed in various ways in boxes of Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), amabilis fir (*Abies amabilis*), and grand fir (*Abies grandis*), and placed in cold storage. Final sampling will be done by expert butter graders of the Department of Agriculture at the end of a suitable period of storage.

Use of Wood for Fuel.—Not only does wood rank as an important fuel, but the 9,287,000 cords of it used each year for this purpose constitute the largest single item drawn from Canadian forests. In view of this fact, the efficiency with which wood can be burned was investigated in a series of tests conducted in co-operation with the Fuel Research Laboratories of the Bureau of Mines. Seven types of stove and three types of furnace, some of foreign and some of domestic origin, were compared. The results of 37 individual trials showed that the new European types of stove are not inherently more efficient than Canadian stoves of the usual patterns, but that the latter are sometimes inefficient, not because of poor design, but because of lack of precision in manufacture. This means that stoves which are badly manufactured may operate at only 20 or 30 per cent thermal efficiency when the design itself may be capable of attaining double this efficiency.

Some European furnaces, on account of the arrangement of a magazine feed, are capable of operating without attention for periods three times as long as is the case with similar Canadian furnaces. This makes for greater convenience in operation.

Use of Sawdust for Fuel in Eastern Canada.—Each year large quantities of sawdust are destroyed at sawmills in Eastern and Central Canada for lack of profitable outlets. With a view to improving this condition experiments are being carried out in co-operation with the Fuel Research Laboratories of the Bureau of Mines to determine whether this sawdust can, without the need of costly processing, be used satisfactorily as a domestic fuel under the severe climatic conditions prevailing in the region. The experiments are not yet completed, but the results so far obtained are encouraging.

Exhibits.—An exhibit emphasizing the many uses of forest products in industrial chemistry was displayed at the joint convention of the Society of Chemical Industries, the Canadian Chemical Association, and the Canadian Institute of Chemistry held at Ottawa in June, 1938. Plans were drawn up for the Canadian exhibit of forest products to be shown at the New York World's Fair.

General.—Miscellaneous problems receiving attention had reference to the manufacture and grading of lumber; the manufacture of, and markets for wood flour and excelsior; methods and materials for house insulation; problems of the furniture industry; methods of coating wooden food containers; methods for rendering wood water-resistant; advice in preparing specifications for lumber and timbers for special purposes; the methods of peeling pulpwood; assistance in selecting the most appropriate woods for unusual purposes as well as in locating sources of the most suitable grades and sizes of material for special needs. Fully half the inquiries, however, concerned the use of wood in various forms for fuel.

COMMITTEES

Members of the staff of the Laboratories served on committees of the following organizations:—

Canadian Engineering Standards Association.—Committees on Wood Piling, Fire Tests, Structural Timbers, Logging Chains, Wood Poles.

National Building Code Committee.—Advisory, Administrative, Construction, Wood Construction, Fire Protection.

American Society for Testing Materials.—Shipping Containers, Timber, Paper and Paper Products (Containers).

Canadian Pulp and Paper Association.—Joint Administrative, Woodlands and Technical Sections, Logging Sleighs.

National Research Council.—Associate Committee on Forestry.

Comité International du Bois, Brussels.—Translations.

Canadian Government Purchasing Standards Committee.—Subcommittees on Paper Quality and on Wood Preservation.

Publications and Papers Issued

The following publications were issued by the Ottawa laboratories:

Efficiency of Logging Sleighs for Pulpwood Operations in Different Types of Terrain, (mimeographed), by W. E. Wakefield.

A Grooved Sticker for Lumber, by M. J. Brophy.

Kiln-drying Common Grades of White Pine, by M. J. Brophy.

Prevention of Crosser-stain in Maple and Basswood, by M. J. Brophy.

Storage and Care of Kiln-dried Lumber, by J. R. Coleman (English and French).

- Relative Humidity in Kiln-drying, by M. J. Brophy (English and French).
 Steaming in Kiln-drying, by M. J. Brophy, (English and French).
 Uses of Sawdust, (mimeographed), by J. D. Hale.
 Utilization of Sawmill Refuse, by J. D. B. Harrison.
 Slime in Pulp and Paper Mills, by Clara W. Fritz.
 Twenty-five Years of Forest Products Research, by T. A. McElhanney.
 Utilization Problems in the Wood-using Industries of Canada (excluding Pulp and Paper), by T. A. McElhanney.
 Forest Products Research in Relation to Canadian Economy, by T. A. McElhanney.
 Wood-preservation Research: A Review of the Work in Progress at the Forest Products Laboratories of Canada, by J. F. Harkom.
 Treatment of Timber with Preservatives: Fire-retardant Methods, by J. F. Harkom.

THE PULP AND PAPER DIVISION, MONTREAL

The chief activities of the Division during the past year were mechanical pulping studies; chemical pulping studies; printing studies; and technical services, including the study and analysis of methods of pulp and paper testing, calibration and inspection of instruments for testing of pulp and paper, routine testing, analysis of wood-pulps and paper submitted by firms and individuals, and the furnishing of information on a variety of problems relating to the manufacture of pulp and paper.

Mechanical Pulping Studies.—The object of these investigations is a better understanding of the manner in which mechanical pulps are produced from wood by grinding and refining, with a view to improving the quality of the product and decreasing the cost of its production.

The effect on grinding behaviour and pulp quality of wood properties such as moisture content, density, and rate of growth was studied in some detail for white spruce.

Tests were made on a new type of pulpstone submitted to the Laboratories for examination. These stones are constructed of domestic garnet sand and high tensile strength cement. The results to date have been quite encouraging, and point to the availability in the near future of cheaper pulpstones manufactured in this country.

An auspicious start has been made on a detailed study of the relationships existing between the main grinding variables—pressure, speed, sharpness of stone, production rate, and power consumption. The purpose of this investigation is to place further research on a sound quantitative basis.

It would appear from preliminary investigations that the temperature of pulpstones in the grinding zone and the extent to which pulp is carried out and re-enters the grinding zone may exert important effects upon rates of production, energy consumption, and pulp properties. In view of the remarkably high rates of production obtained from a miniature laboratory grinder, it would seem important to study these effects with care in order to see whether improvements in present commercial grinding practice may not be capable of realization. Since 85 per cent of newsprint today consists of groundwood, there is a growing demand for such improvements in mechanical pulp as may lead either to a greater elimination of chemical pulp or to improvements in the printing qualities of the sheet, the latter being desirable in order to permit finer illustrations in all sections of newsprint. Refining coarse groundwoods or softened chips offers attractive possibilities both for elimination of sulphite pulp and for improved printing qualities.

Chemical Pulping Studies.—The object of these investigations is to increase present knowledge of chemical pulping processes. Attention is now focused upon obtaining greater yields and lower costs of sulphite pulps suitable for use in newsprint after mechanical processing.

The refining of groundwood tailings which had been softened by slight cooking was studied. This waste material gave refined pulps that would be of little or no value. The probable cause of this disappointing result was found during an examination of specimens of white spruce which gave weak degraded sulphite pulps. On testing specimens from one hundred trees, of white and black spruce, balsam fir, and jack pine, it was discovered that wood degraded by sulphite cooking is of common occurrence in these species. The proportion of it in any one log, however, is not likely to exceed 20 per cent, and that in the wood examined was only about 4 per cent of the total wood volume. A consideration of the mode of occurrence of degradable wood and experimental production of it from normal wood showed that this fault is most probably due to compressive stresses in the tree.

Systematic investigation of a new process of pulping by treatment of wood with a gas, mentioned in the 1937-8 report, was continued, with a view to determining the optimum conditions of operation and estimating some of the economic factors involved. The results obtained have been most encouraging and indicate a number of advantages which might accrue from the commercial application of this process. It is proposed to make a qualitative study in order to determine the range in conditions under which the process can be operated and to evaluate the pulp made under various conditions of treatment, particularly such as will give yields ranging from 75 per cent to 80 per cent. A number of factors must be considered, such as moisture content of wood, size and shape of chips, and the amount of sulphur consumed in pulping. Factors which affect the colour of the finished pulp are also receiving attention, and any results obtained should be of value to industry, which is showing an increased interest in the colours of unbleached sulphite pulp.

Printing Studies.—The object of these investigations is to find out those properties of paper which affect its printing qualities and the effect of variations in furnish, stuff-processing, sizing, fillers, paper-making, and surfacing processes. Such knowledge assists in the selection and preparation of different types of paper for printing operations.

Studies on the oil-wettability of different pulps show that sulphite and kraft pulps, whether bleached or unbleached, and whether beaten or unbeaten, differ only slightly in oil-wettability. The behaviour of high-gloss inks on paper has been shown to be dependent on the oil-resistance of the paper. Papers with high oil-resistance produce the best gloss.

By means of a newly designed miniature press it is possible to print paper under controlled conditions of printing pressure, amount of ink, nature of packing, and other variables. It is hoped that such work will lead to a clearer insight into the ink-paper relationship.

Investigations in progress at the present time include the development of suitable methods of assigning a numerical value to the quality of half-tone printing, and of methods of determining printing pressures during printing on flat-bed and cylinder presses.

Means have been devised for comparing the dimensions of half-tone dots with the corresponding portions of the plates from which the impression was made. By examining half-tone dots or solid blacks with a photoelectric cell, it is hoped to assign a numerical value to uniformity of impression in printing. This method, if successful, would enable comparison to be made between different types of paper and, which is more important, between different grades and specimens of the same kind of paper.

The relative influence of printing processes, elasticity of backing, softness and absorbency of paper, and inequality in paper surfaces should then be capable of correlation, a task which has not hitherto been possible owing to the lack of any method for evaluating quantitatively the quality of the impression.

Post-graduate Student Investigations.—A number of students (10 during the past year), under the direction of Dr. O. Maass, of McGill University, investigated problems closely allied with the interests of the pulp and paper industry. These students were given laboratory facilities, and their work was a part of the laboratory program. The problems assigned to them related to the fundamental science of cellulose and paper technology.

During the past year, six of these worked on problems relating to the manner in which water associates itself with cellulose, and progress was made toward a better understanding of this most important factor in the utilization of cellulose.

Three others worked on problems relating to the sulphite cooking process. The tenth studied the relationship of total surface and void fraction of finely divided solids such as pulp, and the rate of flow of liquids through such a mass.

These studies all produced data of value to the industry; but it is recognized that the primary objective here is the training of the men for the industry.

Work on the relation between wood and cooking liquors was continued. Methods have been devised for measuring the rates at which electrolytes diffused into chips and the effect of previous chemical treatment of the wood upon the rate of diffusion. Previous work on the rate of delignification of wood-meal by calcium-base and magnesium-base sulphite liquors has been extended to high concentrations and temperatures. This work will be further extended to cover sodium-base liquors.

In the cellulose-water system further work has been done on the adsorption of water vapour by paper under varying conditions of relative humidity. Additional measurements have been made of the heat of wetting of dry cellulose and pulp by water and on the specific volume and density of the water so adsorbed.

The density of cellulose in different media has been determined by successive displacements of one medium by another without the pulp being dried at any stage. This work is being continued.

Preliminary experiments have been made on the rate of drainage of water through beds of unconsolidated particles, and this work is now being extended to pulps; it is expected that the investigation will shed light upon the drainage of water from paper during the operation of forming the web on fourdrinier wires and cellulose moulds.

Technical Services.—Demands for improved illustrations on all pages of newspapers, coupled with decreased tonnage requirements, has focused attention on the printing qualities of newsprint, and the effect on them of variations in the ratio of sulphite to groundwood, wood species, the groundwood process, and small additions of dyestuffs and mineral fillers. In co-operation with several large producers, the Division has succeeded in classifying newsprints by means of brightness measurements, as plain, tinted, or dyed. Different mineral fillers when used in permissible amounts produced widely varying effects upon opacity of newsprint.

In co-operation with the Technical Section of the Canadian Pulp and Paper Association, the Division evaluated pulps made by refining rejections from groundwood pulp screens, using various commercial refiners. Pulps so produced are returned to the system and sold as newsprint. The refiners tested fell into two groups. One type of refiner converts rejections into a well-fibred pulp,

sometimes superior to the original screened pulp. The other type grinds rejections to a degree where their presence in the finished newsprint is not noticeable. The percentages of acceptable stock before and after treatment were determined, and the refined pulp was examined with respect to its physical properties and the effect of its admixture in various proportions in the finished sheet.

The dimensions of different fractions of pulps classified by the Johnston classifier were found to be in substantial agreement with similar results obtained two years ago. Complete data are available on groundwood, kraft, sulphite, and soda-poplar pulps.

Sheets which were made by using semi-polished plates, in the British Standard Sheet Machine, gave results indistinguishable from sheets made from mirror-polished plates, but are free from sticking or picking. A simpler and more economical form of gridplate has been developed.

It was found that groundwood characteristics are affected by disintegration of laps for testing, thus causing confusion between the seller, who tests before lapping or while the lap is fresh, and the buyer, who tests after disintegrating a lap which has had more or less opportunity to dry out.

Aluminium foil has been tried as a possible material for use in checking the performance of bursting testers. Unlike paper, foil is unaffected by moisture content or relative humidity. Commercial foil is not perfectly uniform, but the ratio of bursting strength to weight per unit area is sufficiently constant for ordinary requirements.

The Hart moisture meter was found to determine the moisture content of paper with sufficient accuracy for purposes of mill control. The temperature of the paper does not affect the accuracy of the reading.

A comparison was made of the properties of typical kraft pulp from mills in Canada and the Southern United States; the Standard Beater test of the Technical Association of the Pulp and Paper Institute was used. The Canadian pulps were stronger in the unbeaten state, but the southern pulps developed good strength on beating.

It was shown that reflecting glossmeters can be used satisfactorily to measure finish of paper boards and that boards graded by skilled graders are arranged similarly by the glossmeter.

Routine Testing of Pulp and Paper.—As in previous years, the Division continued to perform testing services, without charge, for members of the Canadian Pulp and Paper Association. Calibrations of "freeness" testers, pulp-evaluation apparatus, pulp-fibre classifiers, oil-absorption testers, and replacement parts were carried out.

Industrial Investigations.—By special arrangement, a second industrial investigation of the pulping of fruit-tree prunings was carried out by a paper consultant using the semi-commercial equipment of the Division. The pulp was afterwards bleached and converted into cigarette paper.

General.—At the request of the Department of Public Works, an investigation was made of shoals in the harbour system of Port Arthur and Fort William. It was found that in some cases the shoals in question were caused or aggravated by the discharge of solids in the effluents from adjacent pulp and paper mills. Methods for measuring the weight of solids in effluents and factors for their conversion into cubic contents after deposition were outlined. It was suggested that, when the solids in effluents had been reduced to a minimum, metering should be employed to determine the proportion of dredging chargeable to the mill producing the effluents.

At the joint annual meeting of the Canadian Chemical Association and the Society of Chemical Industry of Great Britain, held in Ottawa on June 20, 1938, Dr. H. W. Johnston presented a paper on "Pulp, Paper and Related Industries in Canada".

Based on experimental work carried out by the Division during the previous year on the permanence of paper, a draft specification for the purchase of writing and ledger papers for government use was prepared for the Subcommittee on Paper Standards of the Canadian Government Purchasing Standards Committee. It was found that the probable error in the folding-endurance test necessitated the testing of at least 100 samples of paper in each direction in order to determine this property with sufficient accuracy for the purpose of grading; and that surface sizing affected the retention of folding endurance, after accelerated ageing in an oven. It was found that variations in the hydrogen-ion content of papers were not a satisfactory index of the permanence of such papers, as the variations encountered were of the same order of magnitude as the probable error. It was, therefore, recommended that specification be based upon the determination of tearing endurance with the Elmendorf tearing tester, as a measure of the durability of paper, and that the retention of tearing endurance after oven-ageing for 72 hours at 100° C. be used as a measure of permanence of paper. A detailed specification based on these two tests, which are simple and readily performed, was submitted.

Publications and Papers Issued

The following special publications were issued from the Montreal laboratory:

The Control of Printing Quality in the Paper and Board Mill, by Gerard L. Larocque.

The Heats of Adsorption of Alkalis by Standard Cellulose, by J. L. Morrison, W. Boyd Campbell, and O. Maass.

The Effect of Magnesium-base Sulphite-liquor Composition on the Rate of Delignification of Spruce Wood and Yield of Pulp, by J. M. Calhoun, J. J. R. Cannon, and F. H. Yorston.

Measurement of the Dielectric Constant of Cellulose, by H. A. De Luca, W. Boyd Campbell, and O. Maass.

The Heat Content of Water Adsorbed on Cellulose, by J. H. Shipley, W. Boyd Campbell, and O. Maass.

Disintegration of Lapped Groundwood for Test, by W. C. Lodge.

Aluminium Foil for Checking Mullen Testers, by W. C. Lodge.

The Effect of Pressed Plate Surface on the Properties of Test Sheets, by W. C. Lodge.

Requirements of Folding Board, by W. Boyd Campbell.

Studies in Cellulose: Moisture Phenomena, by O. Maass and W. Boyd Campbell.

The Suitability of Wood for Acid Pulping, by H. Green and F. H. Yorston.

VANCOUVER LABORATORY

Problems resulting from efforts to improve utilization of western hemlock and certain of the secondary species continue to influence the work of the Vancouver laboratory. Technical problems connected with the manufacture and use of such species, market extension for the use of the lower grades, closer utilization of all species in order to reduce waste to a minimum, and problems resulting from shipping hazards and from use in export markets have received attention. The successful solution of many of these problems has helped to promote wider use of Western hemlock and Western red cedar in export markets. The following report indicates the progress made during the year on various projects.

DIVISION OF TIMBER MECHANICS

Standard Tests of Mechanical and Physical Properties.—Tests were conducted on yellow cedar. A special shipment of Douglas fir was also tested in

an effort to determine the influence of growth conditions, such as soil, altitude, site, and weather, upon the quality of the timber. Specimens were tested in connection with a study to determine the effect of rate of growth upon the specific gravity and strength of Sitka spruce. A study of the effect of the shape of the test specimen upon its maximum crushing strength was completed for Douglas fir and Sitka spruce, when matched pieces, prepared according to Royal Air Force specifications, were tested at 8 per cent and 4 per cent moisture content.

The Effect of Coloration upon the Strength of Douglas Fir.—Tests were completed on two shipments of stained Douglas fir from different areas. The results so far show no significant difference in strength between stained and unstained clear Douglas fir.

Tests of Glued Joints.—An investigation of the strength in diagonal compression of three-ply flush and of dowelled doors showed much greater strength in the flush doors.

The advantages of synthetic resin as a bonding medium have been definitely established, but the high cost of hot presses necessary for present types has been a deterrent to its use. Recently a cold-press resin glue was brought to this laboratory for test, which when used on hard maple showed strength value equal to that of the wood. When used with Douglas fir three-ply and tested in shear, the results obtained were equal to those for similar sections bonded with casein or soya bean glues.

In an effort to devise means for reducing the waste in the manufacture of hemlock boxes and crates, a study was made of built-up box ends. The tensile strength of the glued-up ends was slightly less than that of the one-piece box ends used as controls, but quite sufficient for any ordinary requirement. Exposure tests are in progress to determine the effect of atmospheric conditions on the holding-power of the glue; some sections are being prepared for exposure in cold-storage rooms at varying temperatures and humidities for different periods.

Miscellaneous Tests.—Investigations were carried out on (a) tallow-wood and green ironbark for ship's cradles; (b) Sitka spruce aeroplane materials; (c) Douglas fir ladder stock, to determine the cause of abnormal splitting; (d) creosoted Douglas fir wood-stave pipe to determine crushing strength under external load; (e) creosoted Western hemlock ties. Inspections were also made of ash for aeroplane skis.

DIVISION OF TIMBER PRODUCTS

Seasoning.—Studies were continued on the rate of absorption of moisture by British Columbia commercial hardwoods in unheated storage, and of end-coated and uncoated 3- and 4-inch western hemlock.

A series of experimental runs was made in the laboratory humidity chamber in connection with the investigation of the effect of the type of case on the rusting of canned goods during ocean shipment. Fibreboard and wooden cases filled with cans of salmon were first chilled, then subjected to atmospheric conditions corresponding to those encountered during shipment through the tropics. A large shipment of canned goods packed in both wood and fibre cases was examined upon arrival in Vancouver after passage through the Panama canal, and the amount of rust occurring in each type of case noted. The Association of Marine Underwriters co-operated in this study.

Specially prepared piles of lumber were exposed to rain for one, three, and thirty days, respectively, in order to determine the effect of exposure to rain on seasoned lumber awaiting shipment.

Data were obtained on the seasoning of Douglas fir timbers and Western red cedar poles, and arrangements were made to study the rate of air-drying and moisture distribution in Douglas fir piling in large stacks.

Tests were carried out to determine the variation in moisture content of 1-inch black cottonwood lumber air-seasoned during the winter and spring months. A small test pile of untreated and Osmose-treated Western hemlock ties was erected to determine whether the preservative treatment reduced the tendency of ties to check during air-seasoning. After four months the average moisture content of both treated and untreated ties was the same, and surface checking had occurred in all ties to a depth from $\frac{1}{2}$ to 1 inch. The rate of drying of 1-inch and 2-inch hemlock in carrier loads was determined in continuation of a study of the feasibility of partially seasoning Western hemlock lumber in carrier or sling loads while awaiting shipment. A study was completed of factors affecting the air-seasoning of rough and surfaced lumber, the object being to determine the relative rate of air-drying of 1-inch and 2-inch Douglas fir and 1-inch Western hemlock when rough and when surfaced $\frac{1}{4}$ -inch off.

Kiln-drying of Lumber.—A study was made of the kiln-drying of Douglas fir parquet flooring blocks manufactured from lumber and from short-length material. Assistance was given to two mills in working out a satisfactory drying schedule and moisture content for long-length material, and two test runs were made in the experimental kiln to determine a satisfactory method of economically piling and drying timber in block lengths.

Two charges of 1-inch black cottonwood were dried in the large experimental kiln. One charge, previously air-dried to reduce the abnormally high green moisture content of the wood, was kiln-dried to a final moisture content of 3.5 to 4.7 per cent in 6 $\frac{1}{2}$ days. The purpose in drying the second charge was to study the conditioning of partially kiln-dried cottonwood under conditions similar to those in a factory operating one shift only. It required 14 days of 9 hours drying per day to reduce the lumber from an average moisture content of 14 per cent to 6 per cent.

A special study of the manufacture of seasoned lumber was made in co-operation with the British Columbia Lumber and Shingle Manufacturers' Association to determine (a) the cause of internal checking occurring in edge-grain door stock, and (b) the recovery resulting from sending to the dry-kiln low-grade lumber containing clear cuttings for remanufacture after drying.

Small quantities of *Abies amabilis* and of *Abies grandis* were dried separately in a large experimental kiln to a moisture content of 12 to 14 per cent for a series of tests of butter-boxes being carried out by the Ottawa Laboratories and the Department of Agriculture.

Tests were made to determine the accuracy of a recently modified capacity-type electric moisture meter using four quadrant-shaped plates placed on the surface of the lumber for contact.

The seasoning of the common or merchantable grades of Western hemlock for export continued to receive attention and a report embodying suggestions for handling, seasoning, and storage of this material was prepared for the guidance of manufacturers.

An outline of the theory of evaporation was prepared for the Research Committee of the Association of Marine Underwriters.

A special two-day advanced kiln course was held at the laboratory with an attendance of twenty-two.

An important feature of this work was the assistance given sawmills and wood-working factories in connection with their seasoning problems, which included:—

- (a) Use of high temperatures in drying green alder,
- (b) Failure of yellow cedar Venetian blind stock,

- (c) Kiln-drying of 6-inch \times 6-inch Douglas fir for zinc chloride treatment,
- (d) Causes of shrinking in hemlock and fir broom-handles used on the prairies,
- (e) Means of preventing cupping in hemlock box lumber,
- (f) Cupping in cedar bevel siding,
- (g) Seasoning of cedar boat lumber, and
- (h) Drying ponderosa pine factory lumber.

Kiln-drying Shingles.—Examination of twenty-six panels assembled in 1929 to determine the effect of kiln-drying on the serviceability of Western red cedar shingles showed indications of breaking down of the wood structure in small areas and mechanical wear of the spring-wood on some panels. A study was initiated to determine the cause of crushing (similar to collapse) and of dark colorations on the ends of dried shingles. A small test charge of shingles was dried in the experimental kiln as a guide to the study of the drying of shingles in dry-kilns equipped with large internal fans.

Effect of Seasoning on Insects Injuring Lumber.—To assist in revising grading rules covering export shipments, a memorandum was prepared summarizing the results of studies made at the laboratory in co-operation with the Entomological Branch of the Department of Agriculture. It was pointed out that thorough air-seasoning will eventually eliminate all ambrosia insects and that the drying schedules used in commercial kiln-drying practice in British Columbia are more than adequate to kill all beetles, larvæ, and eggs in the lumber.

Advice and assistance were given in the kiln treatment of 40,000 feet board measure of 1-, 1½-, and 2-inch southern oak for boat-building, which was infested with *Lyctus* beetle.

Application of Chemical Seasoning to British Columbia Woods.—Special fitches of Douglas fir, Western hemlock, Western red cedar, and Sitka spruce 8 inches thick, up to 48 inches in width, and 16 feet long, were kiln-dried for the Department of Trade and Industry, British Columbia, for their exhibit at the San Francisco Exposition. Preliminary to kiln-drying, half the fitches were placed for six weeks in a solution of common salt (NaCl), the temperature of which was gradually raised to a maximum of 140° F. The remainder were layered for eight weeks with dry salt placed on both surfaces and the ends of each fitch.

Five charges of 4-inch \times 7-inch Western hemlock that had been immersed in salt solution for varying periods were dried in the small experimental kiln. The results obtained indicate the need for careful consideration of various factors in future studies.

Studies of the effect of chemical treatment on the air-seasoning of 3- and 4-inch Western hemlock were continued.

Sawmill Waste and Its Utilization.—Information regarding the utilization work of the laboratories was compiled for the British Columbia Department of Trade and Industry, the University of British Columbia, lumber and logging associations, and others. The use of a serrated-tooth chipper, specially designed for converting low-grade mill-waste into fuel for domestic sawdust burners, was investigated. Information was compiled regarding the effect of bark and moisture content on calorific values of sawdust as a domestic fuel, and also on the suitability of green hemlock sawdust.

A calorific and moisture-content study was made on selected samples of sawdust manufactured from mill-waste containing a high proportion of bark-covered sapwood. Results indicated that, though the moisture content is higher than normal, the calorific value of the sawdust is slightly greater. The sawdust was found to feed and burn well and to be a satisfactory fuel.

Use of Wood and Charcoal as Motor Fuel.—The laboratory charcoal gas-producer unit was fitted up for demonstration purposes in order to meet demands for information regarding the use of charcoal as a motor fuel.

Tests were made in a co-operative study with the head of the motor mechanics department, Vancouver Technical School, to determine the relative efficiency of a gasoline stationary engine operating on gasoline and on producer-gas. The gas-producers developed only 52 to 70 per cent of the power developed by using gasoline. The tests indicate that, for satisfactory performance under heavy load, an over-powered engine should be installed when charcoal producer-gas is to be used.

Utilization of British Columbia Hardwoods.—The collection of information on the manufacture of red alder and on possible sources of supply of Western birch was continued. This information is of vital importance to the furniture industry in British Columbia. A co-operative study was made to determine the possibility of manufacturing dimension stock from small alder not suitable for sawing into lumber. An investigation was made of the cause of damage to kiln-dried Douglas fir flooring that was covered with a dark stain. An examination was also made of rot that had occurred in 3-inch Western hemlock shipped to Australia; the causal organism was found to be *Fomes pinicola*. An investigation made to determine the cause of rot in a large shipment of clear-grade Douglas fir to South Africa indicated that the trouble was due to improper storage conditions at port of destination.

Relative Durability of British Columbia Woods.—Cross-sections of Western red cedar logs exhibiting zones of straw-coloured wood were sent, on request, to the Government of New Zealand to show that straw-coloured sections in this wood are not necessarily sapwood. As a result, it is reported that Western red cedar will now be accepted for general construction purposes in New Zealand on the same basis as totara and California redwood. Assistance was given the Canadian Pacific Railway in an examination of some 4,600 pieces of piling removed from Pier D, Vancouver, which was destroyed by fire during the year. The study is being carried out in order to determine in what ways the piling had deteriorated during service. The annual inspection was made of wood structures included in the durability tests being carried out in co-operation with the Ottawa laboratory. Selected samples of clear Douglas fir lumber were examined for possible presence of wood-inhabiting fungi, kiln-dried, and delivered to the British Columbia Lumber and Shingle Manufacturers' Association for shipment to the Forest Products Research Laboratory, Princes Risborough, England. This material is to be used for durability tests in comparison with Baltic redwood. Minor projects dealt with under this project included (a) the effect of bark on durability; (b) effect of water saturation on durability; (c) use of Western hemlock for sub-flooring; (d) durability of spruce in house construction; (e) cause of decay in the penstock and bulk-head of a wooden dam; (f) examination of rot found in foundations, roofs, and flooring of various buildings.

Reference Collection of Pathological Material.—One hundred and thirty-one wood specimens were examined to determine the causes of stain, decay, and other defects.

Incidence of Decay in Lumber Cut from Logs Containing Rot.—A study was begun to determine the extent to which fungi responsible for heart-rot in a log may be present in other portions of the log, and the extent to which kiln-drying may facilitate the detection of incipient decay in lumber.

Sap-stain and Mould Prevention: A Study of the Relative Efficacy of Certain Chemicals on Western White Pine, Western Hemlock, and Douglas Fir.—This

study was undertaken at the request of the industry in order to provide definite information on the merits of various sap-stain and mould preventives when applied to certain British Columbia species. The woods tested were Western white pine, Western hemlock, and Douglas fir.

General.—In addition to the regular project work, many important problems of a general nature were given special attention, a few of which are noted herewith. At the request of the British Columbia Lumber and Shingle Manufacturers' Association, a brief study was undertaken to determine the effect of various factors on the application of a proprietary preservative to Western hemlock. Recommendations were made regarding the treatment of a special plaster and cork wallboard, intended for use in tropical regions, in order to reduce danger of termite damage. As a result of the reported failure of Douglas fir railway ties to qualify under a special spike-pulling test used in Egypt, information was assembled on the testing equipment, called the "Extrahometer," and made available to the interested firms and to the Forest Products Laboratories at Ottawa and at Madison, Wisconsin, U.S.A.

Publications and Papers Issued

The following special publications were issued from the Vancouver laboratories:—

An Investigation of the Effect of Type of Case (Wood or Fibreboard) on the Rusting of Canned Goods during Ocean Shipments, by J. H. Jenkins.

The Use of Chemicals in the Seasoning of Wide Flitches of British Columbia Timbers, by J. H. Jenkins.

Glues and Gluing, by J. B. Alexander.

PUBLICATIONS OF THE DOMINION FOREST SERVICE

The following publications were issued during the year:—

Bulletin, 91, *The Forests of New Brunswick.*

Bulletin 93, *The Physical Qualities of Sulphite Liquors.*

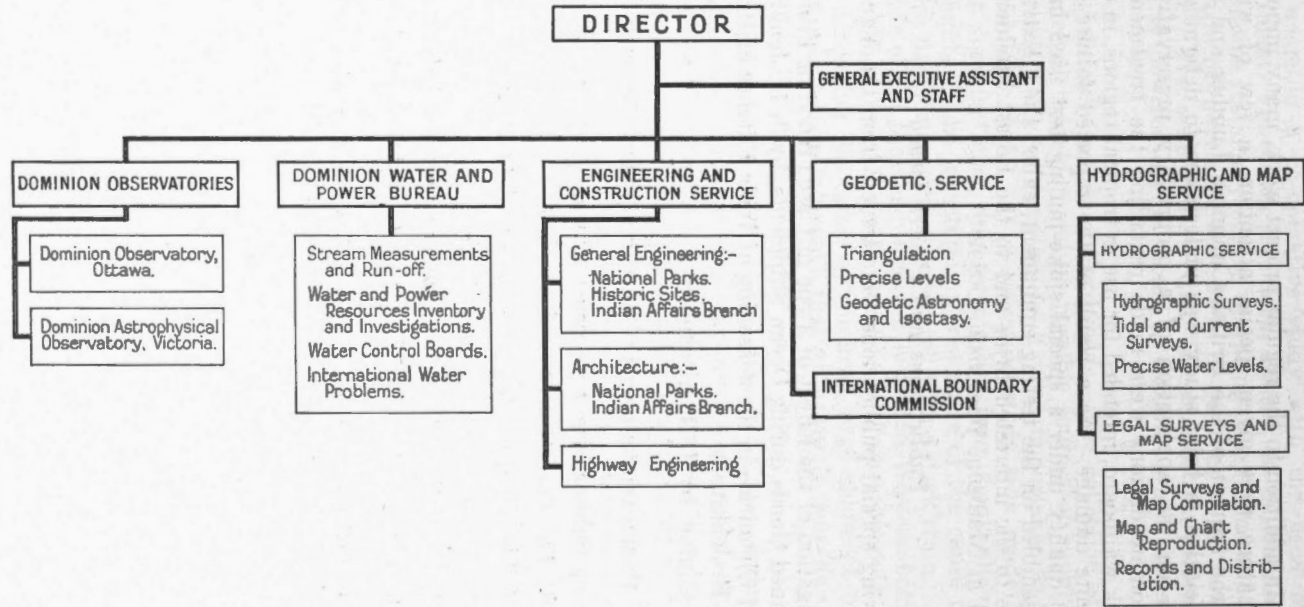
Circular 53, *Brown-stain in Sugar Maple.*

Circular 54, *Strength of Eastern Canadian Spruce Timbers.*

Circular 56, *The Treatment of Fence-posts with Preservatives.*

A revised (fourth) edition of *Forestry Lessons* was also published, and a new edition of the *List of Publications* was brought out.

SURVEYS AND ENGINEERING BRANCH



Organization Chart, Surveys and Engineering Branch.

SURVEYS AND ENGINEERING BRANCH

J. M. WARDLE, Director

The Surveys and Engineering Branch of the Department of Mines and Resources undertakes certain scientific work throughout the Dominion, engineering and construction work and hydrographic, geodetic, boundary, and legal surveys for the Department, and the production and distribution of hydrographic charts, and maps of various types.

As indicated in the accompanying chart, the Branch is divided into five Services—the Dominion Observatories, the Dominion Water and Power Bureau, the Engineering and Construction Service, the Geodetic Service and International Boundary Commission, and the Hydrographic and Map Service. The activities are provided for in the votes of the Surveys and Engineering Branch, the amount expended for the fiscal year being \$1,924,154.32. In addition monies were provided for engineering and construction work and legal surveys by other branches of the Department and expenditures of such monies are shown in the following table:—

<i>To Engineering and Construction from</i>	<i>Service Regular Votes</i>	<i>Special Votes</i>	<i>Total</i>
Lands, Parks and Forests	\$649,168 05	\$1,546,709 71	\$2,195,877 76
Indian Affairs	144,940 60	.....	144,940 60
Department of Labour . . . . .	.....	20,288 65	20,288 65
Department of Transport . . . . .	.....	2,317 14	2,317 14
	\$794,108 65	\$1,569,315 50	\$2,363,424 15
<i>To Legal Surveys and Maps from</i>			
Indian Affairs	\$ 11,617 33	.....	\$ 11,617 33
Total expenditure			\$4,298,495 80

DOMINION OBSERVATORIES

The Dominion Observatory, Ottawa, and the Dominion Astrophysical Observatory, Victoria, conduct scientific research in astrophysical and allied sciences, comprising such subjects as radial velocities of stars and orbits of spectroscopic binary stars, studies of stellar spectra and problems connected with variable stars, the physical nature of novae, the rotation of the galaxy, and the distribution of matter in interstellar space.

At Ottawa, research in purely scientific work also includes the measurement of star positions, problems connected with solar rotation and wave-lengths, paths followed by earthquake waves and their bearing on the constitution and nature of the earth's crust, and the laws governing terrestrial magnetism and gravity. In problems of everyday application, investigations and services include the furnishing of basic time within a small fraction of a second for the whole of Canada, the correlation of cycles of variation in solar radiation with weather conditions and with fluctuations in animal and vegetable life, studies of the effects of Canadian earthquakes and their relation to quake-resistant construction in seismic areas, accumulation of data on the variation of the compass across Canada for surveys, navigation, etc., and determinations of the applicability of several of the newer methods of prospecting to conditions in Canada. Many of the problems are international in character, and are carried on as co-operative investigations with other observatories and scientific institutions, or through various scientific unions and societies.

DOMINION OBSERVATORY, OTTAWA

Observing conditions continued below normal and coupled with a shortage of staff diminished the usual output in several directions. The preparation of delayed publications was advanced as occasion allowed.

The Observatory was represented at meetings of the following societies: the American Geophysical Union at Washington; the Eastern Section of the Seismological Society of America at Washington and Cambridge; the American Association for the Advancement of Science at Ottawa, Ont., and Richmond, Va.; the American Astronomical Society at New York; and the Royal Society of Canada at Ottawa. The annual summer meeting of the American Association for the Advancement of Science and Associated Societies was held in Ottawa from June 27 to July 2, 1938, and some thirty papers were presented by various astronomers before joint sessions of the Section on Astronomy and the Royal Astronomical Society of Canada. The Dominion Astronomer, as one of the vice-presidents of the Association, presided at the meetings of the Astronomy section at Ottawa and Richmond.

More than thirty technical and popular lectures on general astronomy, solar phenomena, and geophysics were given to various societies and clubs, including the Brooklyn Institute of Arts and Science; the Ottawa and Niagara Sections of the Engineering Institute of Canada; the Ottawa, Ste. Anne de Bellevue, and Montreal Centres of the Royal Astronomical Society of Canada; and a series of university lectures on seismology, six technical and one popular, delivered at Dartmouth College, New Hampshire. A number of papers were written for journals, including a news letter on the variable star Algol, a general article on sunspot influences, and one on "Earth Structure" as indicated by seismology. The services of an astronomer were as usual requested and provided for summer camps, five being visited and about 650 young people instructed on general astronomy, with the aid of a small refracting telescope. As in previous years, the Observatory was open to visitors each Saturday evening, with several members of the staff in attendance to answer questions of general interest on astronomy and geophysics, and to give short lectures on one or another of the activities of the institution. Numerous daytime visitors, including school groups, were given information and instruction on the time service system, the equatorial, solar physics apparatus, and seismological, magnetic, gravitational, and other equipment.

In co-operation with the Royal Astronomical Society of Canada, meteor observations were again undertaken. Plans were prepared for the δ Aquarid shower in July, but unfavourable weather curtailed observations. A number of meteors were observed visually during the Perseid shower in August, but photographic recording was prevented by full moon. Successful observations of the Leonid meteors were made the night of November 15-16 which provided one of the best displays on record for several years. In addition to the visual counts, three photographic records were obtained. Measures of the recorded trails were made and the necessary computations carried out.

Position Astronomy and Time Service.—In position astronomy, fundamental observations with the meridian circle were continued on the Backlund-Hough star list. Owing to the continuation of unfavourable observing conditions and shortage of observers only 1,619 stars were observed for right ascension and declination. In addition 77 observations of the sun and 484 readings of instrumental constants were made. The computation of these observations is being kept as closely up-to-date as possible. For the determination of correct time, observations with the reversible transit instruments were made on 157 nights, and the correction to the sidereal standard clock computed for each night. By comparing the other two primary sidereal clocks with the standard twice

each day, their corrections and rates were obtained. The rate of the sidereal standard clock has remained fairly constant, but the other two have been somewhat irregular.

The new time signal clock, which was put in operation last year, has given very satisfactory service and has been used to synchronize the clock systems in the various Government buildings in Ottawa, as well as to control the various relays, minute and seconds dials, and seismograph shutters used at the Observatory. A second complete unit of the time signal clock is being installed so as to insure the operation of mean time circuits with the minimum amount of interruption. Correct time was given by telephone, and, when requested, the clock beats were put on the line. Time signals were sent continuously to the Canadian National and the Canadian Pacific telegraph companies and also to the Canadian Broadcasting Corporation. At their request in place of the half minute beats of the Shortt primary sidereal clock formerly supplied to the Monitoring Station of the Department of Transport, the mean time signals from the new time signal clock, which is controlled by the Shortt primary clock, have been transmitted continuously since July, 1938. The 1,000-cycle circuit, supplied to the Observatory by the Monitoring Station, is now being transmitted over the special line to the National Research Laboratories. Wireless time signals were transmitted directly from the Observatory station CHU on 3330, 7335, and 14670 kc. continuously and through station CBO on 880 kc. and since July, 1938, through station VAA on 11990 kc. once daily except Sunday and holidays. Wireless time signals were received daily from Arlington, Bordeaux, Monte Grande, Nauen, Rio de Janeiro, and Rugby. The times of reception of these signals for each month were forwarded to the International Time Bureau at Paris, and to other co-operating observatories. Changes were made in the transmitting and receiving sets to improve the quality of the signals, and experimental work was carried out with various tubes as relays to replace mechanical relays as used at present.

As in previous years, the synchronized time service in the various Government buildings in Ottawa has been maintained with very few interruptions and is being extended to new buildings. The total number of electrically driven clocks is now 674. The secondary master clock from the demolished Ottawa Post Office was overhauled and fitted with additional electrical contacts and shipped to Dalhousie University to provide time for the recently reconditioned seismographs there. Clocks, chronometers, watches, and other timing mechanisms were cleaned, repaired, and rated for branches of this and other Government departments. The usual tables of the times of sunrise and sunset and moonrise and moonset, phases of the moon, eclipses, and differences of standard time, were prepared for distribution.

Solar Physics.—Cloudiness and haziness continued abnormally high in association with excessive spottedness of the sun. The yearly means of the monthly sunspot "relative numbers" for the years of the present cycle, 1933-1938 inclusive are in order, 6, 9, 36, 80, 114 and 110. The peak year in 1937 is about 30 higher than the peak of the average sunspot cycle. A rapid decline is expected in solar spottedness followed by a slower recession to the next minimum about the beginning of 1945. Thirty-seven photographs recording sunspots were made. On request of the Secretary of the Hail Underwriters' Association, Regina, mean "sunspot cycles" were derived from data supplied in charts (1913-1917) of precipitation (spring and autumn), wheat yield, wheat price, hail premiums, and hail losses. To these were added an investigation of the value per acre of wheat, and of the hail records for the same period. The results were much the same as would be expected from previous investigations of the prairie conditions. The hail mean cycle was similar to that of precipitation and of thunderstorms for this region. Of the five Newfoundland

tree sections mentioned in the 1937-8 report, one yielded a type of variation in the sunspot cycle similar to the precipitation cycle, and three others showed abnormalities which mask normal climatic influences, possibly owing to lumbering operations or insect invasions. Four sections brought in from Poquette Lake, B.C., by a Geodetic Service field party were machined for photographing and measurement of their radii for variations of annual growth-rings for analysis yielded a double pulse in the sunspot cycle. Considerable work was done on the spectroscopic investigation of the solar rotation. The micrometer-oil errors were eliminated from the early measurements of the spectrograms in the Ottawa region of the spectrum at $\lambda 5600$, in the 1911 and 1912 series, and the computation of the large series in 1914 was continued. The 1911 and 1912 series were completely recomputed using the Ottawa Heliographic Tables—now used also at other solar observatories—and the results freed from the mechanical errors of measurement could not be represented by the conventional Faye formula, which represents the changing angular velocity with latitude, φ , thus $A_0 - B \sin^2\varphi$. Discarding this formula, a new and simpler statement of the law of the solar rotation was discovered, namely $A_0 \cos n\varphi$ for angular velocity; or, $V_0 \cos n+1\varphi$ for linear velocity, where A_0 and V_0 are the equatorial velocities, φ the latitude and n is approximately equal to one-third. The law may also be stated thus: The angular velocity of a point on the solar surface is proportional to the cube root of its distance from the axis of rotation. The value 0.315 for n fits the 1911 and 1912 observations with precision, and it also represents closely the Greenwich observations of recurring sunspots, 1878-1933; while 0.35 is the exponent which fits rotation measurements of the high-level flocculi made at the Yerkes Observatory. It is now possible to state definitely that the law of the solar rotation as revealed by the measurements of the changing positions of sunspots is the same as that determined with the spectroscope for the general surface of the sun or the reversing layer. All spectroscopic observations have two errors in varying degree, the first, systematic errors of micrometer measurement, and the second a lessening of the velocity displacements of the spectrum lines caused by a varying overlapping spectrum from haze, optical instruments, and possibly other sources. The first error has been eliminated from the Ottawa measurements referred to, and the extent of the second is indicated by many measurements of the solar rotation under varying degrees of haziness and by arbitrary blends which indicate a correcting factor common to the displacements at all latitudes. For the 1911 and 1912 series this factor appears to be about 1.03, so that the observations are represented by the formula, $1.03 \times 1.95 \cos^{1.315} \varphi$ km. per sec., which is the same as derived from the Greenwich observations referred to. The Faye formula, written as $A_0 (1-b \sin^2\varphi)$ appears as an approximation to the expansion of the new formula, thus: $A_0 \cos^{3.15}\varphi = \{1 - 0.158 \sin^2\varphi (1 + 0.421 \sin^2\varphi + 0.258 \sin^4\varphi + \dots)\}$. From the various series of sunspot measurements the value of b in the Faye formula averages 0.18, for the small range of latitude of 35° from the equator. For spectroscopic measurements, b averages 0.24 corresponding to the higher ranges of latitude up to 75° . These two values of b correspond in the new formula to values of φ about 32° and 55° . So that in general all the previous measurements confirm the new formula. After due allowance for errors undoubtedly present in various early measures of the solar rotation, the new formula would seem to harmonize them all, and it promises to aid in interpreting the sun and its variations.

A computation was made showing how the Ives-Stilwell measurements of the displacement of $H\beta$ in hydrogen canal ray spectra would serve as a test of a corpuscular theory of light, mentioned at recent meetings, which suggests a receding velocity of the atom at the time light is generated, accounting for the difference in the wave-lengths of hydrogen and ionized helium and offering an explanation of the increase in nebular wave-lengths with distance as resulting from the age of the light.

Fifteen-inch Equatorial.—Observational work with the 15-inch equatorial was carried on entirely with the photo-electric photometer. Among the stars observed were α Virginis, ζ Geminorum, δ Cephei and η Aquiliae. Moll tracings of all the remaining spectrograms of Nova Lacertae were made. Previously tracings had been made from only one spectrogram of each day, and in a number of cases several were taken. Checking constellations and star positions on new star charts under preparation for printing was commenced. As in former years the telescope was in use for public demonstration every clear Saturday.

Photographic Photometry.—With the photographic equatorial, observations were continued on the variables RR Leonis, RS Boötis, R Coronae Borealis, RZ Cephei, about one hundred plates being obtained. A series of plates of the north polar regions was made for measurement of the magnitudes of the stars in the polar sequence as given by Harvard College Observatory. Measures were made of the polar region plates and also of those of RZ Cephei, RR Leonis and RS Boötis. Most plates were measured several times in searching for the cause of a marked discrepancy between Ottawa and Harvard magnitudes.

Seismology.—The seismological equipment at the central station, Ottawa, and at the outside stations, Saskatoon, Shawinigan Falls, and Seven Falls, was continued in complete operation. In December, 1938, the Bosch photographic seismographs, formerly operated at Ottawa, were reconditioned and installed at the Halifax station in Dalhousie University, the University providing a new room of suitable construction. The stations at Toronto and Victoria were resumed in operation early in December. A vault has been constructed at the Dominion Astrophysical Observatory for housing the Victoria seismograph equipment which is to be transferred shortly from the nearby Gonzales Heights Meteorological Observatory. The Milne-Shaw seismographs of the Toronto station were completely overhauled and tested in Ottawa. The appointment of Mr. M. J. S. Innes brought the seismological staff up to normal strength, and the interpretation of records of outside stations was brought up to date. Five hundred and twenty-five earthquakes were recorded at Ottawa, ten of which were of sufficient importance and interest for reports to the Press and by telegraph to Science Service, Washington. During November, three records for Ottawa registrations were created, (1) the greatest number of quakes (72) for a month, (2) the largest quake record obtained—Alaskan quake of November 10, and (3) the largest number of quakes (14) for one day—the day of the Alaskan quake. Details of all registrations have been reported through the medium of regular monthly bulletins distributed to the principal seismological stations of the world. Plans have been made for a complete remodelling of the Seven Falls Station, and the work involved will be undertaken at an early date by the Shawinigan Water and Power Company. The Northeastern Seismological Association was recently formed to study the many small earthquakes in Eastern Canada and New England. The Observatory participates in the association's program by supplying data from the short period seismographs at Ottawa, Shawinigan Falls, and Seven Falls. Record bulletins are prepared several times a month by the key station at Weston, Mass., and mimeographed at this Observatory for distribution. The system of collaboration by seismologists in most of the chief countries of the world for preparation of the quarterly Bibliography of Seismology was continued. Rock bursts in Lake Shore Mine, Kirkland Lake, were registered at Ottawa. The mine officials have suggested a study of these and have agreed to purchase a seismograph for operation at the mine, the installation and operation to be supervised by the Ottawa station. The seismologist visited earthquake-recording stations at Williamstown, Mass., and Burlington, Vt., and at the request of the West Petroleum Company a seismic prospecting party near Lethbridge, Alberta, for the purpose of observing operation methods. A report on the work was presented to the Company and mimeographed for distribution. The report is to appear in the Journal of the Royal Astronomical Society of Canada. The

seismological division co-operated with Dr. Louis B. Slichter of the Massachusetts Institute of Technology in his study of earth tremors generated by large blasts. A station at Mount Wilcox near South Lee, Mass., was occupied for a large blast at Hudson, N.Y., in August. The seismologist had charge of the seismograph equipment at Mount Wilcox at that time. Much valuable experience in field technique was acquired.

Terrestrial Magnetism.—The field work of the magnetic survey was confined mainly to the occupation of repeat stations to secure secular change data. Of the number of stations selected, seventeen were occupied exactly. Two new stations were established in localities where former stations were found to be no longer available, and in one locality a transfer was made from an old to a new station. The part of the country over which the majority of the stations are distributed comprises a comparatively narrow belt lying between longitudes 85° W. and 120° W., and the Canada-United States boundary. Two stations, namely Peace River and Prairie Point, are in northern Alberta. The magnetic station located in the Observatory grounds, where absolute observations have been made annually since 1908, was abandoned during the year, because of disturbances from the proximity of buildings, two wireless masts, and the electric railway system. The building in which the observations were made was moved to the Long Island magnetic station where two non-magnetic huts were constructed in 1935 and where, in future, the annual observations will be made. The usual spring and autumn comparisons between field instruments and the instruments adopted as secondary standards were made at the Long Island station. A report covering the work between 1927 and 1937 was completed and is ready for publication.

The two permanent magnetic observatories at Agincourt, Ontario, and Meanook, Alberta, operated without interruption throughout the year. Continuous photographic records of the magnetic elements, horizontal force, vertical force, and declination were obtained. Control was secured through absolute observations made with precise instruments several times each week. Quarterly reports on the magnetic character of the day and numerical intensity were forwarded regularly to the International Commission of Terrestrial Magnetism and Electricity at DeBilt. In co-operation with the Meteorological Service, Department of Transport, the results of observations for the years 1932-3, and the Polar Year results obtained at Chesterfield and Meanook covering the period between August, 1932, and September, 1933, were published and distributed. The results of observations at Agincourt and Meanook for 1930 are in press, and those for 1931 were near completion for early publication. Preliminary computations and reductions of all precise instrument observations were completed practically to date. Copies of photographic records for specific days have been furnished to several research institutions and investigators in different countries.

Gravity.—Twenty gravity stations were established in the form of three traverses, each commencing in the Precambrian and crossing the Appalachian region in Eastern Canada. A similar investigation in the belt of Appalachian folding in the United States has recently been made by that country, and it is believed that the work in Canada will form a valuable contribution to the general study of the relation of the results to this mountain system. Progress was made with reports on this work and that of 1937. The report on Investigations of Methods of Geophysical Prospecting by the Observatory was completed for publication.

Publications.—Four numbers of the regular series of Publications of the Dominion Observatory were issued as follows: Vol. XII, Bibliography of Seismology, Nos. 17, 18, and 19; Vol. XI, No. 4, Gravity Determinations in 1936. Of the usual reports and pamphlets, the following were issued: Saturday Evening Program (quarterly); Seismological Bulletin (monthly); Wireless Time Signals (monthly).

DOMINION ASTROPHYSICAL OBSERVATORY, VICTORIA, B.C.

The observing weather for the year was about 13 per cent better than the average. Apart from the usual two hours reserved each Saturday night for the use of visitors, there were 1,425 observing hours on 221 nights, during which 1,403 spectra were secured. The averages over the 20 years of operation are 203 nights, 1,258 hours, and 1,342 spectra. Details of the year's research are listed at the end as "Publications." In addition to these regular purely technical issues, fifteen papers on the progress of different research problems were prepared for scientific meetings; several articles of a more popular character were written for astronomical journals, and approximately twenty addresses on general astronomical topics were given before service clubs and similar organizations.

The number of visitors continues large, having been approximately 24,000 during the fiscal year. The majority are merely sight-seeing tourists, whose number in the summer months frequently averages several hundred a day. A substantial number, however, are either amateur astronomers or persons genuinely interested in astronomy. This is more particularly the case on Saturday evenings, when, weather permitting, members of the staff are in attendance to show objects of interest through the telescope and explain them to the visitors.

To prevent fogging of the telescope mirrors during the winter months, a device has been constructed consisting of a Callendar recorder with two platinum thermometers, one in each arm of a Wheatstone Bridge. When a rise in the outside temperature occurs, heat is automatically supplied to both mirrors to bring them nearer the outside temperature and as soon as the necessary rise has been achieved, the heat is automatically shut off. Improvements to the photometer for use with the 72-inch telescope have been made during the year and a new type of projection machine for measuring spectrograms has been designed and built.

The work on absolute magnitudes and spectroscopic parallaxes of Class A stars was continued. The spectra of 654 stars of known parallax, which were available at Victoria, were made the basis of a correlation between line character and absolute magnitude. These empirical curves were then used to redetermine the absolute magnitudes and hence the parallaxes of the basic 654 stars and an additional list of 576 stars for which no parallaxes were known. These results were then used in studies of solar motion. From 1,366 stars of Class A with known parallaxes and radial velocities three groups were formed on the basis of perpendicular distance from the galactic plane. The solution of these showed a small decrease in solar velocity, 19.4 to 17.1 km./sec., with increasing distance from the galactic plane.

Considerable time as heretofore has been spent in the determination of the orbits of spectrographic binaries. From 142 spectrograms of Boss 3511 taken over an interval of twenty years there appears to be no change in the orbital elements, and mean values were derived. From observations in 1935 it was shown that the line of apsides in the double-lined binary 57 Cygni was in rotation. From forty excellent spectra secured this year it is very definite that the period of rotation of the apse line is of the order of 25 years. From fine-grained plates of the star k Cancri all lines are shown to be single, none being double as reported when the orbit was determined thirty years ago at the Yerkes Observatory. Further, no change in the orbital elements has taken place in the interval. During eclipse of Algol the spectrum of the Class A companion star has for the first time been photographed. Observations are being continued. From 134 spectrograms made at Michigan, Yerkes, and Victoria the orbit of β Arietis has been very precisely determined and no change in the elements has occurred since it was first determined thirty years ago. The orbit of H.D. 195986 has been completed. Its spectrum shows interstellar calcium whose measures are in accord with the idea of the rotation of the galaxy.

Observations of the P Cygni stars have been continued, mainly in the yellow and red regions, making use of three prisms as well as the first- and

second-order gratings. Through the use of panchromatic films of exceptional speed it has been possible to obtain spectrograms of 9th magnitude stars, whereas formerly the 7th was the limit. A number of stars with spectral characteristics similar to α Cygni have been shown to have P Cygni characteristics and these similarities are being studied further. With the aluminum-on-glass grating, spectra of late-type stars have been secured for the study of the molecular absorption bands. The examination of the isotope effect in high dispersion spectra of the red bands of Li_2 has been essentially completed. It gives results in agreement with those found by other methods.

Spectrophotometric studies of double-lined spectrographic binaries have been continued with a view of obtaining the differences in magnitude between the components from the line profiles. The profiles of several lines in 20 binaries have thus been determined and the results will be published shortly. Spectrophotometric studies of solar-type stars have continued, high dispersion spectra being used. The measurement of 200 lines in the spectral region λ 4,000-4,600 has been completed and "curves of growth" constructed, but a detailed analysis of the material awaits the completion of measurements in the other regions.

During the year five numbers of Volume VII of the Publications were printed and distributed, namely: No. 3—The Definitive Orbit of the Spectrographic Binary β Arietis, by R. M. Petrie; No. 4—The Spectrographic Orbit of H.D. 195986, by Andrew McKellar; No. 5—One Hundred and Thirty-two New Variable Stars in Five Globular Clusters, by Helen B. Sawyer; No. 6—The Calculation of Rotation Factors for Eclipsing Binaries, by R. M. Petrie, and No. 7—The Spectrographic Orbit of Boss 3511, by W. E. Harper.

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 encourages 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 Federal Building, 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 above normal. Excess water was discharged during April, May, June, and July and the amount of storage in the reservoir was considerably increased. Lake level was at elevation 1059.20 on April 1, 1938, and rose to a peak elevation of 1062.02 on May 21. Surplus was wasted to July 21, when the lake level had been lowered to elevation 1060.86, and the demand for water for power purposes resulted in a further lowering to elevation 1057.92 on March 31, 1939.

Lac Seul Regulation.—The direct regulation of Lac Seul is temporarily under the control of the Province of Ontario. During the fiscal year the runoff from the watershed was below normal. Lake level rose from elevation 1166.95 on April 1, 1938, to elevation 1171.87 on August 31, and was drawn down to approximately elevation 1166.20 on March 31, 1939.

Snow Survey.—The eleventh annual snow survey of the Lake of the Woods and Lac Seul watersheds was carried out during the first week in March, in co-operation with the United States Engineer Office at Duluth, Minnesota. The results show that the water equivalent of the snow was 50 per cent greater than the 11-year average.

WATER POWER ADMINISTRATION

Several applications were received for water-power sites in the Yellowknife district, Northwest Territories, including sites on Yellowknife, Petitot, Cameron, and Beaulieu Rivers. A priority permit, granting priority for one year, was issued covering the two lower sites on Yellowknife River.

Water Power Exhibit New York World's Fair.—A considerable amount of work was done in preparation for the water power exhibit in the Canadian Building, New York World's Fair and a large water-power map of the Dominion, on a suitable projection, was completed for the use of the artists who will paint an enlarged reproduction of this map to form the background of the exhibit.

TECHNICAL ASSISTANCE TO INDIAN AFFAIRS BRANCH

Applications were made for conditional water licences for irrigation purpose on Hawks Creek to serve Soda Creek Reserve No. 2 and on Gold Creek to serve Spuzzum Reserve No. 2, British Columbia. A report was prepared on a gravel lease on part of Seymour Creek in Seymour Creek Reserve No. 2. A review was made of licences serving Kamloops Reserve No. 1 from Paul Creek for the purpose of considering a plan for consolidation of existing water rights. Plans were prepared of Kamloops Reserve No. 1 and Niskonlith Reserve No. 1 in connection with the fixation of water rentals paid to the Provincial Water Rights Branch for leased lands on these reserves. A conference was held in January with the Indian Commissioner for British Columbia and the Provincial Comptroller of Water Rights to consider what action should be taken on forty-two licences appurtenant to Indian reserves which had become liable to cancellation through failure to put water to beneficial use by December 31, 1938. After hearing evidence in each case, the Comptroller granted extensions of time for seventeen of these licences, ordered final licence surveys for twenty-two, a new licence for one, and two to be cancelled for inability to use the water.

NATIONAL WATER RESOURCES INDEX-INVENTORY

Work was continued on the collecting and recording of data relating to the water resources of the Dominion.

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 co-ordinated in accordance with the principles of the Index-Inventory system. 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, hydro-power 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.

WATER POWER RESOURCES OF CANADA

All existing stream flow and power data available from federal, provincial, and private sources have been systematically collated, analysed, and co-ordinated by this Bureau with a view to presenting a dependable estimate of Canada's available water power based upon uniform methods of computation and arrangement. The results of these studies indicate available hydraulic power totalling 20,347,400 horse-power under conditions of ordinary minimum flow and 33,617,000 horse-power ordinarily available for six months of the year. These resources will provide for a total hydro-electric installation of 43,700,000 horse-power.

Canada's hydraulic installation at January 1, 1939, was 8,190,772 horse-power and represented a utilization of only about 18½ per cent of her total resources as outlined above. Of this installation 2,463,610 horse-power or more than 43 per cent of the installation at January 1, 1930, has been installed since that date. In other words more than 30 per cent of Canada's present hydro-electric development was installed during a period which included the world depression. A further striking feature is that the output per horse-power of installation is now greater than it has been at any time in the past. The capital investment represented by Canada's present hydraulic installation is conservatively estimated at \$1,650,000,000.

CENSUS OF THE CENTRAL ELECTRIC STATION INDUSTRY

Practically all new hydraulic installation of recent years has been carried on by central electric station organizations. In the ten-year period between the end of 1928 and the end of 1938 the central station hydraulic installation increased by 2,756,566 horse-power as compared with an increase of only 84,974 horse-power for all other purposes, i.e. less than 3 per cent of the total hydraulic installation of the past ten years has been developed by other than central station organizations. Even in the case of plants developed mainly for the operation of some special industry it has become general practice to organize the power producing unit of the plant as a central station in order to secure the most economical development of the site by its maximum installation, any electricity additional to the requirements of the industry being disposed of by sale. This has resulted in almost 88 per cent of Canada's total hydraulic installation being installed in central electric stations. This installation generates more than 98 per cent of all electricity produced for sale in Canada and for export.

DOMINION HYDROMETRIC SERVICE

The work of securing and compiling stream measurement records throughout Canada was continued. Records obtained in the field are brought together in one central agency, which undertakes the compilation and dissemination of stream flow data. For a number of years this work has been carried on by the Dominion Government under co-operative arrangements with the various provinces. The most important use of the records is in connection with water-power development, irrigation, and water supply problems in general.

RUN-OFF CONDITIONS IN CANADA

The average run-off for the fiscal year was generally below normal. Few extremes of flow were recorded. In the Pacific drainage, typical stations showed a range in run-off for the fiscal year from 81 per cent of the long term mean in North Thompson River near Barriere to 103 per cent of the long term mean in Bridge River in the Central Fraser basin. In the Arctic and Western Hudson Bay drainage typical stations showed a range in run-off for the fiscal year

from 17 per cent of the long term mean in Makwa River in central northern Saskatchewan to 99 per cent of the long term mean in Belly River in south-western Alberta. A new maximum rate of run-off was recorded in the Lake of the Woods drainage for a short period in the month of May, and a new minimum flow was recorded in Makwa River in Saskatchewan. In the St. Lawrence and Southern Hudson Bay drainage, typical stations showed a range in run-off for the fiscal year from 49 per cent of the long term mean in Moira River in eastern Ontario, to 128 per cent of the long term mean in Missinaibi River in northern Ontario. In the Atlantic drainage, typical stations showed a range in run-off for the fiscal year from 96 per cent of the long term mean in Lepreau River in southern New Brunswick to 103 per cent of the long term mean in St. John River in central New Brunswick.

POWER AND SPECIAL INVESTIGATIONS

In the Northwest Territories, special arrangements were made to secure flow records of the Yellowknife River at its mouth in connection with the possibility of utilizing the water powers of that river for the power needs of the newly established gold mining industry in the Yellowknife area.

In British Columbia intensive hydraulic investigations were continued on the West Arm of Kootenay Lake and on Kootenay River to its junction with the Columbia in connection with international problems and with the regulation of Kootenay Lake levels in the interest of both water-power development and land reclamation. Close observation was continued of hydraulic and hydro-metric conditions on Columbia and Skagit Rivers and on Phillips Creek where international problems may become active. The Department of Public Works was again given assistance in a major hydraulic problem involving the development and maintenance of permanent ship channels in Fraser River, from the City of New Westminster to the sea. Engineering studies of importance were made for other Dominion Government Departments including irrigation problems of the Department of Agriculture at Kamloops, and water supply at the Dominion Experimental Station at Windermere Creek. Administrative problems of the Lands, Parks and Forests Branch of the Department were studied on various reserves and properties including the construction of monuments on historic sites.

In Alberta the operation of the Lake Minnewanka storage reservoir during the filling season from May to November was undertaken by the Bureau. The third annual Bow River snow survey in the vicinity of Lake Louise was carried out at the end of March. Investigations were also made in connection with future water storage and power possibilities on the upper reaches of Bow River and its tributaries in co-operation with the Calgary Power Company.

In Saskatchewan and Manitoba, further examination was made of the general situation in the Souris River watershed, relating to dams and water projects that are being developed and as to the effect of the projects that have been completed.

In Ontario, examinations were made of high water conditions on properties bordering Winnipeg River below the Lake of the Woods during the flood period and also after the river had returned to normal. In this connection conferences were held with representatives of the Province of Ontario at which preliminary action was taken towards the securing of flowage easements and the settlement of damage claims. At the same conferences discussions took place with a view to initiating action for the settlement of claims for damage to Indian lands and other private properties bordering on Lac Seul reservoir. Studies were continued on Niagara River with respect to river slopes and discharge and a close inspection was maintained of the work carried to completion in April by the Canadian Niagara Power Company in the construction of a submerged weir at its intake in Niagara River above the falls. Special attention was

given again to Thames River during the freshet season, and at the request of the Grand River Conservation Commission special efforts were made to secure flood flow measurements of Grand River at Galt during March. Heavy flooding on South Nation River in the spring of 1938 brought a request from the Department of Public Works for the establishment of a series of gauges above and below the village of Plantagenet. These gauges were installed and ready to record the spring freshet of 1939. Snow surveys were again undertaken for the Hydro-Electric Power Commission of Ontario in the watersheds of Wanapitei, Sturgeon, South, and Frederickhouse Rivers.

In Quebec, additional gauges were established on Richelieu River and the securing of hydraulic data was continued in connection with the works being undertaken by the Dominion Department of Public Works under the approval of the International Joint Commission. Other special studies included investigations of backwater effect; metering and rating outflow of storage reservoirs; hydraulics of Magog River in connection with international matters, and checking of power station ratings in co-operation with various power organizations.

In New Brunswick an investigation of the international reach of St. Croix River was made in September and a report was prepared for the International St. Croix Board of Control covering conditions during the 1938 season. An investigation was made, also, of the power plant and pulp mill on Magaguadavic River near St. George.

In Nova Scotia, co-operation was afforded the Nova Scotia Power Commission in an investigation of the power possibilities of Barrie's Brook near Mulgrave as a result of which the Commission has decided to proceed with development for the supply of power to communities in Antigonish and Guysborough Counties. Assistance was also given in the second and final stage of hydro-electric development of St. Croix River and in a development under way on Paradise Brook.

INTERNATIONAL WATERWAY MATTERS

Activity with respect to International Waterway matters was as follows:—

The Lake of the Woods Convention between Canada and the United States, signed on February 24, 1925, provided for the securing of a flowage easement up to elevation 1064 sea-level datum upon all lands bordering on Lake of the Woods in the United States, the cost of which is to be shared by the United States and Canada in accordance with the terms of the Convention. During the year, marked progress has been made in reaching a final settlement of Canada's share of the cost.

Hydrometric records were systematically secured on Roseau River and its tributaries in connection with an international problem on this river referred by the Governments of Canada and the United States to the International Joint Commission for investigation and report.

Attention was given to several problems of an international character which arose in the Columbia-Kootenay River basin during the year. These included the re-opening of the application to the International Joint Commission of the West Kootenay Power and Light Company, Limited, for storage rights on Kootenay Lake. The Bureau submitted testimony at hearings held in October. An Order of Approval was issued November 11 and an International Board of Control was appointed by the Commission in January with the Controller as representative for Canada.

The various other International Waterway Boards have functioned as usual throughout the year.

The International St. Croix River Board of Control, set up by the Governments of Canada and the United States in 1917 to supervise the operation of the dams at Grand Falls and Milltown and of the fishways on the St. Croix River, continued its functions. During the year the levels above the Grand

Falls dam and the Milltown dam were maintained to meet the requirements imposed by the Orders of the International Joint Commission, and the flow of water on the lower river was maintained in a manner satisfactory to the power and other interests thereon. The Board's annual report was submitted to the International Joint Commission.

The International Lake Champlain Board of Control, set up by the Governments of Canada and the United States in 1937 to supervise the construction and operation of the proposed dam on Richelieu River, visited the site of the dam four times, inspecting successive reaches of the foundation as they became unwatered.

The International Massena Board of Control, set up by the Governments of Canada and the United States in 1923 to supervise conditions obtaining with respect to the effect of the submerged weir in the South Sault Channel of St. Lawrence River and the diversion of water through the Massena Canal, New York State, continued its functions. Throughout the year the diversion and the weir were maintained in a manner to meet the requirements of the Order of the International Joint Commission. The operations resulted in improved navigation conditions in the reach of St. Lawrence River above, and through, the Cornwall Canal. Hydraulic studies were continued. The Board's annual report was submitted to the International Joint Commission.

The International Niagara Board of Control, set up by the Governments of Canada and the United States in 1923 to control the diversions from Niagara River for power purposes as permitted by Article 5 of the Boundary Waters Treaty, continued to exercise its responsibilities through the year. The Board has continued its record of the daily discharge through the power units installed in the plant of the Niagara Falls Power Company on the United States side and in the plant of the Canadian Niagara Falls Power Company and in the plants operated by the Ontario Hydro-Electric Power Commission on the Canadian side. The total aggregate daily discharge has been maintained within the Treaty limitations.

The International Lake Superior Board of Control, set up by the Governments of Canada and the United States in 1915 to supervise the diversion of water from St. Mary River for power purposes and the construction and operation of control works at the outlet of Lake Superior in the interests of navigation and power, continued to exercise its functions. During the year the gates in the compensating works were operated in accordance with the orders of the International Joint Commission and with due consideration to the requirements of both upstream and downstream interests. The Board met the special requirements of navigation, power, and of the local fishing interests on both sides of the border during the low water months. Study was given to a new rule curve for the regulation of the lake. The Board presented its annual report to the International Joint Commission.

The Lake of the Woods Convention of 1925 provided for two Boards for the control of the level and outflow of the lake—The Canadian Board and the International Board. The Canadian Lake of the Woods Control Board has continued the regulation of the lake between elevations 1056 and 1061 sea-level datum. The International Lake of the Woods Control Board is called upon to exercise certain responsibilities whenever the lake rises above elevation 1061 or falls below elevation 1056. Lake level rose above elevation 1061 on May 7 and the International Board exercised supervision until it fell below that elevation on July 18. The International Joint Commission inspected conditions at the lake outlets on July 4 and 5.

The International St. Mary and Milk River Board of Control, established by the Governments of Canada and the United States under the provisions of the Boundary Waters Treaty of 1909, continued to exercise its responsibilities for the measurement and apportionment of the stream flow of St. Mary and

Milk Rivers and their tributaries in the Provinces of Alberta and Saskatchewan and in the State of Montana, as provided for by the Treaty and by the Order of the International Joint Commission of October 4, 1921.

The seventeenth 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 survey determined that the water content of the snow cover was 127 per cent of the mean of the previous 16 years. The resultant run-off of 73,500 acre-feet from the snow-fields during May, June, and July was 95 per cent of that predicted. The natural flow of 571,900 acre-feet of St. Mary River at the International Boundary during the irrigation season of 1938 was 96 per cent of the average for the 35 years of record. The river rose steadily from April 1 to its maximum of 5,410 second-feet on May 28, then receded very gradually through June and July, to reach the minimum of 279 on October 9. The maximum storage reached in Sherburne reservoir was 60,165 acre-feet on June 27, which was reduced to 1,300 acre-feet by the end of the season. The Canadian share of the natural flow of St. Mary River during the season was sufficient to meet the requirements of the 112,629 acres irrigated in the Lethbridge section.

The estimated natural flow of 77,000 acre-feet of Milk River at the International Boundary during the irrigation season was about 75 per cent of the average for the years of record, and the total seasonal run-off from its tributaries in Saskatchewan was 60 per cent of the average.

Canada stored 8,390 acre-feet of the natural flow of Frenchman River to irrigate lands near East End and Val Marie and delivered 23,830 acre-feet to the United States. The natural flow of Frenchman River at the International Boundary was about one-third of the mean for the last 23 years.

To determine the daily natural flow of the streams, twenty-two international and thirty semi-international gauging stations were maintained and operated in the St. Mary and Milk River basins. Ten of the semi-international gauges were established in 1938 to determine the natural flow of Frenchman River, necessitated by the completion of four reservoirs and irrigation districts in that basin.

The joint report covering the year's operations has been prepared, and was submitted to the International Joint Commission for review upon the occasion of its regular semi-annual meeting in April.

PUBLICATIONS

The printing was completed of Water Resources Paper No. 78, dealing with surface water supply of the Pacific Drainage in British Columbia and Yukon Territory from October 1, 1932, to September 30, 1934, but the report had not been delivered at the end of the fiscal year. The regular annual bulletins on Hydro-Electric Progress in Canada during 1938 and the Water Power Resources of Canada, 1939, were issued as usual.

ENGINEERING AND CONSTRUCTION SERVICE

The Engineering and Construction Service acts as a general engineering unit to the various branches of the Department. The work includes the preparation of plans, estimates, specifications, and designs as well as actual engineering and architectural work.

The portion of the regular National Parks appropriation allotted to this Service was expended mainly on the operation and maintenance of existing services in the parks including electric lighting, telephone, water supply, and sewerage systems, the collection and disposal of garbage in the various town-sites, and the maintenance of streets and all main highways and secondary roads in the parks.

The architectural work performed included the preparation of plans, specifications, and estimates for buildings and landscape work to be undertaken by the Department as well as the examination and approval or revision of plans of buildings proposed to be erected by private individuals in the parks.

ROADS

Funds were also provided under Special Supplementary Estimates to contribute a percentage of the cost up to a stated maximum for approach roads to National Parks and tourist highway projects under agreement with certain provinces.

Funds allotted to this Service were expended as follows:

GOLDEN-REVELSTOKE HIGHWAY

Goldstream to Columbia River Bridge.—Work on this portion of the Golden-Revelstoke Highway, which forms part of the Trans-Canada Highway, was carried on from two bases, Donald for the northern section and Revelstoke for the southern section. New construction on the southern section included 77.5 acres of clearing, 47.29 acres of grubbing, 10.89 miles of grading, 10.83 miles of surfacing, 10.74 miles of tote road, 6.28 miles of ditching, 54 wooden box culverts, 73 plank drain culverts, 4 wooden pipe culverts, one 65-foot deck truss bridge with trestle approaches at Nichol Creek. The maximum crew during any one month was 302 in July.

On the northern section new construction included 8.8 miles of clearing, 9 miles of grubbing, 6.8 miles of grading, 5.2 miles of tote road, 4.6 miles of surfacing, 54 culverts, 2 cribs, and the burning of brush on 4.5 miles of right of way. The maximum crew consisted of 224 individuals in August.

Grading on both sections of the road involved the handling of 372,000 cubic yards of material, of which 50,000 cubic yards was solid rock.

BANFF-JASPER HIGHWAY

Banff Park Section.—Maintenance was carried on over the completed section of road from Miles 1 to 45 including the removal of mud slides between Miles 10 and 22 and oiling from Miles 1 to 40 with the exception of one half mile at Mile 17. New construction comprised 10.77 miles of clearing, 8.14 miles of grubbing, 9.5 miles of grading, 13.89 miles of surfacing, 1 truss bridge, 3 common bridges, 46 culverts, 12.28 miles of telephone line and 10.2 miles of tote road. This involved the handling of 96,000 cubic yards of material, of which 850 cubic yards was solid rock. The maximum crew consisted of 280 individuals in September.

Jasper Park Section.—Maintenance was carried on over the completed portion of the road from Miles 1 to 61 and it was oiled from Miles 9 to 29. Portions of the road in Miles 11, 22, and 23 were scarified to permit better shaping and 1,950 feet of guard rail was erected between Miles 31 and 35. New construction comprised 9.53 miles of clearing, 9.53 miles of grubbing, 6.54 miles of grading and rock excavation, 5 miles of surfacing, 6 log cribs, 56 log culverts, 1 timber truss bridge, 1 concrete slab bridge, 7.58 miles of tote road, and 10.4 miles of telephone line. This involved the handling of 91,000 cubic yards of material including 3,700 cubic yards of solid rock. The road is now practically completed to the upper crossing of the North Saskatchewan River from Jasper and the telephone line is now connected with the Banff section. Employment reached a maximum of 272 in August.

CABOT TRAIL

The Cabot Trail is located for the greater part in Cape Breton Highlands National Park, its total length being 55 miles, of which 45 miles are within

the park. About nine miles of new construction was completed and this included 39.76 acres of clearing, 8.41 acres of grubbing, 9.2 miles of subgrade, 42 culverts, 4 rip-rap walls, and 5 bridges. This work was carried out under contract on the Cap Rouge, MacKenzie Mountain, and South Harbour sections and involved the handling of 146,000 cubic yards of material, of which about 95,000 cubic yards was solid rock. Maintenance was carried on over the previously completed section and over the remainder of the Trail within the park.

TOURIST ROUTE IMPROVEMENT TO NATIONAL PARKS

Kingsgate-Kootenay Park Highway.—In 1936 an agreement was completed between the Province of British Columbia and the Dominion providing for the improvement and permanent surfacing of the main tourist route from Kingsgate on the International Boundary to the southerly entrance of Kootenay National Park. Under this agreement the Dominion contributes 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 three-year period. Periodic inspections were made by engineers of this Service to see that the work done was in accordance with the plans and specifications so that certificates covering the payment of the Dominion contribution could be issued. During the 1938 season about 35 miles of highway was reconstructed to standard section involving the moving of over 345,000 cubic yards of material. In addition to this 19.1 miles of asphaltic pavement was laid. The Dominion contribution to this work totalled \$174,845.15.

Waterton Park-Calgary-Banff Park Highway.—In 1938 an agreement was completed between the Province of Alberta and the Dominion providing for the surfacing of the road from Waterton Lakes Park through Macleod and Calgary to the east boundary of Banff Park, the Dominion agreeing to pay to the Province 50 per cent of the expenditure by the Province up to \$75,000, for bituminous surfacing during the fiscal year ending March 31, 1939. This work was undertaken by the Province and periodic inspections were made by engineers of this Service to see that the work was carried out according to plans and specifications so that certificates covering the payment of the Dominion's contribution might be issued. During the season a blotter and seal coat type of bituminous treatment was applied to a total of 132.9 miles of road involving the use of over 72,000 cubic yards of crushed stone or gravel and 809,000 gallons of asphaltic oil. The Dominion's contribution for this work was \$75,000.

TOURIST HIGHWAYS

During 1938, agreements were entered into with the Provinces of British Columbia, Ontario, New Brunswick, Nova Scotia, and Prince Edward Island providing for the construction of certain approved highway projects by each province to develop tourist traffic as well as to alleviate unemployment conditions. Under these agreements the Dominion contributed a percentage of the total provincial expenditure as approved by the Dominion, 60 per cent in the case of British Columbia and 50 per cent for each of the other provinces up to a stated maximum. The agreement stipulated that a stated percentage of those employed were to be taken from relief rolls or to be those who, but for such work, would have been in necessitous circumstances.

The following is a summary of the work accomplished:—

British Columbia.—A portion of the Peace Arch Highway northerly from Blaine, U.S.A., to a point south of New Westminster, B.C., was constructed. This road was graded to a minimum width of 34 feet for a distance of 8.16 miles between Nicomekl Creek and its junction with the Trans-Canada High-

way. The Dominion's contribution to the Province was \$147,436.17 and of a total of 17,634 man-days of work provided, 13,183 were for those in necessitous circumstances.

Ontario.—The work consisted of four highway projects as follows: (1) Road from Pine Island to Echo Bay near Sault Ste. Marie—8 miles. The excavation of six miles of this road in preparation for paving with concrete was completed and the pavement, 20 feet wide, was completed for a distance of 3.78 miles. (2) Road from Kenora to Kenora Airport—2.37 miles. This road was graded to a width of 24 feet and surfaced with 7,500 cubic yards of crushed gravel. The road was completed by January 19, 1939. (3) Nipigon-Beardmore Highway—47.5 miles. Contracts were awarded on this road for the full distance and grading to a width of 30 feet was completed for a distance of 13.95 miles. (4) Armstrong to Wagaming Flying Field—7.2 miles. This road was graded to a width of 18 feet and surfaced with 4,000 cubic yards of gravel. The road was completed on November 26, 1938.

The total Dominion contribution to the Province for the above projects was \$484,988.17. A total of 115,771 man-days of work was provided, of which 80,011 man-days were performed by those in necessitous circumstances.

New Brunswick.—Three approved projects were undertaken as follows: (1) St. Croix to Thomaston Corners. On this road, which is part of the highway from Vanceboro to Fredericton, 17.5 miles were graded to a width of 30 feet and surfaced with 17,300 cubic yards of gravel. (2) Highway No. 17 from Oliver Siding to Kedgwick. This project was completed by day labour, 17.5 miles being improved and gravelled. (3) Road from No. 2 Highway to Fort Beausejour—1.19 miles. This road was surfaced with 2,200 cubic yards of gravel, the work being completed on October 20, 1938.

The total Dominion maximum contribution of \$100,000 was paid to the Province. A total of 25,751 man-days work was provided of which 23,054 man-days were performed by those in necessitous circumstances.

Nova Scotia.—Work was undertaken on four projects and progress to the end of January was as follows: (1) Trunk Route No. 5, Port Hawkesbury town line to Craigmere School—11.8 miles. Grading was completed to a width of 28 feet for a distance of 8.2 miles and 6.5 miles were gravelled to a width of 20 feet. (2) West side of Margaree River from Margaree Harbour bridge to its junction with Route No. 5—7.9 miles. This road was graded to a width of 28 feet for a distance of 4 miles and gravelled to a width of 20 feet for 1.3 miles. (3) Cabot Trail, Baddeck East village to Ross' Ferry—10.6 miles. This road was graded to a width of 28 feet and gravelled to a width of 20 feet for a distance of 7.25 miles. (4) Cabot Trail-White Point Road to McDonalds Store, Cape North—3.4 miles. This section was graded to a width of 26 feet for 2.2 miles and gravelled to a width of 20 feet for 1.5 miles.

The maximum Dominion contribution to the Province of \$135,000 was approved and paid. Of a total of 41,717 man-days work provided up to the time when the Dominion's contribution was earned 35,869 man-days were given to those in necessitous circumstances.

Prince Edward Island.—Five projects were approved and work was carried on by day labour as follows: (1) North River Bridge Road—2 miles. The road was graded to a width of 30 feet for the full distance and surfaced with 1,500 cubic yards of gravel. (2) Bedford Road—4½ miles. The right-of-way was stumped and the road was graded and surfaced for about 2.5 miles with 4,794 cubic yards of gravel. (3) Margate Road—7 miles. Grading and surfacing were completed for approximately 5.5 miles, 5,965 cubic yards of gravel being spread. (4) Brackley Point Road—6 miles. Fences were moved back

for the full length of the road and one mile was graded and surfaced with 824 cubic yards of gravel. (5) Commercial Road—5 miles. Grading was completed for 4.75 miles and 4,008 cubic yards of gravel were spread on 4.5 miles.

The total Dominion contribution to the Province was \$39,646.72 and of a total of 27,489 man-days worked 15,733 were given to those in necessitous circumstances.

NATIONAL PARKS

Public services were operated and maintained and other work carried out in the National Parks as follows:

Banff National Park.—Electric lighting, power distribution, telephone, water, and sewerage systems were operated and maintained. Streets, sidewalks, and park roads, including Banff Park section of Banff-Jasper Highway were maintained. On the Trans-Canada Highway, 15.93 miles were paved and the subgrade on the Banff-Castle section is being prepared for paving. Garbage from townsite and camp-grounds was collected and disposed of and a new incinerator constructed. Mosquito control was undertaken by draining and oiling breeding grounds.

Jasper National Park.—Electric lighting, telephone, water, and sewerage systems were operated and maintained. Streets, sidewalks, and roads were maintained, garbage from the townsite and camp-grounds was collected and disposed of, and mosquito control was carried on. The new camp-ground at Miette Hot Springs was completed and a sewer system installed. Improvements were made to the Miette Hot Springs bath-house.

Kootenay National Park.—Electric lighting, water, and sewerage systems were operated and maintained and the Banff-Windermere Highway was maintained.

Waterton Lakes National Park.—Electric lighting and water systems were operated and maintained. Townsite streets, sidewalks, roads, and bridges within the park were maintained. Garbage collections were made from the townsite and camp-grounds. Cement reservoirs were constructed for fish culture and facilities generally improved. The pier and abutments of a new bridge over Lower Cameron Creek were completed.

Yoho National Park.—The streets and sidewalks in Field were maintained and improved as were also the roads, including the Yoho Park section of the Trans-Canada Highway. Protection work to public camp-grounds was carried out.

Mount Revelstoke National Park.—Mount Revelstoke Highway was maintained throughout its entire length.

Prince Albert National Park.—Electric lighting, water, and sewerage systems were operated and maintained. Streets and sidewalks in the townsite, and park roads, including the Prince Albert Park Highway were maintained. Garbage was collected and disposed of. Engineer's quarters and a warden's warehouse and stable at Silver Grove were constructed. Anglin Lake dam was repaired and the Lakeview subdivision was improved.

Riding Mountain National Park.—Electric lighting, water, and sewerage systems were operated and all park roads were maintained. Dust-laying oil was applied on heavy traffic sections. The usual garbage collections were made. Alterations were made to the staff quarters to accommodate the resident engineer and the golf course was improved.

Point Pelee National Park.—The water supply was investigated and 14 wells with concrete tops were completed.

Prince Edward Island National Park.—Existing roads were maintained and about 2.5 miles of new road was constructed. Work on Dalvay House included stuccoing walls, renewing verandah and porte cochere, installing plumbing, wiring, fixtures, and alterations. The grounds were landscaped, a well was drilled, and the bowling alley was reconstructed. At Green Gables a basement was constructed, the main roof was shingled and painted, plumbing was installed, and necessary alterations were made. The basement under the main part of the Superintendent's residence was constructed, electric wiring, plumbing, and a fireplace were installed, and the interior was painted and decorated. Work continued on fencing the park boundary, the erecting of bath-houses at Caven-dish, Dalvay, and Brackley Beach, and drilling wells at Dalvay House and Brackley Beach.

Cape Breton Highlands National Park.—In addition to the construction and maintenance work on the Cabot Trail, relocation surveys for the road were carried on between Ingonish and Neils Harbour, in the vicinity of Middle-head, and between Cap Rouge and Mackenzie Mountain sections for a distance of about 22 miles. General improvement in the vicinity of the Administration building included grading for tennis courts, athletic field, and park entrance building site, improving the bathing beach, clearing and development of a site for bath-houses, and underbrushing and clearing an area for picnic grounds. The construction of the Superintendent's residence and administration building was commenced and was about 20 per cent completed.

UNEMPLOYMENT RELIEF

Operations for the relief of unemployed were continued during the fiscal year 1938-9 and qualified permanent park residents with domestic responsibilities in Banff and Jasper Parks who were in urgent need were provided with work on a quota basis from April 1 to the middle of May, 1938, and from January 25 to the end of March, 1939.

In Banff National Park operations were carried on as follows:

- Demolition of various old buildings,
- Clearing and burning brush for mosquito control,
- Completing levelling operations in Central Park,
- Replacing culverts and improving Loop Drive,
- Improving and replacing culvert Mile 4, Lake Minnewanka road,
- Preparing subgrade on the Trans-Canada Highway for paving,
- Getting out firewood for camp-grounds and Administration building,
- Erecting ice palace and toboggan slide for winter carnival,
- Removal of snow from Banff streets,
- Operation of gravel crusher,
- Cleaning up Tunnel Mountain camp-grounds,
- Painting and cleaning up Cave and Basin and Upper Springs bath-houses,
- Improving Administration grounds,
- Painting equipment, making sign boards, and concrete posts for guard rails.

These items provided 4,401 man-days of work for 123 heads of families with 286 dependants.

In Jasper National Park operations were carried on as follows:

- Thinning, clearing, and burning underbrush between Cottonwood Creek camp-grounds and Athabaska River,
- Renewing defective culverts Jasper-Yellowhead road,
- Improving Jasper-Edmonton Highway,
- Improving Pyramid Lake road,

Completion of construction of caretaker's cabin,
Loading and shipping logs for 3 warden's cabins,
Control of mistletoe blight,
Digging and cribbing well for warden's cabin,
Constructing, repairing, and painting signs, equipment, posts.

These items provided 1,230 man-days of work for 33 individuals with 79 dependants.

EXPENDITURE SINCE 1930

Annual expenditure since the year 1930 on account of public works carried out in National Parks, Historic Sites, the Golden-Revelstoke Highway, approach roads to National Parks and Tourist Highways to furnish employment and to stimulate economic recovery are shown in the following table:

Fiscal Year	Relief Acts	P.W.C.A. 1934	Supplement- ary P.W.C.A. 1935	Special Supplement- ary Estimates	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 54	1,536,630 54
1937-38.....				1,082,353 79	1,082,353 79
1938-39.....	2,630 23			2,145,218 83	2,147,849 06
Totals.....	3,361,365 66	1,931,600 00	1,013,881 53	4,764,203 16	11,071,050 44

HISTORIC SITES AND MONUMENTS

Fortress of Louisbourg, N.S.—Work included the continuation of excavation and restoration of the citadel building, the construction of concrete gun carriages, the demolition of an old frame building, and alterations to the museum building for additional lavatory accommodation.

Fort Beausejour, N.B.—Work included the construction of a caretaker's cottage and garage, the extension of the museum building and making over the caretaker's quarters in the museum for additional accommodation.

Fort Chambly, Que.—A protection wall was constructed around the cemetery and the grounds were graded. Rip rap was placed along the river bank to protect the fort and picnic grounds, the fort walls were repaired, and a picnic shelter was erected.

Fort Lennox, Que.—General repairs were made to the commissary building, the guard-house was replastered, the roof of the men's barracks was painted, kitchen and store-house walls were restored, and a floating dock was built.

Fort Malden, Ont.—Foundations and main floor for the new museum building were constructed.

Martello Tower, Halifax, N.S.—The roof was waterproofed.

Port Royal Habitation, Lower Granville, N.S.—Excavation for location of old site was carried out and stone and timber for new buildings were hauled.

Battle of Grand Pre, Grand Pre, N.S.—A cut stone monument with tablet and fence were erected.

- Halifax-Castine Expedition, Halifax, N.S.*—A cut stone monument and tablet were erected.
- Pictou Academy, Pictou, N.S.*—A cut stone monument and tablet were erected.
- Martello Tower, Saint John, N.B.*—The old wooden roof was removed; the upper section of the tower was concreted; entrance road and parking area were constructed.
- Mohawk Indian Fort, Hogg Island, N.B.*—A tablet was affixed to a standard.
- Missequash Baie Verte Portage, Baie Verte, N.B.*—A cut stone monument, tablet, and fence were erected.
- First Postal Terminal, Montreal, Que.*—A tablet was affixed to wall.
- Fort Temiscamingue, Ville Marie, Que.*—A cairn, tablet and steps were erected.
- First Cheese Factory, Ingersoll, Ont.*—A tablet was affixed to wall.
- Trent Valley Canal, Bobcaygeon, Ont.*—A cut stone monument and tablet were erected.
- Murney Tower, Macdonald Park, Kingston, Ont.*—New asphalt shingle roof was placed on the tower.
- Monument on Battlefield of Stoney Creek, Ont.*—Repairs to the monument were effected.
- Samuel Hearne, Port Churchill, Man.*—A tablet was affixed to wall.
- Fort Assiniboine, Barshead, Alta.*—A cairn, tablet, and fence were erected.
- Completion Canadian Pacific Ry., Port Moody, B.C.*—A cairn and tablet were erected.
- Kootenay House, Invermere, B.C.*—Cut stone monument with tablet and wire fence were erected.
- Gonzales Hill, Oak Bay, B.C.*—Additional wire fence was erected and repairs were made.

WORK ON INDIAN RESERVES

Work for the Indian Affairs Branch carried out by this Service comprised the following:—

Buildings.—Day schools with quarters were erected by contract at Oneida and Rabbit Island, Ont., Ahtahkakoops, Sask., Pemberton, B.C., and Bella Bella, B.C., and a day school at Little Saskatchewan, Man. By day labour, day schools were erected at New Credit, Ont., Berens River, Man., Island Lake, Man., and Bella Coola, B.C., and a residential school at Cross Lake, Man., partially constructed. Agency buildings were erected at Fort Norman, N.W.T., by contract, and a farm instructor's residence at Cold Lake, Sask., by day labour. An addition and repairs were made to the school at Caughnawaga, Que.; repairs were made to the building and a new pumping system was installed at Ermineskin School, Hobbema, Alta., and repairs were made to the school at Alert Bay, B.C.

Irrigation Systems.—Irrigation systems were constructed, repaired, improved, or investigated on Indian Reserves in British Columbia as follows: Botanie, St. George, Boston Bar, Okanagan No. 1, Williams Lake No. 1, Kamloops No. 1, Niskonlith No. 3, Cook's Ferry No. 9, Lower Nicola No. 2, Oregon Jack No. 3, Upper Similkameen, Kootenay No. 1, and Kootenay No. 2.

Water Supply Systems.—Investigations were made of the water supply for the Sandy Bay Indian residential school at Amaranth, Man., the Brandon Indian residential school at Brandon, Man., and Shiammon Village, B.C. A pump was installed at St. Philip's school at Kamsack, Sask., and wells were drilled on the Long Plains Home farm at Portage La Prairie, Man., and at the Sacred Heart school at Brocket, Alta. The water supply systems for the village of Port Simpson, B.C., Williams Lake, B.C., Gordon's Indian residential school at Punnichy, Sask., and the Blue Quills school at St. Paul, Alta., were extended.

Repairs were made to the hydro-electric plant and dam at the Indian residential school at Macintosh, Ont., and to the sewage disposal bed at the Cecilia Jeffrey school at Kenora, Ontario.

GEODETIC SERVICE OF CANADA

The Geodetic Service maintains a system of nets of geodetic triangulation and precise levelling extending across Canada in order to provide control data for all other surveys. Horizontal control is provided by referring to triangulation station marks consisting of bronze tablets cemented in solid rock, inscribed: "Geodetic Service of Canada, Triangulation Station" and vertical control is provided by referring to bronze tablets cemented in rock or piers and inscribed: "Geodetic Service of Canada, Bench Mark."

The geodetic data furnished by this Service are of value in the study of isostasy and in the determination of the size and shape of the earth.

Geodetic determinations of Canadian longitudes, latitudes, and elevations above sea level are supplied to Canadian Government and Provincial departments, scientific institutions, and the surveying and engineering public. Publications containing the final geodetic values and full descriptions of station marks are issued at intervals. Special publications prepared by the Geodetic Service of Canada are included in the Reports of the International Association of Geodesy, a section of the International Geodetic and Geophysical Union.

TRIANGULATION

Field work was continued in two districts in 1938, namely, British Columbia and Newfoundland. Primary triangulation was carried on at the western, or British Columbia end of a net from Williams Lake, B.C., through Yellowhead Pass to Edmonton, which, when completed, will connect the main triangulation nets of British Columbia and Alberta. The triangulation of the geodetic survey of Newfoundland was also extended.

TRIANGULATION IN BRITISH COLUMBIA

The Williams Lake-Edmonton net was commenced in 1936, when an aerial reconnaissance was made over a very mountainous area from Williams Lake, B.C., as far east as Yellowhead Pass. In 1937 seven of these stations were visited to check the aerial reconnaissance, and these stations were prepared for observing. While the stations were reasonably accessible from Quesnel, Hobson, and Clearwater Lakes or from existing pack-trails, the presence of snow and glaciers made this operation a slow and arduous one.

In 1938 three more of the stations were ground checked and prepared for observing, these being the most difficult of any used as primary triangulation stations anywhere in Canada. Angular measurements were also carried on at the stations prepared the previous season. Snow and ice impeded progress considerably, but far greater delay was caused mainly by haze brought in by southerly winds, by clouds, and by smoke from forest fires. So great were these

delays that only eight stations were completed in the season by two observers. Heavy packing was the rule, chiefly because of the necessity of observers and light-keepers camping close to the summits of the 9,000- to 10,000-foot mountains.

TRIANGULATION IN NEWFOUNDLAND

The season of 1938 was the fourth in which field work was carried on in connection with the geodetic survey of Newfoundland. The Government of Canada in 1935, at the request of the Commission of Government of Newfoundland, had agreed to assist in this work by providing the technical officers, supplying the instrumental equipment, and calculating and publishing the mathematical data. The Commission undertook to bear all field and travelling expenses.

The program consisted of a primary net along the west coast from Cape Ray to the Strait of Belle Isle, at which points it connected with Canadian nets, completed and projected, and a secondary net started midway of the primary net and roughly following the Newfoundland railway as far as St. John's, the capital.

The season of 1935 was one of preparation. In 1936 and 1937 the southern half of the primary net and westerly half of the secondary net were finished, the reconnaissance of the northerly half of the primary net was completed to the northeasterly end of the Strait of Belle Isle, and a few stations on the same net were prepared for the angular measurements.

The angular measurements of the secondary net were made partly at night on signal lamps and partly in daytime on beacons.

Two base lines were measured in the secondary net, one near Terra Nova and the other near St. John's. Four Laplace stations (combined longitude, azimuth, and triangulation stations) were established, three in the secondary net and one in the completed primary net.

Two base lines were selected in the northerly half of the primary net, one near Parson's Pond and the other, tentatively selected only, near Bradore Bay on the Canadian side of the Quebec-Labrador boundary.

LEVELLING

Levelling operations were carried out in the Provinces of Manitoba and Quebec—a precise levelling party operating in the former and a secondary party in the latter.

LEVELLING IN THE PROVINCE OF MANITOBA

Starting at the Pas a precise level party followed the Canadian National Railway to Cranberry Portage, Sherridon, and Flinflon. On completion of this work the party moved to the Hudson Bay railway and carried levels along it from the first crossing of the Nelson River near Arnot to the second crossing of the same river at Kettle Rapids, the levelling from The Pas to Arnot having been done some years earlier, prior to the completion of the railway to Churchill.

LEVELLING IN THE PROVINCE OF QUEBEC

Secondary levelling for general control purposes was carried on in the area north of St. Lawrence River, below Quebec City. Levels were run along Provincial Highway No. 56 from Baie St. Paul to Port Alfred and along No. 54 from Hebertville towards Quebec. At the close of the season the work on the latter line was discontinued at a point some 30 miles north of the city. Both these lines traverse the Laurentides Provincial Park and fix the exact elevations of numerous stream crossings and lakes.

INSPECTION OF BENCH MARKS

A re-inspection of precise level bench marks in the Province of Ontario south of Ottawa, Algonquin Park, and Parry Sound was started. These bench marks had been published in Geodetic Survey publication No. 19, now almost out of print, and were last inspected in the years 1925-6-7 when the manuscript for the above publication was being prepared.

Detailed Statement of Levelling run in 1938

	Miles	Bench Marks
<i>Precise—</i>		
The Pas to Sherridon and Flinflon.....	133.9	62
Arnot to Kettle Rapids.....	91.0	30
Total precise.....	224.9	92
<i>Secondary—</i>		
Baie St. Paul to Port Alfred.....	77.1	40
Hebertville towards Quebec.....	104.0	57
Total secondary.....	181.1	97
SUMMARY		
<i>Precise Levelling</i>		
Prior to 1938.....	25,969	9,204
1938.....	225	92
Total.....	26,194	9,296
<i>Secondary Levelling</i>		
Prior to 1938.....	11,921	4,217
1938.....	181	97
Total.....	12,102	4,314

The total mileage of levelling, distributed by provinces, at the end of the year 1938, was as follows:

	Precise	Secondary	Public Works	Total
Nova Scotia.....	729		309	1,038
New Brunswick.....	1,096		403	1,499
Quebec.....	3,418	1,288	2,231	6,937
Ontario.....	6,956	1,324	2,012	10,292
Manitoba.....	2,773	368	158	3,299
Saskatchewan.....	4,113	5,098		9,211
Alberta.....	2,866	3,799		6,665
British Columbia.....	3,690	225		3,915
Yukon.....	458			458
Minnesota.....	89			89
Vermont.....	6			6
	26,194	12,102	5,113	43,409

GEODETTIC ASTRONOMY AND ISOSTASY

During the season of 1938, field work consisted in Laplace observations (longitude, latitude, and azimuth) at four of the triangulation stations of the Newfoundland net; two base lines, also in the Newfoundland net; the astronomical longitudes and latitudes at twenty-two geodetic triangulation stations in the Ontario and Quebec nets for the purpose of determining the deflection

of the plumb line and the determination of the astronomical longitudes and latitudes of two points; one on the 60th parallel near the northeast corner of Alberta and the other on Provincial Highway No. 2 near Stewiacke, Nova Scotia.

LAPLACE DETERMINATIONS

The geodetic triangulation stations in the Newfoundland net occupied as Laplace stations were: Robinson, Alex, Lawrence, and Simpson. From Robinson the azimuth of the line to West Base was measured; from Alex that to Terra Nova; from Lawrence that to Thwart, and from Simpson that to Curren. These determinations control the direction of the Newfoundland net of triangulation.

BASE LINES

The base lines measured last season were the Gros Marsh base near Terra Nova and the Donovan base near St. John's, Newfoundland. These bases control the scale of the triangulation of that net. The invar base-line tapes used in the measuring of these bases were standardized from the standard metre bar No. 10239 before and after the field season.

DEFLECTION OF THE PLUMB LINE

The geodetic triangulation stations occupied for longitude and latitude (deflection of the plumb line) were as follows: Portneuf lighthouse, Trois, Citadel, St. Andre church, St. Simeon church, Goose Cape lighthouse, St. Fereol, Dusable, St. Evariste church, Arthabasca, Magog church, Chambly Basin church, Mascouche church, Ste. Julienne church, Coteau du Lac church, South Roxton church, and Varennes church in Quebec, and Bonville, Vankleek, St. Isidore church, Dundela, and North Gower in Ontario.

GEOGRAPHICAL DETERMINATION

The geographical position determined on the 60th parallel at the northeast corner of Alberta was for the purpose of defining the northern boundary of the Provinces of Alberta and Saskatchewan. This is the third observation made on this 60th parallel of latitude by the Geodetic Service of Canada in recent years. The others were on the west coast of Hudson Bay in 1929, and at Pennington, Yukon Territory in 1932. A request for a fourth observation on this parallel at its crossing of Liard River on the northern boundary of British Columbia was recently received from the Surveyor General of British Columbia.

The longitude was also observed and a measurement made to the Alberta-Saskatchewan boundary line (the 110th Meridian). Astronomical observations made near this boundary line in previous years were at Walsh, Alberta, in 1910, at Lloydminster, Alberta, in 1909, and at Onion Lake, Alberta, in 1888. These several longitude determinations all show values of the longitudes at the several points on this boundary line of very nearly $110^{\circ} 00' 10.''00$. This would indicate that this boundary has been very accurately laid down and that the deflection of the plumb line is fairly uniform through this section of the prairie.

In September of 1938 a request was made by the Department of Highways of the Province of Nova Scotia for the location of a point on Provincial Highway No. 2 near Stewiacke, N.S., half way between the equator and the North Pole. This point was located and the Government of Nova Scotia has erected a suitable monument to mark the spot.

ISOSTASY

This important line of scientific research is being continued. To date 193 field stations have been observed for deflection of the plumb line. The

corrections for the effect of topography and isostatic compensation have been read from topographic maps and the results are being prepared for publication. Two parties will be in the field in 1939 continuing the field work. This investigation will give important information concerning the shape and size of the earth and the varying densities of the earth's crust. The data secured along these lines should in a country like Canada with its great mineral and oil deposits prove of great value.

TRIANGULATION ADJUSTMENTS

The work of this Division has been a continuation of the adjustments imposed upon this Service's triangulation structure as a result of the entire revision of the United States system. Published values exist for the regions of Eastern Canada which were based upon the North American datum values of stations near the International Boundary and to which the Canadian system was attached. The newer values now made available demand the present revision, as greater accuracy is obtained and a perfect correlation will then be possible between the stations of the Geodetic Service, United States Coast and Geodetic Survey, and the International Boundary Survey in the same or contiguous areas. A similar revision is not necessary in Western Canada, as the equivalent information was available to this Service previous to any extensive adjustment system or publication of results.

Further field work in Newfoundland and in British Columbia has allowed several large areas to be controlled geodetically and the information regarding co-ordinates is now available for distribution.

LEVELLING ADJUSTMENTS

During the past year the Precise Level Line 185, run in Manitoba from The Pas to Sherridon and Flinflon, respectively, and from Arnot to Kettle Rapids, a total distance of 182 miles, was adjusted to the published elevations of existing bench marks.

From the recent adjustments of the combined Canadian and American net (leaving out the three American tidal stations of Old Point Comfort, Annapolis, and Baltimore) and the "D" adjustment, which contains all the Canadian precise levelling based on five reliable tidal sea level stations, with the new levelling added up to the end of 1935, it is found that the values of the Canadian bench marks in the former case are higher in practically all cases, varying from a high of .47 foot in the eastern section, to an average increase of .10 foot in the westerly part.

GEODETIC RESEARCH

During the past year, Geodetic Service of Canada Publication No. 59, entitled "The Transfer of Geodetic Data from one Ellipsoid to Another" was printed and distributed. This publication is the result of investigation and research as to the adoption of the same ellipsoid of reference by all countries carrying on geodetic operations as recommended by the International Union of Geodesy and Geophysics.

INTERNATIONAL BOUNDARY COMMISSION

The International Boundary Commission continued to perform the treaty obligation of maintaining the International Boundary between Canada and the United States and between Canada and Alaska, in a state of effective demarcation.

The Commissioners held a conference in New York, April 19 and 22, at which details of the program of field work for 1938 were discussed and agreed upon. It was also agreed that where additional boundary marks are required on the prairies, a low-cost concrete monument would be satisfactory and a suitable design of such monument was decided upon. The Commissioners also agreed that they should make a joint inspection of points on the Canada-Alaska boundary during the summer of 1938, and of the work of a United States survey party which would be engaged on maintenance operations on that section of the boundary. They also agreed that they would inspect boundary range marks and reference monuments on the Straits of Georgia, Haro, and Juan de Fuca and the work of a Canadian survey party which would be engaged on maintenance operations on the British Columbia-Washington section of the 49th parallel boundary.

INSPECTION

Meeting in Seattle on June 27, the Commissioners sailed from that port on June 29, arriving in Juneau, Alaska, on July 2. From that point several trips of inspection were made. On the first trip, an inspection was made of the boundary reference monuments at Cape Muzon on the southern end of Dall Island, and along the shores of Portland Canal. The line was also inspected in the neighbourhood of Stewart, B.C., and Hyder, Alaska, at the head of Portland Canal, where the land portion of the Canada-Alaska boundary begins, and in the vicinity of the Premier mine. Inspection was also made of the boundary where it crosses the Taku River, where a United States survey party was engaged in maintenance operations at White Pass, and where the boundary crosses Yukon River. At the latter point a monument on the south bank of the river, which had been badly damaged by floating ice, was repaired. All these points were reached by aeroplane, in order to save time. On returning to Skagway from Yukon River, an aeroplane inspection was made of the extremely mountainous and difficult section of the boundary between Chilkoot Pass and Tsirku River. Returning to Seattle at the end of July, the Commissioners inspected the boundary range marks at Blaine and Boundary Bay, and on the west side of Point Roberts. They also inspected the maintenance work being done on the boundary in the vicinity of Blaine by a Canadian survey party.

Early in August the Commissioners held a conference in Vancouver with members of the International Pacific Salmon Fisheries Commission, regarding territorial waters and the preparation of a special chart for that Commission. With the examination of the boundary reference marks in the Straits of Georgia, Haro, and Juan de Fuca, the Commissioners completed their trip of inspection. They returned to Seattle on August 7, the Canadian Commissioner returning thence to Ottawa.

MAINTENANCE OF THE BOUNDARY

A survey party of the Canadian section of the Commission carried on maintenance operations on the British Columbia-Washington section of the boundary along the 49th parallel of latitude between Cascade and Similkameen River, on a short portion of the line in the Cascade Mountains just east of the Columbia Valley, from Vedder Mountain to Blaine, and across Point Roberts. In all 56 miles of boundary vista were recleared and 4 monuments were repaired. An abandoned shingle mill on the line across Point Roberts was removed.

An engineer from the Canadian section of the Commission acted as attaché on a survey party of the United States section engaged in inspecting reference monuments and in recovering, remarking, and preparing descriptions of boundary triangulation stations on St. Lawrence River.

At the request of the Highway Division of the Department of Public Works of the Province of New Brunswick, an engineer from the Canadian section of the Commission moved a boundary reference monument on the north side of St. John River from its site near the centre of a newly located highway to a new site and determined its new position by survey.

At the request of the Niagara Parks Commission an engineer from the Canadian section of the Commission made the necessary reference surveys to permit the temporary removal of a boundary reference monument at Niagara-on-the-Lake, in order that extensive excavations for landscaping and new highway construction could be made.

The text of the Commissioners' Twelfth Annual Joint Report for the calendar year 1937, required under the treaty of 1925 was prepared. Further progress was made in the preparation of material for a joint report upon the survey and demarcation of the section of the International Boundary between Cape Muzon and Mount St. Elias.

HYDROGRAPHIC AND MAP SERVICE

The Hydrographic Service of Canada conducts all charting of Canadian navigable waters, the investigation of tides and tidal currents, and the precise water-level recording of the St. Lawrence-Great Lakes Waterway. The Service constitutes one of the chief survey organizations of the Dominion and takes its place as an important link in the chain of similar services maintained for the benefit of navigation in countries throughout the world.

The Legal and Map Service conducts all legal surveys required by this and other departments including Indian reserves, airports, national parks, ordnance lands, and all surface and mineral rights in the Northwest and Yukon Territories. It compiles and prepares aeronautical charts, electoral maps, general maps for the use of the various government departments, natural resources and railway maps, and general maps of Canada, and maintains a lithographic office for the reproduction of hydrographic charts and other maps prepared by the Department within the capacity of the presses installed. It maintains a central office for indexing files and recording survey returns and plans, and distributes all topographical and general maps of Canada.

HYDROGRAPHIC SERVICE

The year under review, the fifty-sixth during which hydrographic operations have been carried on by the Canadian Government, was marked by a greatly increased demand for general navigational information. Requests for new charting are constantly broadening, but the number of undertakings which can economically be launched in any one season is limited by the funds and personnel available to carry on the work.

The field program, which embraced the interests of general ship navigation as a whole, included nautical charting, investigation of tides and tidal currents, and the recording of the fluctuating water-levels of navigable waterways. As a result of these operations there were prepared and added to the list of navigational publications, a number of important new nautical charts, a volume of Sailing Directions, Standard Tide Tables, and other official tidal publications as well as special water-level bulletins.

Charting operations on the Atlantic Coast were conducted with the use of the C.G.S. *Acadia* and the C.G.S. *Cartier*; on the Pacific Coast with the C.G.S. *Wm. J. Stewart* and the auxiliary houseboat *Pender*. Smaller parties equipped with motor launches were also employed. Canada possesses one of the longest and most intricate coastlines in the world: in the detailed charting of these

waters, much has been accomplished, but large portions of both coastal and inland waters are still uncharted or covered only by early charts now considered quite obsolete.

Requests for nautical charts and related standard aids to navigation emanate from three distinct sources. First, are the important demands from the national and international shipping interests for charts and volumes of Pilots and Sailing Directions covering our main coastal and inland navigable routes. A second and insistent call is for navigation charts covering our lesser great lakes such as Great Slave Lake, Lake Athabaska, Lake Winnipeg, and Lake Nipigon. In these localities primary industries are rapidly developing and freighting is carried on by water. A third demand is for what might be termed "Yachtsmen's Charts." These charts cover the many sheltered, but often intricate, water-routes of lake and river available to yachts and motor-cruisers.

HEADQUARTERS DIVISION

In addition to general administrative work this Division carried out the planning of new and special charting, investigation and research in hydrographic and navigational subjects, and the dissemination of special navigational information pertaining chiefly to depths, water-levels, tides, recommended navigation routes, ice-data, berthing accommodation, and harbour facilities. On the Pacific Coast, in order to meet the correspondingly increased navigational requirements, the Victoria office was kept open the year round.

Exchange of Hydrographic Data.—As in past years, several other Government Departments participated in the interchange of information pertaining to navigation in Canadian waters. In particular, a great deal of material affecting our nautical charts and volumes of Pilots and Sailing Directions was received from the Departments of Public Works and Transport. Reciprocating, the Hydrographic Service supplied nautical publications such as charts, Sailing Directions, Tide Tables, and water-level bulletins. Through the medium of the official Notices to Mariners, published by the Department of Transport, the Hydrographic Service also reported on the finding of some thirty uncharted rocks or other dangers to navigation. On various occasions the facilities of this Service were extended for the calibration of radio-aids. Navigational range beacons were also established or advised upon.

Many new foreign charts and hydrographic publications were received, examined, and filed for reference and library purposes, principally from the British Admiralty Hydrographic Department, the United States Hydrographic Office and the United States Coast and Geodetic Survey at Washington, the United States Lake Survey Office at Detroit, and the International Hydrographic Bureau at Monaco. Extensive portions of 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. Canada participates in the international scheme devised by the International Hydrographic Bureau, whereby copies of the Notices to Mariners of different countries are made available for examination by Masters of vessels at centralized offices in many maritime ports of the world.

Pilots and Sailing Directions.—The volumes of Pilots and Sailing Directions, published by this Service, cover a great part of the coastal and inland navigable waters of the Dominion. Prepared by hydrographers of long navigational experience, they describe the coasts, channels, shoals, banks, and reefs, and deal fully with the nature and location of the various aids to navigation installed on the routes. Recommended tracks and ships' courses are a most important part of the Sailing Directions and are given after a full consideration of all the navigational factors involved. Many other necessary data are also set

forth, including Pilotage Regulations, Fees, Special Rules of the Road, Descriptions of Harbours, Harbour Facilities, Harbour and Sick Mariners' Dues, Depths at Wharves, Anchorage Regulations, and such general information pertaining to marine transport as is required by the navigator. Constant revision of these volumes is necessitated by the continual natural and artificial changes which affect the safety and efficiency of navigation. In addition to performing this work, the Sailing Direction Section of the Headquarters staff undertakes considerable research work and provides a ready reference service for general navigational information.

Emergency Surveys.—Emergency surveys and field investigations in connection with reported dangers to shipping were carried out as occasion arose. Reports of this work are included in the following record of charting operations conducted by the Hydrographic Service during the past year.

HYDROGRAPHY

Gulf of St. Lawrence—North Shore.—The C.G.S. *Acadia* was commissioned at Halifax and after laying off a Measured Nautical Mile for official speed-test purposes at Bedford Basin, sailed on June 8 for Lockeport and Beaver Harbours where special shoal examinations were carried out. On June 13 the ship proceeded from Sydney to the North Shore of the Gulf of St. Lawrence, and off Magpie Bay located a reported dangerous shoal. This hitherto uncharted obstruction proved to be a pinnacle rock which, without warning, rises abruptly from deep water. Uncharted, it constituted a potential source of grave marine disaster.

The *Acadia* then undertook the main program of the season, namely, the completion of the past several seasons' charting of the intricate and reef-infested ship-channels which wind in and out of the islands fringing the stretch of coast from Harrington to Blanc Sablon. Considerable offshore sounding was also done on the Canadian portion of the much used Belle Isle route. In addition a number of important shoal examinations were made on, or close to, main ship routes.

Included in the season's hydrographic operations was the establishment of navigational range beacons at Blanc Sablon and House Island; the determination of magnetic variation and local disturbances affecting ships' compasses; obtaining of water-temperatures and salinities, and also the calibration of both Cape Whittle radio directional beacon and St. Paul Island radio direction-finding station.

On November 1 the *Acadia* left the North Shore and, upon arriving at Halifax on November 3 was decommissioned for the season.

As a result of the past several seasons' work the following set of new charts will be published: "Flat Island to Little Mecatina," "Blanc Sablon to Five Leagues Harbour," "Salmon Bay to Lobster Bay," "Lobster Bay to Outer Island," "Outer Island to Bun Island," "Bun Island to Mutton Bay."

Summary of Season's Work

Ship Sounding	1,851 linear miles
Boat Sounding	1,255 " "
Shoals examined	1,003

Gulf of St. Lawrence—Cape Breton.—The principal seasonal operations of the C.G.S. *Cartier* consisted of the continuation of the charting of the coast and coastal waters of Cape Breton. The ship fitted out at Charlottetown and after verifying positions of aids to navigation in that vicinity sailed on June 11 for Pictou. Here a large scale charting of Pictou Bar was undertaken. On the last day of the month the ship proceeded to the Magdalen Islands and until

July 12 engaged in charting the entrance to Grand Entry harbour, Grindstone, and in Sandy Hook Channel where an uncharted rock had been reported to exist.

On completion of this work the *Cartier* sailed for North Sydney and, en route, calibrated the St. Paul Island radio direction-finding station. In the vicinity of North Sydney a number of shoals were examined and large scale charts were made of Mainadieu Passage and Louisburg Harbour to replace early Admiralty productions. The urgency of this work is evidenced by the fact that in Mainadieu Passage some 14 uncharted shoals were discovered and many others were found to have less depth over them than previously indicated on the old chart.

Despite difficulties incurred through the prevalence of fog and the heavy surf characteristic of this exposed coast, progress also was made in the coastal charting of the ragged stretch of coast from Guyon Island to Flint Island. Owing to shortage of funds, operations here ceased on October 7 but before laying up on the 14th a special survey was made of the eastern entrance to Caribou harbour in Northumberland Strait.

As a result of the season's work the following charts will be published: "Guyon Island to Flint Island," "Louisburg Harbour," "Mainadieu Passage."

Summary of Season's Work

Ship Sounding	248 linear miles
Boat Sounding	882 " "
Shoals examined	150

Lower St. Lawrence River.—The hydrographic launch *Henry Hudson*, a sturdy little craft originally built for work in Hudson Strait, fitted out at Quebec and on May 1 commenced a resurvey of that important harbour to supersede the charting of 1883. On June 16 she proceeded to the vicinity of Rimouski to examine an area off Barnaby Island where a freighter had reported striking. In this locality also, operations were conducted to locate the wreck of a schooner.

On June 29 the launch crossed to Baie Comeau on the North Shore to undertake a large-scale charting of that newly developed pulp and paper port. Upon completion of this work the launch proceeded on August 29 to Laval Bay and there extended the special charting in connection with another new port project. When navigating from place to place the charted positions of aids to navigation were verified as were also the navigational descriptions given in the Sailing Directions.

On September 10 the charting of Quebec Harbour was resumed and continued until October 29 when the launch was laid up in her winter quarters on Kings Wharf.

As a result of the season's work the following charts or prints will be issued: "Baie Comeau," "Approaches to Laval Bay."

Summary of Season's Work

Boat Sounding	186 linear miles
Coastlining	38 " "
Shoals examined	3

Georgian Bay Survey.—Working out of Midland with a hired motor launch, a small party conducted field operations from May 26 to October 3. Charts of the 30,000 island section of Georgian Bay are much needed. The existing chart covering this coast was made over 45 years ago when traffic conditions did not warrant more than a sketch survey of inshore waters and complicated inland passages. With the development of this region it has been found that

existing charts are quite inadequate to serve the needs of navigation and, indeed, have been considered a deterrent to the full development of this popular but rock-studded coast.

Progress was made on the new chart, "Port Severn to Present Island."

Summary of Season's Work

Boat Sounding	481 linear miles
Coastlining	48 "
Shoal and rocks located	879

St. Lawrence River and Great Lakes.—The echo-sounding equipped launch *Boulton* left Prescott on May 31. En route to Toronto there was located for chart purposes the position of the new International Bridge between Rockport and Collins Bay and an inspection was made of Picton harbour.

At Toronto, a triangulation of the harbour front was carried out and resulted in the establishment of thirty-nine permanent control points for future use of the Harbour Commission. As a result of the work it will now be possible to produce a new chart of Toronto harbour, on which will be correctly shown, the changes in the waterfront which have taken place since the last complete survey was made in 1913. Also, with the co-operation of the Toronto Harbour Commission, harbour improvements which may be made from time to time can readily and accurately be added to this chart. The work in this area was completed on July 19.

The *Boulton* then proceeded to Lake Superior and charted Heron Bay where important port developments are in progress. On September 8 the launch left for Prescott, arriving there on the 25th. She then proceeded to Montreal and conducted a triangulation of the harbour with a view to the production of a modern chart. On October 28 the *Boulton* arrived in Prescott and was there laid up for the season.

As a result of the season's work the following charts will be published: "Toronto Harbour," "Heron Bay."

Summary of Season's Work

Boat Sounding	96 linear miles
Coastlining	22 "
Shoals examined	19

Pacific Coast.—The *Wm. J. Stewart* commissioned at Victoria and with the *Pender* in tow sailed for Vancouver on April 18. Both units continued the charting of Gabriola Reefs to Yellow Island until the 29th when the houseboat was taken to the entrance of Fraser River, the ship continuing the survey alone until June 3. The *Pender* was then towed to Howe Sound and the ship carried out the sweeping of an area off James Island wharf.

From June 3 to 9 sweeping and sounding operations were conducted in the entrances of Esquimalt harbour and dry-dock and general corrections were made to the chart. The ship then sailed for Vancouver where soundings were taken at Parthia Shoal in First Narrows. On June 11 the *Pender* was towed to Union Bay, where the ship coaled, and then proceeded to Blenkinsop Bay.

On June 15 the *Stewart* arrived at the scene of the season's main operations and continued the extensive charting of the area Nahwitti Bar to Cape Scott and Quatsino Sound until September 3. During this period, also, a survey was made of Leeson and Koprino harbours and sweeping operations conducted to disprove the existence of Needle Rock off Gillam Channel. Soundings were conducted in the vicinity of Solander Island and on an extensive bank off Lookout Island. In addition, a short inspection trip was carried out with the Director of Surveys and Engineering.

From September 5 to October 11 charting was done in Fern Passage, Kildala Arm, Caamano and Milbanke Sounds, and Baker Inlet in Grenville Channel. The ship left Prince Rupert on the latter date and took the *Pender* in tow at Havannah Channel on October 13. Vancouver was reached on October 14 where a launch party was left to conduct further sounding in First Narrows. The ship then proceeded to Victoria, arriving the same day and the crew were paid off.

Summary of Season's Work

Ship Sounding	2,280	linear miles
Boat Sounding	2,073	" "
Coastlining	205	" "
Shoals examined	181	

Houseboat Pender.—This hydrographic unit left Victoria for the season's work on April 18 and from the 19th until the 29th was engaged in sweeping portions of Vancouver Harbour. From the latter date until June 3 charting operations were conducted at the entrance of Fraser River and from that date until the 11th soundings were taken in Howe Sound in the vicinity of Lodge Cove.

On June 14 the houseboat was placed in Johnstone Strait where an extensive charting was made about Hardwicke Island and vicinity, including Sunderland Channel, Topaze Harbour, Wellbore Channel, and portion of Chancellor Channel. On August 18 the craft was moved to Clio Channel where hydrographic work was accomplished in Baronet Passage and Clio Channel. On October 13, she was taken in tow by the *Wm. J. Stewart* and the following day arrived in Victoria where she was laid up for the season.

Summary of Season's Work

Boat Sounding	618	linear miles
Coastlining	155	" "
Shoals examined and swept	56	

TIDES AND CURRENTS

The investigation of both vertical and horizontal movements of tidal waters, and the publication of the results, are the main functions of this Division.

The preparation of the various editions of the Tide Tables for the calendar year 1939 was completed in the early part of the fiscal year, and considerable progress was made on the manuscript for the 1940 tables. There are two complete editions, one for the Atlantic Coast and one for the Pacific Coast, which are required by the shipping industry generally. Besides these, are six abridged pocket editions for the needs of fishermen and others locally; four of the latter editions are for the Atlantic Coast regions and two for the Pacific Coast. They are classified as follows:—

Atlantic Coast Tide Tables.—Atlantic Coast (complete edition). The abridged editions are for Quebec and Father Point; Charlottetown and Strait of Canso; Halifax and Sydney, N.S., Saint John and Bay of Fundy.

Pacific Coast Tide Tables.—Pacific Coast (complete edition). The abridged editions are for Vancouver and Sand Heads; Prince Rupert and Northern B.C.

Beginning with the 1939 edition, a small charge was made for the Tide Tables. Those previously on our mailing lists were notified of the change in policy well in advance and all possible steps were taken to avoid any inconvenience to many users of the Tide Tables owing to the change.

The principal tidal stations maintained in operation are.—

Atlantic Coast.—Quebec, Father Point, P.Q.; Charlottetown, P.E.I.; Saint John, N.B.; Halifax, N.S.; and Churchill, Man.

Pacific Coast.—Vancouver, Caulfeild, Victoria, Clayoquot, and Prince Rupert, B.C.

Seasonal Tidal Stations.—Automatic gauges were installed at Louisburg, N.S., and at Baie Comeau on the north shore of the lower St. Lawrence for the dual purpose of obtaining additional tidal data, and for the reduction of soundings for charting surveys in progress in these localities. Another tide gauge was set up at the Government wharf inside the river mouth at Parrsboro, N.S., to afford the means of better determinations of available draught in the harbour, and for the time of tide when there is sufficient water for vessels to enter or leave.

Investigation of Currents.—In modern navigation where competition is so keen, a few tons of coal or a few hours extra steaming may make all the difference between profit or loss. To take full advantage of the strong currents which can either assist or oppose the progress of a ship, a knowledge of tidal action is vital to the mariner. To provide this information, there was devised, prepared, and sent to the printer an Atlas of Current Charts explaining in graphic form the exceedingly complex tidal currents in certain estuarial portions of the St. Lawrence.

Briefly, this new aid to navigation consists of a set of small charts showing diagrammatically the directions and velocities of tidal currents for each hour of the tidal day. A large proportion of wrecks which have occurred in the Lower St. Lawrence have been attributed to the unknown influence of tidal currents. It is expected, therefore, that in addition to assisting the progress of a ship the new Atlas of Current Charts will contribute considerably to the safety of navigation.

The tidal streams in Mainadieu Passage, lying between Scatarie Island and the mainland of Cape Breton, were examined for chart and tide table information. The time of the turn of the tidal streams was found to be quite irregular and, therefore, unpredictable. A recorder was also set up on the bridge of the inner harbour at Gaspé, P.Q., but the currents were found to be too weak and irregular to obtain definite results.

Reductions, Reports, and Information Service.—The tidal records from both the principal and secondary tidal stations were attended to and reductions made as required for tide table, chart, or other purposes. Mean sea level determinations were transmitted to the Association Internationale D'Océanographie Physique, Liverpool, England, and tabulation of records to the Tidal Institute, also of Liverpool, for analysis. The time of the arrival of the "bore" at Moncton was calculated and supplied to the Bureau of Information at that place. Tidal data were supplied Government officers, notably the Department of Transport in reference to ship strandings, and to others as well.

The following reports on tidal currents are available on request: Currents in the Gulf of St. Lawrence; Currents in the Entrance to the St. Lawrence; Currents in the St. Lawrence Estuary; Currents in the Entrance to the Bay of Fundy. The tidal current charts for hourly stages of the tide in the St. Lawrence Estuary is priced at one dollar. Predictions for the turn of the tidal streams at places in St. Lawrence River, in the Strait of Canso; and other straits or passages, are given in the Atlantic Coast Tide Tables. The Pacific Coast Tide Tables have similar information relating to Pacific Coast waters. Other publications are: Tide Levels and Datum Planes on the Atlantic Coast; Tide Levels and Datum Planes on the Pacific Coast; Tides at the Head of the Bay of Fundy; Tides and Tidal Streams (descriptive); Temperatures and Densities, Canadian (Atlantic) Waters.

PRECISE WATER LEVELS

This Division, which has to do mainly with the recording of surface elevations of navigable inland waters, maintains a system of self-registering water-level gauges throughout the Great Lakes-St. Lawrence waterway from Port Arthur to Quebec and in navigable portions of the Ottawa River. For administrative purposes the activities of the Division are divided into three geographical sections: Port Arthur to Kingston and Grenville, Prescott to Ste. Anne de Bellevue, Pointe Claire to Neuville (near Quebec). A technical assistant is in charge of each section and rigid inspections are conducted to insure the accuracy and continuity of the constantly recorded data.

From these records are tabulated statistics of the hourly, daily, monthly, and yearly means of the elevations of navigable lake and river. Information is prepared in the form of graphs and bulletins and is supplied either directly or through the press to shipping and other interests. During seasons when the waters reach flood heights, or when they fall so low as to restrict the loading capacity of ships, the accurate information furnished by this service is of vital importance.

Through the continuous recording of the levels of the Great Lakes-St. Lawrence waterway the important effects of remedial measures to increase depths in certain localities is studied. Another phase of the work is the determination of accurate low water datums to which all the depths on navigation charts are reduced. The water level data supplied by the Precise Water Levels Division of the Hydrographic Service and published in concise form every month by many nautical periodicals. To provide such information, during the year 47 gauging stations were maintained, 524 months of continuous records were registered from which over 500,000 water-level elevations were computed, correlated, and compiled. Some 24,000 sheets of prepared data, bulletins, profiles, etc., were issued upon request during that period.

CHART CONSTRUCTION

The work of this Division covers the extent of marine cartography, from the making of minor chart corrections involving the changed position of a spar buoy, to the compilation of a new coastal chart. Owing to increased demands, certain charts were out of print at various times during the year, but a determined effort is being made to replenish exhausted editions. Towards the end that chart correction may become a continuous rather than a periodic process a system has been introduced whereby a number of charts are kept under surveillance and in readiness for reprint when the issue nears depletion.

In addition to the production of standard nautical charts, the Hydrographic Service has commenced the publication and distribution of a new series of semi-nautical publications to be known as Customs Act Maps. These special maps are published under the authority of Order in Council P.C. 3139 of December 18, 1937, giving effect to the recommendations of the Interdepartmental Committee appointed to consider the extent of Canadian territorial waters, and of the circumstances under which the R.C.M.P. Preventative Force, in dealing with suspected smugglers, can legally make seizures.

The original drawings of these consist of hydrographic charts, or portions of charts, on which have been delineated the official base lines and territorial boundaries, the nature and particulars of the maps being indicated by suitable titles. From these originals were made lithographed copies, each bearing the sign manual of the Surveyor General certifying that they are true reproductions.

The Chart Construction Division possesses a well-indexed repository containing over 10,000 plans which are continually being added to as the result of new charting operations. The field season of 1937-8 yielded a harvest of some fourteen new fair sheets.

During the year 32 charts, maps, prints, and correction patches were printed, consisting of the following: 3 charts published from engraved plates in full colours; 9 charts published by photo-lithography in full colours; 5 charts published by photo-lithography in black only; 3 charts published as process prints on vandyke or similar paper; and 2 patches for chart correction.

List of Nautical Charts Issued 1938-9 and in Hand on March 31, 1939

Province	No.	Issued 1938-9	Scale, Inches to Nautical Mile	Remarks
		Title		
Que.	1	Montreal Harbour.....	6.0	(a) (f) new
"	2	Longue Pointe to Varennes.....	6.0	(a) (f) reprint
Ont.	44	Prescott, Lower Lakes Terminal.....	7.6	(a) (f) "
"	68	Lake Ontario.....	0.2	(a) (d) "
"	76	Lake Erie.....	0.2	(a) (d) "
"	77	Kingston to Howe Island.....	2.4	(a) (f) "
"	82	Cape Rich to Cabot Head.....	0.8	(a) (d) "
		Lionhead Harbour.....	5.8	
		Owen Sound.....	3.0	
		Macgregor Harbour.....	6.3	
"	83	Waubashene to Western Island.....	1.5	(a) (d) "
"	109	Cape Gargantua to Otter Head.....	0.76	(a) (d) "
"	111	Plans of harbours, Georgian Bay.....		(a) (f) new
		Midland Harbour.....	12.0	
		Tiffin.....	12.0	
		Port McNicoll and Victoria Harbour.....	6.0	
"	116	Penetanguishene Harbour.....	4.0	(a) (d) new
Que.	201	White Island to Pointe aux Orignaux.....	1.0	(a) (d) reprint
"	207	Goose Cape to Orleans Island.....	1.0	(a) (d) "
"	208	Grosse Isle to Quebec.....	1.5	(a) (d) "
"	209	Saguenay River.....	1.8	(a) (f) "
"	210	Bersimis River to Bic Island.....	0.8	(a) (d) "
B.C.	314	Hecate Strait.....	0.5	(a) (d) "
"	315	Victoria Harbour.....	11.9	(a) (d) new
"	326	Laredo Sound and Approaches.....	1.0	(a) (d) reprint
"	327	Barkley Sound and Approaches.....	1.0	(a) (d) "
N.S.	422	Yarmouth.....	6.0	(a) (f) new
		Yarmouth Inner Harbour.....	12.0	
P.E.I.	460	Charlottetown Harbour.....	6.0	(a) (f) new
"	466	Hillsborough Bay.....	2.0	(a) (f) "
Ont.	2052	Oshawa Harbour.....	30.4	(b) (f) reprint
"	2065	Toronto Harbour.....	6.0	(b) (f) "
"	2080	Port Colborne.....	12.0	(c) "
"	2081	Plans of harbours, Lake Erie.....		(c) "
		Entrance to Rondeau Harbour.....	15.1	
		Port Stanley Harbour.....	15.0	
		Port Burwell Harbour.....	15.1	
B.C.	3244	Entrance to Portland Inlet.....	2.0	(c) reprint
"	3355	Houston Stewart Channel.....	4.0	(b) (f) "
"	3356	Skidegate Channel.....	2.0	(b) (f) "
"	3361	Rennel Sound and Shields Bay.....	1.0	(b) (f) "
		Customs Act Map No. 1		
		Customs Act Map No. 2		
		Customs Act Map No. 3		

In Printer's Hands March 31, 1939

Que.	21	Quebec Harbour.....	5.9	(a) (f) new
Ont.	64	Kingston to False Ducks.....	1.2	(a) (d) reprint
"	89	Giants Tomb Island to Lone Rock.....	1.5	(a) (d) "
Que.	202	Saguenay River.....	2.0	(a) (f) new
"	203	Saguenay River.....	2.0	(a) (f) "
B.C.	366	Esteban Point to Cape Cook.....	0.5	(a) (f) "
"	367	Kyuquot Sound to Klaskish Inlet.....	1.0	(a) (f) "
C.B.I.	467	Flint Island to Cape Smoky.....	1.0	(a) (f) "
"	468	St. Ann Harbour.....	4.0	(a) (f) "
Ont.	1502	James Bay.....	0.14	(b) (f) reprint
N.W.T.	2170	Slave River to Mackenzie River.....	0.33	(a) (f) "
		Entrance to Mackenzie River.....	1.5	

In Hand March 31, 1939

Province	No.	Issued 1938-9	Scale, Inches to Nautical Mile	Remarks
		Title		
Que.	49	Lachine to Coteau and Carillon.....	1.5	new edition
"	50	Lake St. Louis.....	3.0	new edition
Ont.	67	Hamilton Harbour.....	4.1	new edition
"	86	Georgian Bay to Clapperton Island.....	0.8	new edition
"	87	Killarney Harbour.....	3.0	new edition
"		Clapperton Island to Meldrum Point.....	1.0	
"		Serpent Harbour.....	2.0	
"	93	Little Detroit.....	8.0	new edition
"		Byng Inlet.....	6.0	
"	95	Meldrum Point to St. Joseph Island.....	1.0	new edition
"	98	Cove Island to Duck Island.....	0.8	new edition
"		South Baymouth.....	6.0	
"	101	Head of Thunder Bay.....	1.0	new edition
"	114	Port Arthur and Fort William.....	4.0	new edition
B.C.	306	Skidegate Inlet.....	1.0	new edition
"		Skidegate Channel, East Narrows.....	6.0	
"		Skidegate Channel, East and West Narrows.....	3.0	
"		Queen Charlotte City.....	6.0	
"	318	Alliford Bay.....	4.0	new edition
"		Vancouver Harbour, First Narrows to Second Narrows.....	8.0	
"	333	Vancouver Harbour, Point Grey to Second Narrows.....	3.8	new edition
"	349	Race Rocks to Turn Point.....	1.0	new edition
"	350	Turn Point to Sand Heads.....	1.0	new edition
Que.	400	Gulf of St. Lawrence.....	0.07	new
"	405	Hudson Bay and Strait.....	0.03	new
N.S.	417	Liscomb Island to Egg Island.....	0.7	new edition

- (a) Printed in full colours.
- (b) Printed in black only.
- (c) Vandyke, photostat, blue or similar print, temporary edition.
- (d) Printed from engraved plates.
- (f) Printed by photolithography from originals.

ENGRAVING SECTION

Charts Completed 1938-9

B.C.	351	Discovery Island to Beaver Point.....	2.0
N.S.	463	Cape Smoky to St. Paul Island.....	1.0
"	464	Cheticamp to Cape St. Lawrence.....	1.0

Charts in Hand March 31, 1939

B.C.	349	Race Rocks to Turn Point.....	1.0
"	350	Turn Point to Sand Heads.....	1.0
"	362	Esperanza Inlet.....	1.0
"	366	Esteban Point to Cape Cook.....	0.5
"	367	Kyuquot Sound to Klaskish Inlet.....	1.0
N.S.	469	Flat Island to Little Mecatina Island.....	1.0

DISTRIBUTION OF NAUTICAL PUBLICATIONS

The number of Canadian nautical charts distributed in the calendar year 1938 was, for the fifth consecutive year, considerably in excess of that of the previous corresponding period as indicated in the following table:

1933	1934	1935	1936	1937	1938
8,470	9,236	10,228	12,883	14,006	17,999

The number of various nautical publications sold during the year was as follows:

Catalogue of Charts, Sailing Directions, and Tidal Information with Index	
Maps.....	700
Navigational Charts.....	17,999
Pilots and Sailing Directions.....	430
Tide Tables.....	32,000
Water-levels Bulletins, graphs, etc.....	25,143

There are now available for issue to the public 465 official charts of the Hydrographic Service of Canada. These charts of Canadian waters comprise 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; Saguenay and Richelieu Rivers; and Hudson Bay and Strait).....	197
Great Lakes and inland waters.....	136
Pacific Coast (including Vancouver Island).....	126
Charts for special purposes.....	6

There were 66,632 copies of charts in stock at the Hydrographic Office on January 1, 1939. For the convenience of shipping, a distribution service through local chart dealers, merchants, or Government officers has been provided, whereby charts and other hydrographic publications may be procured at the official list prices, in the following ports: Halifax, Yarmouth, and Canso, N.S.; Saint John, N.B.; Quebec, St. Jean, and Montreal, P.Q.; Kingston, Toronto, Port Colborne, Parry Sound, Killarney, Sault Ste. Marie, Little Current, Port Arthur, and Kenora, Ont.; Winnipeg, Man.; Seattle, Wash.; Prince Rupert, Vancouver, and Victoria, B.C.

MAP SERVICE

LEGAL SURVEYS

This Division acts as a central surveys organization for the carrying out of legal surveys required by other Government services. Many of the records of surveys made under the Dominion Lands System and the survey records in connection with the Indian reserves, national parks, mineral claims, settlement lots on Dominion lands and in connection with aviation fields and penitentiaries are of record in this office.

Under the provisions of the Quartz Mining Regulations and the Yukon Quartz Mining Act, all surveys of mineral claims on Dominion lands must be made by Dominion land surveyors in accordance with the Manual of Survey, and the notes and plans submitted to the Surveyor General for examination prior to his approval. In most cases these surveys are made under the Surveyor General's special instructions. During the year such instructions were issued for the survey of 144 mineral claims. Returns of survey were examined in connection with three homesteads and eight mineral claims from the Yukon Territory, and 127 claims from Northwest Territories, including 42 of excessive size which were dealt with under the regulations. Plans of 113 claims were approved and recorded, including 18 received during the previous year; 43 have not yet been approved, pending corrections to the survey returns.

Noteworthy properties surveyed during the year included Consolidated Smelters of Canada's "Con" group of 27 claims and Negus Mines 6 claims, both groups at Yellowknife Bay, Great Slave Lake; Mining Corporation's "CamLaren" group of 49 claims at Gordon Lake; and Dome Mines 43 "S.D.C." claims at Pensive Lake, all in Northwest Territories. In the Yukon, 8 claims were surveyed as an addition to the Treadwell Yukon Corporation's holdings in the Mayo District. In all of the above cases the principal mineral is gold.

Field Work.—Miscellaneous surveys were carried out in every province of the Dominion except Prince Edward Island, and in the Northwest and Yukon Territories. At the request of the Indian Affairs Branch, new Indian reserves were selected and surveyed at Sandy, Caribou, Sachigo and Cat Lakes in the District of Patricia, Province of Ontario. At these widely separated localities the Indians are accustomed to gather for about three months in the summer and there they are expected to build their homes. From these points they scatter to pre-arranged hunting locations for the autumn and winter. The Indians expressed much gratitude and satisfaction for being allotted lands on which they can establish homes. Three new reserves were surveyed near Fort Ware in central British Columbia about three hundred miles northwest of Prince George. Encroachments upon Indian reserves have caused considerable discontent. Eleven surveys were made in British Columbia to settle disputes of this nature. As many of the Indian reserves were surveyed about 1885, the lapse of time has obliterated the bearing trees and wooden posts used to mark boundaries in those days. It is reported that it is essential to have many of the Indian Reserve boundaries re-monumented as soon as possible. The southern boundary of the Maniwaki Indian Reserve and all the boundaries of Maria Indian Reserve, Province of Quebec, were re-established to prevent further encroachment, and the locations of the roads surveyed to facilitate the compilation of more complete plans of these reserves. A survey was made of a parcel of land in Osnaburg Indian Reserve required for mining and industrial development in that vicinity, as well as a road across the reserve to it. A subdivision was made of the Millbrook Indian Reserve in Nova Scotia for Indian occupation and welfare advancement. To settle a long standing dispute an investigation, a survey, and a subdivision of the John Sero Estate, Lots 24 and 25, Concession A, Tyendinaga, were made.

At the request of the Department of Transport, airports were surveyed at Reay and Bracebridge and extensions to the airports at Killaloe, Megantic, and Ottawa. Radio range sites were surveyed at North Bay, Reay, Bracebridge, Ottawa, and Megantic, and two parcels of land at Ottawa airport were defined for the purpose of preparing plans and descriptions for leasing.

By an order-in-council the Government of the Province of British Columbia has transferred title to 1,215 Indian reserves, outside the lands known as the railway belt, to the Government of the Dominion of Canada. Plans of all of these reserves are being compiled as well as plans, histories, and new schedules of all the Indian reserves in Canada.

For the Federal District Commission, an extensive topographical survey and a map of some of the land to be acquired for the proposed Gatineau Park were made, as well as surveys of parcels in the vicinity of Nepean Point, Ottawa, and Ottawa East Subway. These were supplemented by more than twenty plans and descriptions of legal surveys.

The parkway will begin near the Quebec end of the Champlain Bridge and extend to a point near the Gatineau River about two miles above Wakefield. It rises 1,000 feet from the starting point and falls again about 800 feet to the Gatineau River disclosing along its course scenic views of exceeding beauty. Extensive investigations and explorations were carried out in order to find suitable passes among the hills where grades would not be excessive and where the curves would be least dangerous, all consistent with reasonable economy in construction. It is believed no grade will exceed five per cent and no curve will be less than 800 feet radius. In addition to the main highway, 26 miles of secondary roads were investigated and accurately surveyed.

Plane table surveys were carried out along a ten-mile portion of the main highway. Levels were taken and a profile prepared and cuts and fills calculated and finally an estimate of the cost of constructing the road was made. A map on a scale of one-half mile to the inch showing the road and vicinity was prepared.

For the Lands, Parks and Forests Branch, an investigation and survey were made in connection with a parcel of ordnance land at the easterly end of the Jacques Cartier bridge, Montreal, and another at Laprairie, Quebec. An investigation regarding ordnance lands and Indian Reserve land in British Columbia was commenced by C. H. Taggart, D.L.S., who was appointed Dominion Commissioner for the purpose. This work involves the assembling of copies of numerous plans and information with regard to alienations in all the reserves investigated. A settlement of 125 lots was surveyed at Yellowknife and an official plan was made. This survey is to be extended in the immediate future. Two small surveys were made at Fort Smith which are also to be supplemented in the coming year. The boundary between the Provinces of Alberta and Saskatchewan was extended to the sixtieth parallel of latitude.

Information regarding monuments and boundaries of parcels under the administration of the Dominion Government was supplied to governments of the provinces and individuals upon request.

MAP COMPILATION

The main work of this Division during the year was the compiling of air navigation charts. The base maps necessary to complete the coverage of the Trans-Canada Airway from Vancouver to Moncton were completed with the exception of the Upper Ottawa River sheet. The two sheets necessary to cover the airway from Lethbridge to Edmonton and the sheet required to make the tie to the United States Airways south of Toronto are still to be compiled. No field work was undertaken to collect the information necessary, the latest available from all sources being used, except that a strip of territory along the airway from Nakina to Cochrane was covered by oblique aerial photographs. The plots from the photographs were incorporated in the Nakina-Pagwa and Hearst-Cochrane sheets. These base maps are to serve as topographical editions until such time as it is possible to assemble the further information necessary to convert them into standard topographic map sheets.

The aeronautical data were compiled for four of the map sheets during the year. They include the airports, aerodromes, seaplane anchorages, radio ranges, direction finding stations, power transmission lines, etc., that compose the aids and hazards to air navigation. In order to have them up-to-date their compilation is delayed as late as possible in the construction of the maps. They are overprinted on the base maps in red colour to form the air navigation editions.

Owing to comparatively rapid changes in the aids to air navigation it is expected that the air editions will require revision about every two years. It is not expected that the base maps will be revised for eight years.

Co-operation and the exchange of information with the Civil Aeronautics Authority of the United States Coast and Geodetic Survey is maintained in the production of air navigation maps. Map sheets of both countries overlap in places along the International Boundary and the air information necessary to keep the Canadian portion of the United States Sectional Aeronautical Charts up-to-date is forwarded from this office.

It has not been possible to "flight check" the maps as is done in the United States but it is hoped that any obvious errors or any landmarks of particular service to airmen will be furnished by the air pilots using them.

Toward the end of the year ten eight-mile map sheets of the National Topographic series were undertaken at the request of the Department of National Defence. They are in the vicinity of the Gulf of St. Lawrence and the Atlantic seaboard. Both topographical and air navigation editions will be issued for each sheet. The air navigation editions, being urgently required, are to be prepared first.

The compilation of the general administrative map of the Northwest and Yukon Territories, to be printed on a scale of eighty miles to one inch, was completed during the year. The map includes the whole of the Northwest Territories and Yukon, comprising forty-one per cent of the total area of Canada, and parts of Alaska and Greenland. Although a large part of the area is still only partially explored, detailed information of the topographical features is gradually becoming available through the aerial mapping of the mineralized areas. This new information together with up-to-date data regarding trading posts, Royal Canadian Mounted Police posts, hospitals, schools, post offices, wireless stations, aerodromes and seaplane anchorages have been incorporated into this much needed map.

In order to show more of the topographical details than can be done on the general administrative map, a series of five maps on a scale of thirty-five miles to one inch has been laid out to cover the Northwest and Yukon Territories. In 1933, sheet number two of this series which includes the mineralized areas in the vicinity of Great Bear and Great Slave Lakes was printed. Sheet number one, covering the Yukon Territory and the lower Mackenzie River basin was compiled during the year.

Records of exploration in Northern Canada have been searched and the best information available from them plotted on projection sheets at a scale of eight miles to one inch. The sheets are kept up-to-date by entering new information from current explorations as it becomes available and adjusting the older information to agree with any more recent and more reliable geographic positions.

A map of southern Saskatchewan was printed in 1935. The compiling of its companion sheet "Northern Saskatchewan" was completed during the present year. These two sheets at a scale of sixteen miles to one inch are to replace the Chief Geographer's twelve-and-one-half-mile map, the revision and reprinting of which was uneconomical. The northern sheet is expected to fill the requirements of air navigation until the eight-mile sheets become available.

General.—The compilation of one four-mile map sheet of the National Topographic series in the vicinity of Montreal was commenced. In addition, work was done on 32 other maps of this series, the progress of which had reached various stages or which were reprints requiring revision. These included 12 one-mile map sheets and 1 eight-mile sheet. It has been necessary to reprint other maps without required revision, owing to our inability to undertake the work. This is particularly true of sheets of the Sectional Map of Canada.

One member of the staff was seconded to the Saskatchewan-Alberta Boundary Commission for a portion of the year in order to complete the survey of the boundary line between the two provinces.

COMPUTING AND ELECTORAL MAP

Saskatchewan-Alberta Boundary.—During the year the Fourth Meridian in the System of Dominion Lands Surveys, which is the boundary line between Saskatchewan and Alberta, was continued to the sixtieth parallel of latitude. This work was under the direction of an Interprovincial Boundary Commission consisting of the Surveyor General of Dominion Lands as Chairman, the Controller of Surveys for Saskatchewan, and the Director of Surveys for Alberta.

A Dominion land surveyor from the staff of this Service was seconded to the Commission to have charge of the field work. The line was carried over the ice of Lake Athabaska during the early spring of 1938, and was then discontinued

until the summer. During the summer the line was produced through the remaining forty-eight miles of bush country. Air transport to and from the work, with camp moves along the line by aeroplane, proved considerably more economical than the old method of transport by pack-horse or man-pack. The terminal point on the line was determined by an astronomical observation for latitude taken by a member of the Geodetic Service of Canada. It was very gratifying to this Service that the closing of this astronomic point agreed closely with the theoretically calculated value.

Magnetic Work.—The collection and collation of data relative to the magnetic needle were continued. A large number of observations for magnetic declinations were taken by surveyors of this Service, the Bureau of Geology and Topography, the Geographic Section of the Department of National Defence, the engineers of the Hydrographic Service, and by many provincial surveyors. Co-operation in this work is readily extended by all who realize its value and the results of the numerous observations supplied to this Service were incorporated in the records of some 35,000 previous observations. Close co-operation was extended by the Dominion Observatory whose scientific magnetic research work provides a means of bringing these thousands of observations up-to-date for use in determining the paths of the isogonic lines of the present day. The paths of these lines were studied and supplied for all the topographic and air maps and for the Hydrographic charts published during the year. In connection with the above work, the compasses of the numerous instruments used by the surveyors taking the observations were standardized by comparison with a standard instrument reserved for this purpose and standardized by the Dominion Observatory. In this way the corrections to the different magnetic compasses were determined and applied to the field observations.

Computations.—Numerous computations were made during the year, including the computation of the astronomical field tables which are widely used throughout Canada; the computations of air distances between air landing fields for the Post Office Department; the design for map projections for maps in course of preparation; the design of a system of rectangular co-ordinates for the survey of Toronto harbour to facilitate the computations and ready supplying of information to harbour engineers for future work, and many other computations of a miscellaneous nature.

Interpretation of Records.—Numerous requests from other survey organizations of the Federal and Provincial Governments, and from private firms, for information concerning surveys made by the former Topographical Survey of Canada, were received. These requests necessitated consulting and interpreting the records of the original surveys and the preparation of much information based upon them.

Electoral District Maps.—The maps of the Federal Electoral Districts are distributed from this Division. Considerable work was done in keeping base maps up to date with regard to changes in parish, municipality, and county boundaries so as to be in a position to deal with the work incidental to the next redistribution.

SURVEY RECORDS AND DISTRIBUTION

Survey Records.—This Division has charge of the registration and recording of all survey notes and plans affecting Dominion lands and interprovincial

boundaries; the supplying of information relating to these records, and the storing and distributing of the official plans of townships, townsites, and settlements. Up to the end of the fiscal year, 22,143 books and 39,498 plans had been placed on record. During the year 5,388 official plans were distributed.

Distribution of Maps and Publications.—This Division now distributes not only all the publications and topographical and geographical maps issued by this Map Service, but all the topographical and other maps issued by the Geographical Section, Department of National Defence, the maps which were issued by what was formerly the National Development Bureau, and the topographical and geographical maps issued by the Bureau of Geology and Topography. There are now available for distribution from this office about 1,200 different maps, as well as about 100 reports and pamphlets. A price has been set on all these maps, and on all the reports and pamphlets, except certain technical publications intended only for technical officials of the Government, surveyors, engineers, and scientific organizations. During the last fiscal year there were distributed 137,723 maps and 3,354 publications. In carrying on this work, 28,080 letters and requests were dealt with.

The demand for maps is still increasing. The number distributed during the year just ended was an increase of thirty-three per cent over the previous year. These requests come from all sections of the country and from those in every walk of life. In addition to requests from the business world, private organizations, and the general public, heavy demands were met from other departments of the Federal Government to enable them to carry on their various activities, and from various departments of the provincial governments including such organizations as the Ontario Hydro Electric Commission. Many requests have also been received from people in the United States who expect to spend their vacations in Canada, especially from those who are interested in hunting, fishing, and in taking canoe trips. All these people want the latest and most detailed maps possible. Judging from the letters received, it is quite evident that the issue of these detailed maps has greatly increased the number of these tourists.

The large demand for the map of Canada on the scale of 100 miles to an inch and for the map of the World, still continues. During the past year it was found necessary to reprint 15,000 copies of the map of Canada, 5,000 copies being sent to the Canadian Travel Bureau to meet requests from prospective tourists.

Maps covering the route of Trans-Canada Air Lines and showing flying information, are required. These are on a scale of eight miles to one inch. Some of these maps are already issued and others are being prepared as quickly as possible. During the year, the Charlottetown-Sydney and the Cranbrook-Lethbridge sheets were issued. The route from Ottawa to the Atlantic is now covered.

BOARD OF EXAMINERS FOR DOMINION LAND SURVEYORS

The Board of Examiners for Dominion Land Surveyors held one meeting during the year, beginning February 14 and lasting until March 16. During this meeting examinations were held at Ottawa, Kingston, Saskville, and Edmonton. The total number of candidates who presented themselves at the examination was thirty. Of these, twenty-nine tried the preliminary examination and one tried the final examination.

Nine candidates were successful at the preliminary examination as follows: H. M. Baker; C. C. J. Bond; V. Bradley; H. W. Chapman; R. J. Kennedy; D. Manning; W. Martin; R. G. Rowan; and H. N. Wallace.

One candidate was successful at the final examination, namely:—P. Hargrove.

One Dominion standard measure of length was issued during the year and one measure was tested.

MAP PUBLICATION

This Division makes the finished drawings of maps and plans for reproduction, photographs these drawings to the scale of publication, makes the photo-litho zinc plates and prints the editions. The maps published during the year and those in course of preparation are shown in the separate list. From this it will be observed that work was done for other branches of the Department as well as for other Federal departments. The total number of copies of maps printed was approximately 357,000, necessitating nearly 1,245,000 impressions, as many of the maps were in several colours.

In the interest of further economies and in accordance with departmental policy this Service undertook in 1937-8 to make the necessary lithographic plates and print a number of multi-coloured maps for the Mines and Geology Branch. The work was continued into 1938-9 when twelve additional map sheets were printed. The experiment proved successful.

The work performed in the photo-mechanical division included: wet plate negatives, 1,220; photolithographic plates, 531; contact prints and enlargements, 7,420; plotting grids, 119; line cuts, 89; vandyke prints, 3,020; blue printing, 208,106 square feet; vandyke printing, 16,530 square feet; photostat work, 6,700 sheets. Much of this work was done for other branches of the Department and for other Federal departments.

Similarly, work was done for the whole Department in the following respects: books bound, 62; maps mounted, 248; maps dissected and mounted, 67; maps mounted with rollers, 104; maps, photographs, and other manuscript mounted on card, 50; miscellaneous jobs, 34.

List of Map Sheets of the National Topographic Series and of the Sectional Map Series Issued 1938-9, and in Hand on March 31, 1939

ISSUED 1938-9

Province	No.	Series	Name	Scale (in Miles to 1 inch)	Latitude	Longitude	Remarks
Maritimes...	S. 1/11/ NW.						
	N. 1/11/ SW.	N.T.	Charlottetown-Sydney	8	45° 00' to 47° 00'	60° 00' to 64° 00'	(b)
N.S.	21-A/SE.	N.T.	Bridgewater	2	44° 00' to 44° 30'	64° 00' to 65° 00'	(b)
Que.	31-J/SW.	N.T.	Maniwaki	2	46° 00' to 46° 30'	75° 00' to 76° 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 78° 00'	(b)
Ont.	52-F.	N.T.	Dryden	4	49° 00' to 50° 00'	92° 00' to 94° 00'	(b) reprint
	52-G.	N.T.	Ignace	4	49° 00' to 50° 00'	90° 00' to 92° 00'	(b) reprint
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) revised edition
	53-M.	N.T.	Knee Lake	4	55° 00' to 56° 00'	94° 00' to 96° 00'	(b)
	62-H.	N.T.	Winnipeg	4	49° 00' to 50° 00'	96° 00' to 98° 00'	(a) reprint
	62-I.	N.T.	Selkirk	4	50° 00' to 51° 00'	96° 00' to 98° 00'	(a) reprint
	72.	Sect.	Brandon	3	49° 42' to 50° 24'	98° 00' to 100° 05'	(d) reprint
Sask.	63.	Sect.	Swift Current	3	49° 42' to 50° 24'	106° 00' to 108° 04'	(d) reprint
	267.	Sect.	Battleford	3	52° 29' to 53° 12'	108° 01' to 110° 00'	(d) reprint
Alta.	82-SE.	N.T.	Cranbrook-Lethbridge	8	48° 00' to 50° 00'	112° 00' to 116° 00'	(b) aeronautical
	65.	Sect.	Macleod	3	49° 42' to 50° 24'	112° 02' to 114° 00'	(d) reprint
	114.	Sect.	Calgary	3	50° 24' to 51° 06'	114° 00' to 116° 05'	(d) reprint
	264.	Sect.	Brazeau	3	52° 29' to 53° 12'	113° 59' to 116° 03'	(f) reprint
	265.	Sect.	Peace Hills	3	52° 29' to 53° 12'	112° 01' to 114° 00'	(d) reprint
B.C.	92-L/1.	N.T.	Schoen Lake	1	50° 00' to 50° 15'	126° 00' to 128° 30'	(a)
	92-L/2.	N.T.	Woss Lake	1	50° 00' to 50° 15'	126° 30' to 127° 00'	(a)
	92-L/3.	N.T.	Adam River	1	50° 15' to 50° 30'	126° 00' to 126° 30'	(a)
	93-A/11.	N.T.	Spanish Lake	1	52° 30' to 52° 45'	121° 00' to 121° 30'	(a)
	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'	(a)
	93-A/14.	N.T.	Cariboo Lake	1	52° 45' to 53° 00'	121° 00' to 121° 30'	(a)
	162.	Sect.	Seymour	3	51° 15' to 51° 48'	117° 58' to 120° 07'	(f) reprint
N.W.T.	86/SE & 86/SW.	N.T.	Camsell River	4	64° 00' to 66° 00'	112° 00' to 120° 00'	(c) reprint
P.E.I.	11/NW	N.T.	Charlottetown-Magdalen	8	46° 00' to 48° 00'	60° 00' to 64° 00'	(b)
N.S.	21-H/16.	N.T.	Amherst	1	45° 45' to 46° 00'	64° 00' to 64° 30'	(a)
	11-K/NE.	N.T.	Cape Breton Highlands Park	2	46° 30' to 47° 00'	60° 15' to 61° 15'	(b)
	11-D.	N.T.	Halifax-Sheet Harbour	4	44° 00' to 45° 00'	62° 00' to 64° 00'	(b)
	11/SW	N.T.	Halifax-Louisbourg	8	44° 00' to 46° 00'	60° 00' to 64° 00'	(b)
	S. 1/21/ SW.						
	N. 1/20/ NE.	N.T.	Yarmouth Windsor	8	43° 00' to 45° 00'	64° 00' to 68° 00'	(b)
N.B.	21-H/12.	N.T.	Sussex	1	45° 30' to 45° 45'	65° 30' to 66° 00'	(a) reprint
	21-G/SE.	N.T.	Saint John	2	45° 00' to 45° 30'	66° 00' to 67° 00'	(b)
	21/NE.	N.T.	Campbellton-Moncton	8	46° 00' to 48° 00'	64° 00' to 68° 00'	(b)
Que.	21-L/NW.	N.T.	Quebec	2	46° 30' to 47° 00'	71° 00' to 72° 00'	(a) reprint
	22-D/5, 6, 11 & 12	N.T.	Chicoutimi	2	48° 15' to 48° 45'	71° 00' to 72° 00'	(b)
	31-K/SE.	N.T.	Gracefield	2	46° 00' to 46° 30'	76° 00' to 77° 00'	(b) reprint
	31-I/NE.	N.T.	Grand Mere	2	46° 30' to 47° 00'	72° 00' to 73° 00'	(b)
	31-H.	N.T.	Montreal	4	45° 00' to 46° 00'	72° 00' to 74° 00'	(a)
	31-M.	N.T.	Timiskaming	4	47° 00' to 48° 00'	78° 00' to 80° 00'	(b)
	12/SW.	N.T.	Anticosti Island	8	48° 00' to 50° 00'	60° 00' to 64° 00'	(b)
	12/NW.	N.T.	Natashkwan River	8	50° 00' to 52° 00'	60° 00' to 64° 00'	(b)

List of Map Sheets of the National Topographic Series and of the Sectional Map Series Issued 1938-9, and in Hand on March 31, 1939—Continued

IN HAND MARCH 31, 1939

Province	No.	Series	Name	Scale (in Miles to 1 inch)	Latitude	Longitude	Remarks	
Que.— <i>Conc.</i>	12/NE....	N.T.	Belle Isle.....	8	50° 00' to 52° 00'	56° 00' to 60° 00'	(b)	
	21/NW....	N.T.	Quebec-Edmundston..	8	46° 00' to 48° 00'	68° 00' to 72° 00'	(a)	
	22/NE....	N.T.	Clark City-Mingan.....	8	50° 00' to 52° 00'	64° 00' to 68° 00'	(b)	
	22/SE....	N.T.	Gaspe.....	8	48° 00' to 50° 00'	64° 00' to 68° 00'	(b)	
	31/NE....	N.T.	Gatineau-St. Maurice...	8	46° 00' to 48° 00'	72° 00' to 76° 00'	(b)	
	31/NW....	N.T.	Upper Ottawa River.....	8	46° 00' to 48° 00'	76° 00' to 78° 00'	(b)	
Ont.....	31-F/7....	N.T.	Renfrew.....	1	45° 15' to 45° 30'	76° 30' to 77° 00'	(a)	
	41-J/SW....	N.T.	Thessalon.....	2	46° 00' to 46° 30'	83° 00' to 84° 00'	(b)	
	52-A/SW....	N.T.	Fort William-Port Arthur..	2	48° 00' to 48° 30'	89° 00' to 90° 00'	(b)	
	52-A/NW....	N.T.	Kaministikwia.....	2	48° 30' to 49° 00'	89° 00' to 90° 00'	(b)	
	42-E.....	N.T.	Longlac.....	4	49° 00' to 50° 00'	86° 00' to 88° 00'	(b)	
	52-K.....	N.T.	Lac Seul.....	4	50° 00' to 51° 00'	92° 00' to 94° 00'	(b) reprint	
	31/SE....	N.T.	Ottawa-Montreal.....	8	44° 00' to 46° 00'	72° 00' to 76° 00'	(a) reprint	
	31/SW....	N.T.	Toronto-Ottawa	8	44° 00' to 46° 00'	76° 00' to 80° 00'	(a)	
	E. $\frac{1}{2}$ 40/NE. } W. $\frac{1}{2}$ 30/NW. }	N.T.	Toronto-Windsor.....	8	42° 00' to 44° 00'	79° 00' to 83° 00'	(a) aeronautical	
	42/SE....	N.T.	Hearst-Cochrane.....	8	48° 00' to 50° 00'	79° 15' to 84° 00'	(b) aeronautical.	
	N. $\frac{1}{2}$ 42/SW. } S. $\frac{1}{2}$ 42/NW. }	N.T.	Nakina-Pagwa.....	8	49° 00' to 51° 00'	84° 00' to 88° 00'	(a) aeronautical	
	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)	
	N. $\frac{1}{2}$ 52/SE. } S. $\frac{1}{2}$ 52/NE. }	N.T.	Sioux Lookout-Nipigon.....	8	49° 00' to 51° 00'	88° 00' to 92° 00'	(b) aeronautical	
	N. $\frac{1}{2}$ 52/SW. } S. $\frac{1}{2}$ 52/NW. }	N.T.	Kenora-Hudson.....	8	49° 00' to 51° 00'	92° 00' to 96° 00'	(b) aeronautical	
	Man.....	N. $\frac{1}{2}$ 62/SE.						
		S. $\frac{1}{2}$ 62/NE.	N.T.	Brandon-Winnipeg.....	8	49° 00' to 51° 00'	96° 00' to 100° 00'	(a) aeronautical
Sask.....	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)	
	N. $\frac{1}{2}$ 62/SW. } S. $\frac{1}{2}$ 62/NW. }	N.T.	Indian Head-Rivers.....	8	49° 00' to 51° 00'	100° 00' to 104° 00'	(a) aeronautical	
	N. $\frac{1}{2}$ 72/SW. } S. $\frac{1}{2}$ 72/NW. }	N.T.	Swift Current-Regina.....	8	49° 00' to 51° 00'	104° 00' to 108° 00'	(a) aeronautical	
	117.....	Sect.	Red Deer Forks.....	3	50° 24' to 51° 06'	108° 03' to 110° 00'	(f) reprint	
Alta.....	318.....	Sect.	Big River.....	3	53° 11' to 53° 54'	106° 00' to 108° 05'	(e) reprint	
	82-O/SW....	N.T.	Banff.....	2	51° 00' to 51° 30'	115° 00' to 116° 00'	(a)	
	84-N/NE....	N.T.	Ells River.....	2	59° 30' to 60° 00'	116° 00' to 117° 00'		
	73-L.....	N.T.	Lac la Biche....	4	54° 00' to 55° 00'	110° 00' to 112° 00'		
	N. $\frac{1}{2}$ 72/SW. } S. $\frac{1}{2}$ 72/NW. }	N.T.	Medicine Hat-Maple Creek.....	8	49° 00' to 51° 00'	108° 00' to 112° 00'	(a) aeronautical	
	104.....	Sect.	Banff.....	3	51° 05' to 51° 48'	113° 59' to 116° 07'	(d) reprint	

List of Map Sheets of the National Topographic Series and of the Sectional Map Series Issued 1938-9, and in Hand on March 31, 1939—Concluded

ISSUED 1938-39—Concluded

Province	No.	Series	Name	Scale (in Miles to 1 inch)	Latitude	Longitude	Remarks
B.C.	92-G/1...	N.T.	Sumas.....	1	49° 00' to 49° 15'	122° 00' to 122° 30'	(a)
	92-G/3...	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)
	93-A/5...	N.T.	Beaver Creek...	1	52° 15' to 52° 30'	121° 30' to 122° 00'	(a)
	93-A/6...	N.T.	Horsety.....	1	52° 15' to 52° 30'	121° 00' to 121° 30'	(a)
	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	48° 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)
	82/SW....	N.T.	Okanagan-Kootenay	8	48° 00' to 50° 00'	116° 00' to 120° 00'	(b)
	92/SE....	N.T.	Victoria-Vancouver	8	48° 00' to 50° 00'	112° 00' to 116° 00'	(b) aeronautical
N.W.T.	75/K. & L.	N.T.	Fort Reliance...	4	62° 00' to 63° 00'	108° 00' to 112° 00'	(c)
	85/I. & J.	N.T.	Yellowknife Bay	4	62° 00' to 63° 00'	112° 00' to 116° 00'	(b)
	85/NE. & NW.	N.T.	Rae.....	8	62° 00' to 64° 00'	112° 00' to 120° 00'	(c)

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.

*List of Miscellaneous Map Sheets and Plans Issued 1938-9 and in Hand
March 31, 1939*

ISSUED 1938-9

Province	Map	Scale (in Miles to 1 inch)	Remarks	
Ont.	London.....	3.95	Reprint without revision.	
	Toronto.....	3.95	“ “ “	
	Sault Ste. Marie.....	7.89	“ “ “	
	Renfrew.....	1	Advance edition.	
	Manitoba North.....	16		
Sask.	Saskatchewan South.....	16		
Alta.	Banff and vicinity.....	1	Reprint.	
N.W.T.	Yellowknife Bay.....	4	Advance edition.	
	Fort Reliance.....	4	“ “	
General.	Lake Athabaska.....		Reprint.	
	Dominion of Canada.....	100	Reprint.	
	Map of Canada.....	250		
	Fort Smith Settlement.....		Reprint.	
	Edmonton Settlement.....		Reprint.	
	Index to National Topographic Series, Alberta and British Columbia.....			
	Index to National Topographic Series, Manitoba and Saskatchewan.....			
	Index to National Topographic Series, Quebec.....			
	Index to National Topographic Series, Ontario.....			
	Index to three-mile sectional sheets.....			
	Plan of Aklavik and Lot I.....		Reprint.	
	Three Prairie Provinces.....	35	Reprint.	
	Five Electoral District maps.....			
	Folders for five maps.....			
	Sun tables.....			
	Two sets of astronomical field tables.....			
	Wood Buffalo Park.....			
	Advertising poster for charts.....			
	British Columbia advertising poster.....			
	Loose leaf forms for hydrographic survey field notes.....			
	Manual—General Instructions for Nautical Charts.....			
	Hydrographic graphs—water levels.....			
	110 township plans.....	½	Reprints.	
	38 Hydrographic charts.....			
	Miscellaneous.	Fire Hazard Chart.....		Lands, Parks and Forests Branch.
		Chart showing diameter and height curves.....		“ “ “
		National Parks of Canada.....		“ “ “
Petawawa Forest Experiment Station.....			“ “ “	
Eastern Arctic Patrol Map.....			“ “ “	
Graph—“Jack Pine”.....			“ “ “	
Goulais River Cut-over Lands.....			“ “ “	
Form Class Charts.....			“ “ “	
Georgian Bay and Islands.....			“ “ “	
Jasper Park, North and South.....			“ “ “	
Kootenay Park.....			“ “ “	
Yoho Park.....			“ “ “	
Map of Canada showing Indian Reserves and Agencies.....			Indian Affairs Branch.	
Map of Eastern Canada showing Indian Reserves and Agencies.....			“ “ “	
Map of British Columbia showing Indian Reserves and Agencies.....			“ “ “	
Opemisca geological map.....			Mines and Geology Branch.	
Manitoulin Island geological map.....			“ “ “	
Petitcodiac geological map, east and west halves.....			“ “ “	
Hearst-Kapuskasing geological map, east and west halves.....			“ “ “	
Cranbrook geological map.....			“ “ “	
Shebandowan geological map.....			“ “ “	
Duvernay geological map, east and west halves.....			“ “ “	
Landrienne geological map, east and west halves.....			“ “ “	
Plotting grid forms.....			“ “ “	

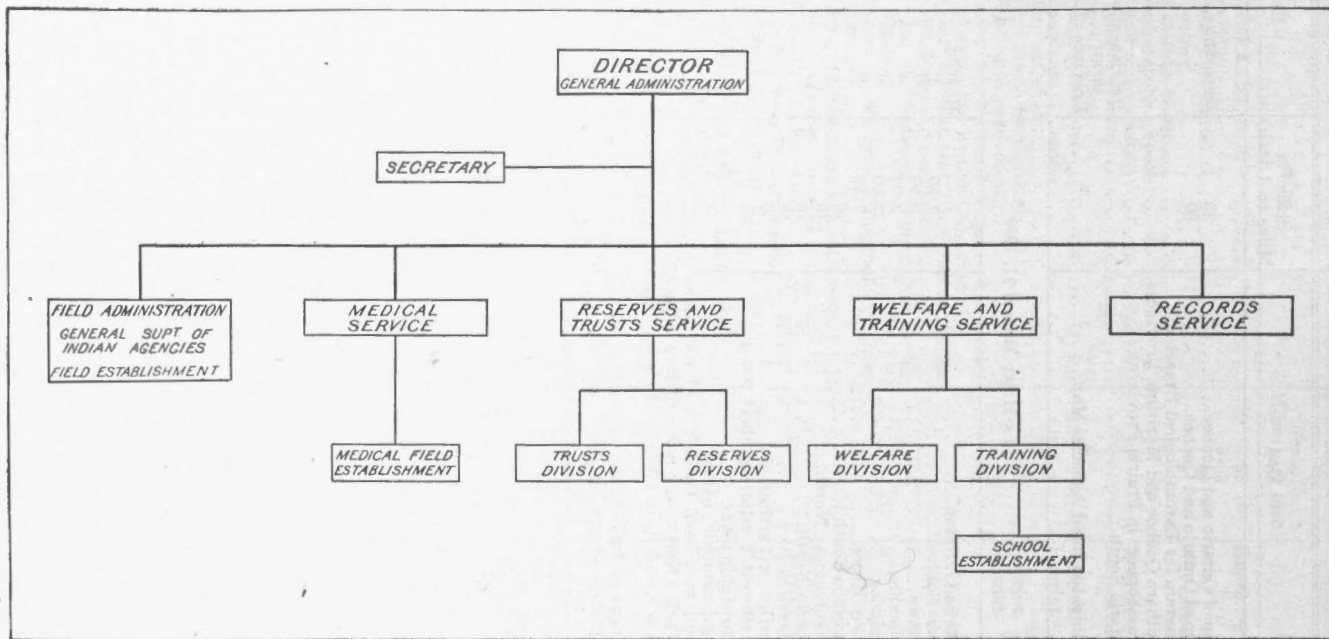
List of Miscellaneous Map Sheets and Plans Issued 1938-9 and in Hand
March 31, 1939—Concluded

ISSUED 1938-39—Concluded

Province	Map	Scale (in Miles to 1 inch)	Remarks
Miscellaneous..	Map of Ontario and Quebec.....	35	Department of Agriculture.
	Map of Ontario and Quebec.....	60	“ “ “
	Diagram for Entomological Branch.....		“ “ “
	Southern Quebec and Maritime Provinces.....		“ “ “
	Grasshoppers in Prairie Provinces.....		“ “ “
	Ontario South.....		Reprint—Province of Ontario.
	Edmonton Land Agencies Map.....		Province of Alberta.

IN HAND MARCH 31, 1939

Que.....	Ottawa-Gatineau.....	1	Reprint.
	Blanc Sablon.....	7-89	“
Ont.....	Ottawa.....	3-95	“
	Belleville.....	3-95	“
	Nipissing.....	7-89	“
	Rainy River.....	7-89	“
Man.....	Manitoba South.....	16	
Sask.....	Saskatchewan North.....	16	
Alta.....	Alberta North.....	16	
	Alberta South.....	16	
N.W.T.....	Northwest Territories.....	80	
	Northwest Territories, Sheet No. 1.....	35	
General.....	20 township plans.....	$\frac{1}{2}$	Reprints.
	7 hydrographic charts.....		
Miscellaneous..	Reprints of Banff Park, Yoho Park, Jasper Park (North & South), Prince Albert Park, and Riding Mountain Park.....		Lands, Parks and Forests Branch.
	Ottawa geological map.....		Mines and Geology Branch.
	Soil Map, Annapolis Valley.....		Department of Agriculture.



Organization Chart, Indian Affairs Branch.

INDIAN AFFAIRS BRANCH

DR. H. W. MCGILL, DIRECTOR

With the extension of settlement and the depletion of wild life, agriculture is becoming of increasing importance for Indians on reserves in areas where land and climate permit of farming and stock raising as a means of livelihood. Many of the tribes have a considerable natural aptitude for agricultural pursuits and are gradually adopting the more advanced methods of farming practised by their white neighbours.

Reports from parts of Canada where the Indians depend upon the hunt for their livelihood indicate a great scarcity of fur-bearing animals, although in some parts of the Northwest Territories moose and caribou appear to have been plentiful. Undoubtedly one of the principal factors in the depletion of fur has been over intensive trapping due to the encroachment of white trappers on the trapping grounds of the Indians. It is well known that the Indian if left to himself is a conservationist, but under the spur of competition he may be forced to disregard his natural inclinations.

Generally speaking the Indians of British Columbia have had a comparatively normal year. In the northern interior agencies, hay, grain, and root crops were light owing to lack of sufficient moisture. In the sections of the interior dependent on irrigation, great care was exercised in the use of water with the result that crops were not seriously affected by the general drought. Reports indicate that the Indians are paying more attention to the proper cultivation of their lands and realize more fully the importance of summer-fallow.

The largest number of self-supporting Indians in the interior agencies of British Columbia are dependent upon cattle raising for a living. In the Okanagan Agency alone some 4,000 head are owned by the Indians and in some sections the Indians own larger herds than their white neighbours. Prices for beef cattle were fair during the year under review. In some sections where a shortage of hay occurred owing to drought, stock which the Indians could not winter was disposed of early and to good advantage.

Returns from trapping were unusually light from all parts of the province. Every effort is being made by the Department to purchase additional trap-lines for these Indians when those held by white trappers become available.

Each year shows an improvement in the farming methods used by Indians of Alberta and the number of acres summer-fallowed has increased. During the summer of 1938 one agency in the southern part of the Province summer-fallowed nearly 10,000 acres of land. The returns of last season were very encouraging, every agency in the Province threshing a bountiful harvest. The herds are steadily increasing and an exceptionally good crop of hay and green feed provided amply for all calves during the winter as well as for many steers and cows. The quality and breed of the Indian horses has been improved by the purchase of new sires and the disposal of small-sized ponies. Indians who fish for food have been well supplied although commercial fishing in Alberta was not as remunerative as during the year 1937-8. Special attention is being given to the timber industry in the Stony Agency and valuable assistance has been afforded by the officials of the Forest Service. The Indians of northern Alberta still live by the hunt, and as in other parts of the country, returns have been small.

The Indians of Saskatchewan in recent years have found existence very difficult and this has had the effect of forcing them to turn to other means of support. During the period of depression and drought the Indians did not have funds to supply themselves with suitable horses and implements. However measures have been taken in the past three years to meet the situation. On

reserves where the Indians were short of horses and equipment community farming enterprises have been organized with remarkable success. During the season of 1938 a good harvest was anticipated but grasshoppers greatly reduced the crop of wheat. Community gardens proved a decided success. From reports received practically all reserves had a sufficient supply of potatoes and garden truck during the winter of 1938-9. The more general use of vegetables has improved the health of the Indians and has reduced flour requirements by as much as fifty per cent in some instances. Every effort has been made to increase the herds but until the period of prolonged drought has definitely come to an end progress in this direction must be slow. During recent years the Indians have had to depend largely upon cattle as a source of food as well as revenue.

The Indians living in the southern portion of the Province of Manitoba continue to show interest in farming and gardening. Small community farms and gardens are being operated and the Indians are encouraged to raise sufficient produce for their needs throughout the winter. The acreage summer-fallowed has been increased each year and in the autumn of 1938 the Indians received fair returns in the way of grain and garden produce; some reserves threshed good crops of wheat. The cattle industry is becoming of increased importance to the Indians of this Province and their herds are being improved by the addition of good sires. Indians of Manitoba who hunt and trap have been experiencing difficult times like other northern tribes. The situation caused by the scarcity of fur-bearing animals will probably continue to be acute until the fur conservation projects now being conducted by the Branch commence to show results.

In Ontario, some of the Indians have taken to farming for the first time during the year under review. They are being encouraged and assisted financially to develop the resources of their reserves as a permanent means of self-support. New land has been cleared and prepared for seeding and crop acreage has been increased. On reserves which are especially well suited for the purpose, the Indians are being encouraged to give greater attention to farming possibilities. On the reserve near Deseronto several individual Indians own tractors and are carrying on successfully. Two tractors and a number of horses have recently been supplied to the Six Nations Reserve near Brantford. A farming instructor has been appointed to direct operations on this and the adjoining reserve of the Mississaguas of the Credit. The housing situation is gradually being improved in this Province. Extensive repairs and improvements have been made and new houses have been built. A considerable amount of road building has given employment to the Indians of Ontario.

The Indians of northern Quebec too have suffered from the general scarcity of fur-bearing animals. A prospective upward trend in the cycle of these animals and the provision of beaver sanctuaries in this Province are expected to improve conditions for the trapping Indians in the future. On some of the reserves in the Province the Indians have been successful in mixed farming and they have been encouraged and assisted in their native handicraft work with good results.

The Indians of the Maritime Provinces are on the whole among the least progressive in the Dominion. A certain advancement can be traced to efforts made to induce them to put in larger gardens and where possible an increase in their live stock has been advocated. The Indian women are good housekeepers and the homes and living conditions are showing gradual improvement.

NEW AGENCY—SIOUX LOOKOUT

In order to provide a more efficient supervision of the Indians of northern Ontario and to more economically administer their relief and medical service, authority was obtained in June, 1938, for the establishment of an Indian agency with headquarters at Sioux Lookout.

INDIAN HEALTH SERVICE

The ordinary medical and health services for Indians were carried on during the year under perhaps better conditions, and in a more effective manner, than in any previous year.

With the exception of the Mackenzie River basin, the incidence of communicable disease throughout the country, was low. With respect to that area, and particularly about Lake Athabaska, the local Medical Superintendent reported that while the health of the Indians in this area was then very good, there had been outbreaks of septic throat, scarlet fever, diphtheria, and influenza. In the autumn an outbreak of septic throat was closely watched and finally subsided to the sporadic case. Several typical cases of scarlet fever developed and were quarantined with good results. In the winter an outbreak of diphtheria occurred in the Jack Fish Lake district with five definite cases put under quarantine. These were treated with complete recovery and as a precaution all the Indians in this and nearby districts were given antitoxin. No further outbreaks of disease were heard of until treaty time when a girl was brought in from Old Fort with paralysis of the throat. She died two days afterwards of acute cardiac failure. Careful questioning of the Indians in that area revealed the fact that during the spring break-up the majority of them had been laid up with sore throats. There had been no new cases for a month previous to treaty time.

At spring break-up a severe epidemic of influenza struck the whole area. This was evidently brought from Fond du Lac by an Indian who came to trade his furs. Three days after his arrival the first cases developed and before the week was out over thirty were down. It also entered the school where all the children contracted it as well as over half the staff. Following that it spread to the various encampments and did not let up until practically every Indian had had the disease.

The facilities and working force available for medical services have been substantially improved during the year. A part-time physician at The Pas was replaced by a full-time Medical Superintendent. Another full-time Superintendent was established at Prince Albert, to attend some small local bands, to supervise a large area in which it is still necessary to employ part-time physicians, and to extend health service to bands north of Prince Albert which have no local doctors. Medical Superintendents were also appointed at the Indian Agency now based on Fort Norman, N.W.T. (formerly on Fort Good Hope), and at Fort Resolution, N.W.T. These were replacements made necessary by one transfer and one retirement. An additional nursing service was provided in the area between Lakes Winnipeg and Manitoba. The staff of the office at Ottawa was strengthened by the appointment of an Assistant to the Superintendent of Medical Services. The position was filled by promotion of a Medical Superintendent with seven years' experience in the field service.

The nine departmental hospitals were operated during the year and their equipment was improved. The total number of beds available in these hospitals is about 225. The number of patient-days treatment provided in the twelve months was 63,730.

Trachoma among Indians remains a menace to the population of Canada, particularly of the Western Provinces. However, progress in the fight against this disease is reported by Dr. J. J. Wall, departmental expert. A good deal of sound and patient trachoma treatment has been carried on in residential schools, and on reserves where nursing services or fairly extensive medical attendance is available. The records show that trachoma in the western residential schools has diminished by about one-half since Dr. Wall organized this service in 1934.

In the fight against tuberculosis, the situation continues to be more encouraging. There was made available in 1938-9, some \$200,000 more than

was expended for medical services in the preceding year. Not only was all this sum used for diagnosis and treatment of tuberculosis but an additional \$56,000 out of the regular funds was applied to this work. The end aimed at was the control, if not elimination, of tuberculosis in residential schools, at reserves where the low incidence of the disease gave hope of fairly early and not too expensive control, and at a few reserves adjoining dense white populations. Much new diagnostic work on a fairly broad scale was undertaken. At the reserves with a low incidence rating it was found that the disease among young people was scarcely, if at all, more prevalent than among the corresponding age groups in the surrounding white population. At reserves where the incidence rating was high there was at least ten times as much tuberculosis as among the population at large, and there were wide variations between these extremes. These findings agreed with information already available, and supported the plan of attack adopted.

It was not to be expected that a program of this extent, covering the whole of Canada, could be got into smooth operation in one year, or without a certain number of complications. Proposals for diagnostic work and sanatorium treatment were, in fact, considered on the principle of first come first served, with the general result that the number of tuberculous Indians receiving treatment in institutions rose from 358 in 1938 to 512 in March, 1939. At the same time study was given to the possibility of providing for tuberculous Indians, and especially for hopeless cases, some sort of isolation and treatment institutions which could be operated at a less cost than fully staffed and equipped hospitals or sanatoria. The problem is still being studied, and two or three such institutions are being established. If they are successful, they may be a contribution to the solution of the problem of tuberculosis control in Canada.

In this program, the Department had the advice of provincial and voluntary tuberculosis organizations throughout Canada. A meeting was held at Ottawa in December, 1938, at which plans for 1938-9 were thoroughly discussed by representatives of the Department and the above organizations. A standing advisory committee is in existence, of which the Chairman of the Sanatorium Board of one of the provinces is chairman, and which includes representative workers in this field from several other provinces and the Dominion service. It is the aim of the Branch to avail itself of the advice and assistance of all organizations, provincial and otherwise, engaged in this work, and to avoid duplication of effort.

WELFARE AND TRAINING SERVICE

TRAINING

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
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.....	8,906	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
1937-38.....	9,233	8,121	9,510	5,978	18,743	14,099	75.22
1938-39.....	9,179	8,276	9,573	6,232	18,752	14,508	77.36

Day schools were constructed during the year at the following reserves; Caughnawaga, Que.; New Credit, Rabbit Island, and Caradoc, Ont.; Berens River, Island Lake, Little Saskatchewan, Man.; Ahtahkakoops, Sask.; Pemberton, Bella Bella, and Bella Coola, B.C. At Rabbit Island, Ont., and at Pemberton, B.C., schools were established for the first time. Seven of the schools were constructed to replace buildings that had become totally unsuitable for educational purposes.

Educationists in this and other countries continue to stress the need for practical and vocational training. The need of the Indian pupil for this form of instruction is even greater than that of the white pupil. Labour opportunities for him during the years that lie immediately ahead must follow such lines as farming, stock-raising, logging, fishing, and hunting and trapping.

An attempt has been made during the year to encourage a number of pupils who would ordinarily proceed with high school studies to take up vocational courses such as agriculture, auto mechanics and domestic science. In addition to the regular vocational courses, for which provision has now been made at practically all day and residential schools, special courses also have been organized, largely by way of experiment, at a number of Indian schools. At Caughnawaga, classes in hand-loom weaving have been started. The girls engaged in this project have been successful in producing hand-loom woven ties, scarves, and shopping bags. There appears to be a steadily increasing market for these products. There has been a feeling for some time among residential school principals that the care and feeding of fur-bearing animals should form part of the training provided at Indian schools. At the Qu'Appelle Residential School, Lebret, Saskatchewan, and at the Morley School, Alberta, mink farms have been established. At the Brandon residential school a group of students are engaged in a bee-keeping experiment. This experiment is designed to give practical training to the boys and at the same time provide an adequate supply of honey for the institution. At the Mount Elgin Institute, Muncney, Ontario, the pupils have responded enthusiastically to the wrought metal projects which have formed part of their studies during the year.

Indian Education—Expenditure for Year 1938-9

	Day Schools		Residential Schools		General		Total	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.
Nova Scotia.....	9,818	73	28,133	76			37,952	49
Prince Edward Island.....	882	26					882	26
New Brunswick.....	16,226	97					16,226	97
Quebec.....	56,927	25	7,471	37			64,398	62
Ontario.....	106,571	85	256,901	65			363,473	50
Manitoba.....	60,472	29	159,884	18			220,356	47
Saskatchewan.....	37,812	79	272,308	79			310,121	58
Alberta.....	1,802	51	307,941	02			309,743	53
British Columbia.....	69,501	52	312,575	27			382,076	79
British Columbia Schools Vocational Instruction					9,739	50	9,739	50
Northwest Territories.....	1,576	08	36,416	50			37,992	58
Yukon.....	2,861	70	18,014	43			20,876	13
Assistance to ex-pupils.....					1,672	92	1,672	92
Freight and express.....					55	98	55	98
Salaries and travel.....					15,751	89	15,751	89
Stationery.....					38,084	65	38,084	65
Tuition.....					26,416	65	26,416	65
Transferred to Surveys and Engineering Branch for building and repairs to schools.....					95,392	45	95,392	45
Miscellaneous.....					122	02	122	02
	364,453	95	1,399,646	97	187,236	06	1,951,336	98

WELFARE

Legislation providing for the establishment of a revolving fund was passed by Parliament and bands or groups of Indians can, by assuming collective responsibility, secure loans from this fund for the purchase of farm machinery, live stock, etc. Loans secured from this fund, which cannot exceed the sum of \$100,000 per annum, are repayable over a five-year period. Seventeen applications from groups of Indians were approved during the year, involving advances amounting to \$35,538. With the single exception of the Abenakis band, the members of which secured a loan for a basketry project, these loans are being used for the clearing of land and the purchase of farm equipment. Thirteen fully equipped community farms, supplied with equipment in whole or in part from this fund, are now in operation in the Prairie Provinces.

Agricultural returns from Indian reserves, with one or two exceptions, have been more encouraging than at any time in recent years. This is particularly true of returns from the Prairie Provinces, where a number of reserves were supplied with farm machinery, live stock and other requirements from the welfare vote. It is encouraging to note that there was a reduction in relief costs following the harvest season. On the Blood Reserve, in southern Alberta, with a population of 1,300 Indians, the grain threshed this year amounted to 255,000 bushels. The community farm on the Cote Reserve, Pelly, Sask., with an Indian population of 354—one of the first farms of its kind organized under the welfare program—produced 11,000 bushels of grain and 2,800 bushels of potatoes.

The following is a statement of welfare expenditures, by provinces, for the years 1937-8 and 1938-9:

Province	1938-9	1937-8	Province	1938-9	1937-8
Nova Scotia.....	72,241 26	73,197 71	Northwest Territories..	26,781 45	26,892 30
Prince Edward Island..	8,347 63	9,008 78	Yukon.....	9,907 02	10,040 18
New Brunswick.....	61,503 32	57,827 72	Triennial clothing.....	1,717 28	4,174 34
Quebec.....	206,092 56	209,168 45	Grants to Agricultural		
Ontario.....	143,539 93	139,086 00	Fairs	5,659 95	.....
Manitoba.....	114,396 71	125,911 66	Miscellaneous.....	31,432 27	14,886 62
Saskatchewan.....	109,934 41	139,308 98			
Alberta.....	90,910 25	133,890 36		1,004,813 55	1,075,545 56
British Columbia.....	122,349 51	132,152 46			
			<u>Net Decrease.....</u>	<u>70,732 01</u>	

HANDICRAFT

Handicraft projects have been organized on eastern reserves where relief costs were high and where the agricultural resources were either limited or non-existent. These projects have been particularly successful at St. Regis, Caughnawaga, and Pierreville, Que., and at Muncey, Ont. During the period under review a number of worthwhile Indian handicraft exhibits have been organized and placed on display at Ottawa, Montreal, and Vancouver.

In the promotion of Indian handicraft projects, the present policy is to emphasize quality production on the reserves, and by the establishment of a sample room and wholesale warehouse at Ottawa a continuous supply is assured to the wholesale and retail trade.

As the majority of the large commercial houses do their buying months in advance of the time for the sale of the goods, they were not in a position to place orders immediately following the establishment of the warehouse. However toward the end of the year goods valued at \$25,000 were sold.

GRANTS TO AGRICULTURAL EXHIBITIONS AND INDIAN FAIRS, 1938-9

New Brunswick

Fredericton Exhibition \$ 16.50

Ontario

Ohswaken Agricultural Society, Brantford 200.00
 Garden River Agricultural Society, Sault Ste. Marie 100.00
 Caradoc United Indian Fair, Muncey 200.00
 Manitoulin Island Unceded Agricultural Society 150.00
 Snake Island Agricultural Society, Georgina Island..... 50.00
 Thunder Bay Agricultural Association 250.00
 Plowing Matches. 610.45
 Field Prizes, Standing Crop Competitions 390.00
 Garden Prizes, Standing Crop Competitions 250.00
 Tyendinaga Agricultural Society 75.00

Manitoba

Rosburn Agricultural Society 20.00
 Manitoba Provincial Exhibition, Brandon 200.00

Saskatchewan

Prince Albert Agricultural Society 350.00
 Regina Agricultural and Industrial Exhibition Association 350.00
 Garden Prizes 18.00

Alberta

Calgary Exhibition 350.00
 Edmonton Exhibition Association, Ltd. 350.00

British Columbia

Cowichan Agricultural Society, Duncan 150.00
 North and South Saanich Agricultural Society, Cowichan 50.00
 Windermere and District Fall Fair, Kootenay 150.00
 Vanderhoof Plowing Association (Stuart Lake) 30.00
 Vancouver Fall Fair 350.00
 Armstrong Fall Fair, Okanagan 250.00
 Grant to Indian Arts and Handicraft Exhibition, Vancouver 750.00

\$5,659.95

CONSTRUCTION, SURVEYS, AND ENGINEERING WORKS

Agency Buildings

Repairs and improvements as required were carried out to agency buildings at the following Indian agencies: Christian Island, Kenora, Manitowaning, Six Nations, Saugeen, Caradoc, Walpole Island, and Cape Croker, Ont.; Pointe Bleue, Bersimis, St. Regis, Seven Island, Caughnawaga, and Restigouche, Que.; Norway House, Fisher River, Griswold, Birtle, The Pas, and Portage la Prairie, Man.; Touchwood, Carlton, Duck Lake, Battleford, File Hills, Crooked Lake, Onion Lake, Pelly, and Qu'Appelle, Sask.; Hobbema, Blood, Stony, Saddle Lake, Blackfoot, Peigan, Edmonton, and Athabaska, Alta.; Queen Charlotte, Kamloops, Williams Lake, Babine, Bella Coola, and Stuart Lake, B.C.; and Chapel Island Reserve in Nova Scotia. Minor repairs and painting were carried out at Fort Resolution, N.W.T.

The following new buildings were erected: An implement shed was built on the Six Nations Reserve, Ont. A granary was erected at Sandy Bay Reserve, an ice-house at Little Saskatchewan Reserve, an implement shed at Lake Manitoba Reserve, and a coal shed at Swan Lake Reserve, all in Portage la Prairie Agency, Man. Storehouses were built at Red Earth and Shoal Lake Reserves in The Pas Agency, Man. Materials were purchased for a farming instructor's residence on the John Smith's Reserve, Duck Lake Agency, Sask. A ration house was built at the Big River Reserve and granaries at Little Pine

and at Red Pheasant Reserves in Battleford Agency, Sask. Granaries were built at Poorman's, Muscowequan, and Gordon's Reserves in Touchwood Agency, Sask. A warehouse was erected at Sandy Lake Reserve in the Carlton Agency, Sask. A granary was built at File Hills Agency and a root-house at Pelly Agency, Sask. In Alberta a new kitchen was added to the Farm 4 house in the Blood Agency, and an addition was provided to the clerk's house at the Lesser Slave Lake Agency.

Bridges

A small bridge was repaired on the Bear River Reserve, N.S.; a bridge was constructed over the Fisher River, Man., and the bridge on the Central road in the Caradoc Agency, Ont., was repaired. In co-operation with the Manitoba Provincial Government a bridge was constructed over the Assiniboine River in the Griswold Agency.

Other Construction Work

In British Columbia repairs were carried out to the Ahousaht float, fender piles were driven at the Kincolith wharf, and a new float was provided for the Homalco Reserve. Totem poles were repaired on the Jasper-Prince Rupert line, and a new float was provided for the Khlahooshe Indians in the Vancouver Agency. Crib work was built along the west bank of Fraser River and along Lillooet River for the purpose of protecting the lands from erosion.

In Nova Scotia repairs were made to the breakwater at the Middle River Reserve, and a float was provided at the Chapel Island Reserve.

Wells

New wells were provided or existing ones cleaned or repaired at the following points: Griswold, Man.; Assiniboine, Muscowequan, and Nut Lake Reserves in Saskatchewan; and Keeheewin Reserve and Edmonton Agency in Alberta.

Drainage Work

The Delormier drain at Caughnawaga, Que., was cleaned. Drainage work was carried out at the rear of the Greenville Indian Village in British Columbia to prevent damage to the cemetery and village water supply.

Road Work

Road work was carried out on reserves in the following provinces:—

Quebec.—Restigouche, Bersimis, Abenakis, Caughnawaga, Pointe Bleue, Lorette and St. Regis. At St. Regis and Caughnawaga, stone was crushed in preparation for spring work. Warning signs were erected at both ends of bridges on Caughnawaga Reserve, and sidewalks at Restigouche were repaired.

Ontario.—Golden Lake, Tyendinaga, Parmachene, Parry Sound, Caradoc, Oneida, Rama, Manitoulin Island, Mud Lake, Moravian, Walpole Island, Kettle, and Stony Point. Stone was crushed during the winter at Tyendinaga Reserve, and a new road was cut on Cedar Point leading to a proposed new dock. Culverts were rebuilt on the road along Echo River in the Sault Ste. Marie Agency.

Manitoba.—Cross Lake, Norway House, Peguis, Brokenhead, Fort Alexander, Sandy Bay, Fairford, Dog Creek, Muskeg Lake, and Fisher River.

Saskatchewan.—The road into Pelican Lake, in Carlton Agency, was repaired, and roads in Duck Lake Agency were given attention.

Alberta.—The road fronting the agency buildings at Brocket was repaired.

British Columbia.—Road work was carried out at Cowichan No. 1 and Cheam No. 1, and the road leading to Babine Agency was repaired. The road along St. Mary's River in the Kootenay Agency between the Indian Village and the north side of the reserve was repaired.

Nova Scotia.—Eskasoni, Bear River, Malagawatch, and Sydney.

Prince Edward Island.—Lennox Island.

New Brunswick.—Eel River, Tobique, and St. Mary's.

Lighting Plants

A new lighting plant was installed at Bersimis, Que. and a complete new diesel outfit at Norway House, Man. New lighting plant batteries were furnished for the Babine Agency, B.C. and Fort Resolution Agency, N.W.T.

Boats

A new boat, the *Brendan*, was purchased for the Bella Coola Agency. The *Keego* at the Port Arthur Agency, the *Charles Stewart* at the James Bay Agency, and the *Naskeena* at the Skeena Agency were repaired. Minor repairs and replacements were made as required to other departmental boats.

Miscellaneous

Funds were transferred to the Surveys and Engineering Branch for the construction and maintenance of irrigation systems in British Columbia and for various other works, a list of which appears under the report of that Branch.

RESERVES AND TRUSTS SERVICE

RESERVES DIVISION

The volume of sales of surrendered Indian lands continued to decrease throughout the year. This decrease can be attributed to two principle causes, a reduction of purchasing power and a falling demand for farming land, and a realization that lands held as reserves for the Indians of Canada are not more than sufficient for their ultimate needs. The policy of the Branch leans toward the leasing of land surplus to immediate needs rather than outright sale, and toward the conservation of Indian land assets against the future needs of a steadily increasing population.

LAND SALES

As at March 31, 1939, the Indian asset represented by agreements for sale covering surrendered land was \$1,611,105.92, as against a total of \$1,631,604.63 in the preceding year. This capital asset is represented by 882 subsisting contracts; the collections thereon, after adding cash sales, represents Indian income in the amount of \$72,545.01.

ADJUSTMENTS UNDER F.C.A.

Adjustments of land contracts as to both principal and interest have continued. During 1938-9 a total of \$36,102.83 was written off by judicial orders under the Farmers' Creditors Arrangement Act. The Branch cooperated in every way with the officers charged with the responsibility of administering the Act.

CANCELLATIONS

During the year 15 land contracts were cancelled involving 2,248 acres of land and 2 town or sub-division lots. In this connection the utmost leniency was shown toward purchasers particularly in relation to agricultural land contracts on account of economic conditions in the agricultural areas.

NEW SALES

Sales of surrendered Indian lands were not pressed unduly, the Department being satisfied merely to meet the demand for lands in the districts affected. During the year 36 new sale contracts were entered into, and 3 old ones reinstated. Ten land contracts were paid out in full and 73 new land patents were issued.

LAND LEASES

Rented Indian land properties yielded a net income of \$140,410.77 to Indian owners. This income was earned from a total of 1,472 leases under which rentals were collected and returned to the individual Indians or band lessees.

FUR CONSERVATION AND LAND USES

During the year the policy of acquiring trapping and hunting grounds, and traplines under long term leases for Indian use has been further pursued. Substantial concessions have been obtained from several of the provinces and among the larger areas now departmentally controlled are the following:

The Nottoway River Beaver Sanctuary in northern Quebec consists of approximately 13,000 square miles. This area by permission of the Government of that Province is now under departmental control. Under strict supervision by departmental officers it is managed by the Indians themselves and a gratifying increase in the number of beaver has been recorded. The spirit in which the Indians have undertaken the task of re-establishing the beaver in their area has been most gratifying.

At Grand Lake Victoria and Lake Abitibi there is another large area in which only Indians are permitted to hunt and trap fur-bearing animals.

By arrangement with the Manitoba Government an area of 160,000 acres of marshland in the Saskatchewan River Delta has been placed under the control of the Department to be used for the exclusive benefit of the Indians and half-breeds in its immediate vicinity. During the year a substantial start has been made toward the development of this area as a muskrat ranch. The muskrat has in the past contributed generously to the welfare of the Indians, and steps are being taken to restore these animals in their former hundreds of thousands to this almost wholly depleted area. The method employed is the conservation and control of an adequate water supply coupled with strict protective supervision. The employment provided by development work, consisting of the construction of canals, dams, and dikes, has greatly benefited the resident population and has already noticeably reduced the amount of relief which it has been necessary in the past to give these needy bands. The project opens an avenue of hope to substantial groups of people who in twenty years have seen their chief means of livelihood disappear under the stress of drought and white encroachment. Both of these influences are now under Departmental control.

North of the Alberta boundary in Wood Buffalo National Park, Northwest Territories, a similar rat development program was begun along the same lines and by the same methods employed on the Manitoba development.

The whole development program is based on the recognized necessity of providing self-sustaining livelihood for the Indians along the lines for which they are fitted by temperament and habit.

Plans have also been formulated to encourage Indian bands to use the large funds held in trust for them to assist their members individually and collectively to bring their land reserves into productive use.

LAND RECORDS AND SURVEYS

Attention has been directed toward improvement in the land records system of the various agencies. With the growing trend toward individual holdings of lands within the reserves, the importance of adequate and accurate records is

recognized. This involves an extension of the survey system to enable boundaries to be permanently fixed, title disputes settled, and accurate descriptions of holdings made possible.

INDIAN ESTATES

With the growth of individual ownership and more universal recognition by the Indian of his power to will and to inherit property, the administrative duties of the Department in respect to Indian personal estates are rapidly increasing. The Department finds it necessary to maintain what is in effect a Surrogate Division and to fix a practice and procedure for handling this exacting phase of Indian administration. The number of estates under administration has greatly increased and will continue to increase as the population grows and the consciousness of private ownership and rights of inheritance spreads among the tribes.

TIMBER AND FORESTRY

The quantity of timber cut for sale from Indian reserves throughout the Dominion during the 1938-9 season was 35 per cent less than during the previous year. This decrease was due no doubt to general unsettled conditions in the lumber trade and inactivity in the pulpwood market.

The kinds and quantities of timber cut for sale from Indian reserves during the 1938-9 season, on which royalties or dues were collected, were as follows:

Pine.....	551,825 f.b.m.
Spruce.....	2,322,768 "
Hemlock.....	2,867,099 "
Cedar.....	1,759,248 "
Fir, (Douglas).....	6,319,390 "
Fir, (balsam).....	617,017 "
Maple.....	73,524 "
Birch.....	192,555 "
Elm.....	4,000 "
Oak.....	6,600 "
Basswood.....	204,207 "
Poplar.....	84,300 "
Cottonwood.....	100,055 "
Alder, (B.C.).....	76,119 "
Christmas trees.....	35,194 bales
Cordwood, (mixed).....	7,655 cords
Pulpwood, (spruce and balsam).....	15,443 "
Shingle bolts.....	292 "
Ties.....	44,591
Poles.....	5,406
Posts.....	1,514
Piling.....	29,759 lin. ft.

The above quantities expressed in terms of board measure feet represent a cut of approximately 27,000,000 feet board measure and in addition to this the Indians cut approximately 2,000,000 feet board measure for sale, free of dues, also a quantity of approximately 8,000,000 feet board measure was cut by them for building, fencing, and fuel purposes.

Revenue From Timber

Revenue derived from timber during the year is classified as follows:

Licence royalties and dues.....	\$ 25,941 02
Permit dues.....	17,511 72
Rentals from timber licences.....	2,308 60
Licence fees.....	138 00
Interest on past due accounts.....	155 59
Trespass dues.....	135 50
Fines.....	7 00
Total.....	\$ 46,197 43

Sales of timber during the year:

	Deposit
Cape Mudge Reserve No. 10, B.C.....	\$ 750
Nekite Reserve No. 2, B.C.....	100
Lot 1, Con. 6 Pedley Twp. Ont.....	100
Total Deposits.....	\$ 950

There were 22 timber licences current on April 1, 1939, being one less than in the previous year, three new licences having been issued and four having terminated. Indian Agents were authorized to issue a total of 234 timber permits to various Indian bands of which 51 were exempted from payment of dues as a means of employment and a measure of relief.

FOREST PROTECTION

The number of forest fires reported on Indian Reserves during 1938 was 81, being 29 more than the previous year. The increased number occurred in the Province of Ontario and in the interior of the Province of British Columbia, during protracted dry spells in the months of July and August. Fortunately 64 of these fires were restricted to an area of less than 10 acres, and the actual loss of timber was not much greater than last season.

A summary of the salient features with respect to these forest fires is shown hereunder:—

Summary of Forest Fires on Indian Reserves, 1938

Total number of fires.....	81
Total area burned over.....	8,135 acres
Merchantable timber area burned.....	6,368 "
Quantity of merchantable timber burned.....	2,338,000 f.b.m.
and.....	4,822 cords
Estimated stumpage value of timber burned.....	\$20,700 00
Young growth area burned.....	186 acres
Estimated value of young growth lost.....	\$ 500 00
Cut-over area burned.....	1,381 acres
Est. value of timber and young growth lost on cut-over lands	\$ 2,000 00
Non-forested area burned.....	200 acres
Value of other property burned.....	\$ 950 00
Actual cost of fire fighting.....	\$ 3,673 34

Fire Classification

Size of Fires		Cause of Fires	
Less than $\frac{1}{2}$ acre.....	18	Campfires.....	15
$\frac{1}{2}$ acre to 10 acres.....	46	Smokers.....	26
10 acres to 500 acres.....	14	Settlers.....	8
Over 500 acres.....	3	Lightning.....	9
	81	Indians.....	3
		Incendiary.....	4
		Unknown.....	16
			81

Monthly Occurrence

	No.	Area
		Acres
April.....	2	1,003
May.....	8	77
June.....	13	300
July.....	19	880
August.....	20	158
September.....	13	132
October.....	5	5,485
November.....	1	100
	81	8,135

Locality	
Quebec.....	2
Ontario.....	24
Manitoba.....	4
Saskatchewan.....	2
Alberta.....	1
British Columbia.....	48
	81

No actual fire-fighting organization is maintained by the Indian Affairs 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.

MINING

Mining activity developed in northern Ontario, particularly in the Kenora District and 168 mining claims were recorded on Indian reserves in that part of the Province. New regulations for the disposal of quartz mining claims were

established on August 31, 1938, provisions being made under the Act for the staking and recording of claims, working conditions, and the granting of 21-year leases. Road construction through Indian reserves caused a demand for sand and gravel and the revenue from this source was considerably more than last year.

A summary of the revenue derived is as follows:—

Royalty on sand and gravel.....	\$3,615 95
Rentals from mining permits.....	467 00
Prospector's fees.....	176 00
Rentals from coal leases.....	230 00
Total.....	\$9,488 95

PETROLEUM AND NATURAL GAS

During the year there was a noticeable increase of interest, mainly in the Provinces of Saskatchewan and Alberta, in prospective oil and gas development. The Indian reserves in the Province of Alberta, particularly those in the foothills area, are looked upon as possessing important potentialities. On the Blood Indian Reserve, interested parties undertook a seismic survey of the northern part of the reserve for the purpose of obtaining necessary information preliminary to deep drilling. This survey will not be completed until well into the next fiscal year. On the Sarcee and Stony Reserves in the Calgary district, investigational and exploratory work continued throughout the year. In the Province of Saskatchewan, several Indian reserves have been receiving attention during recent months and it is expected that actual tests will be made on one or two reserves during the coming year.

BLACKFOOT COAL MINE

The mine on the Blackfoot Reserve, Alberta, has been a valuable asset to the Indians during the years of crop failures. Soil drifting and cutworms have destroyed the crops of a number of Indian farmers on this reserve during the past seven or eight years and the Indians have turned to the coal mine for remunerative employment. Because of keen competition, it was considered necessary to make needed improvements during the slack season in 1938, in order to hold customers and increase business. The Indian Council considered that this industry, which is vital to so many members of the band, should receive a subsidy from the band funds and accordingly voted an amount to cover the cost of repairs, development work, and purchase of additional machinery. During the autumn of 1938 sixty Indians were employed to mine the coal required, working in shifts twenty-four hours a day. November was the best month in the history of the mine; two thousand and fifty tons were sold. The revenue for the year 1938-9 was \$20,211.55, slightly higher than for the previous year. The excellent condition of the industry was shown by an increase in revenue during a winter milder than usual.

INDIAN ENFRANCHISEMENTS

Under the provisions of Section 114 of the Indian Act there were carried out during the past fiscal year 68 enfranchisements, comprising a total of 143 men, women, and children.

TRUSTS DIVISION

INDIAN TRUST FUNDS

The Indian trust funds are derived from the sale of land, timber, and other assets of the various Indian bands. The accounts are of two types, capital and interest. The funds deposited in the capital account are those received from the sale of capital assets of the band, and the interest account is derived from

rentals and other revenue not involving alienation of property, and from the interest allowed by the Government on the funds held in trust. The amount of these trust funds on March 31, 1939, was \$14,149,503.19, comprising \$11,978,329.35 capital and \$2,171,173.84 interest and representing an increase in capital of \$42,423.56 and of interest of \$25,120.64.

The proceeds of these trust funds are expended for the benefit of the Indians and where possible in making cash distributions to the members of the bands. During the year steps were taken to increase agricultural activities of certain Indian bands by the purchase of tractors and other mechanical farm equipment for use on a community basis, and by providing approximately 150 loans from band funds to individual Indians for the purchase of live stock and equipment for their individual use. The following are some of the major items of expenditure:—

Salaries and wages.....	\$ 61,301 79
Building materials and repairs.....	19,093 76
Fencing.....	5,298 04
Farming operations.....	25,150 37
Farming equipment, machinery, and repairs.....	35,530 79
Livestock purchases.....	6,660 00
Operation and promotion of industries.....	25,215 70
Relief.....	192,906 36
Repairs to roads, bridges, and docks.....	43,876 67
Seed grain and feed.....	44,323 50
Distributions of cash to Indians:	
{Interest.....	399,061 62
{Rentals.....	48,065 40
{Land.....	4,758 56
{Timber.....	10,315 81
Loans to Indians.....	21,959 20
Withdrawals by Indians from savings.....	44,868 02

ANNUITIES

Under the provisions of treaties, made between the Crown and the Indians occupying the western portion of Ontario, the Provinces of Manitoba, Saskatchewan, and Alberta, and a large portion of the Northwest Territories, these Indians are entitled to an annual distribution of what is termed "Treaty Annuities." The amount distributed during this year was \$253,189. These distributions are made by the various Indian Agents between the months of April and August. In the more remote districts, where air transportation is available, this mode of travel is being used, and has resulted in an enormous saving of time and hardship to the treaty-paying party. Seven of these flights were arranged covering the northwest portions of the Provinces of Ontario, Manitoba, Saskatchewan, Alberta, and the Northwest Territories.

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 considerable amount of money has been spent in repairs to Indian houses, and on the whole these Indians have fairly good homes.

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. 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 camps, 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 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 bands 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.—There has been a marked improvement in recent years in the housing conditions among the Indians of New Brunswick. Many of their houses are solidly constructed of squared timbers, covered with shingles and often whitewashed.

QUEBEC

Agencies.—The Indian agency offices in Quebec are located as follows: Bersimis, Cacouna (Viger), Caughnawaga, Gaspé, Gentilly (Bécancour), Havre St. Pierre (Mingan), Harrington Harbour (St. Augustine), Maniwaki, Maria, Notre Dame du Nord (Timiskaming), Oka, Pierreville, Pointe Bleue, Restigouche, St. Regis, Seven Islands, Village des Hurons (Lorette).

Tribal Origin.—The principal tribes found in Quebec are: Iroquois at Caughnawaga, 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.—The Indians of the northern interior and the north shore of the Gulf of St. Lawrence depend entirely on hunting and trapping for their subsistence. In the organized central and southern portions of the Province they engage in mixed farming. They are good gardeners and a number raise fruit and dispose of it at nearby markets. They cultivate their land with a considerable measure of success. Where they possess cows they sell the milk to the creameries and cheese factories. Most Indians prefer working for an employer to working on their own land. In the past few years, however, a number of lumber companies have closed down and this, and the disappearance of other means of livelihood, have made it necessary for them to turn more to farming and livestock raising. In the Saguenay district they act as guides and canoemen and on the Gaspé Peninsula they can still find employment in lumber camps and mills. The Indians of Caughnawaga are noted as steel workers and find highly remunerative employment when building operations are active. It is chiefly in the Province of Quebec on certain reserves that the native handicraft projects have been organized and have proved successful.

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 the Indians live in tents during the greater part of the year.

ONTARIO

Agencies.—The Indian agency offices in Ontario are located as follows: Brantford (Six Nations), Chapeau, Chippawa Hill (Saugeen), Christian Island, Deseronto (Tyendinaga), Fort Frances, Golden Lake, Highgate (Moravian), Kenora, Longford Mills (Rama), Manitowaning (Manitoulin Island), Moose Factory (James Bay), Muncey (Caradoc), Parry Sound, Peterborough (Rice and Mud Lakes), Port Arthur, Sarnia, Sault Ste. Marie, Scugog, Sioux Lookout, Sutton West (Georgina and Snake Islands), Sturgeon Falls, Wallaceburg (Walpole Island), Wiarton (Cape Croker).

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.

Occupation.—The Indians in the southern, western, and central parts of Ontario engage largely in farming. The reserves are generally well suited for this purpose. Considerable assistance has been given from both band funds and appropriations to supply the Indians with the equipment they require, with very good results. Some of the Indians do well with dairy products.

During the summer months Indians act as guides and canoemen. Others are employed at various industries and trades. They are proficient bushmen and some 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.

Dwellings.—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 tipis are used during the summer months.

Northern 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. These Indians are, of necessity, more or less nomadic and, consequently, live in tents most of the year.

MANITOBA

Agencies.—The Indian agency offices in Manitoba are located as follows: Birtle, Griswold, Hodgson (Fisher River), Norway House, Portage la Prairie, Selkirk (Clandeboye), The Pas.

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 Indians living along the lakes have depended mainly on fishing, hunting, and trapping for their existence. Fish are becoming scarce, and as in other provinces, trapping of animals is limited, making it necessary for these Indians to turn to farming and gardening where practicable. The reserves in Manitoba most suitable for extensive agriculture are mainly within the Birtle, Griswold, Portage la Prairie, and Clandeboye Agencies. A great many of the Indians from around Lake Manitoba and Lake Winnipeg come south in summer and work in the harvest fields in the farming communities. In the southern part of the Province the Indians raise cattle extensively and most of the reserves own good herds of well-bred stock, chiefly of the Shorthorn type. They milk the cows and make butter and other dairy products. Any surplus of hay is put up for sale and on some reserves they own hay presses, shipping their surplus to market in winter. Some Indians make their living during the winter by taking out wood; others work for the large fish companies. The women derive revenue from the sale of moccasins and gloves. Most of them are expert needlewomen.

Dwellings.—On most reserves in Manitoba fairly good log homes are to be found. They are one and one-half stories high with shingle roofs. 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 Indian agency offices in Saskatchewan are located as follows: Balcarres (File Hills), Battleford, Broadview (Crooked Lakes), Duck Lake, Kamsack (Pelly), Leask (Carlton), Muscow (Qu'Appelle), Onion Lake, Punnichy (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 à 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. The Indians also own a number of cattle of a very good type, principally of Short-horn breed. They are well equipped with implements and own a number of horses.

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. 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 of an old log cabin with a sod roof in winter and a tent in the summer.

ALBERTA

Agencies.—The Indian agency offices in Alberta are located as follows: Brocket (Peigan), Calgary (Sarcee), Cardston (Blood), Driftpile (Lesser Slave Lake), Fort Chipewyan (Athabaska), Gleichen (Blackfoot), Hobbema, Morley (Stony), Saddle Lake, Winterburn (Edmonton).

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. In good years the Indians derive a considerable revenue from the sale of hay.

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. They get good returns for the sale of beef cattle.

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.—Practically all the Indians in this Province 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 Indian agency offices in British Columbia are located as follows: Alert Bay (Kwawkewith), Bella Coola, Cranbrook (Kootenay), Duncan (Cowichan), Fort St. John, Hazelton (Babine), Kamloops, Lytton, Massett, Graham Island (Queen Charlotte), Merritt (Nicola), New Westminster, Port Alberni (West Coast), Prince Rupert (Skeena), Telegraph Creek (Stikine), Vancouver, Vanderhoof (Stuart Lake), Vernon (Okanagan), Williams Lake.

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 Kwawkewith 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 Algonkin.

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 cattle industry is a very important one in the interior agencies of the Province. Gradual improvement in the Indian cattle herds continues.

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 in 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. Housing conditions on the whole are improving. There is much evidence of rapid progress in some sections over conditions of a few years ago, but there is still much room for improvement.

NORTHWEST TERRITORIES

Agencies.—The Indian Affairs Branch now has three agencies in the Northwest Territories, namely: Fort Simpson, Fort Resolution, and Fort Norman.

Tribal Origin.—The principal tribes found in the far north are the Slaves, 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 wild berries for winter use.

Dwellings.—The Indians live in log cabins in winter, using tents and tipis during the summer.

YUKON TERRITORY

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 snow-shoes. 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 and Territories, 1939

	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.....	12,163	1,709	.....	1,558	.....	8,745	.....	151	1,374	1,444	1,423	1,406	559	561	2,454	2,311	308	323
British Columbia.....	24,276	4,701	109	4,794	.....	13,954	690	28	2,194	2,290	2,929	2,922	1,112	1,116	5,301	4,699	868	845
Manitoba.....	14,536	4,727	50	4,192	721	4,591	1	254	1,486	1,538	1,732	1,571	920	914	2,849	2,607	460	459
New Brunswick.....	1,821	.....	.....	.....	.....	1,821	.....	.....	219	201	232	203	78	101	377	335	40	35
Northwest Territories.....	3,724	640	.....	.....	.....	3,084	.....	.....	396	396	444	401	191	180	795	792	38	91
Nova Scotia.....	2,172	5	.....	.....	3	2,164	.....	.....	232	241	221	235	112	105	488	406	71	61
Ontario.....	29,907	9,719	1,179	5,376	226	9,769	864	2,774	2,493	2,653	2,929	2,980	1,976	1,944	6,674	6,496	830	932
Prince Edward Island.....	274	.....	.....	.....	.....	274	.....	.....	24	33	30	31	11	22	60	50	3	10
Quebec.....	14,195	2,802	.....	316	.....	11,000	17	60	1,382	1,404	1,597	1,529	767	755	3,173	2,810	370	405
Saskatchewan.....	13,020	4,256	.....	1,228	139	6,242	10	1,145	1,443	1,594	1,526	1,533	617	547	2,512	2,590	293	365
Yukon Territory.....	1,563	1,336	.....	.....	.....	145	.....	82	160	178	173	174	87	74	287	267	85	78
Total Indian population.....	117,651	29,895	1,338	17,464	1,089	61,789	1,582	4,494	11,403	11,972	13,236	12,985	6,430	6,322	24,970	23,363	3,366	3,604

TABLE 2

Crops Sown and Harvested, Land Broken and Summer-fallowed, Hay Put Up, Etc.

Agencies	Wheat		Oats		Other Grains		Roots and Tubers		Green Feed		Acres of Garden	Acres Broken	Acres S. Fallow	Tons of Hay	Total Acres under Cultivation
	Acres Sown	Bushels Harvested	Acres Sown	Bushels Harvested	Acres Sown	Bushels Harvested	Acres Sown	Bushels Harvested	Acres	Tons					
ALBERTA															
Athabaska							17½	680	8	60				145	25½
Blackfoot	4,096	24,151	354	8,517			13	1,542	1,869	1,156		30	5,080	708	11,442
Blood	6,444	205,250	875	39,828		645	5	410	49	43	5	130	9,204	1,980	17,407
Edmonton	377	9,350	1,963	56,741	1,108	13,271	31	3,423	206	302	7	233	717	1,867	4,642
Hobbema	1,742	40,903	3,821	149,227	809	16,982	15	3,854	167	254	15	493	1,140	4,166	8,202
Lesser Slave Lake	520	9,344	729	20,019	10	150	44	2,064	154	99	25	139		2,519	1,621
Peigan	1,748	40,705	192	4,325			12	1,100	124	115	5	5	1,746	1,241	3,832
Saddle Lake	1,181	12,218	987	12,601	281	2,908	27	2,639		114	8	122	1,303	2,773	3,910
Sarcee	650	20,001	322	15,801			18	1,317		95		60	420	486	1,566
Stony										282		10		800	302
Total	16,758	361,922	9,243	307,059	2,853	50,061	182½	17,029	2,954	2,653	75	1,273	19,610	16,685	52,948½
BRITISH COLUMBIA															
Babine			390	630			321	11,360	1,026	1,511					1,737
Bella Coola							39	2,685			42	42		795	128
Cowichan	48	1,535	348	11,120	56	1,720	187	3,840			27			1,430	666
Fort St. John							10	100			5	15		50	30
Kamloops	107	2,675	160	4,500	14	350	79	7,800	61	95	56	2,307	526	2,350	3,810
Kootenay	65	408	470		25	180	24	2,700	240	315	7	8	20	1,610	359
Kwawkweth							14	2,305							59
Lytton	36	770	21	495	165	3,455	116	13,145	39	63				678	452
New Westminster	8	160	179	8,840	9	380	179	13,430	16	47	119	29	71	522	610
Nicola	128	3,810	398	10,900	6	140	163	16,450	34	56	74			6,025	808
Okanagan	4,000	62,100	720	11,950	140	2,500	330	60,860	730	750	225	7,105	1,075	6,600	14,325
Queen Charlotte							26	900	1	1½	13			1	40
Skeena River			8				150½	9,560	13		150½	165		83	496
Stikine															
Stuart Lake							99	1,835	240	242	10	1,033	30	695	1,320
Vancouver	2	40	406				34	3,625			48			5	82
West Coast					11½	245	30½	974	6½	5	42½	53¾			680
Williams Lake	36	1,100	57	2,580			119	16,030						5,160	212
Total	4,430	72,598	3,187	51,015	426½	8,970	1,921½	167,599	2,406½	3,115½	913½	11,276½	1,722	26,007	26,254

MANITOBA															
Birtle.....	515	7,042	491	8,675	197	2,245	16	2,100	27	15	8	108	739	2,016	2,101
Clandeboys.....	612	9,425	271	4,110	175	4,220	83	4,520	.....	.....	30	268	195	1,280	1,684
Fisher River.....	37	1,136	457	11,090	53	1,409	56	7,100	68	130	28	30	284	5,139	1,013
Fort Churchill.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Griswold.....	842	15,890	294	6,552	181	1,542	44	2,562	.....	.....	28	105	600	562	2,074
Manitowapah.....	85	839	23	150	6	160	70	13,027	8	9	15	20	10	6,574	287
Norway House.....	.....	.....	.....	.....	.....	.....	103	7,550	.....	.....	.....	5	.....	400	108
The Pas.....	.....	.....	23	400	.....	.....	87	5,380	19	74	.....	.....	.....	3,285	129
Portage la Prairie.....	637	8,673	518	8,939	615	10,297	18	2,495	101	95	5	401	564	784	2,859
Port Nelson.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	2,728	43,005	2,077	39,916	1,207	19,873	477	44,734	223	323	114	937	2,392	19,890	10,155
NEW BRUNSWICK															
Northern Division.....	.....	.....	.....	.....	.....	.....	12	1,650	.....	.....	5	.....	.....	50	17
Northeastern Division.....	.....	.....	103	1,010	14	140	56	1,550	7	13	15	.....	.....	110	195
Southwestern Division.....	.....	.....	.....	.....	.....	.....	8	486	.....	.....	10	.....	.....	4½	18
Total.....	.....	.....	103	1,010	14	140	76	3,686	7	13	30	.....	.....	164½	230
NORTHWEST TERRITORIES															
Fort Good Hope.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fort Resolution.....	.....	.....	.....	.....	.....	.....	46½	1,642	3	6	46½	3½	1½	60	101
Fort Simpson.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	.....	.....	.....	.....	.....	.....	46½	1,642	3	6	46½	3½	1½	60	101
NOVA SCOTIA															
Annapolis.....	.....	.....	.....	.....	.....	.....	1	150	.....	.....	3½	.....	.....	.....	4½
Antigonish and Guysborough	.....	.....	3	80	.....	.....	16	355	.....	.....	5	.....	.....	21	24
Cape Breton (Eskasoni)	.....	.....	4	100	2	30	3	35	1	2	3	11	41	45	65
Cape Breton (Sydney)	.....	.....	.....	.....	.....	.....	12	600	.....	.....	.....	.....	.....	3	12
Colchester.....	.....	.....	.....	.....	.....	.....	7½	425	5	.....	7½	12½	.....	8	33
Cumberland.....	.....	.....	1	5	.....	.....	1	11	.....	.....	5	.....	.....	7	7
Digby.....	.....	.....	.....	.....	.....	.....	1	125	.....	.....	4	1	.....	6	6
Halifax.....	.....	.....	.....	.....	.....	.....	2	20	.....	.....	.....	.....	.....	.....	1
Hants (Indian Brook)	.....	.....	3	75	.....	.....	7	550	.....	.....	.....	.....	.....	35	10
Hants (Windsor)	.....	.....	.....	.....	.....	.....	4	50	.....	.....	.....	.....	.....	.....	1
Inverness.....	.....	.....	3½	50	.....	.....	21½	1,327	.....	.....	.....	.....	.....	25	24½
Kings.....	.....	.....	.....	.....	.....	.....	1	50	.....	.....	1	.....	.....	.....	2
Lunenburg.....	.....	.....	.....	.....	.....	.....	4	50	.....	.....	.....	.....	.....	.....	1
Pictou.....	.....	.....	1½	10	.....	.....	16½	672	.....	.....	9	.....	.....	1	18½
Queens.....	.....	.....	.....	.....	.....	.....	1	10	.....	.....	.....	.....	.....	.....	1
Richmond.....	.....	.....	11	160	.....	.....	12	1,100	2	6	1	.....	.....	50	28
Shelburne.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....
Victoria.....	.....	.....	2	30	.....	.....	10	100	.....	.....	1	3	4	30	20
Yarmouth.....	.....	.....	.....	.....	.....	.....	1½	100	.....	.....	1½	2	.....	.....	5
Total.....	.....	.....	29	510	2	30	113½	5,630	8	8	33½	29½	45	228	260½

Maniwaki.....	2	15	120	715	4	25	31½	1,275			55		185	212½	
Maria.....			20	350	1½	20	20	228	2	4	3	1	2	49½	
Mingan.....															
Oka.....			100	2,000	35	400	60	800			50		250	245	
Pierreville.....			25	150	2	30	30	300			25		50	82	
Pointe Bleue.....	13	140	180	1,716	195	2,000	24	350	10	30	15	49	20	506	
Restigouche.....	3	8	140	1,060	4	12			6	10	60	20	200	433	
Seven Islands.....															
St. Regis.....			460	6,670	269	4,651	174	5,480	40	140	45	38	22	1,048	
Timiskaming.....	7	44	68	850	6	60	8	360			3	223	45	360	
Total.....	30	255	1,586	21,341	617½	9,523	588½	12,545	81	307	308	342	489	4,042	
SASKATCHEWAN															
Battleford.....	1,735½	12,602	1,888	24,059			140	11,405	194	700	78	104	1,238	4,086	5,377½
Carlton.....	1,487	9,535	1,009	8,335	347	1,637	191	20,262	78	176	41	541	1,189	3,954	4,883
Crooked Lakes.....	1,369	12,371	1,501	32,669			47	4,788	83	187	681	513	1,884	4,026	5,578
Duck Lake.....	1,394	3,148	1,029	7,300	189	1,473	36	4,702	53	88	15	220	1,130	4,459	4,066
File Hills.....	1,211	13,579	1,398	26,294			26	1,410		36		185	1,800	2,330	4,120
Moose Woods.....							5	700			3		224	710	233
Onion Lake.....	1,166	11,061	673	15,958			43	6,143	316	323	24	214	327	3,538	2,793
Pelly.....	1,555	32,841	1,368	25,844	414	7,842	40	8,671	40	123	18	553	467	1,627	4,455
Qu'Appelle.....	2,421	16,266	1,498	11,211			35	1,952	480	280		150	2,107	2,865	6,682
Touchwood.....	1,378	14,835	899	18,632	3	53	42	3,805	40	64	31	100	1,183	4,752	3,666
Wood Mountain Reserve.....	120	300	70				10	100			5		20	5	225
Total.....	13,836½	126,538	11,323	170,442	953	11,005	616	63,940	1,284	1,947	897	2,580	10,569	32,350	42,058½
YUKON TERRITORY															
Yukon.....							2	234	½	½	2½			45	5

RECAPITULATION

PROVINCES															
Alberta.....	16,758	361,922	9,243	307,059	2,853	50,061	182½	17,029	2,954	2,653	75	1,273	19,610	16,685	52,948½
British Columbia.....	4,430	72,598	3,157	51,015	426½	8,970	1,921½	167,599	2,406½	3,115½	913½	11,276½	1,722	26,007	26,254
Manitoba.....	2,728	43,005	2,077	39,916	1,207	19,873	477	44,734	223	323	114	937	2,392	19,890	10,155
New Brunswick.....			103	1,010	14	140	76	3,686	7	13	30			164½	230
Northwest Territories.....							46½	1,642	3	6	46½	3½	1½	60	101
Nova Scotia.....			29	510	2	30	113½	5,630	8	8	33½	29½	45	228	260½
Ontario.....	2,165	37,028	20,422	505,497	6,175	100,700	2,151½	74,104	1,000	3,289	1,260½	5,289½	1,537	16,023	40,000½
Prince Edward Island.....	1	5	40	550			7½	1,000			2			37	50½
Quebec.....	30	255	1,586	21,341	617½	9,523	588½	12,545	81	307	308	342	489	3,961	4,042
Saskatchewan.....	13,836½	126,538	11,323	170,442	953	11,005	616	63,940	1,284	1,947	897	2,580	10,569	32,350	42,058½
Yukon Territory.....							2	234	½	½	2½			45	5
Total.....	39,948½	641,351	47,980	1,097,340	12,248½	200,302	6,182½	392,143	7,967	11,662	3,682½	21,731½	36,365½	115,450½	176,105½

TABLE 3

Land: Private and Public Buildings and Property

RECAPITULATION

Provinces	Total Area of Reserve (Acres)	Acres under Wood	Acres Cleared but not Cultivated	Acres under Actual Cultivation	Acres Fenced	Private Property							Public Property						
						Stone, Brick, and Frame Dwellings	Other Dwellings	Outbuildings, etc.	Ploughs, Harrows, Drills, etc.	Mowers, Reapers, Binders, Threshers, etc.	Carts, Wagons, and Vehicles	Automobiles	Tools and Small Implements	Churches	Council Houses	School-houses	Sawmills	Other Buildings	Engines and Machinery
Alberta.....	1,225,710	346,132	826,629½	52,948½	419,378	420	1,890	2,473	2,376	1,486	2,491	80	9,313	6	8	8	1	123	266
British Columbia.....	798,523	474,286	297,983	26,254	294,145	4,493	2,910	4,207	2,889	982	2,510	492	35,018	164	65	60	11	64	157
Manitoba.....	554,605	364,043	180,407	10,155	51,201	139	2,822	1,848	857	665	1,370	55	8,165	60	14	45	3	99	45
New Brunswick.....	37,404	35,591	1,588	230	1,142½	365	36	187	64	20	69	18	1,135	6	5	10	.....	3	1
Northwest Territories.....	1,924	1,709	114	101	58	.....	639	166	4	.....	.....	.....	777	.....	1	.....	.....	.....	.....
Nova Scotia.....	18,325	15,173½	2,891	200½	1,558	428	64	151	76	17	91	11	2,367	11	2	10	1	24	6
Ontario.....	1,326,172	1,173,076	113,095½	40,000½	120,521	2,454	2,191	5,618	4,286	1,298	3,598	498	46,123	96	37	72	10	109	124
Prince Edward Island.....	1,508	1,397	60½	50½	188	36	.....	31	13	9	8	.....	20	1	1	1	.....	1	.....
Quebec.....	195,528	166,193	25,293	4,042	14,782	1,377	388	2,256	618	276	1,308	111	5,235	15	5	24	1	34	32
Saskatchewan.....	1,283,311	518,890	722,362½	42,058½	328,482	169	2,262	2,774	2,352	1,722	2,813	64	15,607	35	17	24	3	57	67
Yukon Territory.....	160	152	3	5	5½	1	.....	5	3	1	4	.....	3	1	.....	1	.....	4	6
Total.....	5,443,170	3,096,642½	2,170,422	176,105½	1,231,461	9,882	13,202	19,716	13,538	6,476	14,262	1,329	123,763	395	155	255	30	518	704

TABLE 4

Live Stock and Poultry: General Effects

RECAPITULATION

Provinces	Horses			Cattle				Other Stock	Poultry	General Effects					
	Stallions	Geldings and Mares	Foals	Bulls	Steers and Work Oxen	Milch Cows	Young Stock	Pigs, Sheep, etc.		Motor and Sail Boats	Row Boats and Canoes	Rifles and Shot Guns	Steel Traps	Nets	Tents
Alberta.....	120	8,899	926	170	1,548	4,094	3,512	357	5,136	201	635	2,345	18,375	2,072	2,168
British Columbia.....	186	7,580	1,260	287	4,699	2,465	4,668	3,175	27,193	1,830	3,112	8,286	77,511	2,251	2,016
Manitoba.....	14	1,521	38	48	720	1,955	1,093	355	5,955	102	1,872	3,631	56,775	6,080	1,851
New Brunswick.....		8		1	2	25	17	16	375	39	168	278	1,366	182	54
Northwest Territories.....		2								139	554	1,091	13,230	1,098	492
Nova Scotia.....	1	31	4	4	7	118	49	53	603	10	60	224	1,437	31	23
Ontario.....	29	2,058	202	86	484	2,702	1,564	2,917	33,247	398	2,717	5,143	90,406	4,566	1,981
Prince Edward Island.....		7				10	12	3	125	3	5	8	75	10	
Quebec.....	3	546	57	110	4	1,603	755	643	6,329	52	1,081	1,879	17,765	577	810
Saskatchewan.....	13	4,224	60	69	1,190	2,862	1,988	1,044	7,757	38	475	2,485	30,617	1,472	1,984
Yukon Territory.....		4		1	2	5	5	3	40	1	1				2
Total.....	366	24,880	2,547	776	8,656	16,739	13,663	8,566	86,760	2,813	10,630	25,370	307,557	18,339	11,331

TABLE 5

Value of Real and Personal Property and Progress during the Year

RECAPITULATION

Provinces	Total Value on Lands in Reserves	Value of Private Fencing	Value of Private Buildings	Value of Public Buildings Property of the Band	Value of Implements and Vehicles	Value of Live Stock and Poultry	Value of General Effects	Value of Household Effects	Total Value of Real and Personal Property	Progress During the Year 1939		
										Value of New Land Improvements	Value of Buildings Erected	Total Increase in Value
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Alberta.....	16,283,280	121,305	742,303	193,536	316,513	620,120	153,479	151,044	18,581,580	9,043	28,758	37,801
British Columbia.....	13,566,024	324,335	1,877,585	600,600	423,034	771,863	1,041,680	566,765	19,171,886	31,240	77,075	108,315
Manitoba.....	2,817,869	42,790	470,840	141,400	149,195	211,088	195,475	118,600	4,147,257	5,965	1,915	7,880
New Brunswick.....	76,478	2,934	78,846	78,882	11,980	4,472	6,075	22,670	282,337	100	1,730	1,830
Northwest Territories.....	1,578	1,065	95,500	.....	524	7,300	226,870	119,950	452,787	440	6,000	6,440
Nova Scotia.....	77,935	3,510	98,795	50,900	5,877	11,730	8,410	17,720	274,877	380	2,930	3,310
Ontario.....	4,306,817	458,736	1,401,660	479,388	424,010	361,080	298,425	547,509	8,277,625	5,164	38,213	43,377
Prince Edward Island.....	3,750	300	1,500	2,200	300	1,350	1,100	1,500	12,000	150	200	350
Quebec.....	1,419,800	40,565	897,940	230,186	113,030	104,735	94,450	242,700	3,143,456	600	1,250	1,850
Saskatchewan.....	13,724,948	123,941	584,790	79,200	342,425	424,775	149,553	144,309	15,573,941	14,520	13,305	27,825
Yukon Territory.....	8,000	300	3,000	44,000	1,037	1,900	1,500	3,500	63,237	.....	.....	.....
Total.....	52,286,479	1,119,781	6,252,759	1,900,292	1,787,925	2,520,463	2,177,017	1,936,267	69,980,983	67,602	171,376	238,978

TABLE 6

Sources and Value of Income

Agencies	Value of Farm Products Including Hay	Value of Beef Sold also of That Used for Food	Wages Earned	Received from Land Rentals	Received from Timber	Received from Mining	Earned by Fishing	Earned by Hunting and Trapping	Earned by other Industries and Occupations	Annuities Paid and Interest on Indian Trust Funds	Total Income of Indians
ALBERTA	\$	\$	\$	\$ cts.	\$ cts.	\$ cts.	\$	\$	\$	\$ cts.	\$ cts.
Athabaska.....	2,085	200	2,150				250	22,400		8,410 00	85,495 00
Blackfoot.....	28,000	27,500	2,600	11,980 72				150	35,156	122,749 26	228,135 98
Blood.....	131,412	16,839	10,875	9,940 84		40 85		200	400	8,711 14	177,978 83
Edmonton.....	27,788	371	1,800	782 08			2,825	1,700	3,025	28,436 01	61,727 09
Hobbema.....	55,500	4,700	12,850	1,783 85		\$ 00	1,325	1,875	1,475	17,230 04	96,243 89
Lesser Slave Lake.....	16,205	2,550	4,700	675 15	18 47		3,075	42,900	2,450	24,825 20	97,398 82
Peirain.....	32,221	14,307	2,508	1,089 46				150	2,371	6,266 61	58,911 07
Saddle Lake.....	28,585	3,625	6,600	438 37			1,775	2,750	3,430	7,691 79	54,896 16
Sarcee.....	19,982	3,493	870	9,287 50				241	717	2,663 98	35,270 62
Stony.....	6,800	4,115	1,800	12,058 00	565 23			1,200	3,000	5,732 39	35,270 62
Inspectorate (Claresholm School Farm).....				775 69							775 69
Total.....	348,578	77,200	46,751	48,811 66	583 70	45 85	9,250	73,126	52,024	227,716 42	884,086 63
BRITISH COLUMBIA											
Babine.....	27,000	5,400		929 50			9,250	26,500	19,000	675 48	88,754 98
Bella Coola.....	6,465	2,200	10,900	325 00	1,324 53		52,500	9,600	8,890	665 51	92,670 04
Cowichan.....	10,600	3,000	49,200	6,926 72	4,649 26	630 40	9,600	250	2,550	6,008 86	93,410 24
Fort St. John.....	100		500		86 00			7,000	500	1,790 44	9,976 44
Kamloops.....	35,485	5,950	25,900	6,287 93	293 82	416 75		3,250	8,000	1,059 64	86,643 14
Kootenay.....	18,000	3,100	1,611 35	411 78			150	2,450	2,150	774 06	39,547 19
Kwawkwalth.....	3,345		9,370	925 00	12,482 46		88,850	1,405	26,000	4,167 63	146,525 09
Lytton.....	27,325	8,715	48,358	1,303 00	568 33	146 50		1,560	1,690	4,128 25	93,704 08
New Westminster.....	29,550	12,100	76,100	6,836 92	3,489 58	333 40	30,800	16,250	47,950	15,858 47	239,268 37
Nicola.....	55,075	9,250	30,000	255 42	90 24			1,325	2,200	64 98	98,260 64
Okanagan.....	88,000	24,050	30,500	6,116 06		440 50		3,050	13,050	1,042 16	166,248 72
Queen Charlotte.....	1,425	570	4,600	170 00			25,000	2,300	3,700	147 88	37,912 88
Skeena River.....	21,760	1,200	5,200	5 00	430 05	105 00	106,800	17,950	14,400	2,802 15	170,652 20
Stikine.....			18,700				1,250	29,500	1,000	0 96	50,450 96
Stuart Lake.....	6,825	2,420	2,050	85 00	5 45	158 40		3,480	650	1,529 65	17,203 50
Vancouver.....	2,875	25	119,000	11,694 57	190 28	4,318 29	27,850	1,250	12,900	10,117 93	190,221 07
West Coast.....	1,385	485	26,650	353 40	666 83		68,900	5,250	10,800	1,438 30	115,928 53
Williams Lake.....	42,050	13,035	22,750	538 95	143 51	75 00		16,825		138 98	95,556 44
Total.....	377,265	91,500	490,678	44,363 82	24,812 12	6,624 24	420,950	149,195	175,230	52,406 33	1,833,024 51

Pictou.....	510		2,100				225	50	1,900		4,785 00
Queens.....				15 00	7 20			25	100		147 20
Richmond.....	1,088	40	875				135	25	1,380		3,541 00
Shelburne.....	125		1,000				20	60	200		1,405 00
Victoria.....	300		200				60	120	90		770 00
Yarmouth.....	50		500					30			580 00
Micmacs of Nova Scotia.....										1,824 50	1,824 50
Total.....	7,182	560	16,505	70 00	14 40	522 30	1,295	2,165	9,345	1,824 50	39,483 20
NORTHWEST TERRITORIES											
Fort Good Hope.....			3,650					90,000		6,245 00	99,895 00
Fort Resolution.....										7,315 00	7,315 00
Fort Simpson.....	9,190		7,390				14,940	52,140	4,660	5,530 00	93,850 00
Total.....	9,190		11,040				14,940	142,140	4,660	19,090 00	201,060 00
ONTARIO											
Alnwick.....	4,000	250	11,000					4,000	4,000		23,250 00
Cape Croker.....	5,200	830	5,000	262 00	204 00		3,000	50	500	21,518 56	36,564 56
Caradoc.....	27,010	2,025	42,000	2,785 00			50	900	5,180	3,314 97	83,264 97
Chapleau.....	1,050		4,000			1,990 53		5,000		2,568 00	14,608 53
Christian Island.....	2,500	400	500					2,000	150	400	15,215 50
Fort Frances.....	4,350		17,500	1,010 00	157 66	29 80	10,000	13,000	13,800	16,416 75	75,264 21
Georgina Island.....	1,600	200	5,000	920 60	53 25		1,500	200	350	3,611 36	13,435 21
Golden Lake.....	300	100	1,500	45 00	18 40			1,000	500	17 04	3,480 44
Gore Bay.....	3,550	510	9,200					530	560	1,400	15,750 00
James Bay.....	1,760		23,000					1,700	150,300	9,950	187,349 08
Kenora.....	4,500		10,000	359 00	4,391 89	111 00	77,000	3,000	9,750	32,263 72	146,376 61
Manitoulin Island.....	17,665	5,155	49,530	215 00	4,101 69	402 65	2,590	2,170	13,975	35,850 22	131,954 56
Moravian.....	4,900	200	1,500	495 00				40	125	200	13,266 53
New Credit.....	8,635	900	3,900					200			13,635 00
Parry Sound.....	1,120	300	15,850	432 50	1,565 25	340 53	200	375	800	17,310 65	38,293 93
Port Arthur.....	100		80,450	799 97	137 00	10 00	11,700	7,850	60,900	16,090 48	178,037 45
Rama.....	900		3,000	118 00	4 10			800	5,000	7,997 11	18,219 21
Rice Lake.....	6,750	500	20,000	1,564 00				8,500	11,000	16,999 11	65,313 11
Sarnia.....	6,000		1,900	433 00	6 00	24 70		100		16,784 23	25,247 93
Saugeen.....	6,000	500	6,500	322 00			50	800	4,000	16,084 53	34,256 53
Sault Ste. Marie.....	21,400	1,850	33,600	191 00	276 65	1,039 70	3,300	6,525	8,900	19,497 78	102,080 13
Savanne.....	2,150		9,200				89,000	23,000	13,000		141,350 00
Scugog.....			300	589 00			35	165		1,390 78	2,469 78
Six Nations.....	148,575	3,400	22,000	8,555 63	151 74			1,000	9,000	47,617 53	240,299 90
Sturgeon Falls.....	2,950	350	6,650	100 00	3,907 75		600	3,200	11,150	61,690 87	90,598 62
Tyendinaga.....	76,500	3,000	30,000	5,712 63				2,000	300	4,000	126,378 75
Walpole Island.....	26,251	1,950	65,000	4,772 32	185 98		3,000	2,500	17,000	3,307 67	123,966 97
District of Patricia.....										17,641 00	17,641 00
Georgian Bay Islands.....											
Total.....	385,716	22,420	483,380	29,681 70	17,151 89	1,958 33	209,185	246,270	204,755	383,499 59	1,984,017 56
PRINCE EDWARD ISLAND.....	875	200	1,500		6 00		400	200	500	0 13	3,681 13

TABLE 6—Continued
Sources and Value of Income—Continued

Agencies	Value of Farm Products Including Hay	Value of Beef Sold also of That Used for Food	Wages Earned	Received from Land Rentals	Received from Timber	Received from Mining	Earned by Fishing	Earned by Hunting and Trapping	Earned by other Industries and Occupations	Annuities Paid and Interest on Indian Trust Funds	Total Income of Indians
	\$	\$	\$	\$ cts.	\$ cts.	\$ cts.	\$	\$	\$	\$ cts.	\$ cts.
QUEBEC											
Becancour.....	800	200	800				25	20	100	364 48	2,309 48
Bersimis.....	450	150	5,920	230 00	1,179 66		300	7,950	1,000	7,159 74	24,339 40
Cacouna.....	1,000	300								489 12	1,789 12
Caughnawaga.....	10,500	3,300	38,000	5,943 74			400	175	900	899 24	60,117 98
Jeune Lorette.....			9,000					500	5,500	776 09	15,776 09
Maniwaki.....	3,752	500	28,000	527 50	517 35	5 00	200	2,900	575	3,991 31	40,968 16
Manowan.....					437 22					2,040 91	2,478 13
Maria.....	700	40	750						500		2,070 00
Mingan.....								900	100		1,000 00
Oka.....	3,000	1,000	1,000	16 00	450 39				500	556 77	6,523 16
Pierreville.....	1,200	150	8,200	384 00				200	8,000	347 44	18,481 44
Pointe Bleue.....	10,300	275	14,000	1 00	5 40			18,000	2,000	367 93	44,949 33
Restigouche.....	8,500	120	10,500	215 00					300	226 31	19,861 31
Seven Islands.....				100 00				12,000			12,100 00
St. Regis.....	27,000	2,500	8,000	703 42		10 38	1,200	900	8,000	3,063 58	51,377 38
Timiskaming.....	11,000	100	3,000				25	700		2,277 89	17,102 89
Northern District.....											
Total.....	78,202	8,635	127,170	8,120 66	2,580 02	15 38	2,190	44,285	27,475	22,560 81	321,243 87
SASKATCHEWAN											
Battleford.....	30,305	5,120	7,100	2,469 48			14,000	17,075	2,350	19,304 56	97,724 04
Carlton.....	31,080	10,450	16,200	757 25			254	19,750	9,600	23,763 88	111,905 13
Crooked Lakes.....	28,368	4,610	1,315	1,685 60	5 00	50 00				29,082 91	65,068 51
Duck Lake.....	30,992	9,124	3,651	266 00			331	1,584	7,690	10,098 10	63,736 10
File Hills.....	21,618	2,825	1,900	227 07				250	5,525	4,014 11	36,359 18
Moose Woods.....	3,060	884	300				25	15	342		4,626 00
Onion Lake.....	26,336	6,695	6,500	31 00			6,650	6,100	6,300	7,380 12	65,992 12
Pelly.....	35,090	3,200	12,000	1,672 39				900	3,350	12,118 60	68,330 99
Qu'Appelle.....	24,118	5,390	1,600	253 37			450	490	580	26,393 15	59,254 52
Touchwood.....	26,575	5,183	5,100	271 00				2,340	1,950	19,161 34	60,580 34
Wood Mountain Reserve.....	100	325	250						160	3 56	838 56
Inspectorate (Regina Beach).....				145 75							145 75
Total.....	257,642	53,796	55,916	7,778 91	5 00	50 00	21,710	48,494	37,847	151,320 33	634,559 24
YUKON TERRITORY											
Yukon.....	5,295	317	4,068							17 17	9,697 17

*Figures not available.

RECAPITULATION

PROVINCES												
Alberta.....	348,578	77,200	46,751	48,811 66	583 70	45 85	9,250	73,126	52,024	227,716 42	884,086 63	
British Columbia.....	377,265	91,500	490,678	44,363 82	24,812 12	6,624 24	420,950	149,195	175,230	52,406 33	1,833,024 51	
Manitoba.....	141,011	19,410	69,705	2,043 64	871 45	.....	32,730	112,150	35,725	102,657 12	516,303 21
New Brunswick.....	6,625	220	12,245	200 00	173 80	32 30	1,390	1,775	2,980	2,580 05	28,221 15	
Northwest Territories.....	9,190	.....	11,040	.....	.....	.....	14,940	142,140	4,660	19,090 00	201,060 00
Nova Scotia.....	7,182	560	16,505	70 00	14 40	522 30	1,295	2,165	9,345	1,824 50	39,453 20	
Ontario.....	385,716	22,420	483,380	29,681 70	17,151 89	1,958 38	209,185	246,270	204,755	383,499 59	1,984,017 56	
Prince Edward Island.....	875	200	1,500	.....	6 00	.....	400	200	500	0 13	3,681 13
Quebec.....	78,202	8,635	127,170	8,120 66	2,590 02	15 38	2,190	44,285	27,475	22,560 81	321,243 87	
Saskatchewan.....	257,642	53,796	55,916	7,778 91	5 00	50 00	21,710	48,494	37,847	151,320 33	634,559 24	
Yukon Territory.....	5,295	317	4,068	.....	.....	.....	.....	*	.....	17 17	9,697 17
Total.....	1,617,581	274,258	1,318,958	141,070 39	46,208 38	9,248 45	714,040	819,800	550,541	963,672 45	6,455,377 67	

*Figures not available.

Statement of Ordinary Expenditure by Provinces for the Year 1938-9

Province	Adminis- tration	Indian Agencies	Reserves and Trusts	Medical	Grants to Hospitals	Welfare	Education	Grants to Res. Schools	Grants to Exhibitions	Total
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	60	7,884	.....	37,172	.....	72,241	10,650	27,303	.....	155,310
Prince Edward Island.....	.....	1,716	.....	5,195	.....	8,348	882	.....	.....	16,141
New Brunswick.....	.....	7,099	.....	18,654	.....	61,503	16,227	.....	16	103,499
Quebec.....	48	42,973	62	100,840	275	206,093	56,954	7,445	.....	414,690
Ontario.....	313	101,132	5,747	184,260	.....	143,540	123,222	240,251	2,280	800,745
Manitoba.....	4	74,876	4,966	101,932	323	114,397	72,415	147,942	220	517,075
Saskatchewan.....	221	132,944	3,000	88,162	.....	109,934	54,881	255,240	718	645,100
Alberta.....	92	105,338	3,009	85,267	1,080	90,910	10,779	298,964	700	596,139
British Columbia.....	528	136,484	2,366	179,741	.....	102,351	80,042	302,034	1,726	805,272
Northwest Territories.....	.....	23,320	3,168	34,411	28,240	26,781	1,647	36,346	.....	153,913
Yukon.....	.....	785	.....	11,204	.....	9,907	6,780	14,097	.....	42,773
Headquarters and Miscellaneous.....	45,004	11,743	29,614	15,647	.....	33,150	82,104	.....	.....	217,262
Hospitals, Nursing Stations and Tuberculosis Control.....	.....	.....	.....	348,531	.....	.....	.....	.....	.....	348,531
B.C. Special.....	.....	.....	.....	48,950	.....	19,999	9,739	.....	.....	78,688
B.C. Special, Surveys and Engineering.....	.....	20,397	.....	.....	.....	.....	.....	.....	.....	20,397
Surveys and Engineering.....	.....	40,768	.....	.....	.....	.....	90,504	4,889	.....	136,161
Pensions and Gratuities.....	.....	2,447	.....	.....	.....	.....	.....	.....	.....	2,447
Total.....	46,270	709,906	51,932	1,259,966	29,918	999,154	616,826	1,334,511	5,660	5,054,143
Indian Annuities.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	253,189
										5,307,332

Special Supplementary Vote Expenditure by Provinces, Year 1938-9

FUR CONSERVATION

Quebec.....	\$	2,048
Manitoba.....		32,450
Alberta.....		1,911
British Columbia.....		900
Miscellaneous.....		691
	\$	<u>38,000</u>

OPEN ACCOUNT—INDIAN ACT REVOLVING FUND

Quebec.....	\$	3,500
Saskatchewan.....		2,425
	\$	<u>5,925</u>

Annuities Paid and Interest on Indian Trust Funds, 1938-9

ALBERTA

Athabaska.....	\$	8,410 00
Blackfoot.....		122,749 26
Blood.....		8,711 14
Edmonton.....		23,436 01
Fort St. John.....		1,790 44
Hobbema.....		17,230 04
Lesser Slave Lake.....		24,825 20
Peigan.....		6,266 61
Saddle Lake.....		7,691 79
Sarcee.....		2,663 98
Stony.....		5,732 39
	\$	<u>229,506 86</u>

NORTHWEST TERRITORIES

Fort Good Hope.....	\$	6,245 00
Fort Resolution.....		7,315 00
Fort Simpson.....		5,530 00
	\$	<u>19,090 00</u>

BRITISH COLUMBIA

Babine.....	\$	675 48
Bella Coola.....		665 51
Cowichan.....		6,003 86
Kamloops.....		1,059 64
Kootenay.....		774 06
Kwakwewith.....		4,167 63
Lytton.....		4,128 25
New Westminster.....		15,853 47
Nicola.....		64 98
Okanagan.....		1,042 16
Queen Charlotte.....		147 88
Skeena River.....		2,802 15
Stikine.....		0 96
Stuart Lake.....		1,529 65
Vancouver.....		10,117 93
West Coast.....		1,438 30
Williams Lake.....		138 98
	\$	<u>50,615 89</u>

Annuities Paid and Interest on Indian Trust Funds, 1938-9—Continued

MANITOBA

Birtle.....	\$	3,620 14
Clandeboye.....		18,735 71
Fisher River.....		12,075 85
Fort Churchill and York Factory.....		3,240 00
Portage la Prairie.....		21,024 85
Griswold.....		455 57
Norway House.....		17,112 01
The Pas.....		26,383 99
	\$	102,657 12

NEW BRUNSWICK

Northern Division.....	\$	1,124 09
Northeastern Division.....		1,337 02
Southwestern Division.....		118 94
	\$	2,580 05

NOVA SCOTIA

Nova Scotia.....	\$	1,824 50
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PRINCE EDWARD ISLAND

Prince Edward Island.....	\$	0 13
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ONTARIO

Cape Croker.....	\$	21,518 56
Caradoc.....		3,314 97
Chapleau.....		2,568 00
Christian Island.....		15,215 50
Fort Frances.....		15,416 75
Georgina Island.....		3,611 36
Golden Lake.....		17 04
James Bay.....		7,847 08
Kenora.....		27,894 14
Manitowaning.....		35,850 22
Moravian.....		5,806 58
Parry Sound.....		17,310 65
Port Arthur.....		16,090 48
Rama.....		7,997 11
Rice Lake.....		16,999 11
Sarnia.....		16,784 23
Saugeen.....		16,084 53
Sault Ste. Marie.....		19,497 78
Scugog.....		1,390 78
Six Nations.....		47,617 53
Sturgeon Falls.....		61,690 87
Sioux Lookout.....		14,302 53
Tyendinaga.....		5,366 07
Walpole Island.....		3,307 67
	\$	383,499 59

QUEBEC

Becancour.....	\$	360 48
Bersimis.....		7,159 74
Cacouna.....		489 12
Caughnawaga.....		899 24
Lorette.....		778 09
Maniwaki.....		3,997 31
Manowan.....		2,040 91
Maria.....		
Mingan.....		

*Annuities Paid and Interest on Indian Trust Funds, 1938-9—Concluded*QUEBEC—*Concluded*

Oka.....	\$	556 77
Pierreville.....		347 44
Pointe Bleue.....		367 93
Restigouche.....		226 31
St. Regis.....		3,063 58
Timiskaming.....		2,277 89
	\$	22,562 81

SASKATCHEWAN

Battleford.....	\$	19,304 56
Carlton.....		23,763 88
Crooked Lakes.....		29,082 91
Duck Lake.....		10,098 10
File Hills.....		4,014 11
Onion Lake.....		7,380 12
Pelly.....		12,118 60
Qu'Appelle.....		26,393 15
Touchwood.....		19,161 34
Wood Mountain.....		3 56
	\$	151,320 33

YUKON

Yukon Indians.....	\$	17 17
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INDIAN TRUST FUND

*Showing Transactions in Connection with the Fund During the Fiscal Year
Ended March 31, 1939*

Service	Debit		Credit	
	\$	cts.	\$	cts.
Balance March 31, 1938.....			14,081,905	63
Collections on land sales, timber and stone dues, rents, fines, fees, etc.....			495,370	02
Interest for year ending March 31, 1939.....			714,993	73
Credit transfers during year.....			8,717	13
Expenditure during year.....	1,132,924	08		
Transfers by warrant, etc.....		18,559	24	
Balance, March 31, 1939.....	14,149,503	19		
	15,300,986	51	15,300,986	51

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1939

School	Reserve	Agency	Teacher	Number on Roll			Average Attendance	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.....	6	7	13	7	5	2	2	.....	3	.....	1	.....	.....
NOVA SCOTIA																
Afton.....	Afton.....	Antigonish Co.....	Miss J. Forbes.....	11	9	20	15	9	1	2	.....	2	4	2	.....	.....
Eskasoni.....	Eskasoni.....	Cape Breton.....	Miss J. McMillan.....	10	17	27	18	12	5	3	3	3	1	.....	.....	.....
Sydney.....	Sydney.....	".....	Miss C. Gallagher.....	11	17	28	17	11	.....	3	5	7	2	.....	.....	.....
Millbrook.....	Millbrook.....	Colchester.....	Mr. F. B. McKinnon.....	17	13	30	23	13	1	1	4	3	1	5	.....	2
Bear River.....	Bear River.....	Digby.....	Mrs. R. L. Ford.....	5	8	13	9	3	.....	5	.....	2	3	.....	.....	.....
Malagawatch.....	Malagawatch.....	Inverness.....	Mr. C. Kennedy.....	9	6	15	11	6	3	.....	3	2	1	.....	.....	.....
Whyoccomagh.....	Whyoccomagh.....	".....	Mr. A. MacDonald.....	19	19	38	21	13	6	10	3	1	2	2	1	.....
Indian Cove.....	Fisher's Cove.....	Pictou.....	Miss G. McGirr.....	22	15	37	28	17	2	4	8	4	.....	2	.....	.....
Salmon River.....	Salmon River.....	Richmond.....	Miss H. Bissett.....	11	17	28	20	12	10	2	1	1	2	.....	.....	.....
Middle River.....	Middle River.....	Victoria.....	Miss M. E. McLean.....	9	17	26	20	16	9	.....	1	.....	.....	.....	.....	.....
Total.....	.....	.....	.....	124	138	262	182	112	37	30	25	26	14	15	1	2
NEW BRUNSWICK																
Big Cove.....	Big Cove.....	Northeastern.....	Mr. A. L. Fraser.....	29	24	53	40	21	7	11	8	2	2	.....	2	.....
Burnt Church.....	Burnt Church.....	".....	Mrs. A. L. Fraser.....													
Eel Ground.....	Eel Ground.....	".....	Miss V. A. Hogan.....													
Indian Island.....	Indian Island.....	".....	Miss C. J. Hogan.....													
Red Bank.....	Red Bank.....	".....	Miss D. G. Murphy.....	11	14	25	20	12	3	2	.....	3	4	1	.....	.....
Eel River.....	Eel River.....	Restigouche.....	Mrs. C. E. F. Savage.....	4	8	12	7	3	4	2	.....	3	.....	.....	.....	.....
Kingsclear.....	Eel River.....	".....	Mrs. S. M. Kehoe.....	7	8	15	12	7	4	1	.....	2	1	.....	.....	.....
Oromocto.....	Kingsclear.....	Southwestern.....	Miss B. L. Arsenault.....	13	10	23	19	7	3	4	3	1	2	1	2	.....
St. Mary's.....	Oromocto.....	".....	Miss E. M. O'Brien.....	10	6	16	11	5	1	2	.....	1	4	3	.....	.....
Woodstock.....	Oromocto.....	".....	Miss M. E. Scott.....	9	9	18	15	6	5	.....	1	2	2	1	2	.....
Tobique.....	St. Mary's.....	".....	Mrs. R. McElligott.....	15	21	36	27	6	5	8	7	3	6	1	.....	.....
	Woodstock.....	".....	Sister M. Annette.....	8	12	20	15	2	5	6	5	.....	1	1	.....	.....
		Northern.....	Sister Catherine.....													
		".....	Sister M. Dolorosa.....													
		".....	Sister M. Columille.....	30	24	54	42	12	11	13	5	7	3	1	2	.....
Total.....	.....	.....	.....	161	165	326	251	90	60	58	37	24	31	16	10	.....

INDIAN AFFAIRS BRANCH

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1939—Continued

School	Reserve	Agency	Teacher	Number on Roll			Average Attendance	Grades											
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX			
QUEBEC																			
Bersimis.....	Bersimis.....	Bersimis.....	Sister St.-Michel des Saints.....	40	45	85	38	48	29	6	2								
Caughnawaga Bush.....	Caughnawaga.....	Caughnawaga.....	Sister Ste.-Angeline.....																
			Miss V. Jocks.....	15	9	24	16	6	5	4		6	2	1					
			Sister M. Cleophas.....																
			Sister M. Leander.....	181	158	339	305	53	60	64	64	21	23	37	17				
Caughnawaga R. C.....	".....	".....	Miss V. Snow.....																
			Sister M. George.....																
			Sister M. Rose.....																
			Sister M. Catherine.....																
			Sister M. Lucie.....																
			Sister Marie.....																
			Sister M. Jeanne.....																
			Sister M. John.....																
			Sister M. Alma.....																
			Sister M. Mechtilde.....																
			Sister M. Leocadie.....																
			Sister M. Anysie.....																
			Sister M. Laurence.....																
			Sister M. Norbert.....																
Caughnawaga St. Isidore.....	".....	".....	Miss M. Stacey.....	8	14	22	17	7	2	2	6	2		3					
Caughnawaga United Church...	".....	".....	Miss E. Bryan.....																
(a) Fort George.....	At Fort George.....	James Bay.....	Miss E. I. Mann.....	1	1	2	1	2											
(1) Rupert's House.....	At Rupert's House.....	".....	Miss V. C. Rutherford.....																
			Rev. L. A. Sampson.....	31	17	48	10	37	5	6									
			Sister Ste.-Jean de Matha.....																
Lorette.....	Lorette.....	Lorette.....	Sister Ste.-Aimee du Sacre Coeur.....	29	33	62	50	24	10	12	12	3		1					
			Miss D. Gideon.....																
Maria.....	Maria.....	Maria.....	Miss E. Baker.....	28	26	54	40	23	6	16	9								
Congo Bridge.....	Congo Bridge.....	Maniwaki.....	Miss J. Bernatchez.....																
Maniwaki.....	Maniwaki.....	".....	Mr. A. E. Smith.....	18	25	43	24	16		8	8	8	3						
Oka Country.....	Oka.....	Oka.....	Mr. M. J. Oke.....																
Oka Village.....	".....	".....	Mr. A. Emmett.....	14	8	22	15	10	5	2	1	4	2						
St. Frances C. E.....	Pierreville.....	Pierreville.....	Mr. M. J. Oke.....																
			Mr. A. Emmett.....	15	12	27	13	9	4	3	5	4	2						
			Sister M. Josephine.....																
St. Frances R.C.....	".....	".....	Sister St.-Rene.....	32	33	65	58	6	18	12	10	7	5	7					
			Sister C. Ovide.....																
Pointe Bleue.....	Pointe Bleue.....	Pointe Bleue.....	Sister Henri Suzo.....	42	44	86	64	51	7	15	12	1							
			Sister Ste.-Jeanne.....																
Restigouche.....	Restigouche.....	Restigouche.....	Sister Mary of St.-Leo.....	92	59	151	104	55	23	29	21	10	5	8					
			Sister M. of the Holy Eucharist.....																
			Sister M. of St.-Peter.....	11	20	31	25	16	4	2	4	4							1
Chenail.....	St. Regis.....	St. Regis.....	Miss U. Billings.....																
Chotlain.....	".....	".....	Miss G. Foisy.....	12	9	21	17	9	2	5	2	2		1					
Cornwall Island East.....	".....	".....	Mr. C. Chisholm.....																
Cornwall Island West.....	".....	".....	Miss E. Peters.....	18	20	47	33	16	7	5	8	7		4					4
			Miss E. Peters.....																

St. Regis Island.....	"	"	Miss H. Fitzpatrick.....	7	11	18	14	6	5	3	4						
St. Regis Village.....	"	"	Miss M. McDonald.....														
Brennan's Lake.....	At Brennan's Lake.....	Timiskaming.....	Miss H. C. McRae.....	7	5	12	8	8	3	1							
Hunter's Point.....	At Hunter's Point.....	"	Miss C. Nephin.....	2	6	8	6	1	2	1	2						1
Timiskaming.....	Timiskaming.....	"	Sister John of the Eucharist.	19	8	27	21	7	2	4	9	5					
¹ Waswanipi.....	At Waswanipi.....	"	Mr. S. R. Iserhoff.....	36	27	63	33	61	1	1							
¹ Manouan.....	At Manouan.....	Outside Treaty.....	Miss U. Bordeleau.....	38	29	67	56	48	11	8							
			Miss B. Savard.....	21	24	45	21	45									
¹ Mistassini.....	At Mistassini.....	"	Mr. G. Iserhoff.....	36	22	58	33	41	17								
¹ Obedjiwan.....	At Obedjiwan.....	"	Miss A. Hubert.....														
			Miss J. Lafrance.....														
¹ Weymontsaching.....	At Weymontsaching.....	"	Miss M. T. Laforce.....	20	20	40	31	27	7	6							
			Miss W. Foy.....														
Total.....				840	758	1,598	1,142	678	252	228	190	92	66	65	27		
ONTARIO																	
Cape Croker.....	Cape Croker.....	Cape Croker.....	Miss S. J. Burke.....	24	22	46	39	13	8	13			9		2		1
Port Elgin.....	"	"	Miss G. R. Parke.....	13	11	24	21	6	5	2	5	3	2	1			
Sidney Bay.....	"	"	Miss G. Edington.....	7	8	15	10	3	3	4	1	4					
Back Settlement.....	Caradoc.....	Caradoc.....	Miss H. M. Howe.....	20	11	31	20	5	7	5	3	2	3	3			3
Bear Creek.....	"	"	Mrs. M. M. Docker.....	8	5	13	9	5	1	2	1	3					
Muncey.....	"	"	Miss B. Comfort.....	8	5	13	7	4	2	2	1	1	1	1			1
² Oneida No. 1.....	Oneida.....	"	Miss M. Stiltz.....	13	17	30	23	15	7	1	2	3	2				
Oneida No. 2.....	"	"	Mr. V. H. Morris.....	29	18	47	24	21	10	6	3	4	2	1			
Oneida No. 3.....	"	"	Mr. L. O. Brayford.....	23	25	48	24	18	8	13	2	4	1				2
River Settlement.....	Caradoc.....	"	Miss P. Sabin.....	16	9	25	15	10	5		4	2	2	2			
Christian Island R. C.....	Christian Island.....	Christian Island.....	Miss M. M. O'Toole.....	12	17	29	21	13	3	1	4	3	3			1	1
Christian Island U. C.....	"	"	Mr. K. A. Cowan.....	21	24	45	32	16	10	9	2		4	4			
			Miss I. Bell.....														
Manitou Rapids.....	Manitou Rapids.....	Fort Frances.....	Miss N. M. Tompkins.....	8	4	12	7	5	1	6							
Seine River.....	Wild Potato.....	"	Mr. J. Leeder.....	9	9	18	17	10	8								
Gull Bay.....	Gull Bay.....	Fort William.....	Mrs. M. H. Reed.....	10	17	27	12	15	3	3	2	4					
Lake Helen.....	At Lake Helen.....	"	Mr. G. W. Vesey.....	7	10	17	11	13	1				3				
Martin Falls.....	Long Lake.....	"	Miss O. Wright.....	5	11	16	8	13	1	1	1						
McIntyre Bay.....	Grand Bay.....	"	Mr. A. W. Murphy.....	9	13	22	13	9	2	8		3					
Mission Bay.....	Fort William.....	"	Miss C. Troy.....	9	12	21	18	4	3	5	2		2	5			
Mobert.....	Mobert.....	"	Mr. J. R. Douglas.....	10	20	30	17	8	9	8	3	3					
Pic.....	"	"	Miss H. Bonnesur.....	11	30	39	20	26	5	4	1	2	1				
Whitesand.....	Whitesand.....	"	Miss A. McGuire.....	12	6	17	12	11	5	5							
Georgina Island.....	Georgina Island.....	Georgina Island.....	Mr. H. S. Rawlings.....	14	10	24	20	5	4	4		7		4			
Golden Lake.....	Golden Lake.....	Golden Lake.....	Miss J. Currier.....	23	12	35	22	14	5	4	3	4	2	1			2
Albany River.....	At Albany River.....	James Bay.....	Rev. R. A. Joselyn.....	22	15	37	10	16	14	7							
Moose Fort.....	At Moose Fort.....	"	Miss D. L. Robinson.....	16	15	31	15	22	4	1	1	1	1	1			
Whitefish Bay.....	At Whitefish Bay.....	Kenora.....	Mr. A. Lafliche.....	11	13	24	19	12	4	5		3		1			
Birch Island.....	Whitefish River.....	Manitoulin Island.....	Miss E. Fortin.....	13	22	35	30	17	2	3	4	3	2			2	
Buzwah.....	Buzwah.....	"	Miss C. Wakegigig.....	22	11	33	25	21	4		5		2				
Kaboni.....	"	"	Mrs. S. A. Prudhomme.....	12	13	25	15	13	7	3							
³ Rabbit Island.....	Wikwemikong.....	"	Miss E. Allen.....	18	5	23	20	15	4	2	1	1					
Sheshgewaning R.C.....	Sheshgewaning.....	"	Miss J. Goody.....	10	8	18	12	9	4	2		3					
Sucker Creek.....	Sucker Creek.....	"	Miss L. Sims.....	8	14	22	17	8		5	3			3			3
West Bay.....	West Bay.....	"	Miss M. Wrinn.....	24	23	47	34	15	7	13	8	3	1				

(a) School closed June 30, 1938.

¹Seasonal School only.²New school opened Sept. 1, 1938.³New school opened Sept. 19, 1938.

"	11	"	"	"	Miss E. Monture.....	20	35	55	38	12	0	8	8	6	3	6	3	.....
Dokis.....	Dokis.....	Sturgeon Falls.....	"	"	Miss A. Hill.....	14	16	30	20	3	8	4	6	3	3	2	1	.....
Garden Village.....	Nipissing.....	"	"	"	Miss L. Addey.....	19	21	40	25	23	6	5	2	1	2	1	.....	.....
1Temogami.....	At Temogami.....	"	"	"	Miss M. B. Roche.....	10	17	27	20	3	5	6	7	6	.....	.....	.....	.....
Whitefish Lake.....	Whitefish Lake.....	"	"	"	Rev. L. C. Wittig.....	6	12	18	12	5	2	.....	7	1	1	2	.....	.....
Tyendinaga Central.....	Tyendinaga.....	Tyendinaga.....	"	"	Miss E. Kelly.....	14	20	34	23	11	5	4	3	3	2	5	1	.....
" Eastern.....	"	"	"	"	Miss J. E. Schell.....	17	18	35	20	11	7	6	4	5	.....	.....	.....	.....
" Mission.....	"	"	"	"	Miss N. H. Stoddart.....	8	22	30	15	6	6	.....	9	6	1	.....	.....	.....
" Western.....	"	"	"	"	Miss L. Brant.....	8	11	19	13	5	.....	4	.....	3	3	1	.....	.....
Walpole Island No. 1.....	Walpole Island.....	Walpole Island.....	"	"	Mr. J. W. Daly.....	30	35	74	60	29	14	6	8	3	7	3	.....	.....
" No. 2.....	"	"	"	"	Mrs. J. W. Daly.....	19	11	30	24	7	12	.....	10	.....	1	.....	.....	.....
					Mrs. E. E. George.....														
Total.....						1,484	1,462	2,946	1,990	1,146	456	343	271	277	177	154	119	3	
MANITOBA																			
Berens River R.C.....	Berens River.....	Clandeboye.....	"	"	Sister Benoit.....	17	14	31	23	17	3	.....	7	.....	4	.....	.....	.....
" U. J.....	"	"	"	"	Sister Lacroix.....	31	23	54	29	18	18	10	2	.....	4	.....	.....	.....
Black River.....	Black River.....	"	"	"	Mr. C. D. Street.....	10	6	16	7	10	2	1	3	.....	4	.....	.....	.....
Bloodvein River.....	Bloodvein.....	"	"	"	Mr. G. Slater.....	15	12	27	15	9	4	3	3	.....	4	.....	.....	.....
Brokenhead.....	Brokenhead.....	"	"	"	Rev. F. Leach, O.M.I.....	14	12	26	18	8	9	3	1	3	1	1	.....	.....
Fort Alexander Upper.....	Fort Alexander.....	"	"	"	Mr. C. E. Sage.....	16	18	34	11	25	4	3	2	.....	.....	.....	.....	.....
Grand Rapids.....	Grand Rapids.....	"	"	"	Mrs. C. R. Harbord.....	11	10	21	14	6	4	5	3	.....	2	1	.....	.....
Hollowwater River.....	Hollowwater River.....	"	"	"	Rev. F. L. Donaghy.....	13	7	20	14	12	5	1	2	.....	.....	.....	.....	.....
Little Grand Rapids R.C.....	Little Grand Rapids.....	"	"	"	Mr. R. C. Marsh.....	16	11	27	14	9	13	5	.....	.....	.....	.....	.....	.....
" R.C.....	"	"	"	"	Mr. N. Bellavance.....	20	19	39	24	20	13	3	.....	.....	.....	.....	.....	.....
" U.C.....	"	"	"	"	Mr. R. Schuetze.....	7	10	17	9	8	6	3	.....	.....	.....	.....	.....	.....
Poplar River.....	Poplar River.....	"	"	"	Mr. J. Taylor.....	39	43	82	49	34	14	6	10	8	5	5	.....	.....
Fisher River.....	Fisher River.....	Fisher River.....	"	"	Mr. W. G. Tong.....	13	6	19	10	10	2	4	2	1	.....	.....	.....	.....
Jackhead.....	Jackhead.....	"	"	"	Miss M. Stevens.....	8	12	20	13	8	8	.....	1	1	1	1	.....	.....
Peguis Centre.....	Peguis.....	"	"	"	Miss A. L. Clarke.....	12	9	21	15	10	8	2	.....	.....	.....	.....	.....	.....
Peguis North.....	"	"	"	"	Miss A. Eaton.....	22	18	40	28	17	4	4	8	.....	3	1	.....	.....
Peguis South.....	"	"	"	"	Miss N. S. Skatfeld.....	3	10	13	7	10	3	.....	.....	.....	.....	.....	.....	.....
Oak River Sioux.....	Oak River.....	Griswold.....	"	"	Miss W. H. Stapleton.....	16	13	29	19	23	3	2	.....	1	.....	.....	.....	.....
Ebb and Flow Lake.....	Ebb and Flow.....	Manitowaph.....	"	"	Mrs. H. M. Adam.....	16	23	39	20	23	10	.....	6	.....	.....	.....	.....	.....
Fairford.....	Fairford.....	"	"	"	Miss I. G. Fairservice.....	13	7	20	13	12	5	2	.....	1	.....	.....	.....	.....
Lake Manitoba.....	Lake Manitoba.....	"	"	"	Miss A. C. E. Field.....	19	21	40	20	27	3	8	1	1	.....	.....	.....	.....
Lake St. Martin.....	Lake St. Martin.....	"	"	"	Sister Cecilia.....	12	12	24	10	14	7	3	.....	.....	.....	.....	.....	.....
Little Saskatchewan.....	Little Saskatchewan.....	"	"	"	Mrs. C. R. McKenzie.....	17	19	36	20	31	3	2	.....	.....	.....	.....	.....	.....
Shoal River.....	Shoal River.....	"	"	"	Mr. A. Wheadon.....	9	5	14	12	4	5	.....	2	1	2	.....	.....	.....
Waterhen River.....	Waterhen.....	"	"	"	Miss B. McNevin.....	21	22	43	25	41	2	.....	.....	.....	.....	.....	.....	.....
1Churchill.....	At Fort Churchill.....	Norway House.....	"	"	Sister P. Fuller.....	23	23	46	16	27	17	1	1	.....	.....	.....	.....	.....
Cross Lake R.C.....	Cross Lake.....	"	"	"	Mr. R. Loutitt.....	12	11	23	15	12	7	.....	4	.....	.....	.....	.....	.....
Cross Lake U.C.....	Cross Lake.....	"	"	"	Sister St. Luc.....	12	11	23	15	12	7	.....	4	.....	.....	.....	.....	.....
1God's Lake R.C.....	God's Lake.....	"	"	"	Miss E. McLaren.....	23	23	46	16	29	9	8	.....	.....	.....	.....	.....	.....
1God's Lake U.C.....	"	"	"	"	Bro. J. Cordean.....	10	17	27	14	15	7	5	.....	.....	.....	.....	.....	.....
Island Lake R.C.....	Island Lake.....	"	"	"	Mr. H. Meadows.....	31	22	53	24	30	6	9	8	.....	.....	.....	.....	.....
Island Lake U.C.....	"	"	"	"	Mr. J. E. Blackburn.....	34	26	60	26	52	4	4	.....	.....	.....	.....	.....	.....
					Mr. B. Grafton.....														

1Seasonal school only. 2New school opened June 1, 1938.

School	Reserve	Agency	Teacher	Number on Roll			Average Attendance	Grades																		
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX										
MANITOBA—Concluded																										
Jack River R.C.	Norway House	Norway House	Sister Morin	6	9	15	8	10	2	3																
Oxford House	At Oxford House	"	Mrs. A. M. Scoates	19	15	34	15	27	1	2			4													
Rossville	Norway House	"	Miss E. Smith-Windsor	10	9	19	8	17	1	1																
York Factory	At York Factory	"	Mr. F. E. Goldring	22	21	43	11	39	3	1																
Big Eddy	The Pas	The Pas	Miss E. McKay	9	9	18	15	6	8	1	1	2														
Chemawawin	Chemawawin	"	Mr. H. Priestly-Barrett	16	9	25	20	5	4	9	5	2	2													
Nelson House R.C.	Nelson House	"	Mr. R. Louie	14	13	27	17	18	4	1	2			2												
Nelson House U.C.	"	"	Mr. E. Monias	15	14	29	15	24	4	1																
The Pas	The Pas	"	Miss A. Wright	16	13	29	18	16	3	3	3	1	1	2												
Pine Bluff	Pine Bluff	"	Mr. P. Sciotte	6	5	11	8	5		2	1	2	1													
Red Earth	Red Earth	"	Rev. J. L. Lowe	18	12	30	26	8	5	8	5	2	2													
Shoal Lake	Shoal Lake	"	Mr. C. E. Wilde	9	6	15	14	7	2	1			2	3												
Split Lake	Split Lake	"	Rev. G. C. Cowley	16	20	36	10	33	3																	
Swan Lake	Swan Lake	Portage la Prairie	Rev. J. E. Cooper	12	13	25	11	15	2	2	3	3														
Total				711	652	1,363	746	801	250	132	83	47	35	10	5											
SASKATCHEWAN																										
Little Pines	Little Pines	Battleford	Miss A. L. Cunningham	20	12	32	27	7	7	2	5		3	3	5											
Red Pheasant	Red Pheasant	"	Miss K. Good	24	21	45	30	34	1	5	5			1												
Thunderchild	Thunderchild	"	Mr. E. A. Morgan	11	15	26	19	15	7	1	2			1												
Ahtahkakoops	Ahtahkakoops	Carlton	Miss K. Beanland	15	18	33	23	12	11	7	1	1	1													
Big River	Big River	"	Mr. E. B. Goodman	13	11	24	15	18	3	2	1															
Chitek Lake	Chitek Lake	"	Miss C. Marrett	11	10	21	11	14	3	3	1															
Little Red River	Little Red River	"	Mr. F. J. Daniels	9	9	18	14	12	1	2	2			2												
Mistawasis	Mistawasis	"	Mr. F. C. Dey	12	17	29	22	35	1	2	1															
Montreal Lake	Montreal Lake	"	Rev. W. W. Moore	22	35	57	39	42	9	6																
Sturgeon Lake	Wm. Twatt's	"	Mr. J. N. Steinhour	14	8	22	15	15	2	1	1	3														
White Bear's	White Bear's	Crooked Lakes	Miss D. Brant	10	23	33	27	11	10	3	7	2	3													
Fort-a-la-Corne South	James Smith	Duck Lake	Mrs. M. Waywell	8	7	15	10	9	3	3	7	2														
James Smith	"	"	Mr. T. E. McDonald	7	18	25	14	13	3	5	3															
John Smith	John Smith	"	Mr. W. A. Richard	5	16	21	18	5	2	3	3			1												
Kinistino	Kinistino	"	Rev. G. J. Waite	12	11	23	16	21	1	1	4	4														
Whitecap Sioux	Moose Woods	Moose Woods	Mr. J. R. Gardner	3	13	16	12	4	4	3	4	1														
Big Island Lake	Bighead	Onion Lake	Mrs. E. C. Carlin	12	13	25	21	15	2	8																
Frog Lake	Frog Lake	"	Mr. J. H. Lirette	11	7	18	8	14	1	1	2															
Long Lake	Keehewin's	"	Mr. A. E. Peterson	10	10	20	12	10	5	3	2															
Ministikwan	Ministikwan	"	Mr. C. Hebert	4	8	12	6	9	2	1																
Cote's	Cote's	Pelly	Mr. A. B. Cuthand	8	15	23	17	6	7	4	4	2														
Key's	Key's	"	Mr. L. L. Dobbin	7	5	12	9	2	3	2	3			2												
Assiniboine	Assiniboine	Qu'Appelle	Rev. J. Jolley	19	11	30	21	13	6	4	2	5														
Day Star's	Day Star's	Touchwood	Miss F. M. Hodgson	7	9	16	13	4	5	4	3															
Fishing Lake	Fishing Lake	"	Rev. F. E. Torpey	14	13	27	12	14	6	5	2															
Stanley	Stanley	Treaty No. 10	Rev. A. J. Lawes	15	17	32	26	32																		
			Mr. L. Ahenakew																							
Total				303	352	655	448	376	105	73	55	21	17	3	5											

ALBERTA				17	11	28	14	10	1	3	7	3			
Sarcee.....	Sarcee.....	Sarcee.....	Rev. F. M. R. Gibney.....	17	11	28	14	10	1	3	7	3			4
Morley.....	Morley.....	Stony.....	Miss E. A. Willison.....	1	3	4	3	1	1			2			
Total.....				18	14	32	17	11	2	3	7	5			4
NORTHWEST TERRITORIES															
Fort Smith.....	At Fort Smith.....	Athabaska.....	Sister O. Lavoie.....	2	4	6	2	4		2					
Fort Simpson R.C.....	At Fort Simpson.....	Fort Simpson.....	Sister M. A. Gamache.....	4	8	12	10	5	2	3	1	1			
¹ St. David's Mission.....	At St. David's Mission.....	".....	Rev. H. G. Cook.....	9	10	19	14	14	2	1	2				
Total.....				15	22	37	26	23	4	6	3	1			
BRITISH COLUMBIA															
Fort Babine.....	Fort Babine.....	Babine.....	Mr. J. J. Moroney.....	24	18	42	40	16	13	8	5				
Glen Vowell.....	Sikedakh.....	".....	Mr. A. F. Parkinson.....	9	14	23	19	7	5	2	4			5	
Hazelton.....	Hazelton.....	".....	Mr. F. Burling.....	21	28	49	42	29	5	5	3	3	4		
Kispiox.....	Kispiox.....	".....	Rev. D. W. More.....	27	44	71	35	42	9	8	5	7			
Kitsegukla.....	Kitsegukla.....	".....	Rev. B. Black.....	14	18	32	15	13	8	5	4	2			
Kitwanga.....	Kitwanga.....	".....	Rev. B. Shearman.....	15	21	36	20	10	12	3	2	5	3	1	
² Kitwancool.....	Kitwancool.....	".....	Mr. Norman Green.....	14	19	33	18	24	7	1		1			
³ Kisgegas.....	Kisgegas.....	".....	Mr. William Wale.....	11	5	16	13	15	1						
Moricetown.....	Moricetown.....	".....	Miss O. B. Sargent.....	23	24	47	35	37	2	5		3			
⁴ Old Fort Babine.....	Old Fort Babine.....	".....	Miss M. T. Hughes.....	22	10	32	19	31							
Rocher Deboule.....	Hagwilget.....	".....	Mrs. J. Macdonald.....	8	9	17	9	10		3	2			2	
Bella Bella.....	Bella Bella.....	Bella Coola.....	Miss L. Jessop.....	32	30	62	33	45	11	4		2			
Bella Coola.....	Bella Coola.....	".....	Miss E. Allen.....	17	25	42	20	30	2	7		3			
Kitamaat.....	Kitamaat.....	".....	Miss F. Elford.....	30	31	61	35	24	12	9	8	5	3		
Klemtu.....	Klemtu.....	".....	Miss R. Nelson.....	11	8	19	8	14	3	2					
Cowichan.....	Cowichan.....	Cowichan.....	Mr. C. Von Storch.....	17	14	31	16	21	5	2		2	1		
Koksilah.....	Koksilah.....	".....	Mr. D. M. J. Conway.....	12	15	27	17	9	5	3	4	4		2	
Nanaimo.....	Nanaimo.....	".....	Miss E. Creighton.....	21	15	36	20	18	4	2	2	4	4	2	
Songhees.....	Somenos.....	".....	Miss M. Hepworth.....	10	15	25	15	18				4		1	
Tsartlip.....	Tsartlip.....	".....	Miss O. V. Kennedy.....	14	21	35	15	24	3	5	2	1			
Alert Bay.....	Nimkish.....	Kwakw'kweth.....	Mr. Noel Stewart.....	46	43	89	46	74	1	11	2	1			
Campbell River.....	Campbell River.....	".....	Miss K. Pitts.....	12	16	28	18	12	4	3	2	7			
Cape Mudge.....	Cape Mudge.....	".....	Miss J. Hill.....	16	15	31	19	13	5	3	3		5	2	
Kingcome Inlet.....	At Kingcome Inlet.....	".....	Miss P. M. Arrowsmith.....	15	25	40	27	25	3	6	4		2		
Mamalilikulla.....	Mamalilikulla.....	".....	Miss M. Bird.....	9	12	21	19	12	2	6		1			
Quatsino.....	Quatsino.....	".....	Mrs. H. M. Cuttle.....	12	9	21	8	6	5	5	5				
Smith's Inlet.....	Kwasheda.....	".....	Miss M. H. Pennington.....	1	4	5	3	2		1					
Boothroyd.....	Boothroyd.....	Lytton.....	Miss L. Blachford.....	3	12	15	12	4		4	2	5			
Seabird Island.....	Seabird Island.....	".....	Miss M. Boeur.....	11	7	18	7	10	2	2	2	1	1		
Seton Lake.....	Shalalth.....	".....	Miss F. A. Roussel.....	13	6	19	15	8		5	2	1	3		
Chehalis.....	Chehalis.....	New Westminster.....	Mr. J. W. Burns.....	17	10	27	11	12	3	3	8	1			
Katzie.....	".....	".....	Miss M. Winter.....	9	4	13	7	8		2	1	2			
⁴ Pemberton.....	Pemberton No. 10.....	".....	Mr. M. J. Barre.....	14	23	36	33	31			4	1			
Skwah.....	Skwah.....	".....	Mr. C. O. Daly.....	12	9	21	14	12	2		4	1	2		
Shulus.....	Nicola Mameet.....	Nicola.....	Miss E. M. Aylwin.....	9	9	18	10	11	5	2					
Inkameep.....	Osoyoos.....	Okanagan.....	Mr. A. Walsh.....	5	6	11	7	5	1	3	1	1			

¹ Seasonal school only.

² New school opened Oct. 1, 1938.

³ New school opened Sept. 1, 1938.

⁴ New school opened Jan. 1, 1939.

⁵ New school opened Oct. 15, 1938.

Statement of Indian Day Schools in the Dominion for the Fiscal Year Ended March 31, 1939—Concluded

School	Reserve	Agency	Teacher	Number on Roll			Average Attendance	Grades									
				Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX	
BRITISH COLUMBIA—Concluded																	
Okanagan	Okanagan	Okanagan	Mr. T. N. Curteis	15	21	36	18	19	3	4		10					
Penticton	Penticton	"	Miss C. McDonald	9	9	18	12	8	2	1	2		2	3			
Masset	Masset	Queen Charlotte	Miss P. Moon	43	51	94	67	47	16	14	7	7	3				
			Mrs. E. I. Smiley														
Skidegate	Skidegate	"	Mrs. N. Moss	26	25	51	39	17	11	5	5	8	1	4			
			Miss C. A. Vanderveen														
Kitladamioks	Kitladamax	Skeena	Rev. S. Kinley	12	18	30	13	24	4	2							
Gwinoha	Gwinoha	"	Mrs. F. L. Suddaby	6	10	16	7	6	3	6	1						
Hartley Bay	Hartley Bay	"	Mr. J. A. Findlay	20	13	33	21	15	4	2	3	4	3	2			
Kincolith	Kincolith	"	Miss A. Saunders	22	25	47	20	28	11	4	1	2	1				
Kitkatla	Kitkatla	"	Rev. G. H. Goodreid	21	26	47	21	26	4	8	5	1	2	1			
Kitselas	Kitselas	"	Mrs. I. M. Wilson	8	8	16	9	8		5	1			2			
Lakalsap	Lakalsap	"	Mrs. N. C. Hayhurst	15	12	27	19	23		3		1					
			Mr. J. Hayhurst														
Metlakatla	Metlakatla	"	Mr. T. A. Bryant	12	18	30	16	11	2	8	6	2	1				
Port Essington	Port Essington	"	Mr. A. Rutherford	13	16	29	14	18			3	3	4	1			
Port Simpson	Port Simpson	"	Miss L. K. How	55	34	89	43	50	13	9	5	6	3	3			
			Miss L. Swartz														
Cariboo Hide	At Cariboo Hide	Stikine	Mr. J. A. E. Anglin	6	5	11	9	6	5								
Dease Lake	Dease Lake	"	Mr. J. E. Moran	9	7	16	11	11	5								
Clappan	Iskut Lake	"	Mr. J. E. Moran	9	11	20	11	4	8	3	5						
McDames	"	"	Mr. J. A. E. Anglin	7	5	12	9	11	1								
Tahltan	Tahltan	"	Mr. W. P. Thorman	11	14	25	16	7	8	6	4						
Fort Grahame	Fort Grahame	Stuart Lake	Mr. W. P. Fitzgerald	12	3	15	14	5	2	2	6						
Fort McLeod	Fort McLeod	"	Mr. G. N. Cormack	11	7	18	14	18									
Takla Landing	Takla Lake	"	Mr. D. Parent	10	16	26	22	8	7	2	8	1					
Homalco	Aupe	Vancouver	Mr. D. J. Gallagher	15	10	25	18	18	3	2	2						
Sliammon	Sliammon	"	Mr. P. J. A. McGuinness	7	17	24	11	13	4	3	2	1	1				
Squamish	Squamish	"	Sister Mary Amy	9	14	23	19	10	6		3		2	2			
Alberni	Alberni	West Coast	Mr. J. B. Glover	13	14	27	12	16	1	3	2	4	1				
Ucluellet	Itedse	"	Mr. E. B. Severson	17	10	27	13	11	5	5	6						
Total				969	1,012	1,981	1,198	1,120	264	232	155	119	61	28	2		
YUKON																	
Champagne Landing	At Champagne Landing	Yukon	Mr. J. W. Ellis	3	12	15	7	12	3								
Moosehide	At Moosehide	"	Rev. A. Anderson	6	11	17	12	8	4	5							
Old Crow Village	At Old Crow Village	"	Miss M. McCabe	14	16	30	11	28	2								
Selkirk	At Selkirk	"	Rev. R. C. W. Ward	9	13	22	10	17	5								
Teslin Lake	At Teslin Lake	"	Mr. F. M. Gilbert	19	13	32	16	20	5	6	1						
Total				51	65	116	56	85	19	11	1						

¹Seasonal school only.

Statement of Combined White and Indian Schools in the Dominion for the Fiscal Year Ended March 31, 1939

School	Reserve	Agency	Number on Roll			Average Attendance	Grades									
			Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX	
QUEBEC																
Kippewa.....	Timiskaming.....	Timiskaming.....	15	13	28	15	26	1	1							
ONTARIO																
Hiawatha.....	Near Keene.....	Rice Lake.....	14	3	17	10	4	2	3	1	1	1	4	1		
Honey Harbour.....	Near Midland.....	Parry Sound.....	27	26	53	39	18	9	7	6	1	6	3	3		
Mattawa.....	At Mattawa.....	Sturgeon Falls.....	31	22	53	39	25	6	5		6	4	2	1	4	
Michipicoten Harbour.....	At Michipicoten Harbour.....	Sault Ste.-Marie.....	7	5	12	6	3	2	1	1	2		3			
Whitefish River.....	At Whitefish Falls.....	Manitowaning.....	10	8	18	14	2	3	5		2	3		1	2	
Total.....			89	64	153	108	52	22	21	8	12	14	12	6	6	
MANITOBA																
Jack River C.E.....	Norway House.....	Norway House.....	6	9	15	7	6	6	1	1			1			
Moose Lake.....	At Moose Lake.....	The Pas.....	8	5	13	8	8	2	2	1						
Patapun.....	At Patapun.....	Clandeboye.....	5	3	8	6	3	2	1			1		1		
Total.....			19	17	36	21	17	10	4	2		1	1	1		
SASKATCHEWAN																
Round Plain.....	Near Prince Albert.....	Carlton.....	4	5	9	5	5	3					1			
BRITISH COLUMBIA																
Telegraph Creek.....	At Telegraph Creek.....	Stikine.....	8	10	18	11	9	5	1	2			1			

Statement of Indian Residential Schools in the Dominion for the Fiscal Year Ended March 31, 1939

School	Post Office Address	Agency	Principal	Denomination	Number on Roll			Average Attendance	Grades								
					Boys	Girls	Total		I	II	III	IV	V	VI	VII	VIII	IX
NOVA SCOTIA																	
Shubenacadie.....	Shubenacadie.....	Hants.....	Rev. J. P. Mackey.....	Roman Catholic.....	84	85	169	161	42	20	30	28	10	17	20	2	....
QUEBEC																	
Fort George C.E.....	Moosonee.....	James Bay.....	Rev. B. S. Green.....	Church of England.....	28	34	62	52	37	15	....	9	1	....	....	....	....
Fort George R.C.....	".....	".....	Rev. D. Couture, O.M.I.....	Roman Catholic.....	10	10	20	20	15	2	2	1	....	....	....	....	....
Total.....	.....	.....	.....	.....	38	44	82	72	52	17	2	10	1	....	....	....	....
ONTARIO																	
Albany Mission.....	Fort Albany.....	James Bay.....	Rev. A. R. Bilodeau, O.M.I.....	Roman Catholic.....	23	55	78	72	30	22	12	9	5	....	....	....	....
Cecilia Jeffrey.....	Kenora.....	Kenora.....	Mr. E. W. Byers.....	Presbyterian.....	74	75	149	137	38	29	11	12	18	24	10	7	....
Chapleau.....	Chapleau.....	Chapleau.....	Canon A. J. Vale.....	Church of England.....	47	56	103	83	33	8	13	4	16	10	11	5	8
Fort Frances.....	Fort Frances.....	Fort Frances.....	Rev. P. Chatelain, O.M.I.....	Roman Catholic.....	54	43	97	89	34	18	18	6	8	10	3	....	....
Fort William.....	Fort William.....	Fort William.....	Sister M. Eugene.....	Roman Catholic.....	46	51	97	79	41	9	20	....	9	14	3	1	....
Kenora.....	Kenora.....	Kenora.....	Rev. J. Lemire, O.M.I.....	Roman Catholic.....	45	57	102	80	41	16	16	5	11	8	5	....	....
McIntosh.....	McIntosh.....	Sioux Lookout.....	Rev. C. Perreault, O.M.I.....	Roman Catholic.....	63	59	124	113	44	31	15	11	13	10	....	....	....
Mohawk.....	Brantford.....	Six Nations.....	Rev. H. W. Snell, B.A.....	Church of England.....	72	94	166	145	21	21	14	16	23	20	25	21	5
Moose Fort.....	Moose Fort, via Moosonee.....	James Bay.....	Rev. G. Thompson.....	Church of England.....	56	55	111	94	86	6	9	5	2	....	2	1	....
Mount Elgin.....	Muncey.....	.....	Rev. O. B. Strapp.....	United Church.....	68	90	158	154	31	18	7	13	24	27	13	18	7
Shingwauk.....	Sault Ste-Marie.....	Sault Ste-Marie.....	Rev. C. F. Hives.....	Church of England.....	61	82	143	139	10	14	17	27	16	20	21	5	13
Sioux Lookout.....	Sioux Lookout.....	Sioux Lookout.....	Rev. J. F. J. Marshall.....	Church of England.....	69	75	144	136	85	13	17	14	11	4	....	....	....
Spanish.....	Spanish.....	.....	Rev. J. Howitt, S.J.....	Roman Catholic.....	131	127	258	249	80	48	28	27	29	17	19	10	....
Total.....	.....	.....	.....	.....	811	919	1,730	1,551	574	253	197	149	185	164	112	68	28
MANITOBA																	
Birtle.....	Birtle.....	Birtle.....	Rev. E. H. Lockhart.....	Presbyterian.....	61	64	125	117	36	18	30	21	12	6	1	1	....
Brandon.....	Brandon.....	.....	Rev. J. A. Doyle, D.D.....	United Church.....	75	104	179	170	45	13	28	9	16	13	15	12	28
Cross Lake.....	Cross Lake.....	Norway House.....	Rev. A. Chamberland, O.M.I.....	Roman Catholic.....	9	21	30	29	4	6	8	4	....	....	....	....	....
Elkhorn.....	Elkhorn.....	.....	Rev. A. E. Minchin.....	Church of England.....	83	78	161	145	38	51	18	20	14	6	12	1	1
Fort Alexander.....	Fort Alexander.....	Clandeboye.....	Rev. J. Brachet, O.M.I.....	Roman Catholic.....	52	65	117	107	41	25	23	10	10	8	....	....	....
Norway House.....	Norway House.....	Norway House.....	Rev. R. T. Chapin, B.A.....	United Church.....	45	61	106	98	50	14	16	15	4	....	3	4	....
Pine Creek.....	Camperville.....	Portage la Prairie.....	Rev. L. Gauthier, O.M.I.....	Roman Catholic.....	64	61	125	117	40	34	8	10	10	22	1	....	....
Portage la Prairie.....	Portage la Prairie.....	".....	Rev. J. Jones.....	United Church.....	50	50	100	95	27	15	18	15	13	4	5	3	....
Sandy Bay.....	Marius.....	".....	Rev. O. Chagnon, O.M.I.....	Roman Catholic.....	43	48	91	79	24	12	14	16	15	4	1	5	....
Total.....	.....	.....	.....	.....	482	552	1,034	957	305	188	163	124	98	63	38	26	29

Statement of Indian Residential Schools in the Dominion for the Fiscal Year Ended March 31, 1939—Concluded

School	Post Office Address	Agency	Principal	Denomination	Number on Roll			Average Attendance	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	36	39	75	69	25	10	7	15	6	8	4			
Alert Bay	Alert Bay	Kwakwewith	Mr. F. E. Anfried	Church of England	113	104	217	208	37	30	76	36	12	14	8	4		
Cariboo	150 Mile House	Williams Lake	Rev. M. Murphy, O.M.I.	Roman Catholic	57	71	128	125	42	11	26	10	16	8	11	4		
Christie	Kakawis	West Coast	Rev. G. Forbes, O.M.I.	Roman Catholic	42	59	101	89	40	5	9	17	4	11	14	1		
Coqualeetza	Sardis	New Westminster	Rev. R. C. Scott, B.A.	United Church	141	119	260	223	96	44	31	27	30	17	10	4		1
Kamloops	Kamloops	Kamloops	Rev. F. O'Grady, O.M.I.	Roman Catholic	166	179	345	289	136	54	40	35	47	17	12	4		
Kitamaat	Kitamaat Mission	Bella Coola	Mrs. E. H. Durbin	United Church	14	28	42	37	18	10	5	5	4					
Kootenay	Cranbrook	Kootenay	Rev. P. Collins, O.M.I.	Roman Catholic	49	46	95	78	39	23	8	15	4	6				
Kuper Island	Kuper Island	Cowichan	Rev. J. Camirand, O.M.I.	Roman Catholic	46	47	93	70	34	14	16	11	8	7	2			1
Lejac	Lejac	Stuart Lake	Rev. A. R. Simpson, O.M.I.	Roman Catholic	83	108	193	166	75	42	21	20	14	16	2			3
Port Simpson	Port Simpson	Skeena	Miss L. M. Deacon	United Church	71	29	29	27	2	2	6	9	7	3				
St. George's	Lytton	Lytton	Rev. A. R. Lett	Church of England	71	85	156	144	28	29	18	17	18	18	21			6
St. Mary's Mission	Mission City	New Westminster	Rev. A. H. Fleury, O.M.I.	Roman Catholic	87	108	195	180	88	33	14	33	15	7	4			1
Sechelt	Sechelt	Vancouver	Rev. E. J. Cornell, O.M.I.	Roman Catholic	44	50	94	79	36	18	15	8	7	5	3			2
Squamish	North Vancouver	"	Sister Mary Amy	Roman Catholic	31	33	64	60	21	9	11	8	7	4	3			1
Total					982	1,105	2,087	1,844	718	334	303	266	199	141	94	25	7	
YUKON																		
Carcross	Carcross	Yukon	Rev. H. C. M. Grant	Church of England	23	24	47	43	19	7	11	8	4	5				
St. Paul's Hostel	Dawson	"	Rev. L. G. Chappell	Church of England	14	13	27	21	17	1	5	2	1	1				
Total					37	37	74	64	29	8	16	10	5	6				

Statement Showing the Enrolment by Provinces in the Different Classes of Schools for the Fiscal Year Ended March 31, 1939

RESIDENTIAL SCHOOLS

Province	Number of Schools	Denomination				Number on Roll			Average Attendance	Percentage of Attendance	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	84	85	169	161	95-27	42	20	30	28	10	17	20	2		
Quebec	2				38	44	82	72	87-80	52	17	2	10	1					
Ontario	13	5	1		811	919	1,730	1,551	89-85	574	233	197	149	185	164	112	68	28	
Manitoba	9	1	1		482	552	1,034	957	92-55	305	188	163	124	98	63	38	26	29	
Saskatchewan	14	3			884	950	1,834	1,642	90-51	638	256	246	214	194	139	62	28	17	
Alberta	19	5		12	1,010	1,978	1,800	1,601	91-00	628	296	315	287	204	153	84	26	9	
Northwest Territories	4	1		3	88	123	211	185	87-67	101	44	30	14	6					
British Columbia	15	2		9	982	1,105	2,087	1,844	88-35	718	334	303	266	199	141	94	25	7	
Yukon	2	2			37	37	74	64	86-48	29	8	16	10	5	6				
Total, residential schools	79	20	2	45	12	4,354	4,825	9,179	8,276	90-16	3,103	1,416	1,302	1,082	912	689	410	175	90

Province	Number of Schools	Number on Roll.			Average Attendance	Percentage of Attendance	Grades								
		Boys	Girls	Total			I	II	III	IV	V	VI	VII	VIII	IX
Prince Edward Island.....	1	6	7	13	7	53.84	5	2	2	3	1	1	1	2	
Nova Scotia.....	10	124	138	262	182	69.46	112	37	30	25	26	14	15	1	
New Brunswick.....	11	161	165	326	251	76.99	90	60	58	37	24	31	16	10	
Quebec.....	31	840	758	1,598	1,142	71.46	678	252	228	190	92	66	65	27	
Ontario.....	86	1,484	1,462	2,946	1,999	67.85	1,146	456	343	271	277	177	154	119	
Manitoba.....	45	711	652	1,363	746	54.73	801	250	132	83	47	35	10	5	
Saskatchewan.....	28	303	352	655	448	68.39	376	105	73	55	21	17	3	5	
Alberta.....	2	18	14	32	17	53.12	11	2	3	7	5	1	4	1	
Northwest Territories.....	3	15	22	37	26	70.27	23	4	6	3	1	1	1	1	
British Columbia.....	63	969	1,012	1,981	1,198	60.47	1,120	264	232	155	119	61	28	2	
Yukon.....	5	51	65	116	56	48.27	85	19	11	1	1	1	1	1	
Total, day schools.....	283	4,682	4,647	9,329	6,072	65.08	4,447	1,451	1,118	827	615	401	296	169	5

COMBINED WHITE AND INDIAN DAY SCHOOLS

Quebec.....	1	15	13	28	15	53.57	26	1	1	1	1	1	1	1	1
Ontario.....	5	89	64	153	108	70.58	52	22	21	8	12	14	12	6	
Manitoba.....	3	19	17	36	21	58.33	17	10	4	2	1	1	1	1	
Saskatchewan.....	1	4	5	9	5	55.55	5	3	1	1	1	1	1	1	
British Columbia.....	1	8	10	18	11	61.11	9	5	1	2	1	1	1	1	
Total, combined white and Indian day schools.....	11	135	109	244	160	65.57	109	41	27	12	12	15	15	7	6

Summary of School Statement

Province	Classes of Schools			Total Number of Schools	Number on Roll			Average Attendance	Percentage of Attend-	Grades								
	Day	Residential	Combined		Boys	Girls	Total			I	II	III	IV	V	VI	VII	VIII	IX
Prince Edward Island.....	1			1	6	7	13	7	53.84	5	2	2	3	1	1	2		
Nova Scotia.....	10	1		11	208	223	431	343	79.58	154	57	60	53	36	31	35		
New Brunswick.....	11			11	161	165	326	251	76.99	90	60	58	37	24	31	16		
Quebec.....	31		1	34	893	815	1,708	1,229	71.95	756	270	231	200	93	66	63		
Ontario.....	86	13	5	104	2,384	2,445	4,829	3,638	75.75	1,772	731	561	428	474	355	278		
Manitoba.....	45	9	3	57	1,212	1,221	2,433	1,724	70.86	1,123	448	299	209	145	99	49		
Saskatchewan.....	28	14	1	41	1,171	1,307	2,478	2,095	84.54	1,039	364	319	289	215	156	66		
Alberta.....	2	19		21	985	1,024	2,010	1,817	90.39	635	298	318	274	209	153	88		
Northwest Territories.....	3			3	103	145	248	211	85.08	124	48	36	17	17	6			
British Columbia.....	63	15	1	79	1,959	2,127	4,086	3,033	74.71	1,847	603	536	423	318	202	123		
Yukon.....	5	2		7	88	102	190	120	63.15	114	27	27	11	5	6			
Total.....	283	79	11	373	9,171	9,581	18,752	14,508	77.36	7,659	2,908	2,447	1,921	1,539	1,105	721	351	101

IMMIGRATION BRANCH

F. C. BLAIR, DIRECTOR

Between Confederation in 1867 and March, 1892, immigration was under the control of the Department of Agriculture. From 1892 until October, 1917, when it was created the Department of Immigration and Colonization, it was a branch of the Department of the Interior. On December 1, 1936, the Department of Immigration and Colonization, became the Immigration Branch of the Department of Mines and Resources then created.

The Immigration Branch is responsible for the administration of the Immigration Act and Regulations, the Chinese Immigration Act and Regulations, and all matters related to the encouragement of immigration, the inspection of immigrants, tourists, and other travellers seeking entry to Canada, the exclusion of the prohibited and undesirable classes, the investigation of complaints subsequently arising in Canada, and the deportation of undesirables, inquiry into settlement arrangements for prospective immigrants, and also general matters relating to colonization in Canada.

The organization through which the Branch functions under the Minister and the Deputy Minister, consists of a Head Office in Ottawa with four District offices in Canada and one in London, England. The Head Office organization includes a Director of Immigration, a Commissioner of Immigration and his Assistant with the necessary staff and units dealing with the collection and preparation of statistics, the overseeing of juvenile immigration and women's work. The four districts in Canada are known as the Atlantic, the Eastern, the Western, and the Pacific.

All immigration work in the British Isles and in Continental Europe comes under the immediate direction of the Commissioner of European Emigration, W. R. Little, Oceanic House, 1A Cockspur Street, London. A special office is maintained at Hong Kong, as required by the Chinese Immigration Act and Regulations. The immigration officer there is a Controller of Chinese Immigration.

The work of the past year has been characterized by the large number of individual applications from residents of Canada for the admission of relatives or friends from those countries of Europe desirous of ridding themselves of unwanted minorities. It would have been possible at any time during recent years to have obtained tens of thousands of immigrants by the simple expedient of letting down the bars erected in 1930 to protect the Dominion against an influx of surplus labour. If quantity rather than quality was the objective sought, its attainment was simplicity itself.

Through the examination of these applications, which reach the Department, often at the rate of several hundred in one day, it is possible to arrive at a fair estimate of what is offered in the way of European immigration. Five facts are apparent: first, that the vast majority are interested only in settlement in our urban centres where they hope to find employment in Canadian enterprises already well supplied with labour; second, that relatively few have funds beyond their immediate needs and therefore are dependent on finding early employment or being maintained at private or public expense; third, that many who have been wealthy in Europe are unable to move their capital; fourth, that a very considerable number of excellent farming families are available with a moderate amount of capital for settlement in this country; and lastly, that a number are the owners of industries new to Canada which can be transferred with sufficient capital to make a start here.

In the previous fiscal year this Branch, with the co-operation of transportation interests, began a widespread effort to secure new industries in the belief that such immigration would be of great value to Canada. Each case has to be considered on its merits and this has involved much correspondence and many references to various Departments of the Federal Government which have given invaluable help. Almost every industry transferred from Europe to Canada has involved a movement of capital, experts, and managers. This work has been continued throughout the past year with very considerable success. A great deal more might have been accomplished had it not been for the difficulty of moving capital from Europe to Canada.

For some years there has been a co-operative effort between this Branch and the Colonization Branches of the Canadian Pacific Railway and the Canadian National Railways in placing immigrant settlers with capital on farms in various parts of the Dominion. The contact begins in Europe and continues until the settler has acquired a farm of his own with the guidance of colonization officials of the railways. No charge is made to the settler for this service. As the year closes plans have been completed for a movement of families from the Sudeten area of Czechoslovakia. It is expected that upwards of 1,000 suitable families may be secured although at the close of the year only two groups of approximately 150 families each are in process of selection. The first two groups are to be settled in Saskatchewan and British Columbia in areas where there is sufficient cheap land available to place them in such a way that directional oversight will be possible at a reasonable cost. Capital approximating \$1,500 per family has been secured from overseas for the settlement of these two groups and any others who may follow.

In last year's report reference was made to the appointment of a Board of Review to inquire into rumours then current that a large number of persons from the Orient had effected illegal entry to Canada. As the Board completed its task in the autumn of 1938 it is now possible to make further comment on this matter.

The Board was composed of one representative each of the Department of External Affairs, the Royal Canadian Mounted Police, and the Immigration Service, with Dr. H. L. Keenleyside of External Affairs as Chairman. The Board's first meeting was held at Vancouver on March 24, 1938, and its first act was to give widespread publicity both by advertisement and otherwise to its desire to secure all information available concerning supposed illegal entries, informants being assured that their representations would be treated as strictly confidential. The Board held sittings between March 24 and May 13, 1938, at Vancouver, Victoria, Port Alberni, New Westminster, Chilliwack, Prince Rupert, Prince George, Kamloops, Vernon, Kelowna, and Penticton.

After checking over the information secured, the Board came to the conclusion that at the time of the inquiry the number of Japanese illegally in Canada was not much if any in excess of 100. In addition there were a number of East Indians who had entered irregularly but the number of these could not then be determined. The Board found that between 1923 and 1931, owing to the operations of a Japanese employed as an Immigration interpreter and certain other weaknesses that had developed in immigration inspection, a considerable number of Japanese had effected illegal entry, most of whom had already left the country either through fear of detection or as the result of deportation proceedings. The prosecution and imprisonment of the Japanese interpreter followed by a closer check-up of all crew lists, had the effect of almost completely stopping illegal entries after 1931.

The Immigration Act has for many years provided for an appeal to the Minister by persons rejected at ports of entry and by persons ordered deported at any time after entry. In the year under review 695 appeals were considered and decided by the Minister as compared with 700 in the previous year.

For many years Canadian missionaries and representatives of Canadian business firms serving abroad were called upon to register annually with British Diplomatic or Consular officers in order to protect Canadian domicile. An amendment to the Immigration Act made in June, 1936 removed all further need of such registration. This amendment provides that any person while absent from Canada as a representative or employee of a firm, business, company, or organization, religious or otherwise, established in Canada, shall not by such absence be held to have lost Canadian domicile. The protection is now automatic and retroactive, and the length of absence does not endanger the loss of domicile so long as the person concerned continues to represent abroad some organization established in Canada.

The usual statistical matter is submitted in a form that allows comparison with the statistics of most other countries and at the same time answers most of the immigration inquiries that reach the Department.

A movement not included in the immigration statistics, in other words not counted as immigrants, is that of the returning Canadian. An effort to collect and tabulate this information was commenced at the beginning of the fiscal year 1924-5. The following table shows the number of returning Canadians who left Canada to reside in the United States and who returned to Canada declaring their intention to resume permanent residence in Canada. Canadian citizens as defined in the Immigration Act are divided into three classes, as the headings of the table indicate.

Returning Canadians

—	Canadian Born	British Born Outside Canada	Canadians Naturalized	Totals
Fiscal year, 1924-25.....	36,473	4,487	2,815	43,775
Fiscal year, 1925-26.....	40,246	4,102	2,873	47,221
Fiscal year, 1926-27.....	49,255	5,326	2,376	56,957
Fiscal year, 1927-28.....	35,137	3,280	1,470	39,887
Fiscal year, 1928-29.....	30,008	2,795	995	33,798
Fiscal year, 1929-30.....	26,959	2,030	841	29,830
Fiscal year, 1930-31.....	26,811	2,111	1,287	30,209
Fiscal year, 1931-32.....	17,691	1,089	651	19,411
Fiscal year, 1932-33.....	16,320	757	548	17,625
Fiscal year, 1933-34.....	8,366	397	409	9,172
Fiscal year, 1934-35.....	5,811	937	870	7,618
Fiscal year, 1935-36.....	4,854	418	542	5,814
Fiscal year, 1936-37.....	4,522	319	223	5,064
Fiscal year, 1937-38.....	4,524	356	329	5,209
Fiscal year, 1938-39.....	3,825	360	386	4,571

During the year the number of pieces of incoming mail was 304,256 and of outgoing 198,305, or an average of approximately 1,000 incoming and 660 outgoing for each working day.

REPORT OF THE CHIEF CONTROLLER OF CHINESE IMMIGRATION

Legislation governing the entry to Canada of persons of Chinese origin was first enacted in 1885, at which time the practice of imposing a head tax was adopted. The original tax was \$50, which was increased in January, 1901, to \$100, and in January, 1904, to \$500. The law provided that merchants, their families, university students, and persons of the non-immigrant classes should be exempt from the payment of head tax. In June, 1923, the present Chinese Immigration Act was passed. This Act abolished the head tax and provided for the entry to Canada of the following classes:

- (a) Members of the diplomatic corps, consuls, consular agents, and other government representatives, their suites, and servants;
- (b) Children born in Canada of parents of Chinese origin or descent, who left Canada for educational or other purposes, on establishing their identity to the satisfaction of the controller at the port where they seek re-entry;
- (c) Merchants, as defined by regulations made by the Minister, students entering Canada for the purpose of attendance, and while in actual attendance at any Canadian university or college authorized by statute or charter to confer degrees;
- (d) Persons in transit through Canada.

During the fiscal year 1938-9 no Chinese immigrants were admitted. Five students were admitted during this period as non-immigrants to attend universities.

The Minister has authority to grant temporary entry, under permit, for a specified period only, to persons of Chinese origin without such persons being subject to the provisions of the Act. Bonds are required in the case of actors, amahs, servants, teachers, etc., temporarily admitted under the Act, guaranteeing that they will follow no occupation other than that for which temporary admission is allowed and will leave Canada within the period of validity of their permits. Fifty-seven permits were issued during 1938-9, as follows:—

Amahs..	2	Lecturer..	1
Actors and actresses..	23	Merchants..	3
Consuls' families..	3	Secretary (Y.M.C.A.)..	1
Doctors (Medical)..	2	Specialist (Canning)..	1
Editors..	1	Specialist (Meat)..	1
Government officials..	3	Students..	7
Infants..	2	Teachers..	5
		Tourists..	2

Of this number 14 left Canada within the year.

Provision is made in the Chinese Immigration Act for registration, prior to departure, and the right to return within a period of 2 years, of Chinese legally admitted to and lawfully resident in Canada. The number of Chinese who registered prior to leaving Canada during this fiscal year and thus protected their right to re-entry totalled 678. A total of 139 Chinese employed on vessels trading in international waters also registered. During the same period 113 Chinese sailed for China without registering, and 280, who had registered, failed to return within the period allowed by virtue of their registration, all of whom have thus forfeited the right to re-entry to Canada.

The Chinese Immigration Act, in common with the general Immigration Act, sets out specifically the classes whose entry to Canada is prohibited, provides machinery for the deportation of undesirables, and authorizes penalties for violations of the Act. Twenty Chinese were deported during the period under review following conviction under the Opium and Narcotic Drug Act, 1929. One administrative fine of \$1,000 was assessed under Section 19 of the Chinese Immigration Act.

The Department maintains a special staff on the Pacific Coast and in Hong Kong dealing with the administration of the Chinese Immigration Act, and there are also controllers at the principal Atlantic ports and at other points in Canada. The departmental machinery developed over a period of years for regulating the entry to Canada of persons coming within the scope of the Act enables immigration officials to deal promptly and efficiently with all applicants. Special regulations are in effect for the purpose of facilitating the entry of Chinese of the non-immigrant classes.

All crew members are carefully checked both on arrival and departure, by immigration officers. The Chinese crew members arriving at Canadian ports

in 1938-9 totalled 18,803 on 293 vessels. During the entire year there was but one desertion, which fact indicates both the effectiveness of the inspection and the efforts of the steamship companies to see that regulations are carefully observed.

For the purpose of comparison the following table relating to Chinese immigration is furnished:—

	Exemptions	Paying Tax	Percentage of Total Arrivals Admitted Exempt	Registered for Leave	Total Revenue
					\$
1912-13.....	367	7,078	4-03	3,742	3,549,242
1913-14.....	238	5,274	4-32	4,143	2,644,593
1914-15.....	103	1,155	8-19	4,373	588,124
1915-16.....	68	20	77-27	4,064	19,389
1916-17.....	121	272	30-79	3,312	140,487
1917-18.....	119	650	15-47	2,907	330,757
1918-19.....	267	4,066	6-16	3,244	2,609,669
1919-20.....	181	363	33-27	5,529	538,479
1920-21.....	1,550	885	63-56	6,807	474,332
1921-22.....	287	1,459	16-44	7,532	743,032
1922-23.....	59	652	8-30	6,682	434,557
1923-24.....	49	625	7-27	5,661	334,039
1924-25.....				5,992	308,659
1925-26.....				3,947	25,969
1926-27.....				5,987	14,844
1927-28.....	1	2	33-33	5,087	25,679
1928-29.....	1		100-00	5,480	30,795
1929-30.....				5,682	30,799
1930-31.....				5,783	28,846
1931-32.....				4,387	11,584
1932-33.....	1		100-00	3,626	9,152
1933-34.....	2		100-00	2,156	7,237
1934-35.....				2,103	6,506
1935-36.....				2,138	6,501
1936-37.....	1		100-00	2,059	9,893
1937-38.....				792	2,359
1938-39.....				817	2,959
Totals.....	3,415	22,501	13-17	114,132	12,934,582

REPORT OF THE COMMISSIONER OF IMMIGRATION

In last year's report reference was made to the gradual upward swing in immigration from the all-time low of 11,103 in 1936. The immigrant arrivals in the past seven years are as follows:—

Year ended March 31, 1933.....	19,782
“ “ “ “ 1934.....	13,903
“ “ “ “ 1935.....	12,136
“ “ “ “ 1936.....	11,103
“ “ “ “ 1937.....	12,023
“ “ “ “ 1938.....	15,645
“ “ “ “ 1939.....	17,128

Of this year's total 11,465 came from overseas and 5,663 from the United States, an increase of 9.5 per cent from the previous year. The total movement is insignificant when viewed against the extent of Canada and the restless millions of Europe and is in strange contrast to the peak of 382,841 new arrivals of 1913. The falling off in immigration is due to several causes, amongst which may be mentioned restrictive regulations which date from the autumn of 1930 and are applicable to all countries except the United Kingdom, Eire, self-governing British Dominions and the United States; the discontinuance of

advertising and of general Governmental propaganda, including passage assistance, and most of all to the unemployment conditions which affected Canada in common with other countries.

Much of the immigration work both at Head Office and in the field is of a routine character in that it does not change much from year to year and does not require much in the way of explanation. At Head Office the most important item is dealing with a daily grist of over 1,000 pieces of mail, much of which relates to the desired admission of individual immigrants. In the field, inspectional work is the largest item with investigational activities second. In days when pressure to move from the country of birth or residence was much less than it is now, the need of careful examination of those seeking entry was not so evident nor was there the same necessity for inquiry into settlement conditions in Canada to guard against newcomers becoming a charge on the country.

For the direction and control of field and inspectional work, Canada is divided into four districts, each in charge of a District Superintendent. The Atlantic District includes all territory east of the Ontario-Quebec boundary; District Superintendent, G. G. Congdon. The Eastern District includes that part of Ontario west of the Ontario-Quebec boundary to Schreiber; District Superintendent, J. Saxon Fraser. The Western District extends from Schreiber, Ont., to Kingsgate, B.C.; District Superintendent, C. E. S. Smith, Winnipeg, Man. The Pacific District includes all Canadian territory west of Kingsgate, B.C.; District Superintendent, F. W. Taylor, Vancouver, B.C.

No two districts are exactly alike in the problems that have to be dealt with. The Atlantic District includes all the Eastern ocean ports at which immigrants arrive from the Mother Country, Continental Europe and the Near East, and at the same time includes many important International Boundary ports. The work in the Pacific District differs from that of any other due to the fact that the problems of Oriental immigration are almost entirely centred there. While the immigrant movement is small, the entry of non-immigrants continues with relatively little variation as the following table shows:—

	Via Ocean Ports	From U.S.A.	Totals
Fiscal year ended March 31, 1933.....	41,525	23,255,308	23,296,833
Fiscal year ended March 31, 1934.....	36,739	20,861,486	20,898,225
Fiscal year ended March 31, 1935.....	39,224	22,733,957	22,773,181
Fiscal year ended March 31, 1936.....	40,401	25,039,758	25,080,159
Fiscal year ended March 31, 1937.....	47,008	28,888,106	28,935,114
Fiscal year ended March 31, 1938.....	47,832	31,179,807	31,227,639
Fiscal year ended March 31, 1939.....	53,822	29,099,356	29,153,178
Totals.....	306,551	181,057,778	181,364,329

The following table gives the number of admissions and rejections by Districts:—

	Admitted as Immigrants	Admitted as Non- immigrants	Rejected
Atlantic.....	12,777	9,106,282	2,844
Eastern.....	2,578	16,589,566	6,186
Western.....	732	1,771,445	601
Pacific.....	846	1,685,885	696
Through U.S.A. ocean ports.....	195	.....	10
Totals.....	17,128	29,153,178	*10,337

*This figure does not include any rejections that took place overseas: for information about overseas rejections see the report of the Commissioner of European Emigration which appears on a later page of this report.

It is doubtful whether the Canadian public realize the protection to prospective oversea immigrants and to Canada that is provided by the system of Canadian medical and civil inspection abroad. This practice, established in 1921, has saved thousands the cost and hardship of a fruitless trip to a Canadian port of entry and at the same time has saved the Dominion the expense and unpleasant task of detaining and deporting ineligible immigrants.

Deportations to all countries during 1938-9 totalled 424 against 392 in the previous year. Of these 106 were returned to the British Isles, 25 to other Empire countries, 142 to the United States, and the remainder (151) to twenty-four foreign countries. The principal causes for deportation were:—

Entry by misrepresentation..	178
Convictions of criminal offences..	89
Public charge grounds..	45
Previously deported..	40
Mental disability..	32
Infractions of the Opium and Narcotic Drug Act..	25

It has become increasingly difficult within the past few years to return undesirables to European States owing to the unwillingness of some countries to recognize the retention of citizenship after absences abroad. Deportation from Canada under the Immigration Act, except for offences under the Opium and Narcotic Drug Act and a seldom used clause of the Immigration Act, is not possible in the case of those who have obtained Canadian domicile. It does not always follow, however, that because a person is deportable from Canada he can be returned to the country from which he came since it is necessary to secure the consent of that country. This is sometimes refused on technical and other grounds. The deportation difficulties encountered during the past year in returning undesirables to Continental Europe were greater than in any previous year.

The administrative staff in Ottawa, which in 1931-2 was 166, was reduced to 82 in 1938-9, while the field staff, which was 1,073 in 1931-2, was reduced to 850 in 1938-9. There were 33 ocean ports of entry and 198 International Boundary ports, not including five points of examination in the United States, at the end of the year. For many years it has been the practice to employ Customs officers at the smaller ports of entry where one set of officers can conduct both the Customs and Immigration inspection. Of the 231 ocean and boundary ports of entry approximately 163 were manned entirely by Customs officers, while other officers of the Customs Department were employed as part-time Immigration Inspectors at some 24 additional ports of entry. Effective from April 1, 1938, the Civil Service Commission approved of the employment and payment of part-time Customs officers on a new basis, whereby instead of naming individual Customs officers, a specified number of part-time positions were created at each port of entry where part-time service is required, thus allowing payment at a fixed rate per shift. The new arrangement is working out satisfactorily.

The District Superintendent of the Atlantic District in commenting on the year's work reports one death, three retirements on account of age, four dismissals, and four promotions in the staff. Two ports of entry were closed and five new ones established. In addition to the examination of passengers, 8,713 crew lists were examined during the year with crew members totalling 244,497; 309 members of crews deserted at Canadian ports. Under the Immigration Act the Inspector-in-charge at a port where a desertion occurs is empowered to take deposits as security for the return of deserters to cover any expense that may be incurred while the deserter is in Canada, and also the cost of returning him to his own country.

The District Superintendent for the Eastern District reports a decrease of about one and one-half million persons examined in his district, the decrease

being most noticeable at Windsor and Niagara Falls, at the latter port owing in part to the destruction of one of the international bridges through an ice jam. Two new international bridges, one at Sarnia, Ont., and the other at Lansdowne, Ont., were completed and opened during the year with prospects of heavy tourist traffic over the routes served by these bridges.

The District Superintendent of the Western District reports one port of entry closed and three new ports opened during the year. The Western District has the lowest number of ports of entry and the smallest movement of persons across the International Boundary, but has a very large area in which investigational work must be conducted. The number of investigations made during the year was 6,749. There are also in this district three Immigration Halls at Winnipeg, Edmonton, and Prince Albert, for the temporary accommodation of settlers. The number of settlers accommodated during the year was 1,247.

The District Superintendent of the Pacific District reports that 170 Boards of Inquiry were held during the year with 125 deportations to nineteen different countries. Investigations over and above the Boards of Inquiry totalled 1,221. There was an increase in aeroplane travel and 4,323 passengers arriving on 1,364 aeroplanes were examined.

The Pacific District is the centre of Canada's Oriental immigration problem and concerns mainly Chinese, Japanese, and East Indians. Chinese who leave Canada for visits abroad and who intend to return to this country are required to register outward. There is also an arrangement under which both Japanese and East Indians may voluntarily register outward and thus protect their return. The District Superintendent reports that the number of Chinese registering outward is slightly higher than the previous year but still much below normal, owing to hostilities in China. There is also a noticeable falling off in the return of Chinese to Canada. The number of Chinese admitted at Vancouver and Victoria in transit through Canada to other countries was 4,550 and the number admitted at other ports for exit through Vancouver and Victoria was 1,280.

REPORT OF SUPERVISOR OF WOMEN'S DIVISION

Unaccompanied women and children arriving at Atlantic ports during the year numbered 856 British and 2,018 foreign. The larger number of foreign immigrants is explained by the fact that most of them are the wives and children of men who came here from Continental Europe some years ago.

Accompanying is a statistical review of houseworkers arriving between the years 1920-1 and 1938-9. It will be noted that British houseworkers admitted during the year numbered 542.

A few houseworkers came out under the auspices of the Society for the Oversea Settlement of British Women, which acts as the Women's Branch of the Oversea Settlement Department of the British Government. They were interviewed and recommended by the Society and were destined to our larger cities where there is a demand for the experienced cook-general. Although the number of arrivals to date is small the Society reports a recent increase in applications. This is noteworthy in view of the apparent shortage of houseworkers in the United Kingdom and the fact that passage assistance is available to Australia while migrants coming to Canada pay full fare.

A limited number of Scandinavian houseworkers were also admitted and were very readily placed as domestics in private homes, most of them in Montreal.

The Society for the Oversea Settlement of British Women is interested in re-uniting British families and during the year arranged passage to Canada of a number of women and children to join husbands and fathers here, the settlement arrangements having first been investigated by this Branch. In some instances passage loans were granted by the Society.

Number of Houseworkers Arrived in Canada, for the Nineteen Years Ended March 31, 1939

	By Racial Origin																			Totals
	1920-21	1921-22	1922-23	1923-24	1924-25	1925-26	1926-27	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	
British—																				
English.....	4,607	2,537	2,129	3,187	3,230	2,351	2,758	2,859	2,677	3,107	1,861	582	250	206	226	226	261	353	367	33,774
Irish.....	861	595	542	1,227	1,405	1,163	1,556	1,443	1,683	1,860	986	146	49	53	46	41	53	58	74	13,841
Scotch.....	2,427	1,818	1,967	3,789	2,971	2,144	2,800	2,664	2,753	3,320	1,553	323	107	95	80	69	71	122	98	29,171
Welsh.....	79	54	62	85	105	94	116	153	167	206	77	21	6	2	1	2	5	7	3	1,245
Newfoundland.....	221	71	163	434	203															1,062
Total.....	8,195	5,075	4,863	8,722	7,914	5,752	7,230	7,119	7,280	8,493	4,477	1,072	412	356	353	338	390	540	542	79,123
Other races—																				
African, South.....	8		1	2	3															14
Albanian.....							1	5	3											9
Arabian.....						2	1	1		2								1		7
Armenian.....	8	2	9	120	115	29	19	4	3	2	8			1		1			1	322
Austrian.....	2	1	2	4	6	8														23
Australian.....	2	3	4	4	11															24
Belgian.....	73	29	28	77	70	34	40	58	42	22	19			1			2	2	7	504
Bermudian.....	4	2																		6
Bohemian.....								2	1	2										5
Bulgarian.....			2	11	5	3	9	9	18	14	12									83
Chilean.....					2															2
Croatian.....						8	13	17	81	87	42	2	1	2	2	6	2	4	2	169
Czechoslovak.....	28	16	9	62	52	23	37	54	33	46	19	2		1	1	2	6	7	7	398
Dalmatian.....									1											1
Dutch.....	15	6	11	33	61	39	46	85	99	121	27	1		1		2	2		7	556
East Indian.....								1												3
Estonian.....				7	7	7	21	26	35	22	22	5	2	1	3	2	2	8	1	146
Finnish.....	77	81	94	551	703	271	873	1,279	1,288	1,686	688	5	2	1	3	1	2	8	11	7,624
French.....	38	22	22	32	30	34	35	47	46	47	31	8	2	7	5	6	13	14	10	449
German.....	8	22	48	288	266	743	1,014	1,192	1,394	1,661	1,032	8	14	14	5	5	12	21	18	7,765
Greek.....	10	35	37	78	64	50	46	65	56	67	38	2	5	4	2	1				565
Hebrew, N.E.S.....	74	172	63	95	105	602	621	691	585	647	512	14	14	44	21	41	41	17	30	4,359
Hebrew, Polish.....	86	519	199	233	168															1,205
Hebrew, Russian.....	7	77	76	392	373															935
Hungarian.....	2	4	5	26	58															95
Italian.....	131	127	61	234	217	184	209	210	21	59	43	10	5	4	4	8	4	10	13	1,534
Jamaican.....	5	9	7	7																23
Japanese.....	4	5	4	3	11	6	8	6	6	1	6	2	1	1	2	4	3	3	2	77
Jugo-Slav.....	10	22	22	44	60	16	44	42	82	95	35		1		3					487
Latvian.....				3	7															10
Lettish.....				1		5	20	18	14	10	6			1				1		22
Lithuanian.....				6	35	43	48	109	201	162	203	2	2	1	1	1	1	1	4	684
Luxemburg.....				7	1															8
Magyar.....						87	208	212	253	316	261	7	6	5	6	1	2	19	16	1,894
Maltese.....	6	2		6	4	2	1	3		3	2									29
Mexican.....				1																10
Moravian.....						1	2	3	1	3										1
Negro.....	46	25	28	29	24	34	28	67	80	152	89	2	2	3			1		2	612

New Zealand.....	1	1	1	3	8															14
Persian.....					1			2			1									4
Polish, N.E.S.....	261	359	421	1,010	776	253	557	745	899	1,014	732	9	9	6	9	7	10	21	25	7,063
Polish, Russian.....	1																			1
Portuguese.....					1	1	2	2	3	4	24									14
Roumanian.....	65	64	57	138	163	28	20	20	26	31	24	2	1	3	1	3	1			650
Russian.....	32	33	15	423	160	59	78	95	47	71	83	1	1	1	1	1		4	3	1,108
Ruthenian.....						445	1,034	1,404	1,785	1,825	1,282	15	4	6	3	10	16	32	68	7,929
Scandinavian—																				
Danish.....	27	30	22	45	114	87	113	266	391	368	128	7	5	4			1	4	4	1,614
Icelandic.....	11	1	1	6	4	6	4	5	7		5									50
Norwegian.....	32	35	38	88	184	95	192	327	359	356	146	1	4	2	4		1			1,845
Swedish.....	57	45	73	181	160	130	244	289	352	378	118	6	1	3		3				2,041
Serbian.....						11	9	14	11	21	10		2			1		3		82
Slovak.....						17	60	144	198	253	146	4	1					8	38	47
Spanish.....	1		2	2	1	2	1	1		1		1	1	5	4	5				930
Spanish American.....																				13
Swiss.....	18	20	15	69	69	32	46	56	49	66	20	1	1	2			1	6		471
Syrian.....	34	14	7	37	34	22	25	11	12	8	20								1	228
Turkish.....			2	6	3	4	3	1		1	3				1			1	2	83
Ukranian.....	5	12	5	135	3															160
U.S.A. citizens.....	7	5		7	3															22
Venezuelan.....				3																3
West Indian.....	41	7	11	24	17															100
Totals.....	1,237	1,805	1,410	4,562	4,156	3,428	5,789	7,679	8,335	9,621	5,723	113	85	122	78	109	129	222	290	54,893
Grand totals	9,432	6,890	6,273	13,284	12,070	9,180	13,019	14,798	15,615	18,114	10,200	1,185	497	478	431	447	519	762	832	134,016
From U.S.A.....	1,010	755	701	581	363	506	538	516	626	634	636	298	207	134	95	81	61	80	98	7,920
Grand totals	10,442	7,635	6,974	13,865	12,433	9,686	13,557	15,314	16,241	18,748	10,836	1,483	704	612	526	528	580	842	930	141,936

Houseworkers who came to Canada under the Empire Settlement Scheme of assisted passage between the years 1923-1931 numbered 23,804. The after-care of this group is a continuing obligation though now on a small scale. The Women Officers formerly with this Division in Montreal and Toronto are now attached to the local Immigration offices, but devote such time as is necessary to these cases.

The Women's Division office at Ottawa now has a staff of three. A Woman Officer on duty at Quebec in summer and Halifax in winter met 168 ships at the two ports and gave any necessary assistance and advice to unaccompanied women and children. She also distributed ribbons to identify passengers needing care at Montreal, where the ships and trains with immigrants are met by workers representing several religious denominations and the Y.W.C.A.

Soon after the arrival of a young unaccompanied woman a form letter, with space and return envelope for reply, is sent to her destination. This is a method of confirming her safe arrival and acquainting her with the existence of this office should she need advice. In order that a contact may be established between the newcomer and the health facilities in Canada the names of new arrivals with children are sent to the Provincial Health authorities or the Victorian Order of Nurses according to location. Names of young women coming to be married are sent to the Canadian Welfare Council and the names of settlers in the rural districts to Women's Institutes.

The Supervisor, Women's Division, acts as Canadian representative of the Service Women's Benevolent Fund, from which help is available in certain circumstances to women who served during the war with the Women's Royal Naval Service, Queen Mary's Army Auxiliary Corps, Women's Legion (Motor Transport Section), Women's Forage Corps and Women's Royal Air Force. In addition applications from ex-service nurses and V.A.D. members are at times forwarded to England for consideration by another committee of the United Services Fund. Grants totalling \$877.33 were made during the year. Three of the women assisted were from Western Canada, two of them wives of farmers in the drought area, but the majority of the applications came from Ontario. The ex-service women are now reaching middle age, which adds to the difficulty of getting suitable employment. Letters have been received from several nurses anxious to secure other work as they find they are no longer able to compete in the nursing field.

REPORT OF THE SUPERVISOR OF JUVENILE IMMIGRATION

The arrival of sixty boys and three girls in Ontario and Quebec during this year has added another fine group of young people for placement on Canadian farms. The placement of these boys and girls has been a rather easy matter, owing to the large number of applications for such help which give opportunity to pick the best homes possible. Each organization reported that several good placements for boys had to be cancelled owing to the small number of boys who came to Canada.

There has again been a good demand from farmers who have a connection with the Department for older, experienced boys and young men, at a rate of wages which shows a decided improvement over recent years. All the new arrivals were visited in their homes, which necessitated 158 visits. Both the farmers and the boys appreciate the interest of the Department, and it is satisfactory to note that not one complaint of abuse or unkindness was made by the boys.

Again this year numbers of inquiries have been received and attended to from older people who came to Canada under a juvenile scheme. Considerable advice and help was given to young men who had accumulated sufficient

capital to start farming on their own. Two boys received grants through the Lawrence Atwell Fund of London, England, of \$1,000 each, while the applications of three others are awaiting approval.

Less work has been necessary this year with the records of the British Immigration and Colonization Association, but an increasing number of young men who came to Canada under this Association are soliciting the advice of the Department in their permanent settlement.

The Fairbridge movement has been further enlarged by the addition of another farm in British Columbia, for the training of their boys and girls. This year fifty-seven children were brought to Canada by this organization, and are being retained for training and education at the headquarters.

In general, the movement of juveniles to Canada has been kept well within the limits of demand for help, and it has been found necessary by several of the organizations to leave experienced boys in their situations at an increased wage, rather than move them to a larger farm, as has been the practice in former years.

The girls who came under the juvenile movement were of a fine type, and were found in good homes and reported a pleasant connection with their mistresses. Some of the societies have reported a considerable demand for girls for farm homes, but owing to the number of girls in Canada available for training as domestics, the movement of girls has been comparatively small.

The juvenile movement has filled a demand which seemingly cannot be satisfactorily supplied in any other way than by the placement of these young immigrants who seem to grow up in their new environment and quickly acquire the habits and ways of Canadian people, and eventually become excellent Canadian citizens.

Table Showing the Number of Juvenile Immigrants That Arrived in Canada During the Past Seventy-one Years and the Agencies Through Which This Immigration Was Effected.

	Year	Number That Migrated
Miss Macpherson and Mrs. Birt, London and Liverpool (Canadian Headquarters, Marchmont Home, Belleville).....	1868 to 1926	14,578
Miss Rye and Church of England, Niagara-on-the-Lake and Toronto, Ontario, and Sherbrooke, Quebec.....	1868 to 1939	4,458
Mr. (later) Sir J. T. Middlemore, Fairview, Halifax, Nova Scotia.....	1873 to 1933	5,155
The National Children's Home and Orphanage (formerly Dr. T. Bowman Stephenson), Hamilton, Ont.....	1873 to 1932	3,377
Mrs. Bilbrough-Wallace (Marchmont Home), Belleville, Ont.....	1878 to 1915	5,529
Cardinal Manning (Ottawa and Montreal).....	1880 to 1888	1,403
Dr. Barnardo, Toronto, Ont., and Winnipeg, Man.....	1882 to 1939	27,203
Mr. J. W. C. Fegan, Toronto, Ont.....	1884 to 1939	3,249
Mr. Wm. Quarrier, Brockville, Ont.....	1890 to 1939	4,512
The Catholic Emigration Association and Amalgamated Societies (St. George's Home), Ottawa, Ont.....	1897 to 1933	8,228
The Salvation Army.....	1905 to 1933	4,040
Dr. Cossar, Lower Gagetown, New Brunswick.....	1910 to 1933	1,049
Captain Oliver Hind, The Dakeyne Farm, Falmouth (near Windsor), Nova Scotia.....	1913 to 1931	128
British Immigration and Colonization Association, Montreal, Quebec (now Ottawa, Ont.).....	1923 to 1931	5,358
Church Army, Winnipeg, Manitoba.....	1925 to 1931	929
Church of England Council of Empire Settlement, Edmonton, Alta., Indian Head and North Battleford, Sask.....	1926 to 1932	766
United Church of Canada, Norval, Ontario, and Georgetown, Ontario.....	1928 to 1933	1,284
National Association of Boys' Clubs, Falmouth, N.S.....	1930 to 1934	57
Minor Agencies (including unaccompanied).....	1897 to 1939	6,686
Fairbridge Farm Schools.....	1934 to 1939	197
Total.....		98,156

REPORT OF THE COMMISSIONER OF EUROPEAN EMIGRATION FOR CANADA

Owing to unsettled conditions in Europe there has been a tremendous increase in the work of the London and Continental Offices. In the London Office there has been a constant stream of refugees and other aliens asking for information regarding entry to Canada. These interviews take up considerable time, because it is necessary to determine what applications should be forwarded to Ottawa for entry by special regulation. The inquirers comprised professional and business men, manufacturers, bankers, and people belonging to almost every trade and occupation. The amendment to the Passport Regulation has also created considerable additional work, both in the Continental Offices and in London and other district offices in the British Isles. There was a very large increase of applications for non-immigrant alien visas by refugees and other aliens. The Emigration Officers were required to exercise great care and patience in dealing with these applicants, some of whom were visitors while others were seeking employment or investigating business prospects with a view to settlement. This action was necessary because, in most cases, people were not permitted to return to the country of origin and, as a matter of fact, they did not wish to return.

Information was given to prospective settlers who had an aggregate capital of \$51,120,476, and an annual income of \$521,513. Many of these are known to have sailed already and others may have gone forward without our knowledge.

BRITISH EMIGRATION

About the usual number of inquiries have been received from farmers and experienced farm workers in the United Kingdom. These inquiries cover requests for information regarding the various classes of farming and opportunities for employment.

A total of 117 juveniles sailed during the year under the auspices of the following Societies:—

Mr. Fegan's Homes	15
Church of England Society	3
Orphan Homes of Scotland	28
Dr. Barnardo's Homes	14
Fairbridge Farm Schools	57

There were 404 interviews during the fiscal year. Of this number 168 were regarded as good prospects, comprising cooks, cooks-general, housemaids, parlourmaids, etc., the remainder being sales-ladies, hairdressers, and various other occupations. In addition, there were quite a number who intended to join relatives, friends, or fiancés in Canada. There has also been a movement of Scandinavian domestics, who appeared to be young women with useful experience in various branches of housework.

The statement given below shows the number of British subjects who did not pass medical inspection and were certified by medical examiners under the following clauses of section 3 of the Immigration Act:—

(a) Mental	19
(b) Infectious or contagious disease	9
(c) Physically defective	265
(k) Constitutional psychopathic inferiority.....	3

Letters were received daily from former residents of Canada who have returned to the United Kingdom, and who give particulars with a view to protecting Canadian domicile. Applicants of this kind are carefully examined and the necessary action is taken.

The following is a record of the correspondence and interviews in the London and District Offices:—

	Letters Received	Letters Dispatched	Interviews
London.....	48,752	41,063	12,905
Glasgow.....	4,206	6,465	1,409
Liverpool.....	3,194	3,457	4,331
Belfast.....	2,298	2,008	1,237

In addition, 489 cablegrams, 364 telegrams, and 2,972 parcels were dispatched from the London Office.

Upon the request of applicants, booklets and maps have been distributed for educational purposes, as follows:—"Atlas," 5,123; "Eastern Canada," 8,131; "Canada West," 8,579; wall maps, 150.

Numerous inquiries were received from potential tourists and 3,240 pieces of literature, received from provincial and city tourist and publicity bureaux, were distributed through the London and District Offices. Canadian National Parks publications were also in demand and through various Agencies were distributed in the United Kingdom as follows:—

Canada's Mountain Playgrounds	4,563
Playgrounds of the Prairies	1,524
National Parks of Canada	520
Riding Mountain National Park	1,040
Jasper National Park	1,105
British Columbia National Parks	53
Banff National Park	41

In addition, 57,330 pieces of literature, comprising National Parks and other booklets, were handed out at the Empire Exhibition at Glasgow.

The bookings of National Parks films in England were arranged by the Imperial Institute, and in Scotland by the District Emigration Agent in Glasgow. National Parks films were shown on 3,318 occasions; National Parks lantern slides were loaned 125 times, and the Immigration Branch slides, 145 times.

The number of photographs loaned by the London Office during the fiscal year was 611, of which 313 were lent to District Emigration Agents for publicity purposes, 241 to the Press Officer in Canada House, and 57 to publishers and others.

The number of distressed Canadians who were returned to Canada was 119, of whom 25 were repatriated. A total sum of £56.10.1 was advanced for the temporary assistance of 44 distressed Canadians in London. The sum of £24.13.1. was reimbursed to the Canadian Legation in Paris for advances made to distressed Canadians, and the sum of £231.16.10. was refunded through the Foreign Office to British Consuls and direct to British Consuls who had made advances to distressed Canadians in foreign countries. Fine co-operation was received from the Salvation Army.

CONTINENTAL EMIGRATION

Under existing regulations the only classes of alien immigrants (being subjects or citizens of countries in the Continent of Europe) eligible for entry to

Canada are: farmers who have sufficient means to establish themselves on the land; the wife or unmarried child, under 18 years of age, of any person legally admitted to and resident in Canada, who is in a position to receive and care for his dependants; the fiancée of any adult male, legally admitted to and resident in Canada, who is in a position to provide for his intended wife.

Since December 15, 1938, when the new passport regulation came into force, a total of 289 aliens made application for non-immigrant visas. Of this number 169 were granted and 120 refused.

The following statement shows the result of civil and medical inspection at Continental ports, also correspondence and interviews:—

Statement Showing Result of Civil and Medical Inspection at Continental Ports, Correspondence and Interviews, 1938-9

Office	Admissions	Rejections	Appeals			Causes of Rejection														Letters In	Letters Out	Interviews		
			Sustained	Dismissed	Pending	P.C. 23	P.C. 3016	P.C. 185*	P.C. 695	P.C. 1413	P.C. 2115	Sec. 2	Sec. 33	Sec. 42	Section 3 s.s.									
															(h)	(2)	(5)	(a)	(b)				(c)	(h)	(j)	(t)	(u)
Antwerp.....	1,338	304	40	7	.....	64	70	.....	110	.....	.....	.....	.....	.....	6	52	.....	.....	3	125	9,903	10,877	4,297	
Paris.....	2,308	123	43	27	.....	11	9	12	40	5	5	17	2	1	.....	3	38	.....	37	.....	34	5,500	6,745	5,024
Rotterdam.....	259	103	6	3	.....	35	42	.....	56	.....	.....	.....	.....	.....	.....	8	9	.....	.....	26	.....	.....	.....	387
Hamburg.....	645	189	38	21	.....	6	.....	1	21	.....	.....	.....	.....	.....	1	3	50	.....	.....	2	82	3,959	4,692	1,373
Gdynia.....	2,770	547	73	18	3	.....	.....	2	10	.....	.....	.....	.....	.....	1	11	108	.....	.....	4	233	2,587	2,869	70†
Totals.....	7,320	1,246	200	76	3	116	121	15	237	5	5	17	2	1	2	23	265	9	37	9	500	21,949	25,183	11,151

*Now rescinded 5/12/38.

†From November only.

TABLE 1

Immigration to Canada from 1900 to 1939

	Via Ocean Ports			From U.S.A.				Grand Totals
	British Nationals	Others	Totals	U.S.A. Citizens	British Nationals	Others	Totals	
Six months ended June 30, 1900..	5,141	10,211	15,352				8,543	23,895
Fiscal year ended June 30, 1901..	11,813	19,349	31,162				17,987	49,149
" " 1902..	17,270	23,721	40,991				26,388	67,379
" " 1903..	42,200	36,691	78,891				49,473	128,364
" " 1904..	51,050	34,110	85,160	12,648	4,145	23,946	40,739	125,899
" " 1905..	65,967	36,756	102,723	15,477	2,263	22,190	39,930	142,653
" " 1906..	88,174	43,094	131,268	33,013	2,108	17,675	52,796	184,064
Nine months ended March 31, 1907..	59,272	30,736	90,008	20,479	1,309	10,369	32,157	122,165
Fiscal year ended March 31, 1908..	126,783	77,374	204,157	31,411	2,674	19,067	53,152	257,309
" " 1909..	55,463	31,613	87,076	33,474	2,894	17,926	54,294	141,370
" " 1910..	63,757	41,239	104,996	65,190	3,662	22,196	91,048	196,044
" " 1911..	126,170	63,463	189,633	77,353	5,007	22,524	104,884	294,517
" " 1912..	141,504	79,023	220,527	91,840	6,236	16,250	114,326	334,853
" " 1913..	152,373	111,050	263,423	92,061	7,398	19,959	119,418	382,841
" " 1914..	144,513	132,835	277,348	74,745	6,374	8,773	89,892	367,240
" " 1915..	44,117	40,893	85,010	34,745	3,541	3,482	41,768	126,778
" " 1916..	9,032	2,568	11,600	21,370	2,796	1,687	25,853	37,453
" " 1917..	9,980	4,005	13,985	43,261	3,324	4,558	51,143	65,128
" " 1918..	4,879	2,881	7,760	47,818	3,444	6,923	58,185	65,945
" " 1919..	10,701	6,286	16,987	28,280	1,725	1,950	31,955	48,942
" " 1920..	60,659	7,021	67,680	36,628	2,250	1,850	40,728	108,408
" " 1921..	75,783	24,635	100,418	33,891	2,768	1,651	38,310	138,728
" " 1922..	39,606	21,048	60,654	18,782	1,825	1,063	21,670	82,324
" " 1923..	36,360	14,520	50,880	14,095	1,641	830	16,566	67,446
" " 1924..	78,740	49,299	128,039	14,928	1,478	805	17,211	145,250
" " 1925..	54,943	40,601	95,544	13,171	1,794	853	15,818	111,362
" " 1926..	37,569	39,717	77,286	15,442	2,251	1,085	18,778	96,064
" " 1927..	50,378	72,586	122,964	17,820	2,239	966	21,025	143,989
" " 1928..	51,552	75,041	126,593	21,260	2,696	1,051	25,007	151,600
" " 1929..	59,497	77,666	137,163	26,539	3,061	960	30,560	167,723
" " 1930..	64,962	67,599	132,561	26,751	3,121	855	30,727	163,288
" " 1931..	28,144	35,799	63,943	20,723	2,938	619	24,280	88,223
" " 1932..	7,332	4,123	11,455	12,277	1,815	205	14,297	25,752
" " 1933..	3,283	3,303	6,586	11,172	1,806	218	13,196	19,782
" " 1934..	2,454	3,709	6,163	6,545	1,032	163	7,740	13,903
" " 1935..	2,408	3,768	6,176	5,104	769	87	5,960	12,136
" " 1936..	2,264	3,718	5,982	4,322	709	90	5,121	11,103
" " 1937..	2,521	4,389	6,910	4,301	742	70	5,113	12,023
" " 1938..	3,351	6,651	10,002	4,727	852	64	5,643	15,645
" " 1939..	3,831	7,634	11,465	4,685	917	61	5,663	17,128

TABLE 2

Immigration to Canada for the Period July 1, 1900, to March 31, 1910

	Fiscal Years										Totals
	1900-1901	1901-1902	1902-1903	1903-1904	1904-1905	1905-1906	Nine Months Ended March 31, 1907	1907-1908	1908-1909	1909-1910	
English.....	9,331	12,783	32,087	36,003	48,847	65,135	41,156	90,380	37,019	40,416	413,157
Irish.....	933	1,311	2,236	3,128	3,998	5,018	3,404	6,547	3,609	3,940	34,124
Scottish.....	1,476	2,853	7,046	10,552	11,744	15,846	10,729	22,223	11,810	14,706	108,985
Welsh.....	70	312	423	691	770	797	502	1,032	463	728	5,788
Totals.....	11,810	17,259	41,792	50,374	65,359	86,796	55,791	120,182	52,901	59,790	562,054
African, South.....				21	35	46	23	76	53	97	361
Arabian.....	98	70	46	58	48	19	31	50	4	14	438
Armenian.....	62	112	113	81	78	82	208	563	79	75	1,458
Australian.....	3	11	46	58	204	322	185	180	171	203	1,383
Austro-Hungarian.....	5,692	8,557	13,095	11,137	10,089	10,170	4,045	21,376	10,798	9,757	104,716
Brazilian.....				2	1	2	5	1			15
Bulgarian.....		1	7	14	2	71	179	2,529	56	557	3,416
Chinese.....	7	2				18	92	1,884	1,887	2,156	6,046
Doukhobor.....		12			24	204					240
Dutch.....	25	35	223	169	281	389	394	1,212	495	741	3,964
East Indian.....				3	45	387	2,124	2,623	6	10	5,195
Egyptian.....	1	3	1	3	2	18	10	8		2	60
Finnish.....	682	1,292	1,734	845	1,323	1,103	1,049	1,212	669	1,457	11,366
French and Belgian.....	492	654	1,240	2,392	2,539	2,754	1,964	3,885	2,658	2,637	21,215
German.....	984	1,048	1,887	2,985	2,759	1,796	1,903	2,377	1,340	1,533	18,612
Greek.....	81	161	193	191	98	254	545	1,053	192	452	3,220
Hebrew.....	2,765	1,015	2,066	3,727	7,715	7,127	6,584	7,712	1,636	3,182	43,539
Italian.....	4,710	3,828	3,371	4,445	3,473	7,959	5,114	11,212	4,228	7,118	55,458
Japanese.....	6				354	1,922	2,042	7,601	495	271	12,691
Malay.....		5									5
Maltese.....			2								2
Mennonite.....		52	38	11							101
Negro.....					5	42	108	136	73	7	871
Newfoundland.....			335	519	190	340	1,029	3,374	2,108	3,372	11,267
New Zealand.....			2	23	57	89	30	70	65	82	418
Persian.....		1	40	5	8	7	31	7		1	105
Polish.....	162	230	274	669	745	725	1,033	1,593	376	1,407	7,214
Portuguese.....					1	6	2	2		2	15
Roumanian.....				610	270	396	431	949	278	293	4,377
Russian.....	1,044	2,467	5,505	1,955	1,887	3,152	1,927	6,281	3,547	4,564	32,329
Scandinavian.....	1,750	2,451	5,448	4,203	4,118	3,859	2,296	4,073	2,082	3,782	34,062
Serbian.....	23		2	10	7	19	4	48	31	76	220
Spanish.....	14	1	7	5	10	12	29	61	32	42	213
Swiss.....	30	17	73	128	150	172	112	195	129	211	1,217
Syrian.....	464	1,066	847	369	630	336	277	732	189	195	5,105
Turkish.....	37	17	43	29	30	357	232	489	236	517	1,987
U.S.A. citizens, via ocean ports.....	68	73		58	109	123	89	133	94	186	933
West Indian.....			23	55	77	194	90	278	159	203	1,079
Total Continental, etc...	19,352	23,732	37,099	34,786	37,364	44,472	34,217	83,975	34,175	45,206	394,378
From the United States.	17,987	26,388	49,473	40,739	39,930	52,796	32,157	53,152	54,294	91,048	457,964
Total immigration.....	49,149	67,379	128,364	135,899	142,653	184,064	122,165	257,309	141,370	196,044	1,414,396

TABLE 3

Immigration to Canada for the Period April 1, 1910, to March 31, 1920

	Fiscal Years										Totals
	1910-1911	1911-1912	1912-1913	1913-1914	1914-1915	1915-1916	1916-1917	1917-1918	1918-1919	1919-1920	
English.....	84,707	95,107	108,082	102,122	30,997	5,857	5,174	2,477	7,954	45,173	487,460
Irish.....	6,877	8,327	9,706	9,585	2,525	818	958	174	336	2,751	43,057
Scottish.....	29,924	32,988	80,735	29,128	8,246	1,887	2,062	474	1,518	10,997	148,058
Welsh.....	1,505	1,699	2,019	1,787	598	102	88	53	106	682	8,640
Totals.....	123,013	138,121	150,542	142,632	43,276	8,664	8,232	3,178	9,914	59,603	687,215
African, South.....	86	144	22	50	23	11	1	4		23	370
Albanian.....				3	4						7
Arabian.....	3	2	10	16							31
Argentinian.....				2	5						7
Armenian.....	20	60	100	139	36		3			10	372
Australian.....	266	184	106	106	51	32	18	34	35	88	596
Austro-Hungarian.....	16,285	21,651	21,875	28,233	7,150	15	1		2	8	95,310
Belgian.....	1,563	1,601	1,826	2,651	1,149	172	126	19	48	1,632	10,687
Brazilian.....	13			5		2					20
Bulgarian.....	1,068	3,295	4,616	1,727	4,048	1				1	14,784
Chinese.....	5,278	6,247	7,445	5,512	1,258	88	393	769	4,333	544	31,867
Cuban.....				10	1	1	3			2	18
Doukhobor.....	41	24	108	4							177
Dutch.....	931	1,077	1,524	1,506	605	186	151	94	59	154	4,387
East Indian.....	5	3	5	88		1					162
Egyptian.....	3		7	5							15
Finnish.....	2,132	1,646	2,391	3,183	459	139	249	113	2	44	10,858
French.....	2,041	2,094	2,755	2,683	1,206	180	199	114	222	1,584	13,078
German.....	2,533	4,664	4,953	5,537	2,472	27	9	1	1	12	20,309
Greek.....	777	693	1,390	1,102	1,147	145	258	45	4	39	5,600
Hebrew.....	5,146	5,322	7,387	11,252	3,107	65	136	32	22	116	32,585
Italian.....	8,359	7,590	16,601	24,722	6,228	388	758	189	49	1,165	66,049
Japanese.....	437	765	724	856	592	401	648	883	1,178	711	7,195
Macedonian.....				17	132						149
Maltese.....			128	402	19	4	109	144	2	405	1,313
Mexican.....		3	9	9					1	3	25
Montenegrin.....			36	13	9		1				59
Negro.....	12	138	211	266	202	34	98	35	22	61	1,079
Newfoundland.....	2,229	2,598	1,036	496	338	255	1,243	1,199	512	443	10,349
New Zealand.....	116	61	39	24	21	18	12	13	15	31	350
Persian.....	19	19	20	19	7	3		2	2		91
Polish.....	2,177	5,060	9,945	9,793	1,976	8	12			76	29,051
Portuguese.....	13	6	9	58	8		1	1		3	99
Roumanian.....	511	793	1,116	1,504	361	4	4			21	4,314
Russian.....	6,621	9,805	18,623	24,485	5,201	40	25	42	42	51	64,935
Scandinavian—											
Danish.....	535	628	798	871	326	167	145	74	44	233	3,821
Icelandic.....	250	205	231	292	145	15	9	3	12	11	1,173
Norwegian.....	2,169	1,692	1,832	1,647	788	232	303	235	91	179	9,168
Swedish.....	3,213	2,394	2,477	2,435	916	177	332	156	101	241	12,442
Spanish.....	50	209	366	193	220	6	1			1	1,058
Swiss.....	197	191	296	1,138	755	11	76	28	12	15	2,719
Syrian.....	270	230	246	269	209	42	30	12	11	100	1,419
Turkish.....	124	144	232	278	79	3	9	2		18	889
U.S.A. citizens, via ocean ports..	469	632	770	187	33		5				2,097
West Indian.....	203	143	121	121	41	15	20	28	21	55	768
Others.....	455	393	495	719	389	47	315	307	223	66	3,409
Total, Continental, etc.....	66,620	82,406	112,881	134,726	41,734	2,936	5,703	4,582	7,073	8,077	466,738
From the United States.....	104,894	114,326	119,418	89,892	41,768	25,853	51,143	58,185	31,955	40,728	678,152
Total immigration.....	294,517	334,853	382,841	367,240	126,778	37,453	65,128	65,945	48,942	108,408	1,832,105

TABLE 4

Immigration to Canada for the Period April 1, 1920, to March 31, 1925

	Fiscal Years					Totals
	1920-1921	1921-1922	1922-1923	1923-1924	1924-1925	
English.....	47,687	23,225	19,188	37,030	26,466	153,596
Irish.....	6,384	3,572	3,668	9,719	9,379	32,722
Scottish.....	19,248	11,596	11,071	25,057	16,174	83,146
Welsh.....	943	627	581	1,113	1,159	4,423
Totals.....	74,262	39,020	34,508	72,919	53,178	273,887
African, South.....	63	32	41	60	87	263
Albanian.....	6	6	1	7	2	22
Arabian.....	8	5	2	.....	.....	15
Argentinian.....	4	.....	4	.....	.....	8
Armenian.....	85	70	59	486	304	1,004
Australian.....	90	76	67	112	162	507
Austrian.....	26	14	23	82	75	220
Belgian.....	1,645	508	316	1,662	1,300	5,426
Bermudian.....	8	2	7	4	4	25
Brazilian.....	.....	.....	.....	.....	1	1
Bulgarian.....	4	27	19	267	69	386
Chilean.....	.....	.....	.....	.....	3	3
Chinese.....	2,435	1,746	711	674	.....	5,660
Cuban.....	.....	.....	.....	1	.....	1
Czecho-Slovak.....	308	152	101	2,757	2,084	5,402
Dutch.....	595	183	119	1,149	1,637	3,688
East Indian.....	10	13	21	40	46	180
Egyptian.....	9	2	.....	3	3	17
Esthonian.....	.....	.....	12	51	49	112
Finnish.....	1,401	274	1,171	7,640	4,261	14,747
French.....	861	392	281	370	326	2,170
German.....	137	178	215	1,799	2,215	4,515
Greek.....	357	209	177	292	237	1,272
Hebrew.....	2,763	8,464	2,793	4,255	4,459	22,674
Hungarian.....	23	48	23	364	1,052	1,510
Italian.....	3,880	2,413	2,074	6,379	2,349	17,095
Jamaican.....	18	13	30	24	8	93
Japanese.....	522	471	369	448	501	2,321
Jugo-Slavian.....	89	180	136	1,306	1,620	3,331
Latvian.....	.....	.....	1	11	20	32
Lettish.....	.....	.....	.....	6	2	8
Lithuanian.....	.....	19	106	236	125	486
Luxemburg.....	16	5	3	85	35	144
Maltese.....	140	34	57	148	20	405
Mexican.....	1	.....	.....	1	.....	2
Negro.....	144	42	42	42	39	309
Newfoundland.....	1,042	367	1,552	5,346	1,283	9,595
New Zealand.....	40	25	33	50	107	255
Persian.....	1	9	1	5	13	34
Polish.....	4,061	2,707	2,921	4,211	2,734	16,634
Portuguese.....	4	.....	2	.....	3	9
Romanian.....	969	759	427	1,431	2,056	5,642
Russian.....	1,077	321	222	3,058	5,411	10,089
Scandinavian—						
Danish.....	511	541	382	1,855	1,830	4,619
Icelandic.....	50	31	21	27	49	178
Norwegian.....	429	480	507	2,424	2,550	6,390
Swedish.....	715	442	948	3,536	2,138	7,779
Spanish.....	202	6	15	39	3	265
Swiss.....	235	187	152	1,585	680	2,839
Syrian.....	443	123	91	286	210	1,153
Turkish.....	8	3	3	27	29	70
Ukrainian.....	491	89	36	832	26	1,474
U.S.A. citizens, via ocean ports.....	110	67	32	134	96	439
Venezuelan.....	.....	.....	1	6	.....	7
West Indian.....	110	24	44	37	37	252
Total, Continental, etc.....	26,156	21,634	16,372	55,120	42,366	161,648
From the United States.....	38,310	21,670	16,566	17,211	15,818	109,575
Total immigration.....	138,728	82,324	67,446	145,250	111,362	545,110

TABLE 5

Immigration to Canada for the Period April 1, 1925, to March 31, 1930

Racial Origin	Fiscal Years					Totals
	1925-1926	1926-1927	1927-1928	1928-1929	1929-1930	
English.....	19,689	24,890	25,991	30,355	32,278	133,203
Irish.....	5,993	9,187	8,756	9,199	10,153	43,294
Scottish.....	10,295	14,296	14,341	16,137	18,640	73,709
Welsh.....	1,053	1,411	1,784	3,189	3,005	10,442
Totals.....	37,030	49,784	50,872	58,880	64,082	260,648
Albanian.....	14	17	30	38	26	115
Arabian.....	10	4	6	1	7	28
Armenian.....	85	65	44	17	14	225
Belgian.....	1,063	2,080	2,171	1,222	696	7,232
Bohemian.....	8	22	7	8	20	65
Bulgarian.....	47	126	249	283	296	1,400
Chinese.....			3	1		4
Croatian.....	1,066	1,085	902	990	771	4,754
Czech.....	805	721	714	846	434	3,520
Dalmatian.....	1			1	7	9
Dutch.....	1,180	1,674	1,928	1,599	1,755	8,126
East Indian.....	62	60	56	63	58	298
Estonian.....	28	92	110	92	117	439
Finnish.....	1,617	5,180	4,765	3,651	4,565	19,778
French.....	498	548	868	745	697	3,256
German.....	7,431	12,941	12,638	12,215	14,718	60,943
Greek.....	217	340	583	736	684	2,510
Hebrew.....	3,587	4,471	4,296	3,301	3,544	19,199
Herzegovinian.....		3	4			7
Italian.....	1,638	3,301	3,593	792	1,277	10,601
Japanese.....	422	475	478	445	194	2,012
Jugo-Slavian.....	1,604	2,064	1,450	2,824	921	8,883
Korean.....	1	1				1
Lettish.....	24	60	77	74	70	305
Lithuanian.....	165	842	1,037	1,608	964	4,616
Magyar.....	4,112	4,863	5,318	6,242	5,688	26,223
Maltese.....	21	33	39	18	40	151
Mexican.....		1				1
Montenegrin.....		5				5
Moravian.....	6	36	33	4	23	102
Negro.....	53	51	88	96	195	483
Persian.....	11	6	4	1	1	23
Polish.....	2,535	6,505	6,733	8,269	6,610	30,682
Portuguese.....	3	14	7	12	13	49
Roumanian.....	265	292	237	294	383	1,461
Russian.....	925	1,127	948	908	763	4,673
Ruthenian.....	4,259	9,995	10,128	15,571	11,291	51,244
Scandinavian—						
Danish.....	1,112	2,030	3,835	3,311	2,685	12,973
Icelandic.....	53	30	28	24	6	141
Norwegian.....	1,072	3,394	4,327	2,434	2,256	13,473
Swedish.....	1,335	2,628	3,134	3,297	2,918	13,312
Serbian.....	2,044	585	411	890	375	2,515
Slovak.....		4,274	3,714	4,303	2,879	17,216
Spanish.....	12	39	28	18	26	113
Spanish American.....		6		3		9
Swiss.....	320	568	614	490	473	2,465
Syrian.....	134	218	82	75	61	570
Turkish.....	17	8	4	3	6	38
Total, Continental, etc.....	40,256	73,180	75,721	78,283	68,479	335,919
From the United States.....	18,778	21,025	25,007	30,560	30,727	126,097
Total immigration.....	96,064	143,989	151,600	167,723	163,288	722,664

TABLE 6

Immigration to Canada for the Period April 1, 1930, to March 31, 1939

Racial Origin	Fiscal Years									Totals
	1930-1931	1931-1932	1932-1933	1933-1934	1934-1935	1935-1936	1936-1937	1937-1938	1938-1939	
English.....	14,662	4,275	1,940	1,375	1,380	1,286	1,445	1,949	2,247	30,559
Irish.....	4,233	791	323	253	291	249	262	364	387	7,183
Scottish.....	7,872	1,843	764	547	472	484	519	604	665	13,770
Welsh.....	817	179	70	55	55	30	38	55	74	1,373
Totals.....	27,584	7,088	3,097	2,260	2,198	2,049	2,264	2,972	3,373	52,885
Albanian.....	25	5		1	3	1	4	8	10	57
Arabian.....	2		2		1			4	4	13
Armenian.....	21	4		7		4	3	4	5	50
Belgian.....	255	47	37	41	61	72	93	123	187	916
Bohemian.....	11					1	1	5	2	27
Bulgarian.....	295	15	3	12	5	22	18	28	29	427
Chinese.....			1	2						4
Croatian.....	482	106	96	108	155	157	240	277	265	1,886
Czech.....	225	69	65	52	77	106	134	188	169	1,065
Dalmatian.....							1			2
Dutch.....	344	33	33	27	44	111	90	119	237	1,038
East Indian.....	80	47	62	33	33	20	13	14	14	316
Estonian.....	63	6		2	2	2	5	2	12	94
Finnish.....	2,297	92	30	51	59	43	49	79	58	2,768
French.....	347	87	88	74	86	95	135	134	138	1,184
German.....	7,340	727	518	401	301	209	367	523	586	11,472
Greek.....	388	20	37	34	35	53	75	115	127	884
Hebrew.....	2,908	202	346	590	335	655	391	317	621	6,374
Italian.....	1,007	414	255	267	325	341	299	408	366	3,681
Japanese.....	204	195	115	104	93	83	103	139	46	1,082
Jugo-Slavian.....	364	57	56	63	120	106	106	116	250	1,238
Lettish.....	28	4		4		3	4	11	4	56
Lithuanian.....	466	45	57	37	37	22	42	37	39	782
Magyar.....	2,401	397	364	509	362	314	328	622	532	5,829
Maltese.....	13	5	2				6	2	1	27
Mexican.....								1	2	9
Montenegrin.....	3							2	8	13
Moravian.....	2		3					3	9	17
Negro.....	120	15	9	19	5	3	5	9	7	192
Persian.....	2						1	2		6
Polish.....	3,997	554	360	374	406	362	432	615	586	7,685
Portuguese.....	5	2	1	2	2	4	2	1	1	20
Roumanian.....	179	22	26	27	52	33	65	77	102	553
Russian.....	879	74	62	61	60	84	79	120	134	1,553
Ruthenian.....	6,413	502	414	421	586	418	855	1,356	1,837	12,802
Scandinavian—										
Danish.....	820	53	55	43	21	21	22	40	49	1,124
Icelandic.....	25		1		1	6		3		86
Norwegian.....	740	70	44	31	37	21	25	27	21	1,026
Swedish.....	730	79	17	19	10	26	16	47	15	959
Serbian.....	140	31	26	37	26	29	35	83	70	477
Slovak.....	1,957	337	252	395	595	432	520	1,249	1,450	7,187
Spanish.....	8	9	7	7	7	6	10	14	6	74
Spanish American.....	1	2		4				3		10
Swiss.....	211	24	17	19	22	32	49	87	75	536
Syrian.....	54	15	19	14	13	26	19	15	18	193
Turkish.....	7	1		2				1		12
Total, Continental, etc.....	36,359	4,367	3,489	3,903	3,978	3,933	4,646	7,030	8,092	75,797
From the United States.....	24,280	14,297	13,197	7,740	5,960	5,121	5,113	5,643	5,663	87,013
Total immigration.....	88,223	25,752	19,782	13,903	12,136	11,103	12,023	15,645	17,128	215,695

Immigration to Canada, by Origins, via Ocean Ports, and from

Racial Origin	1929-30			1930-31			1931-32			1932-33		
	Via Ocean Ports	From U.S.A.	Totals	Via Ocean Ports	From U.S.A.	Totals	Via Ocean Ports	From U.S.A.	Totals	Via Ocean Ports	From U.S.A.	Totals
English.....	32,278	9,379	41,657	14,662	7,498	22,160	4,275	4,525	8,800	1,940	4,153	6,093
Irish.....	10,159	3,762	13,921	4,233	2,904	7,137	791	1,716	2,507	323	1,512	1,835
Scottish.....	18,640	3,638	22,278	7,872	2,917	10,789	1,843	1,732	3,575	764	1,747	2,511
Welsh.....	3,005	332	3,337	817	231	1,048	179	147	326	70	92	162
Totals.....	64,082	17,111	81,193	27,584	13,550	41,134	7,068	8,120	15,208	3,097	7,504	10,601
Belgian.....	696	92	788	255	105	360	47	31	78	37	42	79
Danish.....	2,685	319	3,004	820	184	1,004	53	87	140	55	53	108
Dutch.....	1,755	703	2,458	344	444	788	35	236	269	33	226	269
Finnish.....	4,565	82	4,647	2,297	57	2,354	92	38	130	30	29	59
French.....	697	4,419	5,116	347	4,391	4,738	87	2,734	2,821	88	2,702	2,790
German.....	14,281	3,733	18,014	7,724	2,673	10,397	727	1,532	2,259	518	1,190	1,698
Icelandic.....	6	28	34	25	17	42	.....	10	10	1	6	7
Norwegian.....	2,256	1,149	3,405	740	645	1,385	70	171	241	44	218	282
Swedish.....	2,918	736	3,654	730	366	1,096	79	195	274	17	165	182
Swiss.....	473	117	590	211	83	294	24	28	52	17	41	58
Totals.....	30,332	11,378	41,710	13,493	8,965	22,458	1,212	5,062	6,274	840	4,662	5,502
Albanian.....	26	1	27	25	1	26	5	.....	5	.....	.....	2
Arabian.....	7	2	9	2	.....	2	.....	.....	2	.....	.....	2
Armenian.....	14	16	30	21	1	22	4	1	5	1	4	5
Austrian.....	437	75	512	116	68	184	.....	.....	.....	.....	.....	.....
Bohemian.....	20	81	101	11	57	68	.....	21	21	7	16	23
Bulgarian.....	296	10	306	295	.....	295	15	3	18	3	5	8
Chinese.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Croatian.....	771	11	782	482	2	484	106	5	111	96	4	100
Czech.....	434	14	448	225	8	233	69	9	78	65	7	72
Dalmatian.....	7	.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....
East Indian.....	58	.....	58	80	.....	80	47	.....	47	62	1	63
Estonian.....	117	2	119	63	2	65	6	1	7	.....	1	1
Greek.....	634	48	682	388	48	436	20	43	63	37	32	69
Hebrew.....	3,544	620	4,164	2,908	513	3,421	202	447	649	346	426	772
Italian.....	1,277	236	1,513	1,007	228	1,235	414	166	580	255	142	397
Japanese.....	194	.....	194	204	1	205	195	.....	195	115	.....	115
Jugo-Slavian.....	921	35	956	364	27	391	57	9	66	56	11	67
Lettish.....	70	8	78	28	1	29	4	2	6	.....	4	4
Lithuanian.....	964	22	986	466	11	477	45	5	50	57	6	63
Magyar.....	5,688	99	5,787	2,401	71	2,472	397	41	438	364	20	384
Maltese.....	40	1	41	13	6	19	5	.....	5	2	4	6
Mexican.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....
Montenegrin.....	.....	2	2	3	.....	3	.....	.....	.....	.....	.....	.....
Moravian.....	23	.....	23	2	.....	2	.....	1	1	3	.....	3
Negro.....	195	251	446	120	158	278	15	83	98	9	60	69
North American Indian.....	.....	22	22	.....	8	8	.....	34	34	.....	20	20
Persian.....	1	.....	1	2	.....	2	.....	.....	.....	.....	.....	1
Polish.....	6,610	227	6,837	3,997	226	4,223	554	103	657	360	99	459
Portuguese.....	13	11	24	5	10	15	2	2	4	1	6	7
Roumanian.....	383	62	445	179	44	223	22	15	37	26	11	37
Russian.....	765	173	938	879	97	976	74	32	106	62	35	97
Ruthenian.....	11,291	41	11,332	6,413	78	6,491	502	38	540	414	47	461
Serbian.....	375	29	404	140	18	158	31	16	47	26	18	44
Slovak.....	2,879	46	2,925	1,957	32	1,989	337	9	346	252	8	260
Spanish.....	26	37	63	8	26	34	9	11	20	7	1	1
Spanish American.....	.....	4	4	1	1	2	.....	.....	2	.....	.....	4
Syrian.....	61	51	112	54	22	76	15	16	31	19	26	45
Turkish.....	6	1	7	7	.....	7	.....	1	2	.....	.....	.....
Totals.....	38,147	2,238	40,385	22,866	1,765	24,631	3,155	1,115	4,270	2,649	1,030	3,670
Grand totals.....	132,561	30,727	163,288	63,943	24,280	88,223	11,455	14,297	25,752	6,586	13,196	19,782

IMMIGRATION BRANCH

7

the United States, for the Period April 1, 1929, to March 31, 1939

1933-34			1934-35			1935-36			1936-37			1937-38			1938-39		
Via Ocean Ports	From U.S.A.	Totals	Via Ocean Ports	From U.S.A.	Totals	Via Ocean Ports	From U.S.A.	Totals	Via Ocean Ports	From U.S.A.	Totals	Via Ocean Ports	From U.S.A.	Totals	Via Ocean Ports	From U.S.A.	Totals
1,375	2,623	3,998	1,380	2,053	3,433	1,286	1,744	3,030	1,445	1,738	3,183	1,949	1,870	3,819	2,247	1,824	4,071
283	905	1,188	291	727	1,018	249	626	875	262	617	879	364	688	1,050	387	726	1,113
547	1,088	1,585	472	734	1,206	484	677	1,161	519	639	1,158	604	737	1,341	665	707	1,372
55	77	132	55	55	110	30	56	86	38	69	107	55	48	103	74	60	134
2,260	4,643	6,903	2,198	3,569	5,767	2,049	3,103	5,152	2,264	3,063	5,327	2,972	3,341	6,313	3,373	3,317	6,690
41	23	64	61	18	79	72	9	81	93	13	106	123	22	145	187	15	202
43	47	90	21	28	49	21	33	54	22	44	66	40	43	83	49	34	83
27	137	164	44	104	148	111	97	208	90	102	192	119	113	232	237	139	376
51	16	67	59	21	80	43	24	67	49	16	65	79	14	93	58	14	72
74	1,130	1,204	86	809	895	95	724	819	135	711	846	134	774	908	138	860	998
401	755	1,156	301	656	957	209	471	680	367	529	896	523	571	1,094	586	507	1,093
.....	10	10	1	12	13	6	6	12	.....	2	2	3	5	8	.....	8	8
31	108	139	37	93	130	31	94	125	25	74	99	27	91	118	21	84	105
19	110	129	10	83	93	26	89	115	16	73	89	47	95	142	15	90	105
19	30	49	22	21	43	32	18	50	49	16	65	87	18	105	75	22	97
706	2,366	3,072	642	1,845	2,487	646	1,565	2,211	846	1,580	2,426	1,182	1,746	2,928	1,366	1,773	3,139
1	.....	1	3	.....	3	1	.....	1	4	.....	4	8	1	9	10	.....	10
7	3	10	1	4	5	4	1	5	3	1	4	4	3	7	5	1	6
.....	10	10	.....	9	9	1	6	7	1	13	14	5	6	11	2	10	12
12	2	14	5	.....	5	22	2	24	18	1	19	28	2	30	29	.....	29
2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
108	6	114	155	.....	155	157	.....	157	240	.....	240	277	4	281	265	3	268
52	7	59	77	4	81	106	1	107	134	4	138	188	3	191	169	4	173
.....
33	.....	33	33	.....	33	20	1	21	13	.....	13	14	.....	14	14	.....	14
2	2	4	2	.....	2	2	.....	2	5	.....	5	2	1	3	12	.....	12
34	26	60	35	17	52	53	19	72	75	20	95	115	11	126	127	10	137
599	344	943	335	289	624	655	225	880	391	228	619	317	267	584	621	269	890
267	109	376	325	56	381	341	49	390	299	58	357	408	69	477	365	58	423
104	1	105	93	.....	93	83	.....	83	103	.....	103	139	.....	139	46	.....	46
63	3	66	120	2	122	106	3	109	106	3	109	116	9	125	250	3	253
4	.....	4	.....	.....	.....	3	.....	3	2	3	5	11	.....	11	4	.....	4
37	2	39	37	5	42	22	3	25	42	10	52	37	6	43	39	6	45
509	18	527	362	20	382	314	22	336	328	11	339	622	24	646	532	22	554
.....	4	1	5	2	2	1	5	6
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TABLE 8

Number of Arrivals via Ocean Ports, Classified by Port of Entry and Class, for the Fiscal Year Ended March 31, 1939.

Port of Entry	Number of Arrivals	Rejections	Admissions	Returned Canadians Absent More Than One Year				Other Persons Returning	Tourists, etc.
				Canadian Born	British Born Outside Canada	Canadians Naturalized	Aliens With Domicile		
Halifax.....	10,575	28	3,164	394	222	89	230	3,064	3,384
North Sydney.....	6,018	41	389	45	8	1	1	2,004	3,529
Sydney.....	121	1	7	3				48	62
Louisburg.....	209	1	28					88	182
Dalhousie.....	23			3				11	9
St. John.....	796	4	30	56	11	3		370	322
Montreal.....	2,179	30	143	136	57	6	3	1,257	557
Quebec.....	38,315	39	6,072	1,630	850	155	106	17,524	11,649
Rimouski.....	2	2							
Three Rivers.....	1							1	
Boston.....	9	2	7						
New York.....	1,176	19	1,157						
New Westminster.....	74		5	8	4			9	45
Port Alberni.....	11								11
Vancouver.....	4,320	8	239	267	66	36	39	1,132	3,032
Victoria.....	340	2	29	38	30	2		149	590
Not given.....	205	10	195						
Totals.....	65,464	177	11,465	2,570	1,248	292	379	25,957	23,376

TABLE 9

Immigration to Canada for the Fiscal Year Ended March 31, 1939, Showing Sex, Occupation and Destination.

	Via Ocean Ports	From U.S.A.	Totals
Sex—			
Adult males.....	2,503	1,630	4,133
Adult females.....	4,460	2,300	6,760
Children under eighteen.....	4,502	1,733	6,235
Totals.....	11,465	5,663	17,128
Occupation—			
Farming Class—			
Males.....	1,382	368	1,750
Females.....	905	162	1,067
Children.....	1,796	211	2,007
Labouring Class—			
Males.....	183	118	301
Females.....	38	35	73
Children.....	75	55	130
Mechanics—			
Males.....	240	240	480
Females.....	115	112	227
Children.....	67	64	131
Trading Class—			
Males.....	263	426	689
Females.....	186	205	391
Children.....	141	99	240
Mining Class—			
Males.....	20	14	34
Females.....	6	4	10
Children.....	4		4
Females Domestic Servants—			
18 years and over.....	660	97	757
Under 18 years.....	172	1	173
Other Classes—			
Males.....	415	464	879
Females.....	2,550	1,685	4,235
Children.....	2,247	1,303	3,550
Destination—			
Nova Scotia.....	489	324	813
New Brunswick.....	52	307	359
Prince Edward Island.....	7	54	61
Quebec.....	2,225	1,229	3,454
Ontario.....	4,372	2,452	6,824
Manitoba.....	1,466	232	1,698
Saskatchewan.....	531	144	675
Alberta.....	1,331	336	1,667
British Columbia.....	984	579	1,563
Yukon Territory.....	6	5	11
Northwest Territories.....	2	1	3

TABLE 10

Immigration to Canada for the Fiscal Year Ended March 31, 1939,
Showing Racial Origin and Sex.

Racial Origin	Via Ocean Ports				From the United States				Grand Totals		
	Totals	18 Years and Over		Under 18 Years		Totals	18 Years and Over			Under 18 Years	
		M.	F.	M.	F.		M.	F.		M.	F.
Albanian.....	10		7	2	1						10
Arabian.....	4	1	1	1	1		2	2			6
Armenian.....	5	1	3		1		1		1		6
Belgian.....	187	63	64	32	28	15	7	5		3	202
Bohemian.....	2			1	1	10	3	4	2	1	12
British—											
English.....	2,247	678	1,069	263	237	1,824	532	729	304	259	4,071
Irish.....	387	149	167	26	45	726	201	283	129	113	1,113
Scotch.....	665	190	301	98	76	707	205	257	127	118	1,372
Welsh.....	74	27	28	10	9	60	23	27	5	5	134
Bulgarian.....	29		14	9	6						29
Croatian.....	265	7	122	68	68	3		2			268
Czech.....	169	39	53	46	31	4	2	1		1	173
Dalmatian.....	1										1
Dutch.....	237	52	51	74	60	139	40	52	26	21	376
East Indian.....	14		6	7	1						14
Estonian.....	12	3	6	1	2						12
Finnish.....	58	10	28	10	10	14	2	11	1		72
French.....	138	43	62	17	16	860	205	342	140	173	998
German.....	586	130	193	134	129	507	152	231	65	59	1,093
Greek.....	127	5	68	36	18	10	7	2		1	137
Hebrew.....	621	211	224	85	101	269	104	117	27	21	890
Italian.....	365	29	163	99	74	58	17	26	8	7	423
Japanese.....	46	1	35	7	3						46
Jugo-Slavian.....	250	26	96	63	65	3	1	2			253
Lettish.....	4	1	2	1							4
Lithuanian.....	39	1	24	7	7	6		4	1	1	45
Magyar.....	532	47	222	134	129	22	5	12	3	2	554
Maltese.....	1		1			5	1	1	1	2	6
Mexican.....	2	1	1								2
Montenegrin.....	8		3		5						8
Moravian.....	9	2	2	2	3						9
Negro.....	7	1	4		2	24	6	11	4	3	31
North American Indian.....						13	1	5		7	13
Polish.....	586	71	220	156	139	68	17	38	7	6	654
Portuguese.....	1		1			2	1	1			3
Roumanian.....	102	24	32	19	27	2		1		1	104
Russian.....	134	27	40	36	31	14	4	6	1	3	148
Ruthenian.....	1,837	316	605	467	449	19	5	7	3	4	1,856
Scandinavian—											
Danish.....	49	24	21	2	2	34	12	14	5	3	83
Icelandic.....						8	4		1	3	8
Norwegian.....	21	6	11	1	3	84	27	41	8	8	105
Swedish.....	15	9	5		1	90	32	39	9	10	105
Serbian.....	70	4	21	22	23	5	1	3	1		75
Slovak.....	1,450	270	453	394	333	19	3	13	2	1	1,469
Spanish.....	6	2	2		2	4	2	2			10
Swiss.....	75	29	20	17	9	22	5	6	7	4	97
Syrian.....	18	3	8	3	4	10	1	4	3	2	28
Totals.....	11,465	2,503	4,460	2,350	2,152	5,663	1,630	2,300	890	843	17,128

TABLE 11

Comparative Statement—Immigration to Canada Via Ocean Ports, by Months, for the Fiscal Year 1938-9, Compared With That of the Preceding Fiscal Year.

	1937-38				1938-39			
	M.	F.	C.	Totals	M.	F.	C.	Totals
April.....	243	394	390	1,027	357	483	604	1,444
May.....	250	401	439	1,090	238	401	419	1,058
June.....	211	381	391	983	242	469	449	1,160
July.....	169	347	338	854	263	473	470	1,206
August.....	202	420	430	1,052	197	388	426	1,011
September.....	214	412	394	1,020	306	560	594	1,460
October.....	202	449	457	1,108	308	504	503	1,315
November.....	103	289	284	676	118	271	224	613
December.....	60	272	277	609	101	236	224	561
January.....	62	165	155	382	64	164	137	365
February.....	70	187	147	404	86	190	163	439
March.....	187	305	305	797	223	321	289	833
Totals.....	1,973	4,022	4,007	10,002	2,503	4,460	4,502	11,465

TABLE 12

Comparative Statement—Immigration from the United States to Canada, by Months, for the Fiscal Year 1938-9, Compared With That of the Preceding Fiscal Year.

	1937-38				1938-39			
	M.	F.	C.	Totals	M.	F.	C.	Totals
April.....	162	185	108	455	177	209	180	566
May.....	174	202	151	527	190	226	163	579
June.....	165	252	206	623	170	261	231	662
July.....	134	217	152	503	131	200	183	514
August.....	169	209	145	523	130	216	147	493
September.....	168	251	196	615	166	237	148	551
October.....	158	234	152	544	155	232	145	532
November.....	122	180	132	434	122	190	157	469
December.....	108	122	106	336	115	142	127	384
January.....	94	137	73	304	96	125	75	296
February.....	98	149	107	354	73	132	68	273
March.....	145	159	121	425	105	130	109	344
Totals.....	1,697	2,297	1,649	5,643	1,630	2,300	1,733	5,663

TABLE 13

Comparative Statement—Total Immigration to Canada, by Months, for the Fiscal Year 1938-9, Compared With That of the Preceding Fiscal Year.

	1937-38				1938-39			
	M.	F.	C.	Totals	M.	F.	C.	Totals
April.....	405	579	498	1,482	534	692	784	2,010
May.....	424	603	590	1,617	428	627	582	1,637
June.....	376	633	597	1,606	412	730	680	1,822
July.....	303	564	490	1,357	394	673	653	1,720
August.....	371	629	575	1,575	327	604	573	1,504
September.....	382	663	590	1,635	472	797	742	2,011
October.....	360	683	609	1,652	463	736	648	1,847
November.....	225	469	416	1,110	240	461	381	1,082
December.....	168	394	383	945	216	378	351	945
January.....	156	302	228	686	160	289	212	661
February.....	168	336	254	758	159	322	231	712
March.....	332	464	426	1,222	328	451	398	1,177
Totals.....	3,670	6,319	5,656	15,645	4,133	6,760	6,235	17,128

Immigration Via Ocean Ports, Showing Country of

Country of Birth	Totals	Bohemian	Moravian	Slovak	Hebrew	Arabian	English	Irish	Scottish	Welsh	Mexican	Croatian	Dalmatian	Montenegrin	Serbian	Belgian	Bulgarian	Czech
Africa (British)	18				2		8		2									
Africa (Not British)	2						1		1									
Albania	6																	
Argentina	1																	
Armenia	1																	
Australia	27						22	3	2									
Austria	62				21		1											
Barbados	8						6											
Bahamas	3						3											
Belgium	211				2											179		
Bermuda	5						5											
Brazil	6						6											
Bulgaria	17						6											15
Canada	6				1		2											
Central America	6						6											
Chile	1						1											
China	37						24	2	8									
Cuba	6						4											
Czecho-Slovakia	1,951	2	9	1,857	57							1						125
Danzig	2				2													
Denmark	44																	
Egypt	1						1											
Eire	119						5	111	3									
England	1,712				42		1,585	17	48	9	1						1	
Estonia	9																	
Finland	52																	
France	105				4		3		1								2	
Germany	292				147		3											1
Greece	133																	4
Guiana (British)	4						3		1									
Hawaiian Islands	2						1											
Holland	153				9													
Hong Kong	8						4		1	2								
Hungary	381				10													
India (British)	48						22		10							1		
Ireland (Northern)	189						1	187	1									
Italy	366				2					1		4						
Jamaica	8						5		2									
Japan	61					3	8	3										
Jugo-Slavia	679			87	1						249	1	8	56		4	23	
Korea	1						1		1									
Latvia	10				4	1	1											
Lesser British Isles	15						10		4									
Lithuania	59				19													
Luxemburg	2															1		
Malta	2						1											
Mexico	135						7		2	1								
Newfoundland	478				1		392	43	20	4								
New Zealand	17						9		5	1								
Norway	13																	
Pacific Ocean Islands (Br.)	2						1		1									
Pacific Ocean Is. (not Br.)	2								2									
Palestine	15				15													
Paraguay	4																	
Peru	6						2		1	2								
Poland	2,629				205		1					9						17
Philippine Islands	1						1											
Portugal	2						1											
Roumania	342			4	44		5								13		1	
Ukraine	1				1													
Russia	62				20		2											
St. Pierre and Miquelon	3						1		1									
Scotland	581				6		22	13	539									
Spain	2						1											
Straits Settlements	5						3		2									
Sweden	11																	
Switzerland	122				4													
Syria	18																	
Trinidad	3							1										
Turkey	7							1										
United States	89			2	2		39	4	8			2				4		
Venezuela	4						4											
Wales	71						16	1	1	83								
West Indies (British)	4								1									
Other European countries	1						1											
Born at Sea	1						1											
Totals	11,465	2	9	1,450	621	4	2,247	387	665	74	2	265	1	8	70	187	29	169

Immigration from the United States, Showing Country

Country of Birth	Totals	Bohemian	Slovak	Hebrew	Arabian	English	Irish	Scotch	Welsh	N. A. Indian	Croatian	Serbian	Belgian
Africa (British).....	2					1			1				
Africa (Not British).....	1												
Argentina.....	1												
Armenia.....	1												
Australia.....	3					3							
Austria.....	10		1	4									
Bahamas.....	2					2							
Belgium.....	9												8
Bermuda.....	1					1							
Canada.....	626			7	1	208	88	116	3				
Central America.....	1					1							
China.....	5					3	1	1					
Cuba.....	4					1							
Czecho-Slovakia.....	11		8	1									
Denmark.....	3					1							
Eire.....	28			1			26						
England.....	273			7		254	4	5	1				
Finland.....	6												
France.....	18					2	1						
Germany.....	52			9									
Greece.....	4												
Haiti.....	1												
Holland.....	7												
Hungary.....	9			2									
Iceland.....	2												
India (British).....	8					7		1					
Ireland (Northern).....	20						20						
Italy.....	16												
Jamaica.....	1					1							
Japan.....	1												
Jugo-Slavia.....	2		1										
Korea.....	1							1					
Latvia.....	3			2									
Lithuania.....	2			1									
Luxemburg.....	1												
Malta.....	4												
Mexico.....	1							1					
Newfoundland.....	13					9	1	2					
New Zealand.....	5					4		1					
Norway.....	13						1						
Palestine.....	2			1					2				
Peru.....	1												
Poland.....	37			23									
Portugal.....	1												
Roumania.....	4			1								2	
Russia.....	36	1		24				1					
St. Pierre and Miquelon.....	1												
Scotland.....	105			3		1	4	97					
Sweden.....	12												
Switzerland.....	7												
Syria.....	1												
Turkey.....	1												
United States.....	4,275	9	9	183	1	1,324	580	479	48	13	3	3	7
Wales.....	8					1			7				
West Indies (British).....	1												
Totals.....	5,663	10	19	269	2	1,824	726	707	60	13	3	5	15

Total Immigration to Canada, Showing Country of

Country of Birth	Totals	Bohemian	Moravian	Slovak	Hebrew	Arabian	English	Irish	Scotch	Welsh	N. A. Indian	Mexican	Croatian	Dalmatian	Montenegrin	Serbian	Belgian	Bulgarian	Czech	Finnish
Africa (British)	20				2		9		3	1										
Africa (not British)	3						1		1											
Albania	8																			
Argentina	2																			
Armenia	2																			
Australia	30						25	3	2											
Austria	72			1	25		1													
Barbados	8						6													
Bahamas	5						5													
Belgium	220				2													187		
Bermuda	6						6													
Brazil	6						6													
Bulgaria	17						6													
Canada	633				8	1	210	88	116	3								15		3
Central America	7						7													
Chili	1						1													
China	42						27	3	9											
Cuba	10						5													
Czecho-Slovakia	1,962	2	9	1,365	58								1						127	
Danzig	2				2															
Denmark	47																			
Egypt	1						1													
Eire	147				1		6	137	3											
England	1,985				49		1,839	21	53	10		1					1			
Esthonia	9																			1
Finland	58																			56
France	123				4		5	1	1								2			
Germany	344				156		3											1	4	
Greece	137																			
Guiana (British)	4						3		1											
Haiti	1																			
Holland	160				9															
Hawaiian Islands	2						1													
Hong Kong	8						4		1	2										
Hungary	390				12											1				
Iceland	2																			
India (British)	56						29		11											
Ireland (Northern)	209						1	207	1											
Italy	382				2					1			4							
Jamaica	9						6		2											
Japan	62				3		8	3												
Jugo-Slavia	681			88	1								249	1	8	56		4	23	
Korea	2						1	1	1											
Latvia	13				6	1	1													
Lesser British Isles	15						10		4											
Lithuania	61				20															
Luxemburg	3																	1		
Malta	6						1													
Mexico	136						7		1	2	1									
Newfoundland	491				1		401	44	22	4										
New Zealand	22						13		6	1										
Norway	26							1												
Pacific Ocean Islands, (Br.)	2						1		1											
Pacific Ocean Islands, (not Br.)	2								2											
Palestine	16				16															
Paraguay	4																			
Peru	8						2		3	2										
Poland	2,666				228		1						9						17	
Portugal	3						1													
Philippine Islands	1						1													
Roumania	346			4	45											15		1		
Ukraine	1				1															
Russia	98	1			44		2		1											3
St. Pierre and Miquelon	4						1	1												
Scotland	686				9		23	17	636											
Spain	2						1													
Straits Settlements	5						3		2											
Sweden	23																			
Switzerland	129				4															
Syria	19																			
Trinidad	3							1												
Turkey	8						1													
United States	4,364	9		11	185	1	1,363	584	487	48	13		5		3	11			2	9
Venezuela	4						4													
Wales	79						17	1	1	60										
West Indies (British)	5							1												
Other European Countries	1						1													
Born at Sea	1						1													
Totals	17,128	12	9	1,469	890	6	4,071	1,113	1,372	134	13	2	268	1	8	75	202	29	173	72

Birth by Racial Origin, for the Fiscal Year 1938-9

French	German	Greek	Dutch	Magyar	Italian	Jugo-Slav	Polish	Roumanian	Russian	Danish	Icelandic	Norwegian	Swedish	Swiss	Ruthenian	Albanian	Esthonian	Lettish	Lithuanian	Maltese	Portuguese	Spanish	Negro	Armenian	East Indian	Japanese	Syrian
	1		3									1															
		1			1								1														
	42			1											2												
26	2		1				1							1													
153	27	1	13		1		1			1	1	1	1	1	2							2				1	
	2												1														
	24			64		154	1		4				1		153								2				
										47																	
3			1		2					3		1															
101	168		5				5		2				2		1			8					1				
	129		2	1					1						2												
1	4		147									1															
	11			366	1																						
2											2																
	1				374																						
2	1																										
	42			56		90		53							10												
1	1																		4								
1	1								1										40								
	45		73						7												5						
15			3									1															
						2						25															
	4																										
	154						589		104						1,561	3											
	78			49			1	47	4						102												
1	11		5			2			16			1			7			4									
2			1																								
1	49				2								23		72												
688	424	2	1				56	4	9	32	5	73	76	19	18					5	1	1	4	2	4		19
		4	121	17	41	5	56	4	9	32	5	73	76	19	18				5	1	1	4	2	4		9	
																						1		3			
998	1,093	137	376	554	423	253	654	104	148	83	8	105	105	97	1,856	10	12	4	45	6	3	10	31	6	14	46	28

TABLE 17

Immigration Via Ocean Ports, Showing Destination by Intended Occupation and Sex, for the Fiscal Year Ended March 31, 1939

Destination	Totals	Farming Class				Labouring Class				Mechanics				Trading and Clerical Classes				Mining Class				Female Domestic		Other Classes			
		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years			
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
Nova Scotia.....	489	26	15	7	11	65	3	2	1	22	7	3	6	7	4	4					145	27	20	64	24	26	
New Brunswick.....	52	5	3	4	1	1						1		1				2			6		5	15	4	4	
Prince Edward Island.....	7	1	1	2																			1	2			
Quebec.....	2,225	231	165	180	116	36	4	8	1	64	28	9	13	109	68	37	24	3	1	1	138	35	118	469	182	185	
Ontario.....	4,372	435	223	290	168	52	19	31	16	118	57	7	13	106	70	20	32	9	1	1	255	56	145	1,157	571	520	
Manitoba.....	1,466	307	219	292	227	2	1	1	4	10	7	3	2	6	7	4					39	23	28	132	78	74	
Saskatchewan.....	531	90	74	72	74	2				2	1	1		1							8	6	16	111	29	44	
Alberta.....	1,331	221	164	164	146	1	1	5	2	4	4			6	6	2	2				31	16	18	272	144	122	
British Columbia.....	984	66	41	27	15	22	10	4		20	11	3	6	28	30	9	7	5	4	2	38	9	68	325	132	10	
Yukon Territory.....	6					2												1						2	1		
Northwest Territories.....	2																						1	1			
Totals.....	11,465	1,382	905	1,038	758	183	38	51	24	240	115	27	40	263	186	68	73	20	6	1	3	660	172	415	2,550	1,165	1,082

TABLE 18

Immigration from the United States to Canada, Showing Destination by Intended Occupation and Sex, for the Fiscal Year Ended March 31, 1939

Destination	Totals	Farming Class				Labouring Class				Mechanics				Trading and Clerical Classes				Mining Class				Female Domestic		Other Classes			
		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over	Under 18 Years	18 Years and Over		Under 18 Years	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.			M.	F.	M.	F.
Nova Scotia.....	324	28	12	7	3	4	1	2	3	4	3	.....	11	6	2	2	.....	.....	.....	.....	7	.....	29	84	62	54
New Brunswick.....	307	34	15	8	13	12	3	3	3	3	2	1	2	8	6	.....	1	.....	.....	.....	3	.....	16	78	53	43
Prince Edward Island.....	54	7	3	3	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....	1	.....	7	12	12	5
Quebec.....	1,229	45	26	28	18	40	7	4	13	50	17	7	3	99	52	14	7	.....	.....	.....	28	.....	115	397	118	141
Ontario.....	2,452	92	37	21	20	40	14	7	8	142	66	20	15	243	104	28	28	5	1	.....	36	1	181	760	293	200
Manitoba.....	232	24	9	13	19	2	2	2	2	6	8	5	4	9	5	2	.....	1	1	.....	2	.....	20	57	18	21
Saskatchewan.....	144	34	15	5	4	2	.....	.....	.....	1	.....	.....	.....	7	4	1	1	.....	.....	.....	2	.....	17	31	9	11
Alberta.....	336	68	26	14	8	4	.....	1	.....	6	4	.....	2	8	6	2	.....	1	.....	.....	10	.....	34	84	34	24
British Columbia.....	579	36	19	15	11	14	8	3	4	28	12	2	3	41	21	6	3	6	2	.....	7	.....	45	180	64	49
Yukon Territory.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	2	.....	2
Northwest Territories...	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Totals.....	5,663	368	162	114	97	118	35	22	33	240	112	35	29	426	205	56	43	14	4	.....	97	1	464	1,685	663	640

TABLE 19

Total Immigration, Showing Destination by Intended Occupation and Sex, for the Fiscal Year Ended March 31, 1939

Destination	Totals	Farming Class				Labouring Class				Mechanics				Trading and Clerical Classes				Mining Class				Female Domestic		Other Classes			
		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years			
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
Nova Scotia.....	813	54	27	14	14	69	4	4	4	26	10	3	6	18	10	2	6	.....	.....	.....	.....	152	27	49	148	86	80
New Brunswick.....	359	39	18	12	14	13	3	3	3	3	2	2	2	9	6	.....	1	2	.....	.....	.....	9	.....	21	93	57	47
Prince Edward Island.....	61	8	4	5	1	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....	1	.....	8	14	12	5	
Quebec.....	3,454	276	191	208	134	76	11	12	14	114	45	16	16	208	120	51	31	3	1	1	.....	166	35	233	866	300	326
Ontario.....	6,824	527	260	311	188	92	33	38	24	260	123	27	28	349	174	48	60	14	2	.....	1	291	57	326	1,917	864	810
Manitoba.....	1,698	331	228	305	246	4	3	3	6	16	15	8	6	15	12	2	4	1	1	.....	41	23	48	189	96	95	
Saskatchewan.....	675	124	89	77	78	4	.....	.....	.....	3	1	1	.....	7	5	1	1	.....	.....	.....	10	6	33	142	38	55	
Alberta.....	1,667	289	190	178	154	5	1	6	2	10	8	.....	2	14	12	4	2	1	.....	.....	41	16	52	356	178	146	
British Columbia.....	1,563	102	60	42	26	36	18	7	4	48	23	5	9	69	51	15	10	11	6	.....	2	45	9	108	505	196	156
Yukon Territory.....	11	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	4	1	2	
Northwest Territories....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	1	.....
Totals.....	17,128	1,750	1067	1,152	855	301	73	73	57	480	227	62	69	689	391	124	116	34	10	1	3	757	173	879	4,235	1,828	1,722

TABLE 20

Immigration Via Ocean Ports, Showing Intended Occupation by Province of Destination, for the Fiscal Year Ended March 31, 1939

Intended Occupation	Totals	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon Territory	Northwest Territories
Farming class	1,677	27	2	6	289	570	347	102	260	74		
Clerical class	124	9			46	43	5		3	15		
Professional class	267	14	1	5	99	81	21	8	10	27		
Merchant class	213	1		1	84	96	7	1	4	19		1
Miscellaneous	83	4		1	23	33	1	7	1	13		
SKILLED WORKERS												
Skilled workers, n.e.s.	77	5			22	35	2	1	4	8		
Bakers	5				2	2				1		
Barbers	17				6	9				2		
Blacksmiths	1					1						
Butchers	4	1				1	1			1		
Cabinetmakers	3					2						
Carpenters	20	3			3	11	1	1		2		
Dressmakers	11	1			2	7			1			
Engineers, locomotive	2	1				1						
Engineers, marine	11	7			2	1				1		
Engineers, stationary	3	1			1	1						
Electricians	4				4							
Fur workers	2					1				1		
Hat and cap workers	1				1							
Jewellers, goldsmiths, silversmiths	2				1	1						
Machinists	18				8	10						
Masons and bricklayers	9					9						
Millers	1					1						
Milliners	4					4						
Painters and glaziers	7					5	2					
Pattermakers	1				1							
Photographers	2				1	1						
Plasterers	4					1				3		
Plumbers	3				1	1	1					
Printers, pressmen and printing trades	1					1						
Shoemakers	5				2	3						
Seamstresses	5				1	3		1				
Sheet metal workers	2	1				1						
Tailors	12				3	7	2					
Tanners	2					2						
Textile workers, including weavers spinners	14				2	9				3		
Tobacco workers, including cigarette and cigar makers	3				2	1						
Upholsterers	1				1							
Watch and clock makers	2				2							
Automobile mechanics	10	2			2	5				1		
Boilermakers	1						1					
Ironworkers, n.e.s.	5				2	3						
UNSKILLED AND SEMI-SKILLED WORKERS												
Unskilled and semi-skilled, n.e.s.	38	1			14	16	2			5		
Lumbermen	8	1				1				4		2
Miners	21	1		2	3	9				5		1
Fishermen	25	21				1				3		
General labourers	54	1		1	8	29		1	5	9		
Manufacturing	11	1			1	9				9		
Construction	2					2						
Transportation	70	42			14	9				5		
Apprentices to skilled trades	8				6	1			1			
Domestic servants	832	172			6	173	311	62	14	47		47
Dependent children	3,975	82	1	13	689	1,496	644	206	544	299		1
Dependent wives	2,738	59	3	10	511	1,090	302	144	354	264		1
Occupation not given	1,044	31		7	198	430	65	45	97	169		1
Totals	11,465	489	7	52	2,225	4,372	1,466	531	1,331	984	6	2

TABLE 21

Immigration from the United States, Showing Intended Occupation by Province of Destination, for the Fiscal Year Ended March 31, 1939

Intended Occupation	Totals	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon Territory	Northwest Territories
Farming class.....	399	31	9	39	48	97	27	34	73	41		
Clerical class.....	129	4		1	39	64	2	2	6	11		
Professional class.....	250	6	3	8	82	52	17	11	18	23		
Merchant class.....	364	8	1	10	78	213	8	6	5	35		
Miscellaneous.....	174	4		1	91	60	4	3	8	3		
SKILLED WORKERS												
Skilled workers, n.e.s.....	101			1	19	61	5		3	12		
Bakers.....	4					3				1		
Barbers.....	18	1			6	8	1		2			
Blacksmiths.....	3				3							
Butchers.....	3				1	3						
Cabinetmakers.....	1				2	4	1					
Carpenters.....	10	3			1	4				1		
Dressmakers.....	5	1			1	1	1			1		
Engravers.....	1				1							
Engineers, locomotive.....	3				3							
Engineers, marine.....	1					1						
Electricians.....	8				2	4				2		
Fur workers.....	3				2	1						
Hat and cap workers.....	1				1							
Jewellers, goldsmiths, silversmiths.....	2					2						
Machinists.....	24			1	4	17		1		1		
Masons and bricklayers.....	3					1			1	1		
Millers.....	1					1						
Painters and glaziers.....	8	1				5				2		
Patternmakers.....	1					1						
Photographers.....	2				1				1			
Plumbers.....	3				1	2						
Printers, pressmen and printing trades.....	3					2				1		
Shoemakers.....	2				1				1			
Stonemasons.....	1				1							
Tailors.....	2					1				1		
Tanners.....	1					1						
Textile workers, including weavers and spinners.....	8				2	6						
Tobacco workers, including cigarette and cigar makers.....	1					1						
Woodworkers, n.e.s.....	1			1								
Automobile mechanics.....	19				3	11				5		
Boilermakers.....	1					1						
Ironworkers, n.e.s.....	5					5						
Moulders.....	4					4						
UNSKILLED AND SEMI-SKILLED WORKERS												
Unskilled and semi-skilled, n.e.s.....	17	1		1	5	8				2		
Lumbermen.....	9					2				7		
Miners.....	15				1	5	1			6		1
General labourers.....	37	1		7	13	11		1	2	2		
Manufacturing.....	22				6	13	1			2		
Construction.....	1					1						
Transportation.....	36	2		5	14	9	1	1	1	3		
Apprentices to skilled trades.....	5			1	2	1			1			
Domestic servants.....	98	7	1	3	28	37	2	2	10	7	1	
Dependent children.....	1,669	133	22	118	329	717	82	31	80	155	2	
Dependent wives.....	1,531	69	11	76	236	719	60	36	90	182	2	
Occupation not given.....	651	52	7	34	153	265	19	16	33	72		
Totals.....	5,663	324	54	307	1,229	2,452	232	144	336	579	5	1

TABLE 22

Total Immigration, Showing Intended Occupation by Province of Destination, for the Fiscal Year Ended March 31, 1939

Intended Occupation	Totals	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon Territory	Northwest Territories
Farming class.....	2,076	58	11	45	337	667	374	136	333	115		
Clerical class.....	253	13		1	85	107	7	2	9	29		
Professional class.....	517	20	4	13	181	163	38	19	28	50		1
Merchant class.....	577	9	1	11	162	309	15	7	9	54		
Miscellaneous.....	257	8		2	114	93	5	10	9	16		
SKILLED WORKERS												
Skilled workers, n.e.s.....	178	5		1	41	96	7	1	7	20		
Bakers.....	9				2	5		1		2		
Barbers.....	35	1			12	17	1		2	2		
Blacksmiths.....	4				3	1						
Butchers.....	7	1			4	1				1		
Cabinetmakers.....	6				1	3	1	1				
Carpenters.....	30	6			5	15	1			3		
Dressmakers.....	16	2			3	8	1		1	1		
Engravers.....	1				1							
Engineers, locomotive.....	5	1			3	1						
Engineers, marine.....	12	7			2	2				1		
Engineers, stationary.....	3	1			1	1						
Electricians.....	12				6	4				2		
Fur workers.....	5				2	2				1		
Hat and cap workers.....	2				2							
Jewellers, goldsmiths, silversmiths.....	4				1	3						
Machinists.....	42		1		12	27		1		1		
Masons and bricklayers.....	12					10			1	1		
Millers.....	2					2						
Milliners.....	4					4						
Painters and glaziers.....	15	1				10	2			2		
Patternmakers.....	2				1	1						
Photographers.....	4				2	1			1			
Plasterers.....	4					1				3		
Plumbers.....	6				2	3	1					
Printers, pressmen and printing trades.....	4					3				1		
Shoemakers.....	7				3	3			1			
Seamstresses.....	5				1	3		1				
Stonecutters.....	1				1							
Sheet metal workers.....	2	1				1						
Tailors.....	14				3	8	2			1		
Tanners.....	3					3						
Textile workers, including weavers and spinners.....	22				4	15				3		
Tobacco workers, including cigarette and cigar makers.....	4				2	2						
Upholsterers.....	1				1							
Watch and clock makers.....	2				2							
Woodworkers, n.e.s.....	1			1								
Automobile mechanics.....	29	2			5	16				6		
Boilermakers.....	2					1	1					
Ironworkers, n.e.s.....	10				2	8						
Moulders.....	4					4						
UNSKILLED AND SEMI-SKILLED WORKERS												
Unskilled and semi-skilled, n.e.s.....	55	2		1	19	24	2			7		
Lumbermen.....	17	1				3				11	2	
Miners.....	36	1		2	4	14	1		1	11	1	1
Fishermen.....	25	21				1				3		
General labourers.....	91	2		8	21	40		2	7	11		
Manufacturing.....	33	1			7	22	1			2		
Construction.....	3					3						
Transportation.....	106	44			5	28	18	1	1			
Apprentices to skilled trades.....	13				1	3	7		2	8		
Domestic servants.....	930	179	1	9	201	348	64	16	57	54	1	
Dependent children.....	5,644	215	23	131	1,018	2,213	726	237	624	454	3	
Dependent wives.....	4,269	128	14	86	797	1,809	362	180	444	446	3	
Occupation not given.....	1,695	83	7	41	351	695	84	61	130	241	1	1
Totals.....	17,128	813	61	359	3,454	6,824	1,698	675	1,667	1,503	11	1

TABLE 23

*Immigration, Showing Nationality and Sex, for the Fiscal Year Ended
March 31, 1939*

Nationality	Via Ocean Ports					From the United States					Grand Totals
	Totals	18 Years and Over		Under 18 Years		Totals	18 Years and Over		Under 18 Years		
		M.	F.	M.	F.		M.	F.	M.	F.	
Albanian.....	6		5	1							6
Armenian.....	1		1								1
Austrian.....	22	5	10	3	4	2		2			24
Belgian.....	204	69	66	36	33	2	1	1			206
British.....	3,831	1,113	1,783	506	429	917	226	572	68	51	4,748
Bulgarian.....	18	1	9	5	3						18
Cuban.....	2	1	1								2
Czecho-Slovakian.....	1,950	349	629	514	458	4	1	1	1	1	1,954
Danish.....	40	20	17	2	1	1	1				41
Danzig.....	1		1								1
Dutch.....	158	51	45	34	28						158
Estonian.....	10	3	4	1	2						10
Finnish.....	52	11	24	9	8	1		1			53
French.....	90	32	39	10	9	10	1	9			100
German.....	326	115	123	40	48	17	12	5			343
Greek.....	124	4	64	37	19	1	1				125
Hungarian.....	375	21	161	100	93	1	1				376
Italian.....	306	21	122	90	73	4		4			310
Japanese.....	29	1	22	4	2						29
Jugo-Slavian.....	662	74	241	166	181						662
Latvian.....	10	4	3	1	2						10
Lithuanian.....	56	5	27	12	12						56
Luxemburg.....	2	1	1								2
Mexican.....	41			20	21						41
Norwegian.....	10	2	6	1	1	1		1			11
Polish.....	2,589	461	873	632	623	7	3	4			2,596
Roumanian.....	341	62	120	90	60	2		2			343
Russian.....	17	7	7	1	2	3	1	2			20
Spanish.....	1				1						1
Swedish.....	10	7	2		1	1	1				11
Swiss.....	132	52	32	29	19	4	3	1			136
Syrian.....	17	3	8	3	3						17
Turkish.....	2	1	1								2
U.S.A. Citizens.....	30	7	13	3	7	4,685	1,378	1,695	821	791	4,715
Totals.....	11,465	2,503	4,460	2,350	2,152	5,663	1,630	2,300	890	843	17,123

TABLE 24

Immigration from the United States, Showing State of Last Residence, by Intended Occupation and Sex, for the Fiscal Year 1938-9

State of Last Residence	Farming Class				Labouring Class				Mechanics				Trading and Clerical Classes				Mining Class				Female Domestic		Other Classes				
	18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years				
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.			
Alabama.....																											
Alaska.....	1																					2	5				
Arizona.....	4	3	3																				1	1			
Arkansas.....																											
California.....	23	11	4	3	8	5	3	1	13	6	3	3	21	17	4	3	2				5		36	104	39	33	
Colorado.....	4	3	1	1		1							3	2	4	3	2						2	8	4	1	
Connecticut.....	8	8	4	2	4	1	2	2	3	1	3		8	5			1				2		9	36	13	16	
District of Columbia.....																							3	1	1		
Florida.....	3	1			1				4	3	1		5	2	1	1							3	12	5	3	
Georgia.....	1	1											2										1	3			
Idaho.....	2				1				1	1	1						1				1		2	6	3	4	
Illinois.....	15	4	2	2	2	1	1	2	13	5	3		22	12	2	2	2				6		25	70	30	19	
Indiana.....	7	1	1	1					2	2			3	1									1	13	5	5	
Iowa.....	3	3	3						3	1			1									1	3	13	3		
Kansas.....	5	1	4	4					2	1			2										4	3	1		
Kentucky.....			1	1	1						1		2	2		3							1	8	3		
Louisiana.....																											
Maine.....	21	5	3	9	10	3	3	5	5	4		1	8	3	5	2					4		22	83	44	51	
Maryland.....	2								2	2			1	2										1	9	4	3
Massachusetts.....	43	24	9	11	12	1		4	14	9	2	1	26	14	7	2					11		54	172	91	92	
Michigan.....	46	25	21	15	15	5	2	4	56	20	4	5	68	32	4	8	3	1			14		50	227	116	121	
Minnesota.....	13	2	3	6	1	2			2	2	1	1	9	6	2	1					4		16	43	14	9	
Mississippi.....	1	1																									
Missouri.....	6	4	1						1	2			4	2	1							1		6	23	7	5
Montana.....	11	7	4	3					3				2						1			1		5	12	7	10
Nebraska.....	5	2	1	2																			4	3			1

IMMIGRATION BRANCH

TABLE 24—Concluded

Immigration from the United States, Showing State of Last Residence, by Intended Occupation and Sex, for the Fiscal Year 1938-9—Concluded

State of Last Residence	Farming Class				Labouring Class				Mechanics				Trading and Clerical Classes				Mining Class				Female Domestics		Other Classes			
	18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over	Under 18 Years	18 Years and Over	Under 18 Years	18 Years and Over	Under 18 Years	18 Years and Over		Under 18 Years	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Nevada.....	1																								1	1
New Hampshire.....	2	1			2		1	3	3	1	1	2		2						4		6	35	6	9	
New Jersey.....	1	1	1		3				12	5	2	3	17	9	3	3				1		12	44	18	13	
New Mexico.....	4	2	4	6																						
New York.....	38	14	21	12	32	8	9	7	49	21	9	4	134	54	16	11	1	1		22		94	349	102	117	
North Carolina.....	4																			1		1	4	6	3	
North Dakota.....	11	4	2	3	2	1	1	2	1	1			2	1		1					3	26	5	9		
Ohio.....	11	7	1		2				10	7		1	20	11	3					3		14	61	32	19	
Oklahoma.....	1	1		1					1	1		2	1											3	1	1
Oregon.....	14	9	3	5	3	2		1	1	1			9	4	3					1		6	25	16	8	
Pennsylvania.....	6	2	2		4				14	4			20	9	3	4				3	1	20	73	23	21	
Rhode Island.....	2	1		1	2	1							2	2						2		11	30	6	7	
South Carolina.....																								2	4	
South Dakota.....	2		1	1							1		2									2	3	3		
Tennessee.....					1																			1	4	1
Texas.....									3				1											1	7	1
Utah.....																	1					3	9	1		
Vermont.....	11	5	10	6	2				3				1	4						3		10	31	13	18	
Virginia.....	4	2							1		1						1							4	1	
Washington.....	20	5	5		9	4		2	13	11	1	2	18	5		1	2	1		6		18	85	27	28	
West Virginia.....	2												3	1	1							1	2	1	1	
Wisconsin.....	8	1							3	1	2	2	5	4								6	22	4	9	
Wyoming.....	1	1	1	2																				1		
Not given.....	1		1		1				2				2	1	1							3	6			
Totals.....	368	162	114	97	118	35	22	33	240	112	35	29	426	205	56	43	14	4		97	1	464	1,685	663	640	

TABLE 25

Immigration Via Ocean Ports, Showing Age Groups by Racial Origin, Sex and Literacy, for the Fiscal Year 1933-9

Racial Origin	10 to 14 Years		15 to 19 Years				20 to 24 Years				25 to 29 Years				30 to 39 Years				40 to 49 Years				50 Years and Over			
	Male		Female		Male		Female		Male		Female		Male		Female		Male		Female		Male		Female			
	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.		
Albanian.....			1		1		1			2					2			1					1			
Arabian.....	1		1							1								1					1			
Armenian.....													1								1		1	1		
Belgian.....	10		6		5		10		9		7		10		9		19	2	21		14		12			
Bohemian.....	1		1																			6		8		
British—																										
English.....	74		44		95		145	2	122		174	1	113		169		185		236		99		177			
Irish.....	5		8		17		27		29		32		37		34		41		34		21		27			
Scotch.....	27		13		30		13		29		37		29		52		62		83		28		59			
Welsh.....	1		2		1		1		4		4		6		2		6		11		6		3			
Bulgarian.....	3		1		1		2				6						4		4	2		1		1		
Croatian.....	47	1	37		17		15		1		11		1		22	1	4		64	5		7	1	1		
Czech.....	14		7		8		12		5		3		3		10		15		31		11		6			
Dalmatian.....							1																			
Dutch.....	16		7		5		8		6		5		8		10		18		15		7		7			
East Indian.....					5					5											1					
Estonian.....	1						1			1		1		2		2		2								
Finnish.....	4		2		5		5		1		6		3		7		6		6		4		1			
French.....	3		1		5		10		4		12		8		10		13		14		7		11			
German.....	36		34	1	23		26		10		26		34		40		48		68		20		26			
Greek.....	18		7		4		7				11		1		10				25	2	1		5			
Hebrew.....	25		38		24		27		17		23		25		31		62		61	1	56		46	1		
Italian.....	37		30		40		36		4		20		4		28		10		57	1	3		32	2		
Japanese.....	3				4		2				11		7		9				6		7		7			
Jugo-Slav.....	30		29		12		14		1		14		3		18		10		49		8		13			
Lettish.....	1																							2		
Lithuanian.....	3	1	2		1		3				6				9		1		6	1	1		1			
Magyar.....	68		62		44		57		4		25		12		38		13		98		8		31			
Maltese.....							1																			
Mexican.....					1														1							
Montenegrin.....			2																1	1						
Moravian.....	1									1											1					
Negro.....							1																			
Polish.....	74	1	63		56		39		6		32		15		26	1	25		106	2	12		24	3		
Portuguese.....																										
Roumanian.....	7		4		8		8				3		5		5		12		20		4		3			
Russian.....	11		8		4	1	6		2	1	2	2	3	2	1	3	11		10	8	5	4	5	1		
Ruthenian.....	183	2	164	3	110	2	137	1	22	1	55	2	75	1	79	15	115		232	52	46	2	77	25		
Scandinavian—																										
Danish.....			1		2		1		3		1		8		5		5		8		3		2			
Norwegian.....					1		1				3		1		2		4		1		1		2			
Swedish.....			1				1				1		2		2		1		2		3		1			
Serbian.....	9		12		10		7				4				1		1		8	3	1		4	1		
Slovak.....	131		122	2	110		71		9		34		48		91	1	108		214	2	34		59			
Spanish.....			1								1		2						1							
Swiss.....	6		2		2				3		3		5		2		13		9		3		3			
Syrian.....			1				3		1		1		1										2	1		
Totals.....	841	5	717	6	652	3	699	3	293	1	583	5	462	3	727	21	805	2	1,510	80	410	2	654	38		

TABLE 26

Immigration from the United States, Showing Age Groups by Racial Origin, Sex and Literacy, for the Fiscal Year 1938-9

Racial Origin	10 to 14 Years				15 to 19 Years				20 to 24 Years				25 to 29 Years				30 to 39 Years				40 to 49 Years				50 Years and Over																					
	Male		Female		Male		Female		Male		Female		Male		Female		Male		Female		Male		Female		Male		Female																			
	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.	Lit.	Ill.																		
Arabian.....														1					1																											
Armenian.....																			1																											
Belgian.....				1						2				1					1		3																									
Bohemian.....														1						2																										
British.....														1																																
British—																																														
English.....	62			63				50				55			51			91			59			109			141			181			110			127			156			193				
Irish.....	30			26				22				27			22			26			46			45			88			45			41			53			67							
Scotch.....	27			34				20				23			11			19			22			28			67			37			43			74			91							
Welsh.....	1			1								1			3			7			7			4			6			1			8			7			6							
Bulgarian.....																																														
Croatian.....																																														
Czech.....																																														
Dutch.....	10			6				1				5			4			11			6			6			14			14			5			3			10			15				
Finnish.....																																														
French.....	37			41				26				81			24			65			30			49			59			74			35			52			40			2	59			1
German.....	18			15				8				17			9			37			17			43			44			75			43			33			36			34				
Greek.....																																														
Hebrew.....	3			2				4				7			13			28			17			30			37			29			25			17			11			8				
Italian.....	1			1				1				1			3			5			2			9			3			6			3			1			5			4				
Jugo-Slav.....																																														
Lithuanian.....																																														
Magyar.....																																														
Maltese.....																																														
Negro.....	2			1				2																																						
North American Indian.....																																														
Polish.....	1			1																																										
Portuguese.....																																														
Roumanian.....																																														
Russian.....	1																																													
Ruthenian.....																																														
Scandinavian—																																														
Danish.....	2																																													
Icelandic.....																																														
Norwegian.....	2			1																																										
Swedish.....	2			2				2				1			4			7			3			3			8			10			10			8			10			7				
Serbian.....																																														
Slovak.....	2																																													
Spanish.....																																														
Swiss.....	1																																													
Syrian.....	1			1																																										
Totals.....	203			200				137				236			157			329			213			332			448			601			339	1	371			418	2	493	1					

TABLE 27

Immigration Via Ocean Ports, Showing Language of Immigrants 10 Years and Over by Origin, for the Fiscal Year 1938-9

Origin	Totals																																			
		French	English	German	Norwegian	Swedish	Flemish	Dutch	Danish	Finnish	Esthonian	Lettish	Lithuanian	Russian	Hebrew	Ruthenian Rusniak Ukrainian	Polish	Roumanian	Slovenian	Croat (Serbian)	Czech (Bohemian)	Hungarian (Magyar)	Italian	Spanish	Greek	Albanian	Turkish	Bulgarian	Japanese	East Indian	Armenian (Arassio)	Syrian (Arabic)				
Albanian	9															3									1	5										
Arabian	4		3																																	
Armenian	5		1																									1						2	1	
Belgian	148	27	3	1			117																													
Bohemian	2																					2														
British—																																				
English	1,978		1,978																																	
Irish	351		351																																	
Scotch	563		563																																	
Welsh	59		59																																	
Bulgarian	24																																			
Croatian	227			3													6	1			21	1	1	4	6				17							
Czech	132		1	2												12	1			12	12	101	4													
Dalmatian	1																																			
Dutch	134		11	17							106										1															
East Indian	11																																			
Esthonian	10										10																									
Finnish	51		3			8				44	1																									
French	116	96	16																																	
German	427		17	353													28	15		4	7	2	1	1												
Greek	103																																			
Hebrew	538	3	59	210							9			4	5	71																				
Italian	323		4																																	
Japanese	42																																			
Jugo-Slav	204	2																			1	72														
Lettish	4		1	1								2																								
Lithuanian	35												35																							
Magyar	476		3	11																		5	11	434	2											
Maltese	1		1																																	
Mexican	2		1																																	
Montenegrin	5																																			
Moravian	5																																			
Negro	6		6																																	
Polish	504	1		3										1			4	493																		
Portuguese	1		1																																	
Roumanian	81			3										1								56	2													
Russian	94	1	7	5									1	11								2	2	1												
Ruthenian	1,469			1										4			62	30				16	2	2	1											

TABLE 27—Concluded

Immigration Via Ocean Ports, Showing Language of Immigrants 10 Years and Over by Origin, for the Fiscal Year 1938-9
—Concluded

Origin	Totals	French	English	German	Norwegian	Swedish	Flemish	Dutch	Danish	Finnish	Estonian	Lettish	Lithuanian	Russian	Hebrew	Ruthenian	Rusniak	Ukrainian	Polish	Roumanian	Slovenian	Croat (Serbian)	Czech (Bohemian)	Hungarian (Magyar)	Italian	Spanish	Greek	Albanian	Turkish	Bulgarian	Japanese	East Indian	Armenian (Aramaic)	Syrian (Arabic)		
		Scandinavian—																																		
Danish.....	46		8					1	37																											
Norwegian.....	19		6	1	12																															
Swedish.....	15		5			10																														
Serbian.....	61																				5		55		1											
Slovak.....	1,109			4													8		1	5		45	1,043	3												
Spanish.....	5	1																								4										
Swiss.....	58	10	1	46																			1													
Syrian.....	13	1																																	13	
Totals.....	9,471	142	3,109	661	12	13	120	116	37	44	11	2	41	22	71	696	1,447	140		1	429		1,362	461	326	6	109	6	1	17	42	11	2	14		

TABLE 28

Immigration from the United States, Showing Language of Immigrants 10 Years and Over by Origin, for the Fiscal Year 1938-9

Origin	Totals																							
		French	English	German	Norwegian	Swedish	Icelandic	Finnish	Dutch	Danish	Finnish	Russian	Hebrew	Ruthenian Rusniak Ukrainian	Polish	Roumanian	Croat (Serbian)	Czech (Bohemian)	Hungarian (Magyar)	Italian	Spanish	Greek	Syrian (Arabic)	
Arabian	2		2																					
Armenian	1		1																					
Belgian	13	1	6					6																
Bohemian	7		6																					
British—																								
English	1,448		1,448																					
Irish	565		565																					
Scotch	550		550																					
Welsh	52		52																					
Croatian	3		3																					
Czech	4		2												1			1						
Dutch	110		109						1															
Finnish	13		9							4														
French	676	449	227																					
German	429		386	43																				
Greek	10		6																				4	
Hebrew	231		204	10									15		1				1					
Italian	45		34																	11				
Jugo-Slav	3		3																					
Lithuanian	4		4																					
Magyar	17		11															6						
Maltese	2		2																					
Negro	22		21																			1		
North American Indian	8		8																					
Polish	59		47																					
Portuguese	2		2																					
Roumanian	1																							
Russian	11		8	1								2												
Ruthenian	13		7											6										
Scandinavian—																								
Danish	29		26							3														
Icelandic	5		4					1																
Norwegian	73		69		4																			
Swedish	77	1	66			10																		
Serbian	4		4																					
Slovak	18		13																					
Spanish	4		4																					
Swiss	13	1	9	3																				
Syrian	7		5																					2
Totals	4,531	452	3,923	57	4	10	1	6	1	3	4	3	15	6	14	1	1	5	7	11	1	4	2	

TABLE 29

Immigration Via Ocean Ports, Showing Conjugal Condition by Age Groups and Sex, for the Fiscal Year 1938-9

Age Groups	Males					Females				
	Married	Single	Widowed	Divorced	Totals	Married	Single	Widowed	Divorced	Totals
Years 0-14.....		1,858			1,858		1,705			1,705
" 15-19.....	3	652			655	60	642			702
" 20-24.....	41	253			294	221	363	1	3	588
" 25-29.....	210	253	1	1	465	457	282	5	4	748
" 30-39.....	645	155	3	4	807	1,302	257	21	10	1,590
" 40-49.....	353	51	6	2	412	506	122	55	9	692
50 years and over....	269	28	64	1	362	238	64	279	6	587
Totals.....	1,521	3,250	74	8	4,853	2,784	3,435	361	32	6,612

TABLE 30

Immigration from the United States, Showing Conjugal Condition by Age Groups and Sex, for the Fiscal Year 1938-9

Age Groups	Males					Females				
	Married	Single	Widowed	Divorced	Totals	Married	Single	Widowed	Divorced	Totals
Years 0-14.....		805			805		730			730
" 15-19.....		137			137	61	174		1	236
" 20-24.....	33	124			157	224	104		1	329
" 25-29.....	108	103		2	213	306	64	4	8	382
" 30-39.....	327	96	12	13	448	487	70	21	23	601
" 40-49.....	284	44	6	6	340	264	44	51	12	371
50 years and over....	306	43	61	10	420	232	51	199	12	494
Totals...	1,058	1,352	79	31	2,520	1,574	1,237	275	57	3,143

TABLE 31

Rejections at Ocean Ports, Showing Nationality and Sex, for the Fiscal Year 1938-9

Nationality	Totals	18 Years and Over		Under 18 Years	
		Male	Female	Male	Female
African (not British).....	3	3			
Austrian.....	4	3	1		
Belgian.....	3	1	1		1
British.....	94	66	21	4	3
Czecho-Slovakian.....	2	2			
Danish.....	4	2	1	1	
Dutch.....	5	3	2		
Estonian.....	3	2	1		
Finnish.....	3	2	1		
French.....	5	4	1		
German.....	4	4			
Greek.....	1	1			
Hungarian.....	5	5			
Japanese.....	3	2		1	
Jugo-Slavian.....	2	2			
Mexican.....	3	2			1
Persian.....	1	1			
Polish.....	6	5	1		
Roumanian.....	5	2	2		1
Russian.....	4	4			
South American.....	2	2			
Spanish.....	2	2			
Swedish.....	1	1			
Swiss.....	3	1	1	1	
U.S.A. Citizens.....	9	5	3		1
Totals.....	177	127	36	7	7

Origin, Sex, Occupation, and Destination of Immigrant Arrivals

Racial Origin	Sex				Totals	Trade or								
	18 Years and Over		Under 18 Years			Farming Class			Labouring Class			Mechanics		
	Males	Females	Males	Females		Males	Females	Children	Males	Females	Children	Males	Females	Children
Albanian.....		7	2	1	10		1	2						
Arabian.....	1	1	1	1	4									
Armenian.....	1	3		1	5									
Belgian.....	63	64	32	28	187	54	37	49				2	1	
Bohemian.....			1	1	2									
British—														
English.....	678	1,069	263	237	2,247	170	60	74	104	14	26	126	58	28
Irish.....	149	167	26	45	387	70	7	11	12			19	6	4
Scotch.....	190	301	98	76	665	38	11	44	26	6	10	42	19	18
Welsh.....	27	28	10	9	74	4	2	4	2			6		
Bulgarian.....		14	9	6	29									
Croatian.....	7	122	68	68	265	7	5	11			1			
Czech.....	39	53	46	31	169	38	32	64						
Dalmatian.....		1			1									
Dutch.....	52	51	74	60	237	46	30	64				1		
East Indian.....		6	7	1	14						2		1	
Estonian.....	3	6	1	2	12	3	4	3					1	
Finnish.....	10	28	10	10	58	6	3	3	3	2	1			
French.....	43	62	17	16	138	11	6	8	4			3	1	1
German.....	130	193	134	129	586	94	73	168	2	2		3	2	4
Greek.....	5	68	36	18	127	2	1		2				1	
Hebrew.....	211	224	85	101	621	41	26	30	5	2	2	23	16	8
Italian.....	29	163	99	74	365	3		1	10	4	7	3	2	1
Japanese.....	1	35	7	3	46		1	2	1	2	1			
Jugo-Slavian.....	26	96	63	65	250	23	18	34			6			
Lettish.....	1	2	1		4							1		
Lithuanian.....	1	24	7	7	39	1	1	4		1	1			
Magyar.....	47	222	134	129	532	39	26	62		1	2	2	3	1
Maltese.....		1			1									
Mexican.....	1	1			2									
Montenegrin.....		3		5	8									
Moravian.....	2	2	2	3	9	2	2	5						
Negro.....	1	4		2	7									
Polish.....	71	220	156	139	586	63	43	109	1	1	2	3	1	
Portuguese.....		1			1									
Roumanian.....	24	32	19	27	102	24	17	35						
Russian.....	27	40	36	31	134	23	16	44				1	1	
Ruthenian.....	316	605	467	449	1,837	307	263	508		1	5			1
Scandinavian—														
Danish.....	24	21	2	2	49	18	5	2				1		
Norwegian.....	6	11	1	3	21	1			2	1		1		
Swedish.....	9	5		1	15	2	2		4			1	1	1
Serbian.....	4	21	22	23	70	3	2	9				1		
Slovak.....	270	453	394	333	1,450	264	199	424	2	1	9	1	1	
Spanish.....	2	2		2	6				1					
Swiss.....	26	20	17	9	75	24	12	21	1					
Syrian.....	3	8	3	4	18	1		1	1					
Totals.....	2,503	4,460	2,350	2,152	11,465	1,382	905	1,796	183	38	75	240	115	67

at Ocean Ports, for the Fiscal Year Ended March 31, 1939

Occupation											Destination										
Trading and Clerical Classes			Mining Class			Female Domestic Servants		Other Classes			Nova Scotia	New Brunswick	Prince Edward Island	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon Territory	Northwest Territories
Males	Females	Children	Males	Females	Children	18 Years and Over	Under 18 Years	Males	Females	Children											
									6	1			2	5	3						
1									1	2			1						3		
1		1				1			2					4	1						
1						6	1	6	20	10	1		42	141		2	1				
										2				2							
108	88	47	12	2		331	36	158	516	289	328	28	2	334	887	90	44	98	436		
20	10	7				66	8	28	78	41	36	5	1	56	187	13	12	23	52	2	
34	27	21	3			93	5	47	145	76	27	7		131	324	43	16	25	90	1	
5	1	3				3		10	22	12	5	1		17	31	2	2	5	11		
									14	15				3	26						
				1	1	1	1		115	122	3			25	118	12	7	23	75	2	
						4	3	1	17	10				30	42	74	4	18	1		
									1					1							
	3	1				4	3	5	14	66	19	6	3	36	54	65	4	42	8		
									5	6											
						1								7	3			2			
						10	1	1	13	15				9	42	2		1	4		
6	8	7				9	1	19	38	16	10			102	18	3		2	2	1	
10	6	4				15	3	21	95	84	9	2	1	120	136	124	47	111	36		
						2		1	64	54				10	111		1	2	3		
64	34	43				19	11	78	127	92	18	1		359	187	19	16	9	12		
4	1		2	1	1	9	4	7	146	169	4			83	228	5	1	6	37	1	
									32	7									46		
						4	5	2	74	83				59	108	29	7	15	32		
									2	1				1	2	1					
	1					2	2		18	7				17	8	7	4	3			
1					1	14	2	5	178	195	3			67	325	14	8	104	11		
									1					1							
	1							1						1					1		
									3	5				5					3		
															6	3					
						2		1	2	2				6	1						
1	1	2		1	1	12	13	3	161	188		1		67	258	99	65	93	3		
	1													1							
						1			15	10				61	27	3		10	1		
2	1	2				1	2	1	21	19				8	31	43	5	36	11		
						27	41	9	314	361	12			171	345	461	255	562	31		
2	2	1				4		3	10	1	10			13	6	4	2	8	6		
1									10	4		1		3	4	1	1	5	6		
									1	2				2	5		1	2	5		
									19	36				18	48			1	3		
						18	29	3	234	265	2			302	632	341	23	119	31		
								1	2	2				2	2			1	1		
1								3	8	5				42	13	4	4	3	9		
1	1	2				2			5	4	2			12	3			1			
263	186	141	20	6	4	660	172	415	2,550	2,247	489	52	7	2,225	4,372	1,466	531	1,331	984	6	2

TABLE

Origin, Sex, Occupation, and Destination of Immigrant Arrivals

Racial Origin	Sex				Totals	Trade or								
	18 Years and Over		Under 18 Years			Farming Class			Labouring Class			Mechanics		
	Males	Females	Males	Females		Males	Females	Children	Males	Females	Children	Males	Females	Children
Arabian.....	2				2									
Armenian.....		1			1									
Belgian.....	7	5		3	15	5	2							
Bohemian.....	3	4	2	1	10	2	2						1	
British—														
English.....	532	729	304	259	1,824	109	44	62	29	12	14	86	36	22
Irish.....	201	283	129	113	726	50	17	27	18	2	5	19	16	6
Scotch.....	205	257	127	118	707	46	23	21	14	4	11	37	10	12
Welsh.....	23	27	5	5	60	2	3		1	1		5	1	
Croatian.....		2		1	3									
Czech.....	2	1		1	4	1		1						
Dutch.....	40	52	26	21	139	14	7	12		2		7	3	1
Finnish.....	2	11	1		14	2	2			1				
French.....	205	342	140	173	860	61	29	46	34	6	18	22	12	6
German.....	152	231	65	59	507	35	15	19	7	2	4	24	10	8
Greek.....	7	2		1	10				1			1		
Hebrew.....	104	117	27	21	269	1			5	1	1	18	6	5
Italian.....	17	26	8	7	58				3	1		5	3	
Jugo-Slavian.....	1	2			3									
Lithuanian.....		4	1	1	6									
Magyar.....	5	12	3	2	22	2	1					1		
Maltese.....	1	1	1	2	5	1	1	3						
Negro.....	6	11	4	3	24	1	1		2					
North American Indian.....	1	5		7	13							1	1	2
Polish.....	17	38	7	6	68	4	3	8	1	1		3	2	
Portuguese.....	1	1			2									
Roumanian.....		1		1	2									
Russian.....	4	6	1	3	14	1						2		
Ruthenian.....	5	7	3	4	19	3	1	2				1		
Scandinavian—														
Danish.....	12	14	5	3	34	4	3	3				1		
Icelandic.....	4		1	3	8	1						1		
Norwegian.....	27	41	8	8	84	10	5	2	1	1		2	5	2
Swedish.....	32	39	9	10	90	9	2	4	1			2	4	
Serbian.....	1	3	1		5	1	1	1						
Slovak.....	3	13	2	1	19	1			1	1	2	1	1	
Spanish.....	2	2			4	1								
Swiss.....	5	6	7	4	22	1						1	1	
Syrian.....	1	4	3	2	10									
Totals.....	1,630	2,300	890	843	5,663	368	162	211	118	35	55	240	112	64

from the United States, for the Fiscal Year Ended March 31, 1939

Occupation										Destination											
Trading and Clerical Classes			Mining Class			Female Domestic Servants		Other Classes			Nova Scotia	New Brunswick	Prince Edward Island	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon Territory	Northwest Territories
Males	Females	Children	Males	Females	Children	18 Years and Over	Under 18 Years	Males	Females	Children											
2														2							
									1									1			
								2	3	3			2	11		1					
								1	1	3				6		2	1				
152	66	43	4	2		30		152	539	422	126	135	16	239	906	50	25	98	227	2	
56	24	11	3	1		13		55	210	193	54	47	23	97	329	30	20	51	75		
40	24	13	2			13		66	183	188	79	30	13	77	317	23	17	49	101	1	
8	3							7	19	10	5	1		5	33	4		5	7		
									1	2					3						
									1	1					3						
7	7	3	2			2		10	31	31	11	4		1	1	2					
						2			6	1	1				46	20	3	23	24		
						2			6	1	1				7			1	5		
24	20	7				18		64	257	236	25	68	1	590	130	11	8	13	14		
34	25	3		1		7		52	171	90	13	5		52	293	30	25	35	54		
5									2	1				4	4	1			1		
63	17	9	2			1		15	92	33	4	10		103	120	6	3	3	20		
8	6	5						1	16	10		1		13	42			1	1		
			1						2						1				2		
									4	2	1				2	2	1				
1	1							1	10	5				2	18	1			1		
															5						
1	1					3		2	6	7		1		6	13			3	1		
									4	5					10				3		
3	1	1				2		6	29	4	1			8	35	16		8			
1									1						1				1		
									1	1					2						
	1							1	5	4				1	6	1	3		3		
								1	6	5				1	9	8			1		
6	1							1	10	5	1	1		3	9			11	9		
									2	4									1		
5	3					5		9	22	12	2			1	19	9	21	15	15	2	
6	4	4						14	29	11	1	4		5	31	12	12	14	11		
									2						2						
									11	1					3						
									2						3						
1									2				1		2				1		
2	1							1	4	11				2	15		1	1	2	1	
1						1			3	5				3	7						
426	205	99	14	4		97	1	464	1,685	1,303	324	307	54	1,229	2,452	232	144	336	579	5	1

Origin, Sex, Occupation, and Destination of Total Immigrant

Racial Origin	Sex				Totals	Trade or								
	18 Years and Over		Under 18 Years			Farming Class			Labouring Class			Mechanics		
	Males	Females	Males	Females		Males	Females	Children	Males	Females	Children	Males	Females	Children
Albanian.....		7	2	1	10		1	2						
Arabian.....	3	1	1	1	6									
Armenian.....	1	4		1	6									
Belgian.....	70	69	32	31	202	59	39	49				2		1
Bohemian.....	3	4	3	2	12	2	2							1
British—														
English.....	1,210	1,798	567	496	4,071	279	104	136	133	26	40	212	94	50
Irish.....	350	450	155	158	1,113	120	24	38	30	2	5	38	22	10
Scotch.....	395	558	225	194	1,372	84	34	65	40	10	21	79	29	30
Welsh.....	50	55	15	14	134	6	5	4	3	1		11		1
Bulgarian.....		14	9	6	29									
Croatian.....	7	124	68	69	268	7	5	11			1			
Czech.....	41	54	46	32	173	39	32	65						
Dalmatian.....		1			1									
Dutch.....	92	103	100	81	376	60	37	76		2		8	3	1
East Indian.....		6	7	1	14						2			1
Estonian.....	3	6	1	2	12	3	4	3						1
Finnish.....	12	39	11	10	72	8	5	3	3	3	1			
French.....	248	404	157	189	998	72	35	54	38	6	18	25	13	7
German.....	282	424	199	188	1,093	129	88	187	9	4	4	27	12	12
Greek.....	12	70	36	19	137	2	1		3			1		1
Hebrew.....	315	341	112	122	890	42	26	30	10	3	3	41	22	13
Italian.....	46	189	107	81	423	3		1	13	5	7	8	5	1
Japanese.....	1	35	7	3	46		1	2	1	2	1			
Jugo-Slavian.....	27	98	63	65	253	23	18	34			6			
Lettish.....	1	2	1		4							1		
Lithuanian.....	1	28	8	8	45	1	1	4		1	1			
Magyar.....	52	234	137	131	554	41	27	62		1	2	3	3	1
Maltese.....	1	2	1	2	6	1	1	3						
Mexican.....	1	1			2									
Montenegrin.....		3		5	8									
Moravian.....	2	2	2	3	9	2	2	5						
Negro.....	7	15	4	5	31	1	1		2					
North American Indian.....	1	5		7	13							1	1	2
Polish.....	88	258	163	145	654	67	46	117	2	2	2	6	3	
Portuguese.....	1	2			3									
Roumanian.....	24	33	19	28	104	24	17	35						
Russian.....	31	46	37	34	148	24	16	44				3	1	
Ruthenian.....	321	612	470	453	1,856	310	264	510		1	5	1		1
Scandinavian—														
Danish.....	36	35	7	5	83	22	8	5				2		
Icelandic.....	4		1	3	8	1						1		
Norwegian.....	33	52	9	11	105	11	5	2	3	2		3	5	2
Swedish.....	41	44	9	11	105	11	4	4	5			3	5	1
Serbian.....	5	24	23	23	75	4	3	10				1		
Slovak.....	273	466	396	334	1,469	265	199	424	3	2	11	2	2	
Spanish.....	4	4		2	10	1			1					
Swiss.....	34	26	24	13	97	25	12	21	1			1	1	
Syrian.....	4	12	6	6	28	1		1	1					
Totals.....	4,133	6,760	3,240	2,995	17,128	1,750	1,067	2,007	301	73	130	480	227	131

Arrivals, for the Fiscal Year Ended March 31, 1939

Occupation									Destination													
Trading and Clerical Classes			Mining Class			Female Domestic Servants		Other Classes			Nova Scotia	New Brunswick	Prince Edward Island	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon Territory	Northwest Territories	
Males	Females	Children	Males	Females	Children	18 Years and Over	Under 18 Years	Males	Females	Children												
									6	1				2	5	3						
3									1	2				1	2					3		
1		1				1			3					4	1			1				
1						6	1	8	23	13	1		44	152		3	2					
								1	1	5				8		2	1					
260	154	90	16	4		361	36	310	1,055	711	454	163	18	573	1,793	140	69	196	663	2		
76	34	18	3	1		79	8	83	288	234	90	52	24	153	516	43	32	74	127	2		
74	51	34	5			106	5	113	328	264	106	37	13	208	641	66	33	74	191	1	2	
13	4	3				3		17	41	22	10	2		22	64	6	2	10	18			
									14	15				3	26							
					1	1			117	122	3			25	121	12	7	23	75	2		
						4	3	2	18	10				31	43	76	4	18	1			
7	10	4	2			6	3	15	45	97	30	10	3	44	100	85	7	65	32			
									5	6												
						1								7	3			2				
						12	1	1	19	16	1			9	49	2		2	9			
30	28	14				27	1	83	295	252	35	68	1	692	148	14	8	15	16		1	
44	31	7		1		22	3	73	266	174	22	7	1	172	429	154	72	146	90			
5						2		1	66	55				14	115	1	1	2	4			
127	51	52	2			20	11	93	219	125	22	11		462	307	25	19	12	32			
12	7	5	2	1	1	9	4	8	162	169	4	1		96	270	5	1	7	38	1		
									32	7									46			
			2			4	5	2	76	83				59	109	29	7	15	34			
									2	1				1	2	1						
	1			1		2	2		22	9	1			17	10	9	5	3				
2	1			1		14	2	6	188	200	3			69	343	15	8	104	12			
									1													
	1							1		3	5			1						1		
																					3	
															6							
1	1					5		3	8	9		1		12	14			3	1			
									4	5				10						3		
4	2	3		1	1	14	13	9	190	172	1	1		75	293	115	65	101	3			
1	1								1					1	1							
							1		16	11				61	29	3		10	1			
2	2	2				1	2	2	26	23				9	37	44	8	36	14			
						27	41	10	320	366	12			172	354	469	255	562	32			
8	3	1				4		4	20	6	11	1		16	15	4	2	19	15			
								2		4						6	1	1				
6	3		1			5		9	32	16	2	1		4	23	10	22	20	21	2		
6	4	4	1					15	31	11	1	4		7	36	12	13	16	16			
									21	36				21	50				1	3		
						18	29	3	245	266	2			305	647	341	24	119	31			
1								1	4	2			1	2	4				1	2		
3	1							4	12	16				44	28	4	5	4	11	1		
2	1	2				3			8	9	2			15	10			1				
689	391	240	34	10	4	757	173	879	4,235	3,550	813	359	61	3,454	6,824	1,698	675	1,667	1,563	11	3	

TABLE

Immigration Via Ocean Ports, Showing Origin

Racial Origin	Totals	Albanian	Armenian	Austrian	Belgian	British	Bulgarian	Cuban	Czecho-Slovakian	Danish	Danzig	Dutch	Esthonian
Albanian.....	10	6				1							
Arabian.....	4					4							
Armenian.....	5		1			2							
Belgian.....	187				178	5							
Bohemian.....	2								2				
British—													
English.....	2,247					2,229						1	
Irish.....	387					386							
Scotch.....	665					665							
Welsh.....	74					74							
Bulgarian.....	29					2	16						
Croatian.....	265					11			1				
Czech.....	169					2			122				
Dalmatian.....	1												
Dutch.....	237					51						143	
East Indian.....	14					14							
Esthonian.....	12					2							10
Finnish.....	58					8							
French.....	138				24	34		1				1	
German.....	586			14	2	76			27				
Greek.....	127					8							
Hebrew.....	621			8		93			52		1	12	
Italian.....	365					61		1					
Japanese.....	46					17							
Jugo-Slavian.....	250					5			156				
Lettish.....	4					1							
Lithuanian.....	39					1							
Magyar.....	532					8			64				
Maltese.....	1					1							
Mexican.....	2					2							
Montenegrin.....	8												
Moravian.....	9								9				
Negro.....	7					6							
Polish.....	586					8							
Portuguese.....	1					1							
Roumanian.....	102					1							
Russian.....	134					13			4				
Ruthenian.....	1,837					9			163				
Scandinavian—													
Danish.....	49					5				40		1	
Norwegian.....	21					6							
Swedish.....	15					1							
Serbian.....	70												
Slovak.....	1,450					10			1,350				
Spanish.....	6					3	2						
Swiss.....	75					3							
Syrian.....	18					2							
Totals.....	11,465	6	1	22	204	3,831	18	2	1,950	40	1	158	10

by Nationality, for the Fiscal Year 1938-9

Finnish	French	German	Greek	Hungarian	Italian	Japanese	Jugo-Slavian	Latvian	Lithuanian	Luxemburg	Mexican	Norwegian	Polish	Roumanian	Russian	Spanish	Swedish	Swiss	Syrian	Turkish	U.S.A. Citizens	
													3									1
	3									1										1	1	
	1	2																	1			13
			6				4							1								1
					4		239						9									1
							29						16									
							1															
		1									37				1							4
49																						
	77														1				1			
		131		11	1		40	1		1	4		147	78	1				51			1
	7	185	118	11				6	17				179	38	6				5		1	1
					301														2			
						29																
							87									2						
								3														
		3		352			55		38						49							1
								8														
																						1
		1											576	1								
	2	2					52		1				103	4	5							
							5						1,555	105								
																						3
3		1										10			1							3
				1			56							13			10					1
							86						1	3		1						
																			72			
																				16		
52	90	326	124	375	306	29	662	10	56	2	41	10	2,589	341	17	1	10	132	17	2	30	

TABLE

Immigration from the United States, Showing Racial

Racial Origin	Totals	Austrian	Belgian	British	Czecho-Slovakian	Danish
Arabian.....	2					
Armenian.....	1					
Belgian.....	15		2	3		
Bohemian.....	10			1		
British--						
English.....	1,824			377		
Irish.....	726			104		
Scottish.....	707			138		
Welsh.....	60			15		
Croatian.....	3					
Czech.....	4			2	1	
Dutch.....	139			17		
Finnish.....	14			1		
French.....	860			57		
German.....	507	1		67		
Greek.....	10			1		
Hebrew.....	269	1		40		
Italian.....	58			8		
Jugo-Slavian.....	3					
Lithuanian.....	6			4		
Magyar.....	22			8		
Maltese.....	5			1		
Negro.....	24			2		
North American Indian.....	13					
Polish.....	68			15		
Portuguese.....	2			1		
Roumanian.....	2			1		
Russian.....	14			5		
Ruthenian.....	19			7		
Scandinavian--						
Danish.....	34			3		1
Icelandic.....	8					
Norwegian.....	84			8		
Swedish.....	90			17		
Serbian.....	5					
Slovak.....	19			8	3	
Spanish.....	4			1		
Swiss.....	22			4		
Syrian.....	10			1		
Totals.....	5,663	2	2	917	4	1

Origin by Nationality, for the Fiscal Year 1938-9

Finish	French	German	Greek	Hungarian	Italian	Norwegian	Polish	Roumanian	Russian	Swedish	Swiss	U.S.A. Citizens
												2
												1
												10
												9
												1,447
												622
												569
												45
												3
												1
												122
1												12
	10											793
		8					1	1	1		1	427
			1									8
		9					2		1		1	215
					4							46
												3
												2
				1								13
												4
												22
												13
							4					49
												1
												1
									1			8
												12
												30
												8
						1						75
										1		72
								1				4
												8
												3
											2	16
												9
1	10	17	1	1	4	1	7	2	3	1	4	4,685

Immigration, Via Ocean Ports, Showing Intended

Intended Occupation	Totals	Bohemian	Moravian	Slovak	Hebrew	Arabian	English	Irish	Scottish	Welsh	Mexican	Croatian	Dalmatian	Montenegrin	Serbian	Belgian	Bulgarian	Czech	
Farming class.....	1,677		2	318	42		210	75	67										
Clerical class.....	124				7	1	72	7	25			10			6	57			40
Professional class.....	287				52		107	20	19										
Merchant class.....	213				65		79	17	24										
Miscellaneous.....	89				11		34	12	9										
SKILLED WORKERS																			
Skilled workers, n.e.s.....	77				4		47	8	8	3								1	
Bakers.....	5						2		3										
Barbers.....	17				2		8		3	1									
Blacksmiths.....	1						1		1										
Butchers.....	4			1			2												
Cabinetmakers.....	3				1		1	1											
Carpenters.....	20						15	1	4	1									
Dressmakers.....	11				1		4	1	2										
Engineers, locomotive.....	2						2	1	2										
Engineers, marine.....	11						5	1	5										
Engineers, stationary.....	3						1	1	2										
Electricians.....	4				1		2		1										
Fur workers.....	2				1		1												
Hat and cap makers.....	1																		
Jewellers, goldsmiths, silversmiths.....	2				1		1												
Machinists.....	18				1		11		4										
Masons and bricklayers.....	9						7		2										
Millers.....	1																		
Milliners.....	4					3	1												
Painters and glaziers.....	7						4		1										
Patternmakers.....	1						1												
Photographers.....	2				1		1												
Plasterers.....	4						4												
Plumbers.....	3						1	1	1										
Printers, pressmen and printing trades.....	1						1												
Shoemakers.....	5						1			1									
Seamstresses.....	5				1		1		1										
Sheet metal workers.....	2						2												
Tailors.....	12				7		2												
Tanners.....	2						2												
Textile workers, including weavers and spinners.....	14				2		5	2	4								1		
Tobacco workers, includ- ing cigarette, cigar makers.....	3				2			1											
Upholsterers.....	1																		
Watch and clock makers.....	2				2														
Automobile mechanics.....	10						6	2	2										
Boilermakers.....	1						1												
Iron workers, n.e.s.....	5						1	1	3										
UNSKILLED AND SEMI- SKILLED WORKERS																			
Unskilled and semi-skilled, n.e.s.....	38				1		19	3	8	1									
Lumbermen.....	8						2	2	1										
Miners.....	21						13		3										
Fishermen.....	25						23	1											
General labourers.....	54			9	2		7	2	11			1							
Manufacturing.....	11				1		9												
Construction.....	2						1												
Transportation.....	70						51	4	6	1									
Apprentices to skilled trades.....	8				1		5		2										7
Domestic servants.....	832				47	30	367	74	98	3		2							
Dependent children.....	3,975	2	5	635	173	2	415	53	135	17		130		5	42	56	15	70	7
Dependent wives.....	2,738		2	397	136	1	350	56	104	9	1	95		2	17	47	9	45	7
Occupation not given.....	1,044			43	70		340	40	107	17	1	27	1	1	4	14	5	7	
Totals.....	11,465	2	9	1,450	621	4	2,247	387	665	74	2	265	1	8	70	187	29	169	

Immigration from the United States, Showing Intended

Intended Occupation	Totals												
		Bohemian	Slovak	Hebrew	Arabian	English	Irish	Scotch	Welsh	North American Indian	Croatian	Serbian	Belgian
Farming class.....	399	2	1	1	1	122	55	52	2			1	5
Clerical class.....	129			6		37	25	19	4				
Professional class.....	250	1		5		69	23	23	4				1
Merchant class.....	364			59	2	136	42	31	5				
Miscellaneous.....	174		1	7		30	19	9	2				1
SKILLED WORKERS													
Skilled workers, n.e.s.....	101		1	7		38	7	12	2				
Bakers.....	4					3		1					
Barbers.....	18			1		4	3						
Blacksmiths.....	3					1							
Butchers.....	3			1		1		1					
Cabinetmakers.....	3					1		1					
Carpenters.....	10					2		5					
Dressmakers.....	5					2		1					
Engravers.....	1			1									
Engineers, locomotive.....	3						1	1					
Engineers, marine.....	1					1							
Electricians.....	8					4	1	1					
Fur Workers.....	3			3									
Hat and cap makers.....	1			1									
Jewellers, goldsmiths, silversmiths.....	2			1		1							
Machinists.....	24					11	2	5					
Masons and bricklayers.....	3					1		1	1				
Millers.....	1							1					
Painters and glaziers.....	8			1		2	1	2					
Patternmakers.....	1					1							
Photographers.....	2					1		1					
Plumbers.....	3					1							
Printers, pressmen and printing trades.....	3					2	1						
Shoemakers.....	2												
Stonecutters.....	1												
Tailors.....	2			1		1							
Tanners.....	1					1							
Textile workers, including weavers and spinners.....	8			2		1	2	1					
Tobacco workers, including cigarette, cigar makers.....	1					1							
Woodworkers, n.e.s.....	1							1					
Automobile mechanics.....	19					6	1	2	2				
Boilermakers.....	1									1			
Iron workers, n.e.s.....	5					3		1					
Moulders.....	4					2							
UNSKILLED AND SEMI-SKILLED WORKERS													
Unskilled and semi-skilled, n.e.s.....	17					4	2	3					
Lumbermen.....	9			1		1	2	1					
Miners.....	15					4	3	2					
General labourers.....	37		1	1		8	6	3	1				
Manufacturing.....	22			2		6	1	3					
Construction.....	1												
Transportation.....	36			1		11	8	3					
Apprentices to skilled trades.....	5					2		2					
Domestic servants.....	98			1		30	13	13			1		
Dependent children.....	1,669	3	3	48		550	237	240	10	7		1	3
Dependent wives.....	1,531	4	12	99		504	182	145	22	4	1	3	4
Occupation not given.....	651			17		219	88	120	5	1	1		1
Totals.....	5,663	10	19	269	2	1,824	726	707	60	13	3	5	15

Total Immigration, Showing Intended Occupation

Intended Occupation	Totals	Bohemian	Moravian	Slovak	Hebrew	Arabian	English	Irish	Scotch	Welsh	North American Indian	Mexican	Croatian	Dalmatian	Montenegrin	Serbian	Belgian
Farming class	2,076	2	2	319	43		332	130	119	9			10			7	62
Clerical class	253				13	1	109	32	44	6							
Professional class	517	1			57		176	43	42	10							4
Merchant class	577				124	2	215	59	55	8							1
Miscellaneous	257			1	18		64	31	18	4							1
SKILLED WORKERS																	
Skilled workers, n.e.s.	178			1	11		85	15	20	5							1
Bakers	9						5		4								
Barbers	35				3		12	3	3	1						1	
Blacksmiths	4						2		1								
Butchers	7			1	1		3		1								
Cabinetmakers	6				1		1	1	1								
Carpenters	30						17		3	1							
Dressmakers	16				1		6	1	3								
Engravers	1				1				1								
Engineers, locomotive	5						2	1	1								
Engineers, marine	12						6	1	5								
Engineers, stationary	3						6	1	2								
Electricians	12				1		6	1	2								
Fur workers	5				4		1										
Hat and cap makers	2				1												
Jewellers, goldsmiths, silversmiths	4				2		2										
Machinists	42				1		22	2	9								
Masons and bricklayers	12						8		3	1							
Millers	2						1										
Milliners	4				3												
Painters and glaziers	15				1		6	1	3								
Patternmakers	2						2										
Photographers	4				1		2	1									
Plasterers	4						4		1								
Plumbers	6						2	1	1								
Printers, pressmen and printing trades	4						3	1									
Shoemakers	7				1		1			1							
Seamstresses	5						2	1									
Stonecutters	1																
Sheet metal workers	2																
Tailors	14				8		3										
Tanners	3						3										
Textile workers, including weavers and spinners	22				4		6	4	5								1
Tobacco workers, including cigarette and cigar makers	4				2		1	1									
Upholsterers	1																
Watch and clock makers	2				2												
Woodworkers, n.e.s.	1								1								
Automobile mechanics	29						12	3	4	2							
Boilermakers	2							1			1						
Iron workers, n.e.s.	10						4	1	4								
Moulders	4						2										
UNSKILLED AND SEMI-SKILLED WORKERS																	
Unskilled and semi-skilled, n.e.s.	55				1		23	5	11	1							
Lumbermen	17				1		3	4	2								
Miners	36				2		17	3	5								
Fishermen	25						23	1									
General labourers	91			10	3		15	8	14	1			1				
Manufacturing	33				3		15	1	3								
Construction	3						1										
Transportation	106				1		62	12	9	1							
Apprentices to skilled trades	13				1		7		4								
Domestic servants	930				47	31	397	87	111	3			3			5	43
Dependent children	5,644	5	5	638	221	2	965	290	375	27	7		130			2	20
Dependent wives	4,269	4	2	409	235	1	854	238	249	31	4	1	96			2	51
Occupation not given	1,695			43	87		559	128	227	22	1	1	28	1	1	4	15
Totals	17,128	12	9	1,469	890	6	4,071	1,113	1,372	184	13	2	268	1	8	75	202

TABLE

*Immigration Via Ocean Ports, Showing Racial Origin, Sex, and Age, 18 Years
Year*

Racial Origin	Nova Scotia		New Brunswick				Prince Edward Island				Quebec				Ontario						
	18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Albanian.....																		4	1		
Arabian.....													1								
Armenian.....																		3			1
Belgian.....		1											14	18	5	5	48	43	27	23	
Bohemian.....																			1	1	
British—																					
English.....	96	170	20	42	8	14	3	3	1	1		109	163	33	29	273	405	114	95		
Irish.....	9	17	1	9	2	1	1	1		1		28	23	1	4	73	80	15	19		
Scotch.....	7	10	5	5		5	1	1				40	72	8	11	97	129	64	34		
Welsh.....	2	1		2								9	5	2	1	12	11	3	5		
Bulgarian.....													1	2				13	7	6	
Croatian.....		2		1								1	11	6	7	2	57	30	29		
Czech.....												7	12	6	5	7	15	13	7		
Dalmatian.....																		1			
Dutch.....	5	5	5	4	2	2	2		1	1	1	9	13	10	4	21	17	9	7		
East Indian.....																					
Estonian.....												2	3	1	1	1	1			1	
Finnish.....												2	4		3	6	19	10	7		
French.....	2	7		1								29	45	13	15	8	7	3			
German.....	4	4	1			2					1	38	43	18	21	28	49	34	25		
Greek.....												1	7	1	1	4	55	35	17		
Hebrew.....	8	6	1	3	1							115	130	54	60	65	66	24	32		
Italian.....		2		2								9	37	26	11	14	102	65	47		
Japanese.....																					
Jugo-Slavian.....												9	24	10	16	9	39	32	28		
Lettish.....												1						2			
Lithuanian.....													9	4	4		8				
Magyar.....		2	1									6	28	22	11	32	130	71	92		
Maltese.....																		1			
Mexican.....												1									
Montenegrin.....													2		3						
Moravian.....																1	1	2	2		
Negro.....												1	3		2		1				
Polish.....							1					8	25	18	16	16	114	69	59		
Portuguese.....													1								
Roumanian.....												16	16	12	17	5	13	2	7		
Russian.....												2	4	1	1	4	11	10	6		
Ruthenian.....	1	6	1	4								12	56	57	46	21	140	100	84		
Scandinavian—																					
Danish.....	4	4	1	1								6	6		1	2	4				
Norwegian.....					1							1	1		1	1	2			1	
Swedish.....												1	1		4	1					
Serbian.....														4	10	4	4	15	12	17	
Slovak.....	2											65	86	85	66	100	218	162	152		
Spanish.....													1		1	1	1				
Swiss.....												16	12	9	5	6	2	4	1		
Syrian.....		1		1								2	5	3	2		2			1	
Totals.....	140	238	36	75	14	24	9	5	2	3	2	561	873	417	374	865	1,782	919	806		

NOTE.—In the Northwest Territories, 18 years and over: 1 Scotch female, 1 French male.

and Over and Under 18 Years, by Province of Destination, for the Fiscal 1938-9

Manitoba				Saskatchewan				Alberta				British Columbia				Yukon Territory			
18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years	
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
.....	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....
.....	27	42	7	14	12	28	2	2	31	51	8	8	121	195	76	44	.....	.....	.....
.....	4	8	.....	1	6	6	.....	.....	8	11	2	2	17	20	6	9	2	.....	.....
.....	8	23	5	7	5	8	1	2	11	10	1	3	22	42	13	13	.....	.....	.....
.....	.....	2	.....	.....	1	1	.....	.....	1	3	1	.....	2	5	3	1	.....	.....	.....
.....	1	3	3	5	2	2	1	2	.....	9	9	5	1	37	18	19	.....	1	1
.....	21	17	23	13	1	1	2	.....	3	7	2	6	.....	1	.....	.....	.....	.....	.....
.....	5	3	30	27	.....	1	.....	3	7	5	16	14	2	4	1	1	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	7	1	.....	.....	.....
.....	1	1	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	2	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	3	.....	.....	.....	.....
.....	24	25	39	36	8	18	11	10	19	34	26	32	9	18	4	5	.....	.....	.....
.....	.....	.....	.....	.....	.....	1	.....	.....	.....	2	.....	.....	.....	3	.....	.....	.....	.....	.....
.....	8	6	3	2	5	8	1	2	3	3	1	2	6	5	1	.....	.....	.....	.....
.....	1	3	.....	1	1	.....	.....	.....	.....	1	4	1	3	18	4	12	1	.....	.....
.....	6	10	9	4	.....	3	1	3	1	8	3	3	1	12	8	11	.....	.....	.....
.....
.....	1	3	2	1	.....	2	1	1	.....	2	.....	1	.....	.....	.....	.....	.....	.....	.....
.....	4	5	3	2	1	4	.....	3	3	46	36	19	1	7	1	2	.....	.....	.....
.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
.....	1	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	20	28	23	28	11	21	16	17	16	31	29	17	.....	1	.....	2	.....	.....	.....
.....
.....	1	1	.....	1	.....	.....	.....	.....	2	2	4	2	.....	.....	1	.....	.....	.....	.....
.....	12	11	8	12	2	1	.....	2	4	8	15	9	3	5	2	1	.....	.....	.....
.....	111	128	119	103	49	78	57	71	121	183	125	133	1	14	8	8	.....	.....	.....
.....
.....	4	.....	.....	.....	1	1	.....	.....	5	3	.....	.....	2	3	1	.....	.....	.....	.....
.....	.....	1	.....	.....	1	.....	.....	.....	.....	3	1	1	2	4	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	1	.....	.....	1	1	.....	.....	3	1	.....	1	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	2	.....	.....	.....
.....	89	81	97	74	1	8	8	6	12	47	32	28	1	13	10	7	.....	.....	.....
.....
.....	1	1	1	1	2	1	1	.....	1	1	.....	1	3	3	2	1	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....
.....	353	405	374	334	110	195	102	124	250	478	315	288	204	459	175	146	3	2	1

TABLE

*Immigration from the United States, Showing Racial Origin, Sex, and Age,
Fiscal Year*

Racial Origin	Nova Scotia		New Brunswick				Prince Edward Island				Quebec				Ontario					
	18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years					
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.				
Arabian.....																2				
Armenian.....																				
Belgian.....												2			4	4	3			
Bohemian.....															3	2	1			
British—																				
English.....	28	53	23	22	33	43	33	26	3	8	3	2	73	107	31	28	274	354	146	132
Irish.....	12	10	18	14	11	10	10	16	4	5	11	3	29	45	8	15	90	144	55	40
Scotch.....	22	26	18	13	4	17	4	5	6	3	2	2	22	36	11	8	89	106	58	64
Welsh.....		1	2	2			1						3	2			14	16	1	2
Croatian.....																		2		1
Czech.....													1				1			
Dutch.....		2	5	4	1		2	1					4	3	1		13	23	5	5
Finnish.....		1															1	5	1	
French.....	4	10	5	6	19	23	15	11		1			139	239	100	112	29	50	15	36
German.....	7	3	2	1		4		1					18	26	4	4	79	135	39	40
Greek.....													4				2	1		1
Hebrew.....	1	3			4	4		2					38	44	12	9	48	53	12	7
Italian.....						1							4	6		3	12	19	8	3
Jugo-Slavian.....																		1		
Lithuanian.....		1																1	1	
Magyar.....													1	1			3	11	3	1
Maltese.....																	1	1	1	2
Negro.....						1							2	4			3	5	3	2
North American Indian.....																	1	3		6
Polish.....		1											3	3	1	1	6	28	1	
Portuguese.....																	1			
Roumanian.....																		1		1
Russian.....														1			2	3		1
Ruthenian.....															1	2	5	2		
Scandinavian—																				
Danish.....		1				1							1		1	1	3	6		
Icelandic.....																				
Norwegian.....	1	1											1				6	7	3	3
Swedish.....	1				1	3							1	4			11	11	4	5
Serbian.....													1	1	1			2		
Slovak.....																	2	10	2	1
Spanish.....								1										2		
Swiss.....													2				1	4	6	4
Syrian.....													1	1	1			3	2	2
Totals.....	76	113	73	62	73	107	65	62	14	17	16	7	349	527	171	182	703	1,018	369	362

NOTE.—In the Northwest Territories, 18 years and over: 1 Scotch male.

41

18 Years and Over and Under 18 Years, by Province of Destination, for the 1938-9

Manitoba				Saskatchewan				Alberta				British Columbia				Yukon Territory			
18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years		18 Years and Over		Under 18 Years	
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
									1										
					1			1											
						1	1		1				1						
10	20	8	12	9	10	4	2	31	44	18	5	71	89	38	29			1	1
9	10	5	6	7	10	1	2	21	15	8	7	18	34	13	10				
6	8	7	2	9	5	2	1	15	17	8	9	31	39	17	14				
2	2							2	2	1		2	4		1				
1			1																
5	6	5	4	1	2			12	6	2	3	4	10	6	4				
									1			1	4						
2	5	2	2	5	1		2	4	5	1	3	3	8	2	1				
8	9	7	6	13	9	2	1	14	13	6	2	13	32	5	4				
1													1						
1	4			1	1	1		1	2				10	6	2	2			
												1	1						
													1	1					
									1	1	1	1							
													2		1				
5	3	3	5					3	3	2									
									1										
1					1		2						1	1	1				
2	2	1	3										1						
								4	4	1	2	4	2	3					
2		1	3	1				1											
3	5	1		6	9	3	3	7	7	1		3	11		1			1	1
3	9			7	2	1	2	5	6	2	1	3	4	2	2				
					1														
													1						
					1				1				1		1				1
62	84	40	46	61	52	15	16	121	130	51	34	170	249	90	70			3	2

TABLE 42

Immigration Via Ocean Ports, Showing Origin and Person to Whom Destined, for the Fiscal Year 1938-9

Racial Origin	Totals	Hus- band	Parent	Brother	Sister	Fiancé	Friend	Rela- tive	Em- ployer	Others
Albanian.....	10	5	3			1		1		
Arabian.....	4		2						1	1
Armenian.....	5					1		2		2
Belgian.....	187	6	11	16	2	3	10	57	6	76
Bohemian.....	2		2							
British—										
English.....	2,247	100	180	139	131	63	273	648	247	466
Irish.....	387	23	32	43	33	11	38	100	26	81
Scotch.....	665	35	71	40	51	25	89	201	22	131
Welsh.....	74	5	9	3	4	8	10	13	5	17
Bulgarian.....	29	7	14			4		2		2
Croatian.....	265	82	128	1		22		11		21
Czech.....	169	10	11	8		6	27	34	2	71
Dalmatia.....	1					1				
Dutch.....	237	3	36	8	1	1	11	37	2	138
East Indian.....	14	4	4					1		5
Eesthonian.....	12	2			1			3		6
Finnish.....	58	9	18	2	1	3	7	6	2	10
French.....	138	4	9	6	4	1	5	19	13	77
German.....	586	40	87	24	3	24	42	123	8	235
Greek.....	127	44	55	1	1	13		9		4
Hebrew.....	621	35	68	52	9	13	63	204	10	167
Italian.....	365	120	171	11		14	6	28	5	10
Japanese.....	46	31	7	2			2	4		
Jugo-Slavian.....	250	57	91	1	1	15	12	4		69
Lettish.....	4		1					2	1	
Lithuanian.....	39	6	9	1		12	3	3		5
Magyar.....	532	119	233	6	1	49	15	24	2	83
Maltese.....	1					1				
Mexican.....	2									2
Montenegrin.....	8	2	5			1				
Moravian.....	9									9
Negro.....	7	1	3	2					1	
Polish.....	586	112	204	19	1	40	15	111		84
Portuguese.....	1							1		
Roumanian.....	102	9	11	4		6		13	1	58
Russian.....	134	13	36	6		3	7	46	1	22
Ruthenian.....	1,837	260	448	66	2	42	171	429	4	415
Scandinavian—										
Danish.....	49	4	3	3		3	7	4	3	22
Norwegian.....	21	2	3	2	1	4	2	1	1	6
Swedish.....	15	2	1	1				4	2	5
Serbian.....	70	15	41			4	3	1		6
Slovak.....	1,450	196	318	14	3	22	54	67		776
Spanish.....	6	1						1		4
Swiss.....	75	2	3	4	2		7	9	2	46
Syrian.....	18	1	1	4		1		8		3
Totals.....	11,465	1,367	2,328	489	252	417	884	2,226	367	3,135

TABLE 43

Immigration from the United States, Showing Origin and Person to Whom Destined, for the Fiscal Year 1938-9

Racial Origin	Totals	Husband	Parent	Brother	Sister	Fiancé	Friend	Relative	Employer	Others
Arabian.....	2							2		
Armenian.....	1									1
Belgian.....	15	2	5	1		1		3		3
Bohemian.....	10	1	2					3	1	3
British—										
English.....	1,824	256	401	45	46	27	76	324	103	546
Irish.....	726	115	162	16	16	7	27	145	49	189
Scotch.....	707	73	177	27	29	16	22	151	42	170
Welsh.....	60	12	8		1		7	9	6	17
Croatian.....	3	1				1		1		
Czech.....	4	2	2							
Dutch.....	139	18	24	3	2	2	4	24	10	52
Finnish.....	14	5	1	1			1	3	1	2
French.....	860	88	236	13	17	10	17	139	96	244
German.....	507	102	94	2	5	13	19	57	44	171
Greek.....	10	3	2				1	3		1
Hebrew.....	269	64	44	6	4	9	8	38	19	77
Italian.....	58	10	14	1	1		1	18	5	8
Jugo-Slavian.....	3	2	1							
Lithuanian.....	6	3	2					1		
Magyar.....	22	8	5			1	1	1	1	5
Maltese.....	5									5
Negro.....	24	5	5				1	3	4	6
North American Indian.....	13	3	5			1				4
Polish.....	68	13	4	3	1	2	2	9	13	21
Portuguese.....	2	1	1							
Roumanian.....	2	1	1							
Russian.....	14	3	5			1	3	2		
Ruthenian.....	19	5	5	1				5	1	2
Scandinavian—										
Danish.....	34	6	3				1	8	5	11
Icelandic.....	8		1					1	1	5
Norwegian.....	84	12	10	8	2	2	7	21	6	16
Swedish.....	90	17	15	2		1	7	10	6	32
Serbian.....	5	2			1			2		
Slovak.....	19	10	2				4	2	1	
Spanish.....	4	2	1						1	
Swiss.....	22	3	10				1	1	2	5
Syrian.....	10	3	5					1	1	
Totals.....	5,663	851	1,253	129	125	94	210	987	418	1,596

TABLE 44

Immigration Via Ocean Ports, 18 Years of Age and Over, Showing Racial Origin, Sex and Conjugal Condition, for the Fiscal Year 1938-9

Racial Origin	Adult Males					Adult Females				
	Totals	Married	Single	Widowed	Divorced	Totals	Married	Single	Widowed	Divorced
Albanian.....						7	5	1	1	
Arabian.....	1	1				1	1			
Armenian.....	1		1			3		1	2	
Belgian.....	63	41	21	1		64	49	10	5	
British—										
English.....	678	317	325	33	3	1,069	378	520	158	13
Irish.....	149	44	101	4		167	57	98	12	
Scotch.....	190	108	71	10	1	301	108	145	44	4
Welsh.....	27	12	14	1		28	10	14	4	
Bulgarian.....						14	9	5		
Croatian.....	7	6	1			122	95	23	4	
Czech.....	39	34	5			53	44	8	1	
Dalmatian.....						1		1		
Dutch.....	52	33	17	2		51	38	12	1	
East Indian.....						6	6			
Estonian.....	3	3				6	5	1		
Finnish.....	10	7	3			28	16	10	2	
French.....	43	23	20			62	30	27	5	
German.....	130	87	39	3	1	193	133	39	16	5
Greek.....	5	3	2			68	50	15	3	
Hebrew.....	211	144	59	6	2	224	136	49	33	6
Italian.....	29	15	12	2		163	130	27	6	
Japanese.....	1		1			35	34			1
Jugo-Slavian.....	26	21	4	1		96	77	19		
Lettish.....	1	1				2			2	
Lithuanian.....	1	1				24	9	14	1	
Magyar.....	47	31	14	2		222	148	66	6	2
Maltese.....						1		1		
Mexican.....	1		1			1	1			
Montenegrin.....						3	2	1		
Moravian.....	2	2				2	2			
Negro.....	1	1				4	1	2	1	
Polish.....	71	46	25			220	160	53	7	
Portuguese.....						1		1		
Roumanian.....	24	22	2			32	27	5		
Russian.....	27	19	7	1		40	32	6	2	
Ruthenian.....	316	257	56	3		605	518	67	19	1
Scandinavian—										
Danish.....	24	7	17			21	13	7	1	
Norwegian.....	6	3	3			11	4	5	2	
Swedish.....	9	3	5		1	5	5			
Serbian.....	4	2	2			21	17	4		
Slovak.....	270	208	58	4		453	396	39	18	
Spanish.....	2	1	1			2	2			
Swiss.....	29	16	12	1		20	16	2	2	
Syrian.....	3	2	1			8	3	2	3	
Totals.....	2,503	1,521	900	74	8	4,460	2,767	1,300	361	32

TABLE 45

Immigration from the United States, 18 Years of Age and Over, Showing Racial Origin, Sex and Conjugal Condition, for the Fiscal Year 1938-9

Racial Origin	Adult Males					Adult Females				
	Totals	Married	Single	Widowed	Divorced	Totals	Married	Single	Widowed	Divorced
Arabian.....	2	1	1							
Armenian.....						1		1		
Belgian.....	7	4	3			5	4	1		
Bohemian.....	3	3				4	4			
British—										
English.....	532	372	121	28	11	729	513	94	103	19
Irish.....	201	117	73	7	4	283	188	44	43	8
Scotch.....	205	138	47	13	7	257	149	44	58	6
Welsh.....	23	14	8		1	27	23		4	
Croatian.....						2	1	1		
Czech.....	2		2			1	1			
Dutch.....	40	25	10	5		52	39	6	5	2
Finnish.....	2	1	1			11	9	2		
French.....	205	116	79	8	2	342	163	139	28	12
German.....	152	101	39	9	3	231	189	24	11	7
Greek.....	7	3	4			2	2			
Hebrew.....	104	73	27	2	2	117	99	12	5	1
Italian.....	17	12	5			26	20	2	4	
Jugo-Slavian.....	1		1			2	2			
Lithuanian.....						4	4			
Magyar.....	5	2	3			12	11	1		
Maltese.....	1	1				1	1			
Negro.....	6	3	1	2		11	9	1		1
North American Indian.....	1	1				5	4	1		
Polish.....	17	7	9	1		38	20	17	1	
Portuguese.....	1		1			1	1			
Roumanian.....						1	1			
Russian.....	4	2	2			6	4	1	1	
Ruthenian.....	5	4		1		7	7			
Scandinavian—										
Danish.....	12	11	1			14	13		1	
Icelandic.....	4	4								
Norwegian.....	27	18	9			41	27	7	6	1
Swedish.....	32	19	10	2	1	39	33	2	4	
Serbian.....	1	1				3	3			
Slovak.....	3	2	1			13	12	1		
Spanish.....	2		2			2	2			
Swiss.....	5	3	2			6	5		1	
Syrian.....	1			1		4	3	1		
Totals.....	1,630	1,058	462	79	31	2,300	1,566	402	275	57

TABLE 46

Admissions and Rejections, by Divisions, for the Fiscal Year 1938-9

	Ocean Ports		International Boundary Ports		Ocean Ports and International Boundary Ports	
	Admissions	Rejections	Admissions	Rejections	Admissions	Rejections
Atlantic Division—						
Quebec.....	6,072	39				
Halifax.....	3,164	28				
North Sydney.....	389	41				
Montreal.....	143	20				
St. John.....	30	4				
Sydney.....	7	1				
Louisburg.....	28	1				
Rimouski.....		2				
New York.....	1,157	19				
Boston.....	7	2				
International Boundary Ports.....			1,780	2,687		
Totals.....	10,997	157	1,780	2,687	12,777	2,844
Eastern Division—						
International Boundary Ports.....			2,578	6,186	2,578	6,186
Western Division—						
International Boundary Ports.....			732	601	732	601
Pacific Division—						
Vancouver.....	239	8				
Victoria.....	29	2				
New Westminster.....	5					
International Boundary Ports.....			573	686		
Totals.....	273	10	573	686	846	696
Other Ocean Ports.....	195	10			195	10
Grand Totals.....	11,465	177	5,663	10,160	17,128	10,337

TABLE 47

Rejections, at Ocean Ports, by Causes and Nationalities, from 1902-3 to 1938-9

	Fiscal Years																	Totals	
	1902-3 to 1912-3	1913-4 to 1922-3	1923- 1924	1924- 1925	1925- 1926	1926- 1927	1927- 1928	1928- 1929	1929- 1930	1930- 1931	1931- 1932	1932- 1933	1933- 1934	1934- 1935	1935- 1936	1936- 1937	1937- 1938		1938- 1939
<i>By Causes</i>																			
Medical causes.....	4,162	1,029	130	83	40	95	104	94	78	39	26	16	17	9	13	11	8	7	5,961
Civil causes.....	5,094	5,604	862	948	226	594	215	266	243	444	298	213	177	206	183	236	202	170	16,181
Totals.....	9,256	6,633	992	1,031	266	689	319	360	321	483	324	229	194	215	196	247	210	177	22,142
<i>By Nationalities</i>																			
British.....	1,240	978	187	199	109	209	150	154	160	251	180	126	123	150	123	138	86	94	4,657
American.....	175	134	6	11	.....	5	2	3	8	6	4	13	11	13	7	7	4	9	418
Other countries.....	7,841	5,521	799	821	157	475	167	203	153	226	140	90	60	52	66	102	120	74	17,067
Totals.....	9,256	6,633	992	1,031	266	689	319	360	321	483	324	229	194	215	196	247	210	177	22,142

TABLE 48

Deportations, After Having Been Admitted, by Causes, Nationalities, and Provinces, from 1902-3 to 1938-9

	Fiscal Years																		Totals
	1902-3 to 1912-3	1913-4 to 1922-3	1923- 1924	1924- 1925	1925- 1926	1926- 1927	1927- 1928	1928- 1929	1929- 1930	1930- 1931	1931- 1932	1932- 1933	1933- 1934	1934- 1935	1935- 1936	1936- 1937	1937- 1938	1938- 1939	
<i>By Causes</i>																			
Medical causes.....	2,296	2,213	649	420	410	470	519	650	600	789	697	476	301	144	81	47	42	36	10,840
Public charges.....	2,853	4,517	775	543	506	354	430	444	2,108	2,245	4,507	4,916	2,991	464	125	110	46	45	27,977
Criminality.....	1,083	3,989	511	520	453	447	426	441	591	868	1,006	836	493	267	207	117	101	114	12,470
Other civil causes.....	530	793	93	58	189	149	257	194	107	200	270	277	250	172	163	240	203	229	4,374
Accompanying de- ported persons.....	145	262	78	145	158	165	254	235	559	274	545	626	439	81	34	57	21	10	4,088
Totals.....	6,907	11,774	2,106	1,686	1,716	1,585	1,886	1,964	3,963	4,376	7,025	7,131	4,474	1,128	610	571	413	434	59,749
<i>By Nationalities</i>																			
British.....	4,358	5,226	1,377	985	899	808	1,047	1,933	2,983	3,099	4,248	4,251	2,718	355	157	202	134	135	34,095
American.....	1,066	4,566	417	321	330	351	297	294	225	279	260	331	319	199	146	167	138	145	9,854
Other countries.....	1,483	1,982	312	380	487	426	542	587	752	998	2,517	2,549	1,437	544	307	202	141	154	15,800
Totals.....	6,907	11,774	2,106	1,686	1,716	1,585	1,886	1,964	3,963	4,376	7,025	7,131	4,474	1,128	610	571	413	434	59,749
<i>By Provinces</i>																			
Maritime Provinces..	147	409	38	32	43	48	48	70	93	148	252	244	260	62	42	61	27	40	2,064
Quebec.....	1,589	2,197	301	206	233	233	240	255	490	509	984	1,343	596	163	106	129	102	112	9,778
Ontario.....	2,896	4,243	547	675	620	581	646	600	1,115	1,788	2,828	2,626	1,827	347	167	127	123	121	21,877
Manitoba.....	.....	1,310	802	242	195	177	279	403	1,296	625	1,014	858	408	71	43	32	21	22	.....
Saskatchewan.....	1,783	691	110	115	113	113	197	173	277	414	767	490	261	91	36	26	14	28	18,715
Alberta.....	.....	1,041	102	134	178	169	260	187	396	511	681	738	467	134	79	77	40	19	.....
British Columbia.....	491	1,876	206	282	334	259	216	276	306	381	549	832	655	210	137	119	86	92	7,307
Yukon Territory.....	1	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8
Totals.....	6,907	11,774	2,106	1,686	1,716	1,585	1,886	1,964	3,963	4,376	7,025	7,131	4,474	1,128	610	571	413	434	59,749

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

SIR,—I have the honour to submit a brief report of Soldier Settlement activities for the fiscal year ended March 31, 1939.

Included in this report is a statement relating to field services performed for other departments of the Dominion Government.

Your obedient servant,

G. MURCHISON,
Director of Soldier Settlement.

OTTAWA, October 31, 1939.

Honorable T. A. Cullen
Minister of Mines and Resources
Ottawa

200-1 have the honor to acknowledge the receipt of your letter of the 14th inst. regarding the matter of the 1934-35 season. The information requested is being furnished to you as soon as possible.

Yours faithfully,
T. A. Cullen

1935
T. A. Cullen

1935

SOLDIER SETTLEMENT OF CANADA

The Soldier Settlement of Canada has two functions: (a) the primary work of loan administration in connection with 19,876 farm properties representing a net investment of \$44,550,076.72 as of March 31, 1939; and (b) field services, including land appraisals and a variety of investigations in rural districts, for other departments of Government.

The last annual report made brief reference to two major developments affecting policy and administration inaugurated at the close of the last fiscal year. The first concerns debt adjustment for soldier settlers and other purchasers under the Farmers' Creditors Arrangement Act. While this Act had been in force since 1934, only 2,332 settlers of all classes, including 1,072 soldier settlers, had made application during the four years to March 31, 1938. In the twelve-month period under review a further 3,334 settlers of all classes, including 1,869 soldier settlers, have applied for debt reduction or extension of repayment terms. This work involves inspection of individual properties and review of farming operations of all applicants in relation to their debt position and capacity to pay. As above indicated, a total of 5,666 soldier settlers and other purchasers have made application under the F.C.A. Act to March 31, 1939. Boards of Review have dealt finally with 2,954 cases, awarding debt reduction in 2,414 cases with an average reduction of approximately \$1,887. Less than 40 per cent of the total of 3,080 applications made to date in Saskatchewan and Alberta have been dealt with by Boards of Review, and it is estimated that a further period of eighteen months will be required to complete the operation of debt adjustment for soldier settlers and other purchasers who have made or will make application.

The second matter affecting administration was the designation of certain field staff to give their full time to Soldier Settlement business and the designation of other field staff to perform the services required by other departments of Government. The past twelve months have demonstrated the practical value of this administrative change, more especially in providing the requisite service to problem cases among soldier settlers arising out of adverse crop conditions in important areas of the western provinces, and the general factor of advancing age among settlers which presents problems demanding careful individual attention by field staff.

Collections during the year on account of loan repayments total \$1,372,626.26, closely approximating total collections for the previous fiscal year despite the sharply lower prices for wheat and other grains compared with the previous year.

Loan administration costs were further reduced by \$23,568.77 during the year under review, owing mainly to staff retirements without replacements and transfer of staff to the Controller of the Treasury. The full effect of economies in staff costs inaugurated this year will not be reflected until next fiscal year.

Field staff designated to perform the services required by other departments of Government completed 10,673 investigations in rural districts and made 2,503 appraisals of land. The investigations and land appraisals for respective departments were as follows:

Investigations:

Department of Pensions and National Health	2,629
War Veterans' Allowance Board.....	7,641
Canadian Pension Commission.	165
Department of Mines and Resources—	
Immigration Branch.	196
Lands, Parks and Forests Branch.....	42

Land Appraisals:

Department of Finance (F.C.A. Act).....	2,470
Canadian Farm Loan Board.	33