



Organization Chart, Lands, Parks and Forests Branch.

LANDS, PARKS AND FORESTS BRANCH

ROY A. GIBSON, DIRECTOR

The disturbing conditions that preceded and continued after the outbreak of war had an unsettling effect on general prospecting operations in the Northwest and Yukon Territories. However, the companies that were already mining in the Territories proceeded steadily to increase production, and the interest of experienced and adequately financed operators lent aid and encouragement to the development of promising properties. The substantial character of development in the Yellowknife area has resulted in the establishment of a local administrative district that embraces the area within a radius of $3\frac{1}{2}$ miles from the post office and includes the Con, Rycon, and Negus Mines. The resident population already exceeds 1,000. The Local Trustee Board is composed of two elected and two appointed members, with the Stipendiary Magistrate as Chairman. It has functioned satisfactorily since its creation. By arrangement with the Saskatchewan Liquor Control Board a government liquor store has been established at Yellowknife.

The outstanding events in connection with National Parks administration were the completion of the highway connecting Banff and Jasper National Parks, the reconstruction of a considerable portion of the Cabot Trail in Cape Breton Highlands National Park, the hard-surfacing of part of the road from Banff to Lake Louise and of the Chief Mountain Highway in Waterton Lakes National Park, and the construction of golf links in Cape Breton Highlands and Prince Edward Island National Parks. Much was done to improve the recreational features in the various parks and to provide areas for the convenience of campers. A very encouraging feature was the amount of private capital invested in providing additional hotel accommodation and bungalow camps for the comfort and convenience of travellers.

This Branch undertook for the Department of Labour that part of the National Forestry Program that was carried out on Dominion properties, and also supervised the activities of provincial services participating in the program. The National Forestry Program was a practical demonstration of what could be done for under-privileged boys by healthy work in the woods under adequate supervision.

Economies are being effected in the cost of maintaining the services of this Branch without sacrificing efficiency and at the same time the amount of revenue collected by the Branch is being increased.

The accompanying chart shows the plan of organization of the four main bureaux or services. The various activities carried on during the past year, which extended to every part of the Dominion, are outlined more fully in the pages that follow.

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, Alberta, and British Columbia, 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. How-

ever, owing to mining activity that 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, subject to the provisions of this Act, and of any other Act of the Parliament of Canada applying to the Territories, 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

Sixteen regular and four special sessions of Council were held during the year. Assent was given to ordinances respecting the control and sale of liquor, the administration of local affairs at Yellowknife, and workmen's compensation. Amendments to ordinances dealing with billiard rooms, the legal profession, and businesses, callings, trades and occupations licences were approved.

The Committee on the revision of the Northwest Territories Ordinances reported progress and several obsolete ordinances were repealed.

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. Other questions dealt with by Council included: game conservation; native welfare; hospitals and medical services; public works and improvements; schools; water power development; reindeer affairs; radio services and administration of justice.

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. 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, who was appointed Stipendiary Magistrate at Fort Smith, was 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. 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

Eight hospitals, situated in the principal settlements, are operated by the Anglican and Roman Catholic Missions. A grant of \$2.50 per diem per person is paid to these Missions for the treatment of indigent whites, Eskimos, and halfbreeds. A total payment of \$28,700, representing 11,480 days treatment, was made. In addition, the sum of \$4,600.31 was paid for the maintenance of mental or other patients in provincial institutions. The Department pays for the care and maintenance of aged and infirm in Industrial Homes operated by the Missions in conjunction with the hospitals at Chesterfield and Pangnirtung, on the basis of \$200 per annum. An expenditure of \$4,231.11 was made under this heading during the year. These figures do not include the amounts paid by the Indian Affairs Branch for Indians.

SCHOOLS

The Roman Catholic and Anglican Missions, assisted by grants from the Dominion Government, maintain day and residential schools in the Territories. During the year 118 children were enrolled in residential schools and 345 attended day schools. The sum of \$25,992.31 was expended for educational purposes in addition to a small amount for school supplies. These figures do not include the amount 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 1939 season the water transportation companies handled approximately 16,000 tons of freight in addition to that consigned to Eastern Arctic points. The aeroplane companies carried in excess of 600 tons 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.

COMMUNICATIONS

The Northwest Territories and Yukon radio system was again operated by the Department of National Defence (Permanent Force). Wireless stations were 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 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), Quebec. 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.

LAW AND ORDER

Law and order in the Territories are maintained by the Royal Canadian Mounted Police. Detachments have been established at the more important settlements and extensive patrols are made to outlying areas. To facilitate the administration of justice five Stipendiary Magistrates have been appointed.

LIQUOR PERMITS

The Territorial Liquor Ordinance, assented to April 27, 1939, with amendments, represents the present basis for the sale of liquor, wine, and beer in the Northwest Territories. The Saskatchewan Liquor Board was appointed Territorial Liquor Agent and under the direction of the Board, a liquor store was opened at Yellowknife on June 27, 1939, from which liquor is sold under permit. An arrangement was entered into with the Saskatchewan Liquor Board whereby all supplies for Yellowknife store are furnished by the Board on a percentage basis. All profits arising out of the operation of the liquor store are to be applied to territorial purposes. The Stipendiary Magistrate located at Yellowknife has been appointed inspector under the Territorial Liquor Ordinance.

During the calendar year 1939, 1,998 liquor permits were issued covering approximately 2,194.68 gallons of spirituous liquor, 64.01 gallons of wine, and 14,491 gallons of beer. Permits authorizing the importation of intoxicants to points in the Eastern Arctic are issued at Ottawa.

AIDS TO NAVIGATION

This work was carried out for the Department of Transport under the direction of our Agent. Existing aids were maintained at points on the Mackenzie River between the delta of Athabaska River and Great Bear Lake.

LANDS 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. Two lots were sold and patented. Two time sales of lots in Fort Smith Settlement were approved. At Port Radium Settlement there are 17 surface leases in force.

Yellowknife Settlement lies about 615 miles by air north of Edmonton and land was reserved therefor by Order in Council of May 3, 1938, P.C. 968. During the summer of 1938, 7 blocks were subdivided into 126 lots and 9 additional blocks were subdivided into 117 lots in the summer of 1939. Surface leases for 5-year periods are granted and up to the end of the year, 106 such leases have 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 the Dominion Lands Act. The number of such leases in force is 23.

Ten permits to occupy land during the pleasure of the Department have been granted. There are 5 grazing leases in force and during the year 8 hay permits were issued under which 76 tons of hay were cut.

One hundred and ten timber permits were issued authorizing the cutting of 15,350 lineal feet of timber, 12,000 feet board measure of saw timber, 850 roof poles, and 3,581 cords of wood. Fifty-one of these permits were issued free of dues to educational, religious and charitable institutions, to settlers for domestic use, and to Government departments. In addition, 23 timber berth permits were granted. The revenue derived from lands, timber, grazing, and hay was \$7,506.27.

MINING

The local administration of mineral resources of the Mackenzie District, Northwest Territories, is conducted through the offices of the Mining Recorders at Fort Smith and Port Radium, Sub-Recorders being located at Edmonton, Alberta, and at Yellowknife, Simpson, and Coppermine, Northwest Territories. Since the discovery of gold in the Yellowknife area in 1935, mining development has continued, and, while exploration and staking of new claims in 1939 was below the peak reached in 1938, active development proceeded on several properties. The principal field of activity is in this area, 3 gold properties having reached the production stage.

In September 1938 The Consolidated Mining and Smelting Company of Canada, Limited, brought its "Con" mine into production. By the end of March 1939 gold valued at more than \$400,000 had been produced from this mine, the production for the year under review amounting to about \$1,227,000. Production at this company's "Rycon" mine was reached early in 1939 and by the end of the year gold valued at approximately \$54,000 had been mined. The "Negus" mine, owned by Negus Mines, Limited, commenced production in February 1939 and reported production of gold to the end of March 1940 having a value of more than \$668,000.

Production continued at the pitchblende-silver property of Eldorado Gold Mines, Limited, at Labine Point, Great Bear Lake, where nearly 100 men are employed. The concentrating mill on this property treated about 100 tons daily and produced during the year approximately 1,000 tons of concentrates. Most of these concentrates were shipped to the company's refinery at Port Hope, Ontario, for treatment.

Miner's licences issued during the year numbered 224, and 514 such licences were renewed. Entries were granted for 831 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 4,690. Final leases have been issued comprising an area of 9,079.58 acres. The total revenue obtained from fees payable under the Quartz Mining Regulations amounted to \$23,635.25, including \$7,985 collected as licence fees.

Placer Mining.—Of more than 300 claims staked and recorded in the South Nahanni and Liard Rivers areas since 1934 only 13 are now in good standing. Placer mining fees amounted to \$178.60.

Coal.—Five coal mining leases are in force, comprising an area of 441.60 acres. Revenue from fees, rentals, and royalties in connection with coal mining rights during the year amounted to \$317.35.

Petroleum and Natural Gas.—Petroleum and natural gas leases affecting lands in the Northwest Territories comprise a total area of 3,173.33 acres. Revenue from this source amounted to \$6,304.07. Petroleum produced from the wells of the Northwest Company, Limited, below Norman on Mackenzie River, amounted to 20,640 barrels. A new refinery unit was erected on the company's

property during the year for the purpose of producing aeroplane gasoline and improved fuel oil products. The addition of this unit resulted in a substantial reduction in the price of gasoline and fuel oil. A total of 1,837 feet of drilling was done during the 1939 season. One oil and gas permit was issued during the year, comprising an area of 212.10 acres.

Dredging.—Two dredging leases are in force in the Northwest Territories, comprising in all 2 five-mile stretches of Grizzly and Bennett Creeks.

NORTHWEST GAME ACT AND REGULATIONS

During the past year certain amendments were made to the regulations. Order in Council P.C. 1005 of May 2, 1939, established the Twin Islands Game Sanctuary. These islands are situated in James Bay. The purpose of the sanctuary is to protect polar bears and migratory birds that frequent the islands. The area of the sanctuary is: North Twin Island, 31 square miles; South Twin Island, 24 square miles.

Order in Council P.C. 1925 of July 22, 1939, authorized a consolidation of the game regulations for administrative purposes. The various sections and clauses were realigned but no important changes in the wording or purport of the regulations were made.

Order in Council P.C. 326 of January 26, 1940, rescinded the regulations governing the payment of bounties for the destruction of wolves effective as from February 29, 1940.

The total area included in reserves established for the protection of the wild life in the Northwest Territories as at March 31, 1940, was 609,277 square miles. This does not include the 13,675 square miles of the Wood Buffalo Park situated in the Province of Alberta.

Wood Buffalo Park.—The wardens made extensive patrols for the purpose of securing data upon the condition of the buffalo and the extent of their range within the park. The usual winter concentrations of buffalo were in evidence in the Murdock Creek area north of the Peace River and Baril Lake area to the south. The wardens reported that the herds were much larger than those observed in previous years.

In accordance with the usual practice 30 animals were slaughtered during the winter season and the meat allotted to missions, hospitals, and the Indian Affairs Branch for distribution to needy native families in districts adjacent to the park. As a result of predator control operations 26 wolves and 4 coyotes were destroyed by members of the park staff.

A cabin was constructed at the mouth of Buffalo River and another near the headwaters of Klewi River to provide for the requirements of wardens who are patrolling the northern area of the park.

Additional work was done on the dam commenced last year in connection with the fur conservation project in the Murdock Creek area and 3 dams and numerous fills in the Dempsey Creek area were also constructed. The sum of \$32,000 was expended in connection with these projects. It is estimated that an additional \$15,000 will be needed to complete the work at present contemplated under the fur conservation project.

Fur and Game.—A marked reduction is shown in the catch of certain species of fur-bearing animals during the licence year ended June 30, 1939, as compared with the previous licence year. Figures for ermine, all 6 species of fox, and marten are noticeably lower. Returns for mink, muskrat, and otter show a considerable increase.

Caribou.—Reports indicate that, in general, this animal, so important in the economic life of the country, was fairly plentiful during the past year. Efforts are being continued to educate the natives as to the value of conserving the caribou.

Comparative figures of the number of big game animals and birds taken during the licence year ended June 30, 1939, and the average for the 5 years ended June 30, 1938, follow:—

	Year ended June 30		5-year average 1933-1938
	1939	1938	
Deer.....	20	42	47
Caribou.....	22,929	18,071	13,150
Moose.....	1,140	1,205	1,475
Sheep.....	38	162	98
Partridge.....	794	1,108	1,122
Grouse.....	242	324	279
Prairie Chicken.....	2,350	817	1,309
Ptarmigan.....	7,847	7,619	6,618
Ducks.....	11,742	11,359	7,474
Geese.....	911	1,391	977

Licences, Permits, and Revenue.—Comparative statement of licences and permits issued and revenue derived under the Northwest Game Act:—

Licences

	Year ended June 30		5-year average 1934-1939
	1940	1939	
Hunting and Trapping—			
Resident.....	534	489	471
Non-resident British.....	0	1	5
Non-resident bird licence.....	16	7	9
Trading—			
Resident.....	124	134	135
Non-resident British.....	6	7	7

Permits

	Year ended June 30		5-year average 1934-1939
	1940	1939	
To establish trading posts.....	28	23	24
To take mammals for propagation purposes.....	5	2	2
To hunt and trap in Wood Buffalo Park.....	335	342	372
To render migratory birds permits operative in N.W.T. (countersigned).....	12	13	16
To take specimens of mammals and non-migratory birds for scientific purposes.....	10	8	12
To take quota (15) of beaver.....	1,391	1,338	1,386

Revenue

The following is a statement of revenue collected under the Northwest Game Act and Fur Export Ordinance:—

	Fiscal year		5-year average 1934-1939
	1939-40	1938-39	
	\$ cts.	\$ cts.	\$ cts.
Hunting licences.....	1,313 92	1,632 32	2,310 62
Trading licences.....	2,775 00	1,644 14	1,833 83
Bird licences.....	80 00	35 00	28 00
Fur farm licences.....	26 00	13 00	20 40
Trading post permits.....	28 00	23 00	33 90
Sale of furs.....	436 78	514 43	348 97
Fur export tax.....	95,848 10	97,760 92	95,221 30
Fines and forfeitures.....	1,156 17	145 00	139 50
Sub-totals.....	101,663 97	101,767 81	
Revenue under Businesses, Callings, Trades, and Occupations Licence Ordinance.....	4,465 00	2,542 50	
Totals.....	106,128 97	104,310 31	

Infractions of Game Laws.—There were 24 prosecutions for infraction of the game laws. Convictions were secured in 20 of these cases.

REINDEER

Continued progress is reported in the development of the reindeer industry. The round-up of the main herd on the Government reserve near the Mackenzie Delta was held about the end of July at the corrals on Richards Island. The official count showed the surviving fawn increase for the year to be 1,204 head. In addition to the fawns there were 1,969 females, 626 bulls, and 347 steers, a total of 4,146. A round-up of the native herd on Anderson River in August showed 1,196 deer, an increase of 246.

During the summer of 1939 Dr. Seymour Hadwen, Director of Pathology and Bacteriology, Ontario Research Foundation, Toronto, an eminent authority on animal life, inspected the reindeer on behalf of the Department. His investigations covered many features of the reindeer enterprise including a study of the range, with observations respecting diseases and parasitism, herd management, slaughtering, insect pests, dogs, and wolves, and the supervision and extension of the industry.

Dr. Hadwen reported that the reindeer were in excellent condition and that he had observed practically no evidence of infection or parasitism. He had been struck by the amazing fertility of the herds as shown in figures obtained relating to young deer having fawns. Dr. Hadwen's findings were published by the Ontario Research Foundation in an illustrated article entitled "A Visit to the Mackenzie River Delta".

The annual slaughter of surplus reindeer was held on Richards Island. The meat was supplied mainly to the Anglican and Roman Catholic Missions at Aklavik, 55 carcasses being allotted to each mission. The total number of reindeer slaughtered for meat during the fiscal year was approximately 240 head. Thirty-eight carcasses were sold netting \$936.

Reports to the end of the fiscal year indicated that both the main herd on the reserve and the native herd near Anderson River were in excellent condition. Reindeer moss was abundant on the inland winter ranges and no unusual losses were suffered through storms or the depredation of wolves. The herding method practised consists of maintaining the deer under constant care but allowing them to spread for grazing purposes over an area of several square miles. This method has proved effective and results in the deer becoming accustomed to the presence of man and are, therefore, handled without any great difficulty.

The Interdepartmental Reindeer Committee held four meetings.

EASTERN ARCTIC PATROL

The annual Eastern Arctic Patrol by the Dominion Government was successfully carried out aboard the R.M.S. *Nascopie* of the Hudson's Bay Company. The Patrol sailed from Montreal on July 8 and after a voyage of 10,660 miles returned to Halifax on September 23.

The Superintendent of the Eastern Arctic, Major D. L. McKeand, was the Officer in Charge and represented the Government in the northern archipelago. The party included the following: R. A. Perkins, Post Office Department; Richard Marriott, Historian; D. A. Nichols, Geological Survey; J. G. Oughton, Royal Ontario Museum; M. Dunbar and D. Chitty, Oxford University; H. S. Peters, United States Biological Survey; Dr. C. H. Williams, National Research Council; L. L. Lyster, Macdonald College; J. Lambert, Secretary. Dr. J. Melling was Medical Officer and Ship's Doctor from Montreal to Chesterfield and Dr. Thomas Melling acted in this capacity from Chesterfield to Montreal. Inspector D. J. Martin was in charge of the Royal Canadian Mounted Police party.

Included in the Government party were Messrs. J. A. McLean and F. G. Whitaker, barristers, who acted as Crown Prosecutor and Defence Counsel respectively, in the Eskimo trial held at Pangnirtung.

The usual inspections were made by the Officer in Charge at each port of call and inquiries instituted to determine the condition of the native population. Although fur production throughout the greater part of the Eastern Arctic was reported to be below normal this year, it was found that the general health and economic condition of the natives were satisfactory in most districts. There was a slight increase in births over deaths.

Medals commemorating Their Majesties' visit to Canada were distributed to the native children at the various posts. Scientific studies undertaken by members of the Government party covered a wider range of subjects than on any previous occasion resulting in a considerable addition to the scientific data available in regard to the Arctic regions.

The supplies for Medical Officers, R.C.M.P. posts, radio stations, and hospitals, loaded at Montreal and Churchill amounted to 414 tons and constituted about one-half the general cargo carried on the round voyage.

YELLOWKNIFE ADMINISTRATIVE DISTRICT

Under authority of the Local Administrative District Ordinance for the Northwest Territories, the Yellowknife Administrative District, situated on the north arm of Great Slave Lake, covering an area of 38.48 square miles, was established on October 1, 1939.

The affairs of the District are managed by a Local Trustee Board which commenced to function on January 1, 1940, and thus, for the first time in the history of the Territories as reconstituted in 1905, a local, self-governing, municipal body was established. There is an elected school board of three members. One teacher is maintained and the Alberta curriculum is followed. The Dominion Government gives a quarterly grant at the rate of \$1,000 per annum.

Improvements made in Yellowknife Settlement by the Dominion Government include a summer water supply system, roads built through the settlement, sanitary arrangements, and the survey of additional lots as required.

PUBLIC IMPROVEMENTS

Further improvements were made to the Grimshaw-Great Slave Lake winter tractor road, also to the roads and wharf at Fort Smith Settlement.

Winter landing fields and seaplane bases were improved at Fitzgerald (Alberta), Fort Smith, Resolution, Rae, Providence, Simpson, Wrigley, Norman, and Norman Wells.

Surveys were carried out at Fort Smith, Hay River, Taltson, Rat River, and Yellowknife Settlements.

Fire-fighting and life-saving equipment were maintained at Fort Smith, Resolution, Yellowknife, Rae, Hay River, Simpson, Providence, and Norman.

Sanitary facilities were improved at several of the settlements, including Resolution, Rae, Hay River, Norman, and Aklavik.

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 owing 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 three-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, 1939. This was the second session of the eleventh wholly Elective Council of the Territory. The Council was prorogued on May 2, 1939.

The Miner's Protection Ordinance was amended so as to provide for a compulsory examination at stated intervals by a physician for workmen whose work takes them into a quartz mine or into any ore-crushing or rock-crushing

operation of any mine. The examination made by a physician must include X-ray as well as a general examination. Drills must be equipped with a water needle to prevent the escape of dust, and all ores or other material in a mine broken by blasting, and all ores when entering a crusher, must be thoroughly sprayed with water to prevent dust rising therefrom. Amendments were made to the Workmen's Compensation Ordinance and the Game Ordinance.

ADMINISTRATION

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

The activities of Dominion Government Departments in the Territory involved an expenditure of \$478,310.74 during the past fiscal year and the revenue collected in the Yukon amounted to \$349,252.52. For local purposes the Territorial Government raised \$153,485.99, of which amount \$100,000 represented the profit from the operation of Government liquor stores.

LANDS AND TIMBER

One sale was made; 1 waterfront lease, 1 hay permit, and 4 permits to occupy were granted. Four assignments were registered and 8 renewal leases were issued. There are now in force 23 homestead entries, 8 agricultural leases, 25 waterfront leases, 2 miscellaneous leases, and 17 permits to occupy. The revenue derived from lands amounted to \$6,339.57.

One hundred and four permits were issued authorizing the cutting of 351,157 feet board measure of saw timber and 15,387 cords of wood. Three permits to cut wood for mining purposes were issued free of dues. Annual licences were completed for the 33 berths in force and on January 26 an Order in Council, P.C. 310, authorized that the annual licence fee be increased from \$2 to \$5 as and from May 1, 1940. Ten timber seizures were made. The total revenue collected from timber was \$6,795.99.

MINING

Mining continues to be the principal activity and a marked increase in placer gold production was noticeable during the past year. Placer mining operations produced 108,077.89 ounces of gold, the total value of which, at \$35 per ounce, is \$3,782,726.15. This is an increase of 17,568.38 ounces as compared with the previous year, mainly due to the increased production of Yukon Consolidated Gold Corporation, Limited, which rose from 60,055.76 fine ounces in 1938 to 74,272.42 fine ounces in 1939.

An important development in lode mining was the beginning of production from the Laforma mine in the Carmacks district, where gold deposits were discovered in 1931.

Entries were granted for 200 placer and 101 quartz mining claims staked and applied for during the year, and 2,047 such claims were renewed for another year. As no leases of quartz mining claims were granted or cancelled the area held under lease remains the same as last year, namely, 4,934.42 acres.

Gold Royalty.—The total amount collected for royalty on gold obtained from placer deposits up to March 31, 1940 was \$5,197,123.21, of which amount \$40,529.58 was collected during the fiscal year.

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, 1940 amounted to \$210,206.64. These leases comprise portions of the bed of Klondike River. For the purpose of gold recovery there are 11 dredges engaged in mining in Yukon Territory, most 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 4 hydraulic mining locations held under lease, comprising a total area of approximately 16 square miles. Rentals amounting to \$207,361.50 have been collected on account of such locations, the amount received during the fiscal year being \$3,563.

Placer Mining

The total number of placer claims in good standing at the close of the year was 2,644, most of which are held by the Yukon Consolidated Gold Corporation, Limited. Ten dredges were operated by this company during the year, and these produced 74,242.42 fine ounces of gold and 17,394.63 fine ounces of silver. The company employed an average of 387 men, the peak during the operating season being 683, and expended \$1,061,000 for salaries, wages, and power. A further sum of \$803,146 was expended for equipment, supplies, and freight.

The greater part of the 108,077.89 ounces of gold produced during the year was from the Dawson District, the Mayo District producing 1,221 ounces and the Whitehorse District, 875.91 ounces.

Lode Mining

Dawson District.—Entries were granted for 51 quartz claims staked during the year and development work was conducted on 228 claims previously staked. Since the first gold brick was poured last year in the Mount Freegold area, production has increased and 1,147 ounces of gold were produced during the year.

Mayo District.—Operations in this area are conducted mainly by the Treadwell Yukon Corporation, Limited, on the "Calumet" and "Elsa" groups of mineral claims, the mill being located at the "Elsa" camp. During the calendar year 1939, 54,294 tons of crude ore were milled, producing 7,229 wet tons of concentrates. The average number of men employed by this corporation was 180, and silver, lead, and gold shipped had a value of \$2,002,338.43.

Grants and Leases

Prospecting Leases.—Prospecting leases representing a total stretch of 156 miles were issued during the year, comprising locations on several watercourses, an increase of 58 miles as compared with the previous year.

Water Rights.—There are now in force 40 grants to divert water for mining purposes under the provisions of the Yukon Placer Mining Act, which grants aggregate 14,650 miner's inches.

Assay Office

The Assay Office was maintained as usual at Keno by the Territorial Government. A total of 1,272 samples of rock for assay were received from all parts of the Territory, and 1,929 assays or quantitative analyses were made.

In addition, numerous qualitative determinations and chemical tests were made in connection with the identification and classification of the various rocks and minerals of which no record was kept. The assays made were gold and silver, 1,272; lead, 631; copper, 7; zinc, 16; tungsten, 2; molybdenum, 1; and tin, 1.

ROADS AND BRIDGES

Expenditure on the maintenance of the road system out of Territorial funds were \$50,779.94, a decrease of \$2,598.47 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 \$40,000 was received from the Federal vote for mining roads, and the net expenditure from this grant on roads was \$33,005.69. Highway work consisted of the following: Construction of a road from a point on the Overland road eight miles south of Yukon Crossing to Mount Freegold, a distance of approximately twenty-seven miles; improvements to sections of the Hunker-Dominion-Sulphur road, such as ditching, installing culverts, re-forming, and gravelling; re-forming sections of Dawson to Boundary and Upper Sixtymile roads and surfacing with broken rock the impassable parts; extension of the new Silver King Road system from the "Elsa" Camp via the "Calumet" and "Rio" groups of mining claims on Galena Hill, to make a connection with the old Mayo-Keno road at Crystal Crossing.

DEVELOPMENT OF AIRCRAFT LANDING FACILITIES

An expenditure of \$6,989.44 was made from the Federal vote for mining roads for landing fields and a further sum of \$653.02 was expended out of Territorial funds. The sum of \$1,000 was expended from the Federal grant on the Dawson field to extend the runway for a distance of 1,000 feet and \$179.71 was spent out of Territorial funds to remove snow drifts and roll the field for winter use.

An expenditure of \$2,000 was made from the Federal grant on the Whitehorse field to enlarge the airport and to surface a new runway. The maintenance of this landing field during the winter was taken care of by the White Pass and Yukon Route and the Pacific Alaska Airways, at their own expense. Improvements were made to the landing fields at Mayo, Carcross, and Carmacks, and the sum of \$1,250 was expended out of the Federal grant to construct an emergency landing field at Minto. Emergency landing fields were constructed by the White Pass and Yukon Route at Upper Laberge, Braeburn, Montague, Mica Creek, Crooked, and Strikland Lake about thirty miles from Dawson. The company also made certain improvements to the Selkirk Field.

GENERAL

Agriculture.—The summer and early autumn seasons were wet and early frosts damaged vegetables and prevented taking in crops. Hay and grain fodder crops were good, but the season was unfavourable for cutting and curing the crop.

Fur and Game.—The net collections made under the Fur Export Tax Ordinance amounted to \$8,861.69, a decrease from the previous year's collections of \$1,975.91. A considerable increase is shown in muskrat, weasel, and wolverine, and a small increase in marten, fisher, and bear. Beaver, lynx, fox (all kinds), mink, and otter all show a large decrease.

The number of wolf pelts presented dropped from 637 for the previous year to 266, and coyote decreased from 1,727 to 1,080.

Revenue from fees for licences issued under the Game Ordinance amounted to \$5,109, an increase of \$965 over the previous year.

Public Welfare.—The general health of the public of the Territory was good. Hospitals were operated at Dawson, Mayo, and Whitehorse, grants for their maintenance being provided by the Yukon Council. The numbers of hospital days of patients for the year were: Dawson, 10,984; Mayo, 2,483; Whitehorse, 2,130. The numbers of hospital days for indigents were: Dawson, 7,278; Mayo, 144; Whitehorse, 470.

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 215 and the number of teachers employed was 10.

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

LAND REGISTRY

The Land Registry maintains a Central Office of Record of lands under Dominion control; administers Ordnance and Admiralty lands, Dominion owned public lands, Soldier Settlement land on which advances have been made, and timber and grazing on Soldier Settlement charged lands and military reserves. The adjustment of Seed Grain, Fodder, and Relief indebtedness and the issuing of Letters Patent are also functions of this Division.

CENTRAL OFFICE OF RECORD

The inventory of lands, maintained in the Land Registry, has been found by the public and by other Government Departments to be a convenient means of quickly finding out the ownership of areas regarding which information is desired. There are 4,680 parcels listed.

ORDNANCE AND ADMIRALTY LANDS

Ordnance and Admiralty lands are those areas in the Maritime Provinces, Quebec, Ontario, and British Columbia that were acquired by the Crown because of their strategic situation. When no longer required for the purpose for which they were obtained, they are transferred to this Department to administer, and they are, wherever possible, made revenue-producing, usually by leasing. The administration of these lands requires investigations; appraisals; surveys; searches of titles; preparation of plans, leases, and reports; and collection of rentals. To assist in economical administration much of the field inspection work has been done in late years by the officers of Soldier Settlement when in the vicinity of the property regarding which a report is required. During the year investigations were made at 6 places in Nova Scotia and New Brunswick, 10 places in Quebec, 5 in Ontario, and 2 in British Columbia.

Under the provisions of Section 8 of the Railway Belt and Peace River Block Transfer Agreement, a commission was appointed consisting of a representative of the Province of British Columbia and one representing the Dominion of Canada, to determine the location and boundaries of Ordnance and Admiralty lands in British Columbia. Mr. Henry Cathcart, Deputy Minister of the Department of Lands, Victoria, B.C., was named by the Province as its representative, and by Order in Council P.C. No. 75, January 11, 1939, Charles Henry Taggart, D.L.S., of the Department of Mines and Resources, was named the representative of the Dominion of Canada.

Meetings of the Commission were held at Victoria, B.C., between February 7 and April 15, 1939, and a thorough investigation was carried out to determine the location and boundaries of those Ordnance and Admiralty lands, the right to administration of which has been under dispute for more than fifty years.

The relations between the Provincial and Dominion officials were most cordial, resulting in satisfactory completion of the work. The locations of the lands and the boundaries of the same were determined and laid down on reference maps, and a description, history, and statement of the status prepared for each of the 172 parcels of land involved.

Surveys.—Surveys were made at Oromocto Reserve, Oromocto, New Brunswick; and at Levis, and Pointe aux Trembles, Quebec.

There were 71 leases and permits issued during the year and 9 sales effected. The revenue amounted to \$18,413.66.

PUBLIC LANDS

The revenue from Public lands, \$13,478.57, consisted chiefly of rents and amounts received on account of purchases.

SOLDIER SETTLEMENT CHARGED LANDS

The unpatented lands against which charges under Soldier Settlement Act are registered remain vested in the Dominion. There are 207 quarter-sections of such lands comprising approximately 33,120 acres spread over the four western provinces.

Letters Patent are issued to entrants who have completed the duties in accordance with the terms of the Dominion Lands Act and who have paid their indebtedness to the Soldier Settlement of Canada. In cases where the duties are completed but this indebtedness not repaid, 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. Fourteen patents were issued during the fiscal year.

TIMBER AND GRAZING

Grazing.—During the year 6,855 acres were covered by 4 annual grazing permits on Quarantine reserves along the southern boundary of Saskatchewan and Alberta. This was a decrease in acreage of 3,840 acres as compared with last year. The decrease in the area covered by permits is due to the fact that the Department of Agriculture has taken over control of considerable tracts of land in connection with The Prairie Farm Rehabilitation Program. In the summer-grazing season of 1939 there were 277 cattle, 125 horses, and 350 sheep grazing on lots covered by annual permits.

The revenue, consisting of rental, amounted to \$137.10.

Timber.—There are 11 licence timber berths within the boundaries of National Parks covering a total area of 65.90 square miles. Two of these berths are in the Province of Manitoba and 9 in British Columbia. During the year licences in duplicate were prepared for these 11 berths and the revenue amounted to \$3,781.50.

On the Dominion Government Coal Block near Hosmer, B.C., there are 2 permit timber berths in force, and the revenue amounted to \$1,119.92.

During the year 47 accounts, covering timber permits issued to homesteaders by the Dominion before the transfer of the natural resources, were verified for the western provinces.

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, and relief indebtedness in 825 cases. Their recommendations were ratified by Orders in Council and 542 discharges and releases of liens were issued, resulting in writing off the amount of \$29,158.77. There were 1,993 inquiries received from the provinces for statements of indebtedness outstanding relative to the issue of land grants, and 58 certificates of indebtedness were issued to be attached to title. There were also 6,263 inquiries received from the different Debt Adjustment Boards in the western provinces. Gross collections for the fiscal year amounted to \$8,752.64, which represents an increase of \$4,891.67 over the previous year. The sum of \$172.98 was refunded, leaving a net revenue of \$8,579.66.

The following summary shows the financial operations for the year:—

Debits	Principal		Interest		Total	
	\$	cts.	\$	cts.	\$	cts.
Balance outstanding, March 31, 1939.....	2,822,091	11	3,171,459	40	5,993,550	51
Claims paid to the Province of Saskatchewan for relief and fodder advances under the 50-50 arrangement.....	78,871	62			78,871	62
Accrued interest, April 1, 1939, to March 31, 1940.....			167,462	36	167,462	36
Total debits.....	2,900,962	73	3,338,921	76	6,239,884	49
Credits						
Net Revenue—						
April 1, 1939 to March 31, 1940.....	6,966	30	1,613	36	8,579	66
Amount written off as loss by Orders in Council (Sec. 2, Chap. 51, 17 Geo. V).....	9,711	19	19,447	58	29,158	77
Amount collected and retained by Province of Saskatchewan as Commission Clause 18, Natural Resources Agreement with Province of Saskatchewan.....			7	00	7	00
Total credits.....	16,677	49	21,067	94	37,745	43
Amount outstanding, March 31, 1940.....	2,884,285	24	3,317,853	82	6,202,139	06

LETTERS PATENT

During the fiscal year there were 19 Letters Patent issued covering a total area of 1,778 acres, divided among the four western provinces, Northwest Territories, and Yukon.

There were 265 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, the establishment of National Parks

and the supervision of all activities within the parks, the preparation and distribution of information respecting National Parks and wild life, and the preservation and marking 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 are game officers under the Migratory Birds Convention Act. Highways and other public works of a major character in the National Parks are constructed by the Surveys and Engineering Branch of the Department. From April 1, 1939, maintenance and minor construction work which was formerly handled by the Surveys and Engineering Branch was taken over by the Parks Administration.

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 during the year numbered 995,270, as compared with 954,120 in 1938-39, an increase of 41,150 persons. The largest increases were registered at Banff and Waterton Lakes Parks. Visitors arriving by motor were again in the majority, amounting to approximately 94 per cent of the total, and included 207,236 motor vehicles and 934,346 passengers. Estimated passenger rail traffic was 60,924.

Tourist figures by parks for the fiscal year ended March 31, 1940, compared with returns for the preceding year, are given in the following table:

Visitors to National Parks

Park	1939-40	1938-39
Banff.....	235,509	192,635
Buffalo.....	22,006*	10,960*
Cape Breton Highlands.....	22,035	20,500
Elk Island.....	53,821	73,056
Fort Anne.....	17,116*	17,050*
Fort Beausejour.....	16,589	15,405
Georgian Bay Islands.....	9,677*	6,169*
Glacier.....	1,200*	1,200*
Jasper.....	23,115	19,388
Kootenay.....	62,063	52,027
Mount Revelstoke.....	7,500*	6,000*
Nemiskam.....	30	20
Point Pelee.....	134,242	203,180
Prince Albert.....	27,367	29,727
Prince Edward Island.....	35,488*	10,000*
Riding Mountain.....	129,846	124,459
St. Lawrence Islands.....	21,600*	21,150*
Waterton Lakes.....	108,527	86,517
Yoho.....	67,539	64,677
Total.....	995,270	954,120

* Estimated.

WILD LIFE CONSERVATION

The National Parks of Canada are sanctuaries where all forms of wild life are protected from hunting and trapping.

Under natural conditions the territory comprised in any national park will be found to contain species native to the region maintained by natural control at a level which will not deplete forest cover or range. In the development of

park areas nature is being disturbed to some extent and consequently carefully considered policies of wild life administration are being worked out, based on the constant watchfulness of the warden service, and scientific investigation as need arises.

Investigations carried out during 1939 showed that the various species of wild life in the parks are maintaining themselves in a satisfactory manner. In Waterton Lakes, Banff, Jasper, and Prince Albert National Parks, elk are regaining the ground lost to them in pioneer days, when they were nearly exterminated. Moose are also increasing, particularly along the Banff-Jasper road. Species such as the ruffed grouse, snowshoe rabbit, and marten, which are known to fluctuate in numbers, are on the upgrade in their cycle.

The Department maintains in Alberta three fenced parks for the purpose of preserving animal species native to the plains of Western Canada. These are Buffalo, Elk Island, and Nemiskam National Parks. The first two are buffalo reserves which have also served to protect moose, elk, and deer, and the third is a reserve for prong-horned antelope. After a careful investigation of range conditions and of the buffalo and other animals in Buffalo National Park, it was found necessary to slaughter all the larger animals, so that the range may lie fallow for a time. At the same time investigation in Elk Island Park revealed the magnificent condition of the animals there, particularly the buffalo. Exhibition herds maintained at Banff, Prince Albert, and Riding Mountain National Parks continue to thrive and attract visitors.

Following is a census of wild animals in fenced enclosures in the National Parks, as of March 13, 1940:—

Animals in Fenced Areas

Animal	Banff Park Paddock	Buffalo Park	Elk Island Park	Nemiskam Park	Prince Albert Park Paddock	Riding Mountain Park Paddock	Total
Buffalo*	11		1,084		5	60	1,160
Antelope				70			70
Elk	3		488			84	575
Hybrids (cattalo) †		96					96
Moose			113			3	116
Mule deer			27			6	33
White-tailed deer						7	7
Rocky Mountain sheep	8						8
Totals	22	96	1,712	70	5	160	2,065

*In addition to the buffalo listed here, there is a large herd of buffalo in Wood Buffalo Park.
†These animals belong to the Department of Agriculture and are kept in a special enclosure.

FOREST FIRE CONTROL

Owing to hot dry weather which prevailed for some time, the fire hazard in the National Parks in the West was high throughout the greater part of the summer season. A total of 120 fires occurred and burned over an area of 13,273 acres, as compared with 51 fires and 2,814 acres burned last year. Of the total area burned, 81.9 per cent was in Riding Mountain Park, 16.6 per cent in Mount Revelstoke Park, and only 1.5 per cent in the remaining parks.

Losses of mature timber occurred in Mount Revelstoke and Riding Mountain Parks, where the value on a merchantable basis was estimated at approximately \$19,294. Following is a table showing the cost of fire fighting and total area burned for the years 1938 and 1939:—

Park	No. of Fires	Area Burned—Acres		Cost of Suppression	
		1938	1939	1938	1939
Banff	33	8	3.5	\$ 1,282	cts. 94
Cape Breton Highlands	1		85.0		195 03
Elk Island	1 (outside)				11 00
Jasper	12		0.5	29 00	40 84
Kootenay	4 (spot)				27 17
Mount Revelstoke	3		2,215.0		9,327 62
Prince Albert	14	67	86.7	460 45	301 51
Riding Mountain	41	2,780	10,817.0	3,226 65	5,378 79
St. Lawrence Islands	1 (spot)			6 30	2 50
Waterton Lakes	8 (outside)				151 18
Yoho	2 (spot)			2 38	11 75
Total	120	2,855	13,207.7	5,007 72	15,789 04

Throughout the summer the warden services in the parks co-operated with the Dominion Department of Agriculture in the collection of insects for the 1939 Forest Insect Survey.

GENERAL MAINTENANCE, CONSTRUCTION, AND IMPROVEMENTS

Engineering work carried out in the National Parks included the construction and maintenance of motor highways and secondary roads, trails, bridges, and buildings in the parks and historic sites; general maintenance and operation of electric light, telephone, water, and sewage systems; maintenance of streets and sidewalks; collection and disposal of refuse; and mosquito control in park townships.

The mileage of roads, trails, and telephone lines within the National Parks of Canada on March 31, 1940, will be found in the following table:—

Means of Travel and Communication

Region	ROADS			Trails	Telephone Lines
	Motor	Secondary	Total		
Banff National Park (including Lake Louise end, Banff-Jasper Highway)	186.4	21.5	207.9	903.0	235.0
Buffalo National Park	2.0	25.0	27.0	57.0	36.0
Cape Breton Highlands National Park	31.6	21.1	52.7	13.8	
Elk Island National Park	18.0	2.0	20.0	4.0	16.0
Glacier National Park		12.0	12.0	109.0	3.2
Jasper National Park (including Jasper end, Banff-Jasper Highway)	141.5	10.0	151.5	630.0	372.0
Kootenay National Park	61.1	11.0	72.1	135.0	62.0
Mount Revelstoke National Park	19.0		19.0	49.0	17.0
Point Pelee National Park	9.0	1.5	10.5		6.0
Prince Albert National Park	63.0	75.8	138.8	390.0	151.0
Prince Edward Island National Park	4.0		4.0		
Riding Mountain National Park	50.2	70.0	120.2	119.0	218.5
Waterton Lakes National Park	44.4	3.0	47.4	242.9	60.2
Yoho National Park	44.5	6.0	50.5	192.5	56.0
Totals	674.7	258.9	933.6	2,845.2	1,232.9

UNEMPLOYMENT RELIEF

Unemployment relief work in National Parks was continued during 1939-40. Permanent park residents with domestic responsibilities in Banff National Park were provided with relief on a work basis during April, part of May, and part of December, 1939, and in January, February, and March, 1940. During this period 3,605 man-days of work was provided for 103 individuals having 287 dependants.

The work carried on for unemployment relief included townsite improvements, improvement and maintenance of roads, snow removal, improvement of parking areas, collection of firewood, sanitation clearing along highways, demolition of old buildings, operation of rock crusher, and other miscellaneous works.

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 \$391,570.64 for the fiscal year 1939-40, as compared with \$366,223.97 for the fiscal year 1938-39, an increase of \$25,346.67.

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

National Parks	1939-40		1938-39	
	\$	cts.	\$	cts.
Banff National Park	163,325	78	153,339	77
Buffalo National Park	64,235	58	32,578	16
Cape Breton Highlands National Park	813	61	239	86
Elk Island National Park	4,089	25	20,012	42
Fort Anne National Park	41	60	90	00
Georgian Bay Islands National Park	148	00	119	00
Glacier National Park	191	13	118	55
Jasper National Park	50,508	06	51,010	16
Kootenay National Park	18,770	10	17,607	18
Mount Revelstoke National Park	17	00	1	00
Point Pelee National Park	7,437	45	6,615	10
Prince Albert National Park	14,402	32	13,576	89
Prince Edward Island National Park	892	29	117	35
Riding Mountain National Park	41,136	68	43,820	16
St. Lawrence Islands National Park	200	00	200	00
Waterton Lakes National Park	18,751	99	16,860	67
Wawaskey National Park		00	40	00
Yoho National Park	4,333	31	4,240	80
Historic Sites	127	00	391	20
Miscellaneous (Head Office)	23	05	11	29
Fines and Forfeitures	1,485	83	1,190	71
Casual Revenue	2,627	20	3,856	39
Premiums and Exchange	30	43	2	55
Gross Revenue	393,587	66	366,039	21
Less refunds	3,082	30	665	27
Net Revenue	390,505	36	365,373	94
Migratory Birds				
Fines and Forfeitures	779	91	770	61
Casual Revenue	222	37	11	42
Taxidermist licences	63	00	68	00
Revenue	1,065	28	850	03

PUBLICITY AND INFORMATION

During the year the activities of the Publicity and Information Division in promoting tourist travel to the National Parks were continued on a wide scale. One hundred and forty-six articles descriptive of the scenic, wild life, and recreational attractions of the parks, as well as their historical associations, were given wide distribution to leading newspapers and magazines. More than 200 short articles were circulated by means of the *Canadian Resources Bulletin*, and by special arrangement with the Commissioner of Emigration, London, England, articles and photographs were supplied to newspapers of the British Isles. Material was also furnished to many writers and individuals engaged in press work.

Requests for literature continued in increasing volume from tourist agencies, travel companies, automobile associations, boards of trade, and similar organizations, as well as from educational institutions and individuals. To meet the demand 666,880 copies of publications were printed during the year. Included was an attractive new booklet, descriptive of the National Parks in the Central Rockies, and a folder which was produced for distribution at the New York World's Fair. Illustrated reprints of articles on the Banff-Jasper Highway and the Geology of National Parks in the Rockies and Selkirks were also produced in booklet form. There was a total distribution of 30,500 copies of Immigration literature and 453,022 copies of National Parks literature in addition to approximately 12,500 copies of maps and other pamphlets.

A complete list of publications issued follows:—

Annual Report, National Parks Bureau (Contained in Separate report of the Director, Lands, Parks and Forests Branch) (English edition)	500
Annual Report, National Parks Bureau (French edition)	300
Banff, Kootenay, Yoho, Glacier, and Mount Revelstoke National Parks (Descriptive Booklet)	50,800
Banff National Park (General Information Folder)	25,000
Banff-Jasper Highway, The (Descriptive Booklet)	25,000
Catalogue of National Parks Motion Picture Films (Fourth Edition)	1,000
Canada's Mountain Playgrounds (Descriptive Booklet)	50,400
Canada's Maritime Playgrounds (Descriptive Booklet)	25,000
Geology of the National Parks in the Rockies and Selkirks (Descriptive Booklet)	10,000
Jasper National Park (Descriptive Booklet)	53,580
Jasper National Park (General Information Folder)	25,000
Kootenay, Yoho, Glacier, and Mount Revelstoke National Parks (General Information Folder)	25,000
National Parks of Canada (Descriptive Folder)	200,000
Playgrounds of the Prairies (Descriptive Booklet)	25,000
Prince Albert National Park (General Information Folder)	25,000
Riding Mountain National Park (Descriptive Booklet)	50,000
Riding Mountain National Park (General Information Folder)	25,000
Waterton Lakes National Park (Descriptive Booklet)	25,200
Waterton Lakes National Park (General Information Folder)	25,100

The demand for National Parks motion picture films, particularly from educational institutions, resulted in an increased circulation during the year, as indicated by the following comparative figures: 1936-37—3,884; 1937-38—4,026; 1938-39—3,980; 1939-40—4,508. Prints were circulated in the United States, Great Britain, Australia, South Africa, New Zealand, and Alaska, as well as in different parts of Canada. The reported attendance at showings of National Parks films during the year was 3,079,724. National Parks of Canada films were also shown several times a week in the cinema of the British Pavilion at the New York World's Fair.

The film library now contains 93 subjects in 16-mm. size and 85 subjects in 35-mm. size, comprising a total of 1,943 prints descriptive of the scenic, recreational, and wild life aspects of Canada. During the year 7,157 feet of duplicate kodachrome film, 822 feet of negative, and 28,471 feet of positive film were purchased. The above included 142 prints.

Six new subjects were produced in 16-mm. kodachrome film during the year as follows: *Banff to Lake Louise*, *Motoring in Cloudland*, *Lakeland Resort*, *Playground of Two Nations*, *Sanctuary and Playground*, and *Up the Athabaska Road*.

Co-operation was extended to the National Film Board in the production from national parks film of a new sound picture *The Banff-Jasper Highway*. Assistance was also furnished to other divisions of the Branch in the production of the films *The Forest Inflammability Cycle*, and *Reindeer and the Eskimo*.

The demand for lantern slides as a publicity and educational medium continued, and during the year 6,166 slides, accompanied by suitable lecture notes, were lent to educators and lecturers. The library stock was augmented by 445 new slides, and 1,659 slides from stock were retouched and remounted. A total of 56 photographic enlargements and 102 translites and transparencies were coloured during the year.

Additions to the photographic library included 73 new negatives, and 4,729 prints and enlargements. A total of 9,250 photographs and enlargements were distributed for publicity purposes, and 459 half-tones and line-cuts were lent to editors, publishers, and publicity organizations.

The Canadian Broadcasting Corporation was provided with literature, articles, and special information on national parks for use in the "Canadian Snap-shots" series of broadcasts. Assistance was also provided in making possible a special broadcast on the occasion of the official opening of Prince Edward Island National Park in July, 1939.

The National Parks Bureau participated in the 1939 New York World's Fair with an attractive exhibit in the Canadian Pavilion. The Bureau co-operated with the Canadian Travel Bureau in maintaining a travel information bureau in the Canadian Pavilion for the duration of the Fair. The Bureau was also represented by a well designed exhibit in the Railway Building at the Canadian National Exhibition, Toronto. For the second successive year the exhibit was awarded a gold medal by the Exhibition Association.

Photographs, translites, and other exhibition material were also shown at the following exhibitions: Daily News Exposition, Detroit; Pacific Northwest Tourist Association exhibits at Cincinnati, Chicago, and Minneapolis; and Centennial Exhibition, Wellington, New Zealand.

NATIONAL PARKS OF CANADA

Scenic and Recreational Parks

BANFF NATIONAL PARK

Banff was the first of Canada's national parks, and may therefore be credited with being the forerunner of the whole national parks system. Originally a reservation of only 10 square miles set aside to preserve for the public the mineral hot springs which are a feature of this park, Banff now has an area of 2,585 square miles, and is world-famous for its scenery and for the facilities which it affords to the tourist and vacationist. Accommodation ranges from inexpensive but comfortable bungalow camps to luxurious mountain hostleries. Fine motor roads lead to principal points of interest, and more than 900 miles of trails for saddle-pony or hiking trips penetrate the mountain fastnesses. Motor camp-grounds are located at suitable places.

Banff, like all other national parks in Canada, is a wild life sanctuary. It is a year-round sports centre, and its recreations include motoring, riding, fishing, climbing, hiking, golf, tennis, boating, swimming, ski-ing, skating, and curling.

Tourist travel to Banff Park showed a considerable increase over the previous year and established a new high record for the park. The following table gives the total number of visitors entering Banff Park during the past year, and comparative figures for the previous year:—

Visitors to Banff National Park

Route	Motor Vehicles		Passengers	
	1939-40	1938-39	1939-40	1938-39
<i>Westbound—</i> Via Banff Park (Eastern Gateway entrance).....	50,224	44,125	169,926	142,155
<i>Eastbound—</i> Via Kootenay Park (Radiu Hot Springs entrance— 75% eastbound traffic).....	6,305	5,466	19,910	16,573
Via Yoho Park (Leancoil entrance, 66% eastbound traffic).....	1,487	1,260	4,173	3,907
Tourists for Banff Park by rail—east and west (estimated).....			41,500	30,000
Totals.....	58,016	50,851	235,509	192,635

The Information Bureau was open from May 15 to September 30, and dealt with 25,213 inquiries.

Licences and permits issued during the year totalled 21,582 as follows: park licences, 1,353; transient auto licences, 19,510; provincial auto licences, 270; and permits, 449. This represents an increase of 2,156 over the corresponding period last year.

Health conditions throughout the year were generally good, and constant supervision was maintained over all matters affecting public health. Mosquito control was carried out from April to August with very beneficial results.

At the Cave and Basin bath-house a total of 40,373 persons passed through the turnstile, an increase of 2,088 over 1938-39. The total number of persons making use of the Upper Hot Springs bath-house was 46,894, a decrease of 54 as compared with last year.

The public camp-grounds continued to be popular. Registration at Tunnel Mountain camp-ground showed a total of 2,318 motor vehicles and 8,785 campers, a decrease of 23 cars and 86 persons from last year. The number of person-days spent in camp was 22,428, or an average of 2.55 days per person. Outside camp-grounds at Johnstons Canyon, Castle Mountain, Lake Louise, Moraine Lake, and Lake Minnewanka were all used extensively for overnight camping, and all bungalow camps were well patronized throughout the season.

New construction included a warden's cabin at the North Saskatchewan Crossing; a warden's cabin and equipment building at Lake Louise; and 3 shelters along the Banff-Jasper Highway near Bow Peak, Bow Pass, and Waterfowl Lake. Under private enterprise 104 building permits were issued covering work estimated at \$171,576, and included a new bungalow camp on the Saskatchewan River, a ski lodge on Mount Norquay, and in the townsite an auditorium, 2 store blocks, and 4 residences as well as numerous additions and improvements.

The Banff-Jasper Highway, which connects Banff and Jasper National Parks, was completed. This road along a mile-high mountain trench and skirting the great Columbia Icefield, promises to become one of the popular scenic highways of the world. Hardsurfacing of the Trans-Canada Highway was continued from Mile 9 west of Banff, and completed to a point just west of Johnstons Canyon at Mile 17.4. In addition several revisions were made to eliminate bad turns and steep grades. All main and secondary roads were maintained in good condition. Other improvements were as follows: the Healy Creek fire road was extended for 1,700 feet; on the Spray River fire road 2 bridges were rebuilt and repaired; 2 miles of fire road were constructed on the Cascade River and 2 small bridges built; the road up Anthracite Hill was repaired and 25 guard rail posts erected; on the Moraine Lake road, 19 culverts were constructed and 1 bridge renewed; 1 large and several small bridges were built on the Stoney Creek and Redearth Creek fire roads.

The Peyto Lake trail was improved and a parking area constructed at the foot of the trail; the Mistaya Canyon trail and the Stoney Creek trail were improved. In addition, 3½ miles of bridle path was cleared between Banff and Minnewanka townships. On Bow Pass access was opened up to several view points, and the required trails built. A parking area to accommodate 500 automobiles was completed near the ski slopes on Mount Norquay.

A total of 9 miles of new telephone line was constructed, 3 miles from Minnewanka, to join the north line, and 6 miles up Redearth Creek. Revisions and rebuilding of 7 miles on the south line, re-stringing of the north line from Lake Louise to the Saskatchewan River, and part of the south line up Spray Creek.

In the township, general municipal services were maintained, and minor construction such as sidewalks and hardsurfacing of township streets was carried out. In addition, the parking area at the post office was enlarged, and the old zoo grounds converted into a picnic and playground, with a large parking area along the Buffalo Street side. As a result of a detailed lot and building survey made in 1937, the building situation has been greatly improved, and the township now presents a more orderly appearance. The park museum was open from April 1 to October 3, attracting a total of 22,351 visitors.

Reports received from the warden service indicate that wild life is plentiful. Bears were particularly numerous in the vicinity of Banff township. Predators are reported to be scarce.

During the year an extended visit to the park was made by a qualified mammalogist, covering as large a proportion of the area as was possible. In his report particular attention was paid to the larger mammals. It was found possible to divide the park area into three parts on the basis of its suitability for game animals. The best range is along the eastern border especially in the northeastern section, where all species find suitable conditions. In the higher parts of the park, lying along the Great Divide, the snows of winter are so deep that only moose and mountain goat find ideal conditions. Along the new highway, which runs through this area, motorists are almost sure to see moose. Animal populations were found to be in satisfactory condition, although the rapid increase of some species carries with it the threat of over-population.

Distribution of fish fry from the Banff hatchery during the past year was as follows: in park waters, 807,650; in provincial waters, 624,090; combined total, 1,431,740.

In co-operation with the Dominion Forest Service, a considerable number of trees infected with mistletoe blight were taken out and cut up for firewood. Some tree planting was carried out at the Tunnel Mountain camp-ground. Other work undertaken included clear-cutting 4 acres in an old burn between Miles 33 and 35, and sanitation cuttings over 8 acres on the Banff-Jasper

Highway. In addition a fireguard 100 feet wide and 640 yards long was cut across the Spray Valley; and a considerable amount of brushing was done in the ski area on Mount Norquay.

The Sky Line Trail Hikers held their annual hike from August 4 to 7. The route followed was from Lake Louise into Skoki and Ptarmigan Valleys. The Trail Riders of the Canadian Rockies held their annual ride between July 28 and August 1, following the route from Egypt Lake to Moraine Lake. The annual Indian Days Sports was held from July 20 to 23, and was attended by approximately 550 Indians. The Banff Springs Golf Week was held in August and attracted over 100 entries. The Banff Tennis Club competitions were run off in September.

The Banff Winter Carnival was held from February 15 to 18 and attracted visitors from many outside points including the United States. For this occasion an ice palace, with a small rink in front of it, was erected on Banff Avenue, north of the Bow River bridge, and a toboggan slide was constructed running down Caribou Street to Beaver Street.

Ski-ing continued to be popular and attracted large crowds to the park. The Dominion Ski Championship Meet was held on the slopes of Mount Norquay from February 29 to March 3 and attracted over 3,000 visitors. The weather conditions were ideal, and two records were established on the downhill run. One hundred and fifteen competitors were entered, among whom were many of the leading ski experts of Canada.

The outstanding event of the season was the visit of Their Majesties the King and Queen, who stayed at Banff from May 26 to 28. While in Banff, Their Majesties enjoyed a pleasant rest from their Canadian Tour, and expressed their admiration of the beauties of Banff National Park.

CAPE BRETON HIGHLANDS NATIONAL PARK

Thrust far into the Atlantic at the eastern extremity of Canada, Cape Breton Island, with its rugged shores, forested highlands, sheltered coves, and fishing villages, affords an ideal setting for a national park. Here, in 1936, Cape Breton Highlands National Park was established. From Cabot Trail, which almost completely encircles it, the mountainous interior supplies an appropriate background for magnificent vistas of shoreline, ocean, and the Gulf of St. Lawrence. The Cabot Trail, rapidly being developed into a first-class highway, connects with the excellent road system of the Province of Nova Scotia. Entrance by the eastern route is made through the famous Bras d'Or (Arm of Gold) Lake region to Ingonish; the western route approaches by way of the beautiful Margaree Valley to Cheticamp. The park has an area of 390 square miles, a present highway mileage of 52.7, and 13 miles of trails. In historic and atmospheric interest it is probably not excelled by any like area on the continent.

No facilities were available for accurately checking the number of visitors. However, from registrations at the local hotels and tourist establishments in the vicinity, it is estimated that more than 22,000 persons visited the park during the year. This represents an increase of approximately 11 per cent over the same period last year.

Licences and permits issued during the year totalled 109 as follows: hay permits, 16; guide licences, 5; timber permits, 74; and ice permits, 14.

New construction carried out during the year was as follows: Completion of the Superintendent's residence, Administration building, and entrance lodge at Ingonish; 2 kitchen shelters, a bath-house and a small power-house, and on the golf course 3 shelters, 2 pumping stations, and 3 foot-bridges were built; 629 lineal feet of stone wall was built in the vicinity of the parking field; a parking area was levelled and graded; a part of the athletic field was sloped and sodded; 3 sides of the tennis courts were ripped; a gravity water system was installed to service the Administration building, and a lighting plant was installed in the power-house.

Reconstruction of the Cabot Trail under contract was continued. Included in this work was the following: repairs to 2 large bridges on the Cabot Trail; construction of one 60-foot bridge at Presqu'île Lake, and one 25-foot bridge across an inlet at Ingonish Beach; 81 culverts were constructed; 1,580 feet of timber crib was built at the sea wall on Cap Rouge; 200 feet of dry masonry guard-rail, and 60 feet of timber crib were built on North Mountain; 1,830 feet of guard-rail was built under contract work on the Cabot Trail; and a parking area was graded for a look-out on MacKenzie Mountain.

In addition a one-way road, 3,175 feet long with turnouts, was constructed along the Clyburn River, parallel to the 7th and 8th fairways of the golf course, and a cable foot-bridge 120 feet long was built across the river.

During the year approximately $3\frac{1}{4}$ miles of new trail was constructed as follows: to the golf course, 4,395 feet; along the north shore of Freshwater Lake from the Administration building to the bathing beach, 3,142 feet; around Middlehead, 4,420 feet; and from the picnic grounds site to the athletic field, 2,094 feet. In addition 1,515 feet of old trail was improved. Communication within the park was carried on satisfactorily by radio telephone. The present installation includes stations at Ingonish Beach and Cheticamp.

As a measure of reducing the fire hazard, sanitation cuttings were carried out over 184 acres in the Middlehead area. No serious forest insect infestations were found in the park.

Wild life within the park is in a healthy condition. Normal increases have been noted in black bear and rabbit. White-tailed deer remain about the same. Among the predators red fox and lynx are increasing, which is a natural sequence of events, resulting from the increase in other animals. Two colonies of beaver were placed in Ropers Brook last year. One colony is now established in Round Lake, and the other in a lake about one and a half miles to the southwest. Bird life remains about the same with the exception of bald eagle which show a definite increase.

Fishing in park waters was very good, with some excellent catches of salmon reported from the Cheticamp River, and trout from Warren and Presqu'île Lakes, Corney and Black Brooks, and Fishing Cove, North Aspey, and Clyburn Rivers. During the season 105,000 salmon fry from the Margaree Hatchery were placed in the Cheticamp River. Saltwater fishing in the coastal waters adjacent to the park was also good but the swordfish catch was below normal.

Construction of the 18-hole golf course was completed, and it is expected that the course will be opened for play sometime during the summer. The setting is superb, combining seashore, valley, and mountain terrain. The course starts and terminates on narrow, picturesque Middlehead Peninsula which extends about 2 miles into the Atlantic Ocean. It has been designed to make the fullest use of the natural features of the region. Vistas of mountain grandeur, wooded valleys, rugged seashore, placid lakes, and rolling Atlantic add scenic charm to a course which has been scientifically designed to approach the ultimate in golf requirements.

GEORGIAN BAY ISLANDS NATIONAL PARK

Of some 30,000 islands in Georgian Bay, 30 have been set aside as a national park. They have a total area of 5.37 square miles, and afford some wonderful sand beaches with safe bathing for adults or children. Georgian Bay Islands National Park is a popular summer resort and camp place for residents of Eastern Canada and sections of the United States. Beausoleil Island, largest of the group, is accessible from Midland and Penetanguishene, and on it are located the park headquarters, campsites, and other tourist facilities. Flowerpot Island, named from two picturesque limestone formations having the appearance of immense flowerpots, lies north of Bruce Peninsula and is reached from Tobermory. The other islands are in different locations throughout the bay.

During the year it is estimated that 9,677 persons visited Beausoleil and Flowerpot Islands, as compared with 6,169 during the previous year. About 35 per cent of the visitors to Beausoleil Island came from the United States. Approximately 350 people made use of the camp-grounds.

New construction during the year included an ice-house, sleeping quarters, a bath-house, recreation building, and 6 new docks. New construction on Flowerpot Island included a combination warden cabin and equipment shed, a small lookout, and wooden stairs leading to the caves.

Wild life is flourishing, with a noted increase in elk and white-tailed deer. Among the smaller mammals, red fox, black squirrel, racoon, and ground hog are also reported to be numerous. Bird life appears to be increasing, and includes many varieties of land, shore, and water birds. Ruffed grouse, which have been scarce for a number of years, are increasing, and several woodcock have been seen.

Throughout the season patrols to the various islands were made periodically by the park warden. In May, 100 walnut and numerous small pine trees were planted around park headquarters.

Several parties of skiers visited Beausoleil Island during the winter and ski'd on the hills near headquarters.

GLACIER NATIONAL PARK

In some respects the most remote of all Canada's national parks is Glacier National Park. Still outside the range of the ubiquitous motor car, and accessible only by railway, Glacier National Park preserves unspoiled some of the finest mountain wilderness scenery in the world. Its ice-fields, snow-capped peaks, luxuriant forests, alpine flora, and subterranean caves are typical of the Selkirk Mountains in which it is located. This park is particularly popular with mountain climbers. There are no facilities for recording accurately the number of visitors, but an estimate of 1,200 is considered conservative. Glacier National Park was established in 1886 and has an area of 521 square miles.

Construction work was limited to general maintenance and repairs.

Because of the ideal sanctuary conditions which prevail in the park, wild life is abundant and thriving. Caribou, mule deer, moose, elk, Rocky Mountain goat, grizzly and black bear, as well as many of the smaller fur-bearing animals are plentiful. Predators are scarce, only an occasional coyote or wolverine being seen. Bird life includes ptarmigan, blue grouse, and many smaller species. Fishing in park waters was good.

The snowfall during the past winter was the lightest for many years, amounting to only 292 inches as compared with 408 inches during the previous year.

JASPER NATIONAL PARK

Jasper, with its area of 4,200 square miles, is the largest of Canada's national parks. Located on the eastern slope of the Rockies in an area rich in historical associations, it is famous for the magnificence of its 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. Like Banff, it affords excellent facilities for tourists, ranging from inexpensive bungalow camps and year-round hotels to luxurious accommodation. Summer and winter sports contribute to the enjoyment of the visitor. There are 141.5 miles of motor highways, 10 miles of secondary roads, and 630 miles of trails. The park was established in 1907.

A substantial increase was shown in the number of visitors entering the park. The following table gives a comparison of the numbers of visitors during the past two years:—

Mode of Travel	Motor Vehicles		Passengers	
	1939-40	1938-39	1939-40	1938-39
<i>By Motor Vehicles—</i>				
Canadian.....	2,937	2,158	10,545	7,299
United States and Foreign.....	221	168	646	551
<i>By Rail.....</i>			11,924	11,538
Totals.....	3,158	2,326	23,115	19,388

The information bureau was established for the first time as a definite unit, with separate quarters in the Administration building. During the season a total of 3,607 inquiries were dealt with.

A total of 3,638 licences and permits were issued during the year as follows: automobile (transient), 1,926; automobile (yearly), 245; provincial drivers, 308; camping, 556; chauffeur, 138; guide, 35; business, 63; timber, 89; building, 47; and miscellaneous, 231. This represents an increase of 241 as compared with last year.

The bath-house at Miette Hot Springs was opened for the season on May 24, and closed on September 9. During the season the number of persons using the swimming pool was 7,792 and the plunge baths 2,221, a total of 10,013 which is a slight decrease from last year.

Motor camp-grounds open to the public were Cottonwood Creek, Miette Hot Springs, and Medicine Lake. Registrations at these points were as follows: Cottonwood Creek, 1,243; Miette Hot Springs, 807; Medicine Lake, 145; combined total, 2,195 campers. This represents an increase of 139 campers over the corresponding period last year.

Improvements carried out at Miette Hot Springs included construction of a 1,500-foot flume to tap springs beyond the dam and increase the water supply. At Lac Beauvert the shore was cleared of stumps and boulders.

New construction included the following: 3 new warden's cabins, and 3 garage and equipment sheds located at Pocahontas, Poboktan Creek, and Decoigne near Yellowhead; a warden's shelter cabin halfway between Byng Pass and Twin Tree Lake, and a lookout station near the summit of Signal Mountain.

Improvements carried out were as follows: On the Jasper-Edmonton Highway, 4,040 cubic yards of crushed rock were spread between Miles 5½ and 11¼; the sharp curve at Mile 1·5 was widened and 700 lineal feet of new guard-rail erected; two culverts were renewed at Mile 32; 6,030 lineal feet of guard-rail was repainted between Miles 12 and 15; and a new traffic bridge was built across the Athabaska River at Mile 2·7. On the Miette Hot Springs road, work of clearing rock slides, opening culverts, and cleaning ditches commenced early in May; rock work was completed at Mile 3½ and the proper grade established; all bridges were painted; 8,800 lineal feet of new guard-rail was constructed and 6,242 lineal feet painted. On the Edith Cavell road the new revision at Mile 3½-4 was gravelled; culverts were renewed where required and 640 lineal feet of new guard-rail was constructed; the Athabaska River bridge and guard-rails at the approaches were painted. On the Medicine Lake road the parking space at the end was levelled and extended. On the Pyramid Lake road the widening at Pyramid Lake was completed and 1,200 lineal feet of new guard-

rail was constructed. On the Jasper-Yellowhead Highway, 1,780 feet of new guard-rail was constructed between Miles 2 and 3, and the shoulders brought up to grade. Construction of the Banff-Jasper Highway was completed except for surfacing and finishing.

Six miles of new trail construction was carried out as follows: Signal Mountain trail, 3 miles; Portal Creek trail, 1·5 miles, and Maligne Lake-Evelyn Creek trail, 1·5 miles. All of these trails are of an improved type with a maximum grade of 10 per cent. Considerable improvement work was done on the Snake Indian trail, including the replacement of 1 pier and 2 spans on the Snake Indian bridge at Devona. New bridges replacing old structures were built over the Brazeau River, Twin Tree Creek, and Maligne Canyon; 3 smaller bridges were built at the south end of Medicine Lake. The Maligne River bridge at the outlet of Maligne Lake and No. 2 bridge at Maligne Canyon were redecked.

Thirty-two miles of new telephone line were constructed along the Banff-Jasper Highway. Two miles of poles were re-set between Miles 28 and 30 on the East Highway; telephones were installed in the new warden's cabins at Pocahontas, Poboktan Creek, and Decoigne; and the Lake Edith subdivision and Lake Annette picnic grounds were given emergency telephone service during the summer.

The automatic telephone system in the townsite performed satisfactorily throughout the season. The installation of new 30-pair cable for extension of the service to Blocks 8, 10, 12, and 25 was completed. The number of automatic telephones now in use is 57.

All streets in Jasper townsite were treated with oil where required. During the season portions of the following streets were hard-surfaced: Pyramid, Miette, Cedar, Fir, Elm, and Hazel Avenues and Patricia Street. Hard-surfacing was also done for half a mile along the Jasper-Edmonton Highway, and on part of the newly constructed parking area opposite block 3. Four thousand lineal feet of concrete kerbing was put down on Elm and Miette Avenues and Patricia Street; a new sidewalk alignment was made, unsightly boulders removed, and a riprap wall built. A new sidewalk 200 feet long was built at the south end of Connaught Drive and continued along Spruce Avenue; the sidewalk on the north side of Geikie Street was extended for 300 feet, and a parking space 350 feet by 57 feet was constructed opposite Block 3. In May, tree planting and preparation of flower beds was undertaken and, in September, top-dressing was applied and the young trees staked up for the winter.

During the season 7 water and 8 sewer connections were made to houses under construction.

All species of wild life show normal increases. Feed conditions were exceptionally good during the winter, with the result that the animals were not crowded into the lower valleys. Beaver are quite numerous in the Athabaska Valley and are spreading to outside districts; mule deer are more plentiful than usual. Grizzly and black bear are normally plentiful with the former showing a slight increase. Elk are very numerous and are slowly spreading in all directions and moose are slightly more numerous. Rocky Mountain sheep, goat, and caribou are well represented in practically all districts. The smaller fur-bearing animals are reported to be thriving, with marten very plentiful in the Maligne and Whirlpool districts. Among the predators coyote and cougar are reported to be numerous, with a few wolves in the Pyramid Lake-Snaring River area. Three live bear cubs and a pair of beaver were shipped to Wellington, New Zealand.

During the year many parts of the park were visited by an experienced biologist, who found wild life conditions to be satisfactory. The population of predatory animals was considered to be compatible with national park standards, which require that healthy animal populations be preserved without hunting and with as little interference with nature as possible.

A decided improvement in fishing was noted in all districts in Jasper Park. The total number of permits issued in the Maligne-Medicine Lake area was 944, as compared with 1,140 last year. The total number of fish taken was 5,387, or an average of 5.7 fish per permit. The average weight per fish was 13 ounces, as compared with 11.12 ounces last year. Excellent catches were reported from Lake Edith, Celestine Lake, Leach Lake, and Buck Lake. A number of rainbow trout, each weighing 6 pounds, were taken from Lake Edith.

Stocking of lakes was continued and during the season some 538,494 rainbow trout fry from the Jasper Hatchery were distributed in park waters as follows: Riley Lake, 4,000; Pyramid Lake, 154,000; Patricia Lake, 54,000; Lake Annette, 135,494; Lake Edith, 138,000; Trefoil Lake, 6,000; Leach Lake, 8,000; Mina Lake, 4,000; Valley of the Five Lakes, 25,000; Sulphur Creek, 6,000, and Horseshoe Lake, 4,000.

A 70-foot log-dam was constructed across the outlet of Beaver Lake to raise the water level about 2 feet, and introduce a quantity of new feed. The results produced on the size and improved condition of the fish were very noticeable. The hatchery was opened again in March to receive 500,000 rainbow trout eggs.

A comprehensive study of the waters of the park was made during the year, resulting in an accumulation of data on which it will be possible to base fisheries management practices in the future.

Sanitation cuttings and thinnings were carried out over a distance of one mile on the Edith Cavell road and for 200 yards along the approach to Astoria camp. In making these cuttings special attention was paid to creating viewpoints overlooking the valley below.

Opportunities for many forms of recreation are found in Jasper Park, including riding, hiking, golf, motoring, fishing, tennis, camping and climbing in the summer, and ski-ing in the winter. In addition, bathing may be indulged in at the well known hot springs at Miette.

Ski-ing as the main winter sport has continued to increase in popularity, and during the past winter attracted large numbers of local residents, as well as visitors from outside points. The Jasper Ski Club held two successful meets in which contestants from Edson, Jasper, and Blue River took part. The Provincial Slalom and Downhill Championships were held at Mount Edith Cavell on March 16 and 17 and were run off under ideal conditions.

During the summer a considerable amount of work was undertaken to improve ski-ing conditions in Jasper, and included construction of a new downhill run about 3½ miles long on Whistler Mountain, which is considered to be one of the best downhill runs in Canada.

The outstanding event of the year was the visit of Their Majesties King George VI and Queen Elizabeth on May 31 and June 1. Their Majesties spent 24 hours in the park and among other things enjoyed the Edith Cavell drive and walks around the grounds of Jasper Park Lodge.

KOOTENAY NATIONAL PARK

Kootenay National Park owes its existence to the Banff-Windermere Highway, which passes through it, as the park was established to preserve in its natural state the beauty of the area traversed by the highway. It is on the western slopes of the Rockies and is marked by many deep canyons and beautiful valleys. Like Banff and Jasper, its attractions include hot springs with excellent bathing facilities. Other recreations are riding, hiking, climbing, fishing, and motoring. Motor camp-grounds are provided, and there are 61 miles of motor highways and 135 miles of trails. The park was established in 1920 and has an area of 587 square miles.

Tourist traffic into Kootenay Park showed a marked increase over the previous year. This increase is probably due to the improvement in road conditions between Cranbrook and Radium Hot Springs. Many visitors from Banff enter Kootenay Park at Vermilion Pass, and return eastward to Banff Park without registering at Radium Hot Springs; the following figures therefore include 5 per cent of westbound traffic into Banff Park:—

	Motor Vehicles		Passengers	
	1939-40	1938-39	1939-40	1938-39
<i>Eastbound—</i>				
Via Radium Hot Springs.....	8,407	7,289	26,546	22,098
<i>Westbound—</i>				
Via Radium Hot Springs.....	8,827	5,800	27,873	23,203
Via Vermilion Pass (5% Banff westbound traffic to Oct. 31).....	2,218	1,980	7,644	6,726
Totals.....	19,452	15,069	62,063	52,027

Licences and permits issued during the year totalled 264, as follows: Chauffeurs, 11; automobile, 7; dog, 2; business, 29; timber permits, 4; and camping permits, 211.

Throughout the season regular inspections of all camp-grounds and public services were made by the Medical Health Officer.

During the year a total of 25,061 persons made use of the bathing facilities at Radium Hot Springs as compared with 24,147 persons during the previous year. This is an increase of 914 persons.

The park motor camp-grounds continued to be popular, but again a decrease was noted in the number of persons making use of these facilities. As usual the Radium Hot Springs (Red Rock) camp-ground attracted the largest number of visitors, with a total registration of 1,093 persons. The total time spent in camp was 2,441 person days, or an average stay of 2.2 days per person.

New construction carried out during the year included: 2 new winter patrol cabins, 1 on Simpson River and 1 on Settlers road, both near the park boundary; at Radium Hot Springs, an equipment shed and extension to the garage; 2 log storage sheds for gasoline and oil, 1 at Kootenay Crossing and 1 at Blacks Camp, and a loading platform at McKay Creek. A portion of the rock retaining-wall near the bath-house was rebuilt and reinforced with concrete.

The Banff-Windermere road, which is the main highway through the park, was opened for travel on May 18, and remained open until November 9. Maintenance work on this road included spreading of dust-laying oil, replacement of old culverts, and cutting of brush at curves. The bridge over the Kootenay River was painted and a rock retaining-wall constructed near the Blakley Bungalow Camp. Improvement work on trails was carried out as follows: grading and widening on Tumbling Creek trail; relocation where necessary on Pitts Creek trail, and erection of a new 35-foot bridge near McLeod Meadows. Nine miles of new trail were constructed as follows: 3 miles from the cable to the lake opposite McLeod Meadows; 4 miles from the cable to 1 mile south of Pitts Creek; and 2 miles between Dover Creek trail and the Vermilion River.

All wild life in the park is in good condition and thriving. Elk, mule deer, Rocky Mountain sheep and goat, and black and grizzly bear are increasing. The numbers of white-tailed deer remain unchanged and moose have decreased. The smaller fur-bearers, including marten and weasel, are increasing, while beaver, wolverine, and lynx do not show any change. Bird life is normal with the exception of golden eagle, which are increasing.

Fishing in park waters was poor, only about 150 cutthroat and Dolly Varden trout being caught during the entire season. In September 100,000 cutthroat trout fry were planted in park waters, as follows: lake east side of Kootenay River, 30,000; lake west side of Settlers road, 10,000; Dolly Varden Creek, 25,000; Lake Olive, 5,000; Sinclair Creek, 10,000; Kimpton Creek, 10,000, and Dover Creek, 10,000.

Although the swimming pool at Radium Hot Springs was the main attraction, the tennis courts again proved to be very popular.

MOUNT REVELSTOKE NATIONAL PARK

Mount Revelstoke National Park lies on the western slope of the Selkirk Mountains, between the valleys of the Columbia and the Illecillewaet Rivers. It consists largely of a plateau at an altitude of 6,500 feet marked by high alpine meadows with scattered groves of fir and spruce, and, in summer, veritable gardens of wild flowers. It is widely known as a winter sports resort, and is reached by means of a picturesque motor road from Revelstoke. A suitable camp-ground has been laid out. The principal recreations are fishing, hiking, and ski-ing. The park was established in 1914. It has 19 miles of motor road and 49 miles of trails. Its area is 100 square miles.

As there is no resident Superintendent in the park, no actual check of visitors is maintained. However, on the basis of voluntary registration at the lookout station, situated on the summit of Mount Revelstoke, it is estimated that approximately 7,500 persons entered the park during the year.

New construction carried out included a log registration booth at the end of the road on the summit of Mount Revelstoke; a picnic ground and viewpoint at Mile 5½ on the Mount Revelstoke auto road, with a fireplace, 2 log shelters, and 2 comfort stations, and a stone wall built around the viewpoint. Under private enterprise, a new tourist chalet was erected near the end of the road on the summit of Mount Revelstoke. About 4 miles of new trail was built in the Greely Creek area, and a quarter-mile of telephone line was erected to the new picnic grounds.

Wild life is plentiful and in good condition. Rocky Mountain goat, caribou, and deer are seen frequently, and grizzly and black bear are fairly numerous. Small fur-bearers are scarce and predators such as wolf, wolverine, and cougar are rarely, if ever, seen. Bird life is very plentiful, particularly the grouse species.

Mount Revelstoke maintained its popularity as a ski-ing centre, and attracted many skiers throughout the winter months. The new downhill ski course, on which minor improvements had been made, was extensively used.

POINT PELEE NATIONAL PARK

Not many in Canada, and fewer elsewhere, know that the southernmost part of this Dominion is in almost the same latitude as the northern boundary of California. Yet such is the case. That southernmost part extends into Lake Erie, and has been set aside as Point Pelee National Park. It has an area of only 6.04 square miles, but includes some fine sand beaches and is a noted resting-place for migratory birds. The park was established in 1918. It is equipped with a suitable camp-ground and is one of the popular summering-places of the Dominion.

Again there was a considerable decrease in the number of visitors as compared with the previous year. Tourist figures for 1939-40 are: Canadian motor vehicles, 16,209 carrying 56,732 passengers; United States motor vehicles, 22,146 carrying 77,510 passengers; a combined total of 38,355 motor vehicles and 134,242 passengers, compared with 62,052 motor vehicles and 203,180 passengers during the previous year. Camping permits issued during the year totalled 1,001, an increase of 100 as compared with last year.

Improvements carried out during the year included the following: completion of entrance arch and landscaping of adjacent grounds and alteration of Post property house to provide living quarters for the Superintendent and the Royal Canadian Mounted Police. The main road was prepared for hard-surfacing. The system of groins installed in 1937-38 to protect the east beach from erosion has given very satisfactory results, and has helped maintain a wide beach where formerly the shore-line was fast receding before the pounding of heavy seas.

Wild life within the park has flourished during the past year. Small mammals such as rabbit, squirrel, groundhog, racoon, fox, and muskrat are all plentiful. Point Pelee, located on one of the main routes followed by migratory birds, is also an important bird sanctuary and, during the migration period in the spring and autumn, is visited by many kinds of waterfowl, including duck, geese, and swan. Other birds frequenting the park during the summer include the mocking-bird, cardinal, Carolina wren, and blue-winged warbler. Quail and pheasant are also reported to be plentiful.

During the year three scientists—a botanist, a forester, and an ornithologist—made an investigation of the park for the purpose of determining how best to preserve its unique plant and animal life. A comprehensive report was prepared, recommending the fencing of certain areas for this purpose. The report also dealt with other subjects, including the prevention of windfalls and sandblow.

PRINCE ALBERT NATIONAL PARK

Almost in the geographical centre of the Province of Saskatchewan is Prince Albert National Park, a region of rocks, woods, and water as much unlike the popular conception of Saskatchewan as it is possible to be. More than any other of Canada's National Parks, Prince Albert is a lace-work of lakes and streams; nowhere has the original atmosphere of the area lying between the Prairie and the Great North been more faithfully preserved.

Prince Albert National Park has an area of 1,869 square miles and was established in 1927. It is reached by means of a good highway from the City of Prince Albert, 36 miles to the southward. There are good park roads to principal points of interest but the chief mode of travel is by water. The town-site of Waskesiu, where the park headquarters are located, is a popular summer resort and has an up-to-date camp-ground. The principal recreations are golf, tennis, fishing, bathing, canoeing, and boating. There are 63 miles of motor highways, 75.8 miles of secondary roads, and 390 miles of trails. The average altitude of the park is about 1,800 feet above sea-level.

Registration of visitors at the park entrance was well maintained but shows a slight decrease from last year. A total of 7,175 motor vehicles and 27,367 persons entered the park, as compared with 7,914 motor vehicles and 29,727 persons last year. Although the greater number of these visitors were residents of Saskatchewan, tourists from 6 other Canadian provinces and 26 States of the Union were among those who registered.

During the year a total of 10,230 licences and permits were issued, as follows: golf permits, 4,109; camping permits, 1,410; motor licences, 4,432; hay permits, 55; timber permits, 95, and miscellaneous, 129.

In general, health conditions in the townsite throughout the season were excellent. The usual precautionary measures against disease were taken and periodic inspections were made of all Government camps and public buildings.

The number of visitors making use of the camp-grounds totalled 12,014, as compared with 7,057 during the previous year. Registrations at the various camp-grounds were as follows: Waskesiu, 10,809; Crean Lake, 888; Kingsmere Lake, 295, and Sandy Lake, 22. Motor vehicles numbered 2,646, an increase of 790 over last year.

A new camp-site area was cleared at the end of the Narrows road and a picnic fireplace and camp kitchen were erected. At Paignton Beach construction included a dock, a combination camp-stove and fireplace, and other conveniences.

Building activity in Waskesiu townsite was as follows: the camp-ground registration office was moved to a new site; 1 large log relief building was converted into a storehouse for tools and equipment; a new blacksmith shop was erected and the interior of the Superintendent's residence was remodelled; a floor was laid in No. 2 bunkhouse and the walls sheeted with fabricated board. Under private enterprise, 4 cabins and 1 service building were erected at the Waskesiu bungalow cabins; 4 cabins were erected at the Hillcrest Auto Bungalow Camp, and 1 cottage on Lot 17. Outside of the townsite, a new warden's cabin was erected in District No. 4; 2 log shelters were erected on the golf course; an entrance way was constructed at the southern entrance to the park and 3 old buildings at Camp 10, and all buildings except 1 at Camp 9 and 1 at Camp 11 were demolished.

A combination dam and bridge was constructed over the Waskesiu River where it crosses the Heart Lakes road. The dam, which is of the stop-log type, is intended to raise and maintain the level of the water in Waskesiu Lake by approximately 2 feet. A small dam was built at the outlet of Bear Trap Lake for the purpose of diverting the water from this lake into Waskesiu Lake, and minor repairs were made on the Anglin Lake and Kingsmere River dams.

Other improvements included installation of the chlorinating plant which was purchased for the water system last year, and construction of an incinerator and sewage chute.

Improvements carried out on the Prince Albert Park Highway included relocation and revision of the highway in the vicinity of Spruce River and construction of a new bridge across Spruce River. On the Narrows road, a one-way traffic lane was constructed at Narrows Beach; on the Heart Lakes road, 480 lineal feet of guard-rail was constructed and 200 feet of narrow fill widened. The Rabbit Boundary road was generally reconditioned; the right-of-way on the road to the incinerator was widened, and 5 miles of the old road to Waskesiu was improved for fire protection purposes. Three-quarters of a mile of new trail was constructed at the First Narrows, Waskesiu Lake. The entire telephone system was gone over and thoroughly reconditioned.

With the exception of a short period in July and another in the autumn fire hazard conditions were fairly normal throughout the season. A total of 14 fires occurred within the park and burned over an area of 87 acres, as compared with 8 fires and 67 acres burned in 1938. All of these fires were extinguished before any serious damage was done. The new lookout towers which were erected in 1938 were of great assistance in the detection of fires.

A fireguard 241 chains long and from 40 to 66 feet wide was constructed to protect the townsite from fire on the north and east sides. Fire weather recording stations were set up at 4 points during the summer.

Work carried on included operation of municipal services and maintenance of streets, walks, grounds, and flower-beds. The area surrounding the community hall was landscaped; a fire weather station was established at old Camp 7; a combination foot and bridle path three-quarters of a mile long was constructed along the beach from the Lakeview subdivision, and a 475-foot ditch was dug on the fireguard between the Heart Lakes road and Waskesiu Lake.

Nearly all of the larger animals show small decreases from last year. Among the smaller animals the most notable increases are in beaver, rabbit, and muskrat. Reports indicate that the woodland caribou is more numerous than usual, and that these animals are ranging farther south than they have in the past. It is interesting to note that the common rat has made its appear-

ance in certain areas of the park. Timber wolves are reported to be numerous and coyotes scarce. All species of bird life are plentiful with the exception of ptarmigan. The most apparent increases are in Hungarian partridge, spruce partridge, pin-tailed grouse, ducks, pelicans, and cormorants.

Because of insufficient pasturage in the enclosure 7 buffalo were slaughtered in November, reducing the herd to 5. The remaining animals all came through the winter in good condition.

The program of stocking Waskesiu Lake with smallmouth black bass was continued with the arrival of a shipment of 135 mature fish early in June. These fish were transferred to specially prepared enclosures and spawned early in July. Approximately 38,650 fry were obtained which were distributed as follows: Upper Waskesiu Lake, 19,400; Heart Lakes, 9,250; 10,000 were retained in the feeding enclosures and released in Waskesiu Lake early in August.

Fairly good catches of great northern pike and pickerel were reported from Waskesiu, Heart, and Crean Lakes. Excellent trout fishing was reported from Wassigam Lake, but because of its inaccessibility by land only a few parties fished in this lake.

During the latter part of May all mosquito breeding spots in the vicinity of the townsite were sprayed with oil. Control work included a considerable amount of ditching to provide drainage in low spots.

Approximately 500 white spruce and jackpine and 250 Colorado spruce were planted in the townsite and 125 white spruce and jackpine in the camp-site. Sanitation and release cuttings were carried out on areas totalling 42 acres in the vicinity of the townsite; 115 acres along the Prince Albert Park highway, and 22 acres on the Narrows road.

The golf course continued to increase in popularity, with the number of permits issued passing all previous records. A total of 3,751 single-round tickets, as well as 252 daily, 82 weekly, 6 monthly, and 18 seasonal tickets were issued. The fifth annual Lobstick Golf Tournament was held from August 6 to 12, and had a record entry of 192. Other events of interest included the senior and junior tennis tournaments, that were held from July 29 to 31, and the annual swimming meet, that was held on August 5 and drew 63 entries.

PRINCE EDWARD ISLAND NATIONAL PARK

Prince Edward Island National Park consists of a strip of coastline more than 20 miles in length on the northern shore of Prince Edward Island. It includes some of the finest sand beaches in Eastern Canada, where the water is warmer than on beaches hundreds of miles further south, and on its landward side has a delightful pastoral background. A new park, it is being developed as a recreational area in keeping with national parks standards, and already affords excellent facilities for golfing, bathing, and general summer outside life. It lies within less than an hour's motor drive of the City of Charlottetown.

With voluntary registration at Dalvay House and Green Gables as a basis, it is estimated that approximately 35,488 persons entered the park. This represents a considerable increase over the corresponding period last year, when it was estimated that 10,000 persons visited the park.

Licences and permits issued during the year totalled 29, as follows: business licences, 3; hay permits, 22; grazing permits, 3, and special permit for occupancy of property, 1.

The bath-houses at Dalvay and Cavendish were open throughout the season, and those at Brackley Beach from July 18. All bath-houses are equipped with electric light and water services.

New construction and improvements included the following: at Dalvay House construction of a new stairway to the third floor and an addition to the kitchen. At the Superintendent's residence, installation of lighting fixtures,

screen doors, windows, and storm windows throughout. At the Administration building, Dalvay House; wiring 3 offices and panelling the walls with fabricated board; and installation of oil-burning furnacette. A combined pump-house, workshop, storehouse, and garage was constructed at Dalvay, and a pump-house with storeroom at Brackley Beach. Pumping equipment was installed at Dalvay and Brackley Beach and the necessary pipe-lines laid. Kitchen shelters were constructed at Dalvay, Brackley, and Cavendish. Improvements to the house at Green Gables included the completion of plumbing; installation of a septic tank, and a new pump and kitchen range. Construction of a golf club-house and equipment storehouse at Cavendish was well advanced.

The Maritime Electric Company completed the construction of a transmission line to the Park headquarters at Dalvay, with an extension across Dalvay Lake to the summer residence of the Hon. George D. DeBlois. Lines to Dalvay House, the Superintendent's residence, and Dalvay bath-house were completed by the Department.

Landscaping of the grounds around Green Gables was carried out under contract. Approximately 6,732 feet of boundary fence was erected in the Brackley and Dalvay areas.

Work on roads included maintenance of existing roads, gravelling of 1 mile of the Tracadie-Stanhope road, and construction to grade of approximately 1 mile of new road in the Brackley Beach area.

Wild life in this area is limited mainly to waterfowl and shore and land birds. During the past year an increase has been noted in the number of Canada geese, ruffed grouse, and Hungarian partridge. Black ducks were numerous and many of these nested within the park and remained throughout the winter. During the autumn and early winter flocks of from 50 to 500 Canada geese were seen in the Brackley and Cavendish areas. A few English pheasants spent the winter in the vicinity of Green Gables.

A biological survey of park waters was carried out by Drs. A. H. Leim and M. W. Smith of the St. Andrews Biological Station.

Construction of an 18-hole golf course, started last year, was completed in September, and the first 9 holes were open for play on July 19. The golf course utilizes the area made famous by the novels of L. M. Montgomery; the old "Green Gables" farmhouse has been repaired and redecorated and every effort was made to retain as much as possible its original style as a feature of romantic and literary interest. Skirting the sand dunes and stretching back into the beautiful countryside, the new course combines the qualities necessary to ensure its popularity. After its opening on July 19 a total of 637 round-tickets, as well as 9 daily and 2 weekly tickets were issued.

RIDING MOUNTAIN NATIONAL PARK

Riding Mountain National Park is a rolling woodland plateau some 2,200 feet above sea-level located in the southwestern part of Manitoba. Its southern edge is only about 100 miles from the International Boundary. It is an important big game sanctuary, containing the largest herd of wild elk in Canada, and substantial numbers of moose, deer, and buffalo. The headquarters of the park are at Wasagaming, on Clear Lake, a beautiful body of water which has become very popular as a summer resort. Many other lakes throughout the park offer variety and solitude. Motor camp-grounds are provided, and the principal recreations include golf, tennis, bathing, riding, hiking, and fishing. There are 50 miles of motor highways, 119 miles of trails, and 70 miles of secondary roads. The park was established in 1929.

Registration of visitors at the park entrance gates was as follows: Canadian motor vehicles, 34,636, carrying 124,471 passengers, and United States motor vehicles, 1,389, carrying 5,375 passengers, making a combined total of 36,025 motor vehicles, carrying 129,846 passengers, as compared with 33,212 motor vehicles and 124,459 passengers during the previous year. This represents an increase of 2,813 cars and 5,387 persons and establishes a new high record for the park.

Licences and permits were issued as follows: business licences, 171; building permits, 12; camping permits, 1,501; lot rentals, 220; grazing permits, 136; hay permits, 391; timber permits, 1,335; transient motor licences, 18,486; and miscellaneous, 32; total, 22,284. This represents an increase of 279 as compared with last year.

The camp-grounds at Wasagaming were well patronized, a total of 5,334 persons being accommodated, as compared with 4,761 persons in 1938-39. A total of 48,658 person days were spent in camp, averaging 9.71 days per person. The camp and picnic grounds at Lake Katherine and Moon Lake were well patronized for picnic purposes, but very little camping was done at either point.

Building by private enterprise in the townsite was confined to general improvements, re-decoration of existing buildings in the business section, construction of 5 new cottages, and improvements to existing cottages in the residential section. New construction undertaken by the Government included a new comfort station in the townsite; a new warden's cabin in the Grandview district; a new log stable near the Seech Tower; a dam 135 feet long on the Little Saskatchewan River at the outlet of Lake Audy; a bridge 32 feet long across the river 100 feet south of the dam, and a rock-filled wharf 132 feet long in Lake Audy. The warden's cabin in the Whirlpool district, which was located outside the park, was moved to a new location in Wasagaming townsite. A new camp-ground comprising about 3 acres was cleared on the east side of Lake Audy, and a kitchen, well, and 2 small comfort stations constructed.

During the season approximately 3½ miles of No. 10 highway, extending from the south gate to the golf course, was hard-surfaced. Other new work undertaken included completion of 8.5 miles of secondary road from Lake Audy to the Rossburn cabin, and 7.5 miles of secondary road on the Rossburn-Birdtail Valley section. General maintenance was carried out on all roads.

Six miles of new trail were constructed in the forest experimental area north of Clear Lake. New construction of telephone lines included 22.5 miles of line on the Central road, and from Lake Audy to the Seech Tower.

As an addition to the fire protection system, four fire-weather recording stations were established early in the season. At these stations observations of weather factors are recorded each day and the degree of fire hazard determined. Three secondary towers were erected, one 60-foot steel tower and two wooden towers, 30 feet and 40 feet in height. Two and a half miles of fireguard were constructed along the south boundary of the park, west of Crawford Park.

Work in the townsite included operation of municipal services, and maintenance of streets, walks, grounds, lawns, and flower beds. The junction of Wasagaming and Ta-Wa-Pit Drives was widened, and grounds in the vicinity of the golf club-house, Superintendent's residence, and bubbling spring were well kept. There are at present 183 privately owned cottages, 23 business establishments, and a number of government buildings within the townsite.

The park museum was open to the public daily, and during the season a considerable number of additional specimens were mounted and placed on exhibit.

All wild life within the park is in good condition and is flourishing. The past winter, with sub-normal snowfall, moderate temperatures, and abundant feed available, has been very favourable for wild life. Moose, elk, and white-tailed and mule deer are in excellent condition and increasing normally. New beaver colonies have been observed at various points in the park, and other small fur-bearing animals appear to be normal. Coyotes were present in average numbers. The animals in the enclosure at Lake Audy came through the winter well, and at the end of March numbered 160, as follows: buffalo, 60; moose, 3; elk, 84; white-tailed deer, 7; and mule deer, 6. To avoid overcrowding in the enclosure, 18 buffalo were slaughtered in the autumn and the meat and hides disposed of by contract.

Bird life was plentiful with a noted increase in ruffed grouse and prairie chicken. Migratory waterfowl showed a marked increase, and included whistling swan, geese, cormorant, and many species of duck. A list of birds of the park was compiled by P. A. Taverner and R. Sutton. One hundred and sixty species of birds are recorded for the park.

During the early part of June, 250,000 rainbow trout were received from the Provincial Hatchery at Fort Qu'Appelle and transferred to the fish-rearing ponds on the north side of Clear Lake. The fish remained in the ponds until October, when they were transferred to Clear Lake. The grounds adjacent to the ponds have been improved; a large number of plants and shrubs were set out, and a number of benches and small bridges were built. Fishing in Clear Lake continued to improve, with many good catches of northern pike being reported. On several occasions pike weighing up to 24 pounds have been taken.

Cutting of saw-timber and fuelwood in the park was again carried out under the budget plan adopted in 1937. In comparison with 1938-39, this year's cut showed a slight decrease, particularly in the amount of fuelwood taken out. The following silvicultural work was carried out under the supervision of the Dominion Forest Service; sanitation cuttings over an area of approximately 423 acres, 326 acres of which were along the Dauphin Highway, 11 acres in the vicinity of Lake Audy, and 86 acres in the townsite. In addition, a total of 20,227 young trees were planted, 425 of which were in the camp-grounds, and 19,802 in the vicinity of the golf course. The Dominion Forest Service established a forest experimental area in the park, with headquarters a short distance east of the townsite. Several buildings were erected, and an area of 15 acres cleared and prepared as a nursery.

The golf course continued to be one of the main attractions and late in the autumn the extension of the water service to include the fairways was completed. Tickets issued during the season included 5,670 single-round, 98 daily, 42 weekly, 3 monthly, and 8 seasonal tickets. The Wasagaming Golf Club Tournament in which 118 players competed was held in July. The tennis courts at Wasagaming were improved during the spring. The seventh annual tennis tournament sponsored by the Wasagaming Board of Trade was held during August, and attracted 250 players. In addition, 2 tournaments, open only to summer residents of the park, were held, and attracted 100 competitors. Saddle horses were available, and riding was freely indulged in by visitors. Swimming and boating at Clear Lake were under the supervision of a lifeguard. The third annual regatta sponsored by the Wasagaming Board of Trade was held in July.

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 Lea; 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 offer ample opportunity for camping, swimming, and fishing. Necessary development work has consisted of the construction of pavilions, shelters, camp-stoves, wharves, picnic tables, benches, and other conveniences. 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. Several of the larger islands, notably Beau Rivage, are used extensively for summer camps by Girl Guides and similar organizations. The park was established in 1914, and contains 185.6 acres.

Although an actual count is not feasible, it is estimated that 21,600 persons visited the island parks during the year, as compared with 21,150 during the corresponding period in 1938.

WATERTON LAKES NATIONAL PARK

(Canadian Section, Waterton International Peace Park)

Waterton Lakes National Park is located in the extreme southwestern corner of Alberta, on the eastern slopes of the Rocky Mountains, and immediately adjoins Glacier National Park in Montana, with which it forms the Waterton-Glacier International Peace Park. The park is noted for the beauty of its lakes and the remarkable colouring of its rocks and mountains. It presents an interesting and varied flora and fauna and opportunities for such forms of recreation as swimming, boating, hunting, climbing, riding, golf, fishing and tennis. Accommodation is provided by 2 hotels, an auto-bungalow camp, several boarding and apartment houses, and a government motor camp-ground. Motor highways have a total length of 44.5 miles and trails 243 miles. The park was established in 1895 and has an area of 220 square miles.

There was a noteworthy increase in the number of visitors entering the park as compared with last year. Registrations at the park entrance gates were as follows: Canadian motor vehicles, 17,360, carrying 67,865 passengers; United States motor vehicles, 11,541, carrying 40,355 passengers; foreign motor vehicles, 106, carrying 307 passengers. Combined total, 29,007 motor vehicles, carrying 108,527 passengers, as compared with 23,223 motor vehicles carrying 86,517 passengers last year. This represents an increase of 25 per cent over the previous high which was established in 1938.

The Information Bureau was opened on June 15 and closed on September 4. During the period 12,782 inquiries were dealt with. This total was made up as follows: Canadian, 5,375; United States, 6,907; foreign, 67, and miscellaneous, 433.

A total of 13,990 licences and permits were issued as follows: general receipts, 469; general licences, 137; building permits, 21; timber permits, 52; camping permits, 525, and transient motor licences, 12,786. This represents an increase of 18.8 per cent in revenue over the 1938 figure, the greatest individual increase being in transient motor licences.

Health conditions throughout the year were generally good. All milk and water supplies were subject to frequent tests by the Provincial Laboratory at Edmonton. Regular inspections were made of storage facilities for perishable foods, and close supervision maintained over all matters affecting public health.

Registration at the main park camp-grounds totalled 1,837 persons, as compared with 1,709 persons last year. A total of 448 camping permits were issued, covering a combined stay equivalent to 12,379 person days or an average stay of 6.6 days per person. The camp-grounds at Cameron Lake and Red Rock Canyon continued to be popular. A caretaker was employed for two months at each of these camp-grounds.

Work on government buildings was restricted to general maintenance. Under private enterprise, work in the townsite was continued on the apartment building in Block 2; the new dance hall was completed; 2 new cottages were erected and 1 is in course of construction. New buildings outside of the townsite included a new unit of 6 cabins at the auto bungalow camp at Cameron Lake.

Work on roads was confined to general maintenance, minor repairs, and hard-surfacing of the Chief Mountain International Highway. The hard-surfacing of this highway, from the International Boundary to the Waterton River bridge, was completed during the summer, providing a fine surfaced road between the International Boundary at Chief Mountain and Banff National Park via Calgary. On the Main Entrance road, in addition to general maintenance, revisions were carried out on the first mile in preparation for hard-surfacing. Widening was undertaken on the Pincher road near the Registration Office. The Akamina road was widened near Cameron Lake. On the golf course road a dangerous curve was eliminated at the junction of the approach to the Prince of Wales Hotel with the Main Entrance road. The new bridge over Lower Cameron Creek was completed and the bridges across Indian and Crooked Creeks on the Chief Mountain International Highway were redecked.

Toward the end of the season, work was commenced on the widening of Pincher Creek Avenue at the entrance to the townsite, by constructing a new rock retaining-wall along the lake.

New construction of trails was restricted to 2.25 miles on the Lone Lake Trail, from South Kootenai Pass to Lone Lake at the head of Blackiston Creek; completion of the trail around the Prince of Wales Hill, 0.15 miles; a trail down the south side of Prince of Wales Hill to Pincher Creek Avenue, 0.25 miles, and a trail from Prince of Wales Hotel to Lake Linnet, 0.25 miles.

Work on telephone lines was restricted to general maintenance of existing lines, and construction of 2.5 miles of new line from Hell Roaring Cabin to the townsite line at the Narrows.

At Cameron Falls, the flow of water was diverted back to its former channel, and the natural beauty of the falls preserved. Other improvements included repairs to the Government wharf which was damaged by ice last winter; planting of lawns in the vicinity of the fish ponds near Cameron Falls, and completion of the wharf which the Park Transport Company started last year. Other work included operation of municipal services, and maintenance of streets, walks, grounds, lawns, and flower beds.

All wild life in the park has done well during the past year. Increases have been noted among mule deer, Rocky Mountain sheep, beaver, snowshoe rabbit, and elk. White-tailed deer and Rocky Mountain goat appear to be in a healthy condition, but have not shown any increase. Moose have been seen in the Cameron Lake and Pass Creek areas, but it is thought that these animals strayed in from British Columbia and do not habitually stay in the park. Other animals which have been seen frequently are: badger, black bear, grizzly bear, red fox, lynx, marten, mink, muskrat, otter, porcupine, skunk, weasel, and marmot. Among the predators, coyote are numerous, and 1 cougar and tracks of lynx were seen. Small birds appear to be increasing in the vicinity of the townsite. Ruffed grouse and prairie chicken seem to be increasing slightly, although the broods this year were smaller than the average. Large flocks of migrating ducks, Canada geese, and about 80 swans were seen on the Lower Waterton and Maskinonge Lakes, and at least 2 geese wintered in the park. The spring migration of waterfowl was first noticed on March 12 when large flocks of Canada geese arrived on Maskinonge and Lower Waterton Lakes. Swan and duck were first noticed on March 24. A list of birds which included one hundred and thirty species known to have visited the park was compiled at Head Office.

Fishing in park waters was good, and excellent catches were reported throughout the season. Bertha and Cameron Lakes were probably the most popular, the latter being easily accessible from the townsite. Results of stocking have been remarkably good in these lakes.

The following distribution of fry and fingerlings was made from the Waterton Fish Hatchery: In park waters—cutthroat trout, 40,192; rainbow trout, 62,124; speckled trout, 14,097; combined total, 116,413; in provincial waters, 589,162. A total of 60,704 rainbow trout fingerlings and 81,580 speckled trout eggs was carried over the winter. Improvements carried out at the hatchery included construction of a small building at the rear of the garage to house the food chopper, and installation of a small waterwheel to supply the power. The original flagstone walk leading to the main entrance was rebuilt, a box screen was erected at the outlet of the supply reservoir, and, to improve oxygenation, 5 cone sprays were installed at the inlets of the 5 ponds.

In spite of the extremely dry, hot weather that was experienced, the park golf course was maintained in good condition with 18 holes in play throughout the season. In the autumn preliminary work was started to prepare some of the greens for conversion from sand to grass. The annual golf tournament, sponsored by the local Board of Trade, in which 106 players competed was held on August 13 and 14. The 4 tennis courts were in almost continual use. The baseball diamond was kept in good condition, but did not receive the same patronage as in former years.

YOHO NATIONAL PARK

Outstanding among the scenic mountain regions of the continent is Yoho National Park, located on the western slope of the Rockies, and immediately adjoining Banff and Kootenay National Parks. It contains the famous Yoho Valley with its numerous waterfalls; the Kicking Horse Valley, and Lakes Emerald and O'Hara, and justifies the Indian word "Yoho", an exclamation of wonder and delight. Headquarters of the park are located at Field, just west of the confluence of Yoho and Kicking Horse Rivers. The park has 44 miles of motor highways and 192 miles of trails. It was established in 1886 and has an area of 507 square miles.

Continued improvement is shown in tourist travel to Yoho Park, the number of visitors during the season again showing an increase over the previous year. Traffic from Banff by way of Kicking Horse Pass, which is not registered at the Leancoil Gateway, was recorded by an automatic registration device installed west of the park boundary near Hector.

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

Route	Motor Vehicles		Passengers	
	1939-40	1938-39	1939-40	1938-39
<i>Eastbound—</i>				
Via Leancoil Gate.....	2,232	1,890	6,259	5,861
<i>Westbound—</i>				
Recorded automatically (estimated 4 persons per car)...	13,445	12,954	53,780	51,816
Visitors by rail (estimated).....			7,500	7,000
Totals.....	15,677	14,844	67,539	64,677

During the year a total of 377 licences and permits were issued, as follows: business, 3; chauffeur, 17; dog, 41; motor livery, 32; saddle horse, 45; transient motor, 136, and miscellaneous, 103.

The health of persons resident within the park was, in general, good. Throughout the season regular inspections of public camp-grounds and business premises were made by a medical health officer.

The number of persons making use of public camp-grounds showed a slight increase over last year. Registrations at the Field, Kicking Horse, and Chancellor Peak camp-grounds totalled 1,092 motor vehicles, carrying 4,263 passengers. This represents an increase of 106 motor vehicles and 319 passengers over the corresponding period last year. The Emerald Lake Chalet, Wapta Lodge, Lake O'Hara Lodge, Yoho Valley Lodge, Mount Stephen Auto Bungalow Camp, and tea rooms at Twin Falls and Cathedral, were all open throughout the season.

New construction carried out during the year included a new community building at the Kicking Horse camp-ground; two comfort stations near Emerald Lake, and a new gateway at the west boundary. In addition, the Alpine Club of Canada erected a new cabin in the Little Yoho Valley. As a means of flood control, the bed of Mount Stephen Creek was cleaned out and the bank on the town side reinforced with a stone and concrete wall for a distance of about 300 feet.

Work on park roads was limited to general maintenance and minor repairs. Parking areas at Emerald Lake and the Natural Bridge were widened. In the townsite of Field all streets were graded and oiled, and a new emergency railway crossing was constructed just west of the depot. The Lake O'Hara trail was widened and graded and is now passable for light cars. Corduroy was also replaced on the Ice River and Fossil Bed trails. The forest telephone line from Chancellor Peak camp-ground to Misko was relocated; new poles were installed and copperweld wire used to replace the old galvanized iron wire between Field and a point $3\frac{1}{2}$ miles east.

Wild life in the park is plentiful and in good condition. Small fur-bearing animals are maintaining normal increases, and beaver are particularly active near Ottortail. Fishing continued to be popular, with some good catches reported from Lakes O'Hara and Wapta. Restocking of park waters with rainbow trout from the Banff Hatchery was continued.

The outstanding event of the season was the visit of Their Majesties the King and Queen, who motored through from Banff to Field, where the Royal train was waiting.

Animals Parks

BUFFALO NATIONAL PARK

Buffalo Park, near Wainwright, Alberta, is the largest fenced wild animal preserve in Canada. It has an area of 200.5 square miles and was established in 1908 to provide range for the then newly acquired Pablo buffalo herd. It has also housed various other game species, and has been used for cross-breeding experiments with buffalo, cattle, and yak.

Permits for 24 cords of dry wood, and 8,000 willow pickets were issued to local settlers.

All telephone work was confined to general maintenance and included replacement of 65 poles, resetting of 34 old poles, and replacement of a number of side brackets. Maintenance and repairs were carried out on approximately 120 miles of eight-foot, and 10 miles of ordinary fence. Repairs included replacement of 2,062 fourteen-foot posts, and resetting of 1,599 old posts.

As a means of protection against fire, approximately 140 miles of 20-foot fireguard was ploughed on both sides of the main fence, and also across the park and around buildings and feed corrals.

New construction included a small registration booth at the Hardisty Gate, and a cook's caboose for the use of the fencing gang.

For a number of years the population of large animals has had to be reduced by slaughtering, which has been carried out nearly every year, in order to keep the herd within the grazing limits of the area. In spite of this the range has deteriorated and inspections carried out at the slaughters have shown the presence of diseases and parasites which, while they could be kept at a low ebb by annual slaughters, could never be entirely eliminated in this way.

During the year a careful investigation of the animals and range was made, and it was decided that the only sound course of action was to slaughter all of the larger animals in the park. In this way the range can lie fallow for a few years, eliminating disease completely and allowing the range to recover.

Following the same procedure as in previous years, the buffalo slaughter was carried out under contract which included the disposal of all products except 500 hides which were reserved for the Royal Canadian Mounted Police. Slaughter of elk, moose, deer, and yak was carried out under the direction of the Superintendent and the meat and hides were shipped to agents of the Indian Affairs Branch at various points in the Prairie Provinces. Animals of all species were inspected by meat inspectors of the Department of Agriculture. In all, 2,918 buffalo, 1,806 elk, 113 moose, 242 deer, and 12 yak were slaughtered.

In carrying out this important work exceptionally favourable weather was enjoyed. This made it possible to carry out the slaughter efficiently to the degree of completeness necessary to achieve its purpose.

As a precaution against the possible recurrence of encephalomyelitis which caused such a heavy loss among horses in Western Canada last year, all park horses were vaccinated and no losses occurred. Assistance was also given to the Department of Agriculture in its cross-breeding experiments at the catallo enclosure.

More water in the sloughs than has been recorded for some years resulted in a large increase in the number of mallard and other ducks. An increase was also noticed in pintailed grouse and Hungarian partridge.

Farming operations included the growing of oats and hay, and the harvesting of wild or meadow hay. Approximately 450 acres were under cultivation, of which 320 were sown to oats, and 130 to brome grass with a nurse crop of oats. Returns from this operation were as follows: oats, 9,023 bushels; straw, 100 tons; green feed, 71 tons; crested wheat grass seed, 850 pounds; hay (wild), 1,055 tons, (cultivated), 222 tons.

ELK ISLAND NATIONAL PARK

Within an hour's drive of Edmonton, and in almost the exact centre of Alberta, is Elk Island National Park, a region of well-timbered knolls and coulees, meadows and lakes. The park is completely fenced and is the principal home of Canada's national buffalo herd. It is a natural range for elk, moose, and mule deer, and a favoured breeding ground for waterfowl. A recreation area has been developed and opportunities provided for golf, camping, bathing, and boating.

Elk Island National Park was established in 1911 and has an area of 51.2 square miles. It contains 18 miles of motor highways and 4 miles of trails. Although originally intended primarily as a big game reserve, this park has in recent years developed also into a popular recreational resort.

A total of 53,821 persons visited the park during the year, as compared with 73,056 for the corresponding period in 1938-39. The total number of motor vehicles was 12,815. The decrease in tourist traffic of approximately 26 per cent is attributed to the wet weather which prevailed during the late spring and early summer, and to some extent to the charging of an entrance fee.

Licences and permits issued during the year totalled 98, as follows: boat livery, 6; tea room, 2; camping permits, 88, and miscellaneous, 2.

Health conditions throughout the season were good. Periodical examinations were made of the various wells supplying water, and bacterial analyses made. All milk sold within the park was provided from tested herds.

A new camp-ground and picnic area was constructed at Sandy Beach on the east side of Astotin Lake. Winding roads and sandy paths were laid out leading to all parts of the area. Ample space was provided for tents, and extensive parking areas for cars. The camp-ground on Long Island was occupied for two weeks by the Long Island Bible Camp which accommodated over 1,000 visitors. The Vegreville Boy Scouts camped for two weeks on Archer's Island, the Y.M.C.A. on Elk Island, and the Northern Alberta C.G.I.T. and ~~Tunns~~ Rangers at the south end of the lake.

New buildings included the following: at Sandy Beach, a refreshment booth, a new floating dock, 2 kitchens and 2 comfort stations completed; 2 kitchens and 2 comfort stations partially completed, and 2,095 linear feet of guard-rail; 3 new shelters on the golf course and a new foot-bridge 725 feet long to Long Island.

General maintenance of roads was carried on throughout the season and included resurfacing with gravel where necessary; widening inside the north, south, and east gates for a distance of 100 yards; riprapping the ditches with stone; and erecting gates at the north and south entrances. New work undertaken included a 2,200-foot diversion of the main highway through Sandy Beach; construction of approximately 1½ miles of new road through the camping and picnic areas; construction of a bridge over the inlet to Astotin Lake, and 15 culverts at different points on the main highway. There were 725 yards of new trails constructed in the new camp and picnic grounds. The main park telephone line was reconstructed over a distance of 9½ miles, from the west gate through headquarters to the south gate.

The large animals in the park, which include buffalo, moose, elk, and deer, have come through the year in good condition. Increases during the year included 110 buffalo, 30 elk, and 15 moose. At the close of the fiscal year the numbers of animals in the park were: buffalo, 1,084; elk, 488; moose, 113; and mule deer, 27. Twenty head of buffalo, made up of 16 cows and 4 bulls, were donated to the Ontario Provincial Government, and shipped to Burwash, Ontario.

Among the small animals found in the park are weasel, porcupine, muskrat, red squirrel, flying squirrel, chipmunk, snowshoe rabbit, and gopher. The only predatory animals are coyotes, which are comparatively scarce. Bird life was abundant, with several new species being identified in the park for the first time. The colony of blue herons which for some years has been nesting on an island in Astotin Lake did not return in 1939. Elk Island maintained its reputation as a sanctuary for waterfowl, many species of duck as well as quite a number of whistling swan being noted. The nesting season for ducks was a successful one with many large broods being raised.

Approximately 210 acres were sown to oats; 30 acres of land were brushed and broken for seeding next year; and 100 acres of fall ploughing was done. Approximately 100 acres of oats were threshed yielding 6,803 bushels of grain and 2 large stacks of straw. From the remainder of the area 145 tons of oat sheaves were obtained. In addition, 800 tons of hay were harvested from the Goose Lake meadow.

Under a tree planting program approximately 1,450 young trees were planted, as follows: at Headquarters, south gate, and the golf course, 1,000; at Sandy Beach, 450. Over 1,000 young trees were donated to the park by the

Oliver Institute of the Provincial Forestry Department. Sanitation cuttings were carried out in poplar over 35 acres in areas adjacent to Sandy Beach. Thirty cords of dry wood were obtained from this operation.

The golf course was well patronized, but owing to adverse weather conditions in May and June, the attendance showed a small decrease as compared with last year. The Elk Island Golf Club held its annual tournament on August 20, with a total entry of 115.

NEMISKAM NATIONAL PARK

Nemiskam National Park, Alberta, is a fenced reserve of 8.5 square miles, established in 1922 for the protection of prong-horned antelope, a species indigenous to the western plains of Canada. It is estimated that at the end of the fiscal year there were approximately 70 head of antelope in the park, all of which came through the winter in good condition. Visitors to the park during the year numbered 30.

As a result of good rains in June, range conditions showed a decided improvement, and there was sufficient grass under normal conditions to feed the antelope until the spring. Unfortunately, the first snow was followed by rain which froze the snow into a hard crust and prevented the antelope from grazing. As a result of this condition it was found necessary to start feeding the antelope in January.

Activities throughout the year included the following: repairing and maintenance of all fences; removal of weeds from fences and water courses; fencing of a 50-acre horse pasture, and a smaller enclosure for stacking rye; a new road was constructed across Chin Coulee to give access to the west side of the park, and, in addition, the small cottage, barn and coal shed were moved about three-quarters of a mile to a new site near the artesian well in the southeast corner of the park.

At one time the antelope was almost extinct in Canada and the enclosing of a small herd in Nemiskam Park represented a noteworthy achievement in conservation. Since that time the antelope have increased considerably in both Alberta and Saskatchewan. This increase has frequently been aided by the escape of surplus animals from Nemiskam over the snow drifts that form along the fence in winter. The present Nemiskam herd represents a much smaller portion of the antelope population of Canada than did the herd originally enclosed there, but the future of any big game animal in open settled country may become uncertain and the maintenance of a nucleus under constant care is highly desirable.

Historic Parks

FORT ANNE NATIONAL PARK

This national historic park at Annapolis Royal is on the site of the early Acadian settlement at 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. This building was restored in 1935 and serves as a museum.

During the past year 10,116 persons visited the museum, as compared with 12,050 during the previous year. In addition it has been estimated that 7,000 persons visited the grounds without going into the museum, making a combined total of 17,116 persons to visit the park. This represents an increase of 66 persons over the corresponding period last year. Travel groups

to visit the park included delegates attending the Canadian Electrical Association Convention at Digby; doctors attending the Medical Convention at Digby; French-Canadian priests from Antigonish and Cape Breton; several groups from the United States; and teachers and pupils from Canadian schools.

Among some of the interesting acquisitions to the park museum were the following: Translation of Delabat's report on "Specifications and Estimate of Works to be undertaken for the protection of the entrance to Port Royal Harbour in Acadie"; an old document dated at Boston, December, 1755, regarding Acadians expelled from Nova Scotia being sent to different towns in Massachusetts; an old lock taken off the powder magazine in the south bastion over 50 years ago; a silver medal commemorating the visit of King George VI and Queen Elizabeth to Canada in 1939; Pierre du Gua, Sieur de Monts Records; an old French harrow, believed to be one of the earliest types of harrows used by the French in Canada; a collection of Micmac Indian handicraft exhibits; two pieces of 16th-17th Century French sabres, and a framed picture of Sir Charles Hobby who took part in the attack on Port Royal in 1710.

Detachments of the West Nova Scotia Regiment, C.A.S.F., trained on the fort grounds from September 5 to 9, which added considerably to the interest of the old fort.

Improvements carried out during the year included construction of a new wire fence between Fort Anne and the old cemetery; construction of a temporary roof on No. 2 powder magazine, and shoring up of walls on both magazines. All other work undertaken was of a general maintenance character.

FORT BEAUSEJOUR NATIONAL PARK

The site of old Fort Beausejour, located on the long ridge between the Aulac and Missaguash Rivers, near Sackville, New Brunswick, forms one of the most interesting historic places in New Brunswick. 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.

In 1935, a museum was erected near the entrance to the fort. This building contains an interesting collection of exhibits relating chiefly to the civil and military history of Chignecto, the neighbouring Counties of Westmorland and Albert in New Brunswick, and Cumberland in Nova Scotia.

During the year, 16,589 persons registered at the museum. Work carried out included the erection of a shelter building, improvements to the existing pavilion, masonry work on the stone curtain wall, and the paving of the approach road from the main highway.

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 advised in this work by the Historic Sites and Monuments Board of Canada, an honorary body comprised of a number of recognized historians representing the various parts of the Dominion.

The personnel of the Board is as follows: His Honour, F. W. Howay, New Westminster, B.C.; Dr. J. Clarence Webster, Shediac, N.B.; Professor Fred Landon, London, Ont.; Professor D. C. Harvey, Halifax, N.S.; Honourable E. F. Surveyer, Montreal, P.Q.; Reverend Antoine d'Eschambault, St. Boniface, Man.; J. A. Gregory, M.P., North Battleford, Sask.; and F. H. H. Williamson, Controller, National Parks Bureau, Ottawa.

Brigadier-General E. A. Cruikshank, Chairman of the Board since its formation, died June 23, 1939.

During the year the following memorials were erected:—

Fathers of Confederation, Charlottetown, P.E.I.—Seven bronze plates were placed on the wall of the corridor leading to the Confederation Chamber in the Province Building, to the memory of George Coles, Colonel John Hamilton Gray, Thomas Heath Haviland, Andrew Archibald Macdonald, Edward Palmer, William Henry Pope, and Edward Whelan. These were unveiled by their immediate descendants on July 17, 1939, on the occasion of the 75th Anniversary of the Charlottetown Conference.

Fathers of Confederation, Amherst, N.S.—Four bronze plates were affixed to the Post Office Building, in memory of Edward Barron Chandler, Robert Barry Dickey, Jonathan McCully, and Sir Charles Tupper, all of whom were born in Cumberland County. These were unveiled by the Chief Justice of Nova Scotia, on September 16, 1939.

Naval Encounter at Tatamagouche, Nova Scotia.—A cut stone monument with bronze tablet was erected on the Community Field, adjacent to Highway No. 6, to commemorate the events connected with the naval engagement that took place in Tatamagouche harbour on June 15, 1746. The monument was unveiled on August 30, 1939.

Sambro Island Lighthouse, Sambro, N.S.—A field-stone cairn with tablet was erected adjacent to the main highway, to commemorate the events connected with the construction of this lighthouse, which is famous in the annals of the sea. The monument was unveiled on October 13, 1939.

First Minister of Health in British Empire, Fredericton, N.B.—A cut stone monument with tablet was erected on Parliament Square, to commemorate the establishment in 1912 by the Legislature of New Brunswick of a Ministry of Health, of which Honourable W. F. Roberts became the first Minister. The monument was unveiled on September 24, 1939, by Chief Justice J. B. M. Baxter, Administrator of the Provincial Government.

James de Mille and George McCall Theal, Saint John, N.B.—Bronze plates to commemorate the achievements of these two outstanding personages, born in Saint John, were affixed to the wall of the main hall of the New Brunswick Museum building.

First Transcontinental Train, Montreal, P.Q.—A tablet was affixed to the Notre Dame Street frontage of the old Dalhousie Street Station, to commemorate the departure from there on June 28, 1886, of the first regular transcontinental train.

Ernest Rutherford, Montreal, P.Q.—A tablet was affixed to the exterior wall of the Macdonald Physics Building, McGill University, to commemorate the outstanding discoveries made by Lord Rutherford which opened new paths for the progress of science and human welfare. The tablet was unveiled on October 6, 1939.

Madame Albani, Chambly, P.Q.—A bronze plate affixed to an iron pedestal was erected on the lot in front of the house in which Madame Albani, celebrated Canadian singer, was born. The memorial was unveiled on September 14, 1939, in the presence of her son, Mr. E. F. Gye, C.M.G.

Louis Philippe Hebert, Ste. Sophie d'Halifax, P.Q.—A bronze plate affixed to an iron pedestal was erected adjacent to the main highway, to mark the birthplace of Louis Philippe Hebert, artist and sculptor.

Sir James Lucas Yeo, Kingston, Ont.—A cut stone monument with tablet was erected on the Royal Military College grounds, to commemorate the distinguished public services of Sir James Lucas Yeo, as Commander in Chief of the naval forces on the Great Lakes during the War of 1812-14.

Cornwall Canal, near Cornwall, Ont.—A cut stone monument with tablet was erected at Lock 20, adjacent to Highway No. 2, to commemorate the events connected with the construction of the Cornwall Canal.

First Lighthouse on the Great Lakes, near Niagara-on-the-Lake, Ont.—A tablet was affixed to the outer wall of Fort Mississauga, which stands on the site of the first lighthouse on the Great Lakes, built in 1804. The tablet was unveiled under the auspices of the Niagara Historical Society on October 4, 1939.

Surrender of Indian Lands, Orillia, Ont.—A cut stone monument with tablet was erected in Couchiching Beach Park, to commemorate the treaties made with the Indians in 1798, 1815, and 1818, whereby the ancient country of the Hurons lying north and west of Lake Simcoe was acquired for settlement purposes. The memorial was unveiled on October 13, 1939.

Fort Malden, Amherstburg, Ont.—A tablet was affixed to the stone gateway, at the main entrance to the grounds, to mark the site of the fort built in 1797-99 and strengthened in 1812 as the principal military station on the western frontier.

Thomas Simpson, Winnipeg, Man.—A cut stone monument with tablet was erected in St. John's Park, to commemorate the services of Thomas Simpson, who, with Peter Warren Dease, explored the Arctic Coast of America from Sir John Franklin's Return Reef to Point Barrow, the mainland shore from Coronation Gulf to Rae Strait, and the southern side of Victoria Island.

Dawson Road, Ste. Anne, Man.—A cairn with tablet was erected adjacent to the highway, to mark the land and water route from Fort William to Red River.

Fort Chipewyan, Alta.—A cairn with tablet was erected adjacent to the old buildings of the Hudson's Bay Company, to mark the site of the fort built about 1804 for the North West Company. It was transferred to the Hudson's Bay Company in 1821.

The Overland Expedition of 1862, Jasper, Alta.—A boulder with tablet was erected near the Canadian National Railways station, to commemorate the courage and daring of the parties of gold seekers who, in 1862, left their homes in Upper and Lower Canada and journeyed overland by way of Fort Garry and Edmonton to Kamloops and Cariboo.

PRESERVATION AND DEVELOPMENT WORK

Preservation and development work was carried out during the year at the following sites:—

Fortress of Louisbourg, near Louisbourg, N.S.—Excavation and masonry work on the site of the Citadel building was carried on and a masonry retaining-wall constructed against the south casemates; the west wing of the hospital building was excavated to the first floor level; a new gateway was constructed and iron gates hung; a new telephone line was erected, and all exterior walls of the museum building were waterproofed.

Port Royal Habitation, Lower Granville, N.S.—The Habitation is situated on the north shore of the Annapolis Basin, 7 miles southwest of the town of Annapolis Royal, on the site of the first fort or habitation built by the French

under de Monts and Champlain in 1605. An area of 17 acres, comprising most of the original site, has been acquired, and a replica of the "Habitation" was constructed. This comprises a group of buildings arranged around a courtyard in the manner of 16th Century farms in northern France, fortified at the two southerly corners by a cannon platform and a stockade or palisade.

Fort Monckton, near Port Elgin, N.B.—A new section of sea-wall was constructed, repairs were made to the existing sea-wall, and a new angle-iron fence was erected around the cemetery.

Fort Chambly, Chambly, P.Q.—The fort is situated about 20 miles southeast of Montreal, on Richelieu River. The concrete retaining wall was extended from Pontchartrain Street to the northwesterly bastion of the fort and a ramp constructed to give access to the beach; an angle-iron fence was erected in front of the cemetery along Fort Street, and the basement of the museum building was water-proofed.

Fort Lennox, Ile-aux-Noix, P.Q.—The fort is situated 13 miles south of St. Johns, in Richelieu River. The stone walls of the officers' quarters, powder magazine, men's barracks, and the two entrances were repointed, the roofs of five of the buildings were painted, and repairs were made to the bridges over the moat.

Sir Wilfrid Laurier, St. Lin, P.Q.—The house in which Sir Wilfrid Laurier was born together with the adjacent lot, has been purchased. The brickwork of the house was repointed and the woodwork, both inside and out, put in good condition and painted. Shutters were provided for the door and window openings, and a fence erected at the rear and on two sides of the property. Suitable furnishings were purchased and placed in the house, and the grounds surrounding the building were levelled, seeded, and planted.

Fort Wellington, Prescott, Ont.—This fort is situated at the east end of the town, adjacent to Highway No. 2. A new one-way entrance road was constructed and a parking area provided on the northeast corner of the property. A new entrance gateway, consisting of two rubble stone walls surmounted with granite copings, was also constructed.

Fort Malden, Amherstburg, Ont.—A fireproof museum building was constructed. A stone gateway was erected at the main entrance from Laird Avenue, and a stone fence constructed across the front of the property. Improvements were also carried out on the grounds.

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. In the maritime sections of Canada which have not been seriously affected by adverse waterfowl conditions the open season was extended two weeks.

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, the responsibility for police work under the Act was transferred to the Royal Canadian Mounted Police, all other responsibilities under the Act remaining with the Department of Mines and Resources.

PROTECTION OF MIGRATORY BIRDS

There has been some slight improvement in the waterfowl situation following depletion of the supply in recent years by drought and other harmful factors. This depletion, started with the prairie nesting grounds, and because of the normal migrations of these birds southward and to the Atlantic and Pacific Coasts, affected other parts of the Dominion and almost the entire United States. In the provinces bordering on the Atlantic the situation among waterfowl, with the exception of brant, might be described as highly satisfactory. In Ontario and Quebec the numerical status of the black duck remains the same, and there was little change in the numbers of most of the other ducks and geese. However, Canada geese and brant were below normal, but blue geese and lesser snow geese remained at a high level of abundance. Waterfowl nesting grounds in most of southern Saskatchewan and Alberta continued poor, but were excellent in a part of southwestern Saskatchewan where hundreds of ponds and sloughs were restored by heavy rains. In British Columbia the waterfowl situation in general is satisfactory from the standpoint of conservation. Certain of the more valuable game species, notably mallard, pintail and black brant, have increased in numbers; other species, for example canvas-back and ruddy duck, whose numbers had been seriously depleted, appear to be on the road to at least a partial recovery. Waterfowl breeding areas, so far as can be determined by early spring inspections, carry sufficient water for the requirements of propagation.

The existing hunting season of approximately two months was continued throughout Canada in 1939, except in the maritime sections where the season was extended two weeks. This relatively short season was adopted in 1936 in an effort to restore the loss in the natural supply of migratory waterfowl on the continent. The strict daily and seasonal bag limit then imposed, the bar against use of live decoys in hunting these birds, and the prohibition of baiting waterfowl with grain remain in force. Continuing the policy of recent years, no open season was allowed for wood ducks, and no hunting of Atlantic brant was permitted. The latter species has not recovered from the very serious depletion which occurred in recent years and which was presumably caused by the almost complete failure of one of its chief food plants, eel-grass. The prohibition against the sale of migratory waterfowl continued as in the past.

In the United States, restrictions on hunting waterfowl remain more stringent than those which apply in Canada, the open season there being of only one and a half months' duration. Seasons for several species were closed entirely, the hours of shooting, the possession limit, and other restrictions continued to be strict. Large sums of money were spent in that country in the establishment of bird sanctuaries especially for waterfowl and in other bird conservation work under the authority of the Migratory Birds Treaty.

A total of 56 bird sanctuaries of various types are now reserved under the Migratory Birds Convention Act in Canada, comprising an area of approximately 121 square miles. The following new sanctuaries were established during the year: Dautraie and Kingsmere in the Province of Quebec, and Big Glace Bay and Kentville in the Province of Nova Scotia. In addition, changes in the boundaries of Harrington Lake, Ile au Heron, and Whitlock Bird Sanctuaries in the Province of Quebec were made.

Twelve honorary game officers were appointed under the Migratory Birds Convention Act during the year, this making a total of 797, throughout Canada. These officers gave the usual valuable assistance, especially in educational work.

Under the supervision of four District Migratory Bird Officers, the field administration of the Act was continued. In addition to their regular work, they were able to continue the scientific study of the relation of mergansers to fishing interests on the Pacific Coast; the investigation of waterfowl conditions in the Prairie Provinces, including inspection with provincial officers of bird sanctuaries and public shooting grounds in Alberta; the annual motor-boat patrol for the purpose of inspecting breeding conditions on bird sanctuaries and elsewhere on the north shore of the Gulf of St. Lawrence; research work on the status of woodcock and also the food habits of herring gulls in relation to fish in the Maritime Provinces; and general educational work by radio talks and lectures to the public. Co-operative efforts were also carried on with the Royal Canadian Mounted Police, game conservation societies, and other organizations.

The eider-down industry of the north shore of the Gulf of St. Lawrence, in the eastern part of the Province of Quebec, which is being supervised in co-operation with the Quebec Department of Lands and Forests and Game and Fisheries, continued to expand during 1939. Twenty-six leases were in effect during the season and the production of cleaned eider-down made a substantial increase.

A total of 41,062 records of birds, newly banded in Canada, was added to the official records during the calendar year 1939, this figure being the largest since Canadian bird banding came under the direction of this Bureau. The number of records of banded birds that were recaptured, killed, or found dead has increased in proportion. These records of recovery provide the data whereby many important problems relating to wild bird life are solved, and permit proper steps to be taken towards the conservation and control of wild birds. This Bureau co-operates fully with the United States Fish and Wildlife Service, Department of the Interior, Washington, D.C., in connection with bird banding in North America. Practically all of the bird-banding work done in Canada is performed by over 200 voluntary bird-banding co-operators at their own expense and without remuneration. The number of honorary banders has continued to expand steadily since bird banding became popular in Canada.

No definite recovery has yet occurred in the supply of eel-grass, a very important natural food for waterfowl, particularly brant on the Atlantic Coast. This depletion has been caused by one of the most striking plant epidemics known in natural history.

Permits and licences issued under the Migratory Birds Convention Act, valid during the year 1939, were as follows:—

- 344 permits to collect specimens of migratory birds for scientific purposes.
- 206 permits for banding purposes.
- 102 permits allowing the destruction of certain birds when found injuring agricultural, fishery, or other interests.
- 564 permits to possess birds for propagating purposes.
- 11 permits to take birds for propagating purposes.
- 26 permits allowing the collecting of eider-down.
- 64 permits to destroy herring gulls.
- 62 permits to collect gulls' eggs in Saguenay County, P.Q.
- 5 permits to collect gulls' eggs on bird sanctuaries.
- 3 permits to possess and discharge firearms on bird sanctuaries for the purpose of frightening seals.
- 2 permits to transport unloaded firearms and artificial decoys across bird sanctuaries.
- 1 permit to erect and maintain a cabin on a bird sanctuary.
- 1 permit to possess and discharge firearms on a bird sanctuary in order to control starlings.
- 65 taxidermist's licences.

The following printed material was distributed during the year: Consolidation of the Migratory Birds Convention Act and Regulations, 6,700; Abstracts of the Act, 18,400; posters, 42,000; pamphlets, 26,800.

One hundred and fifteen lectures were given by officers of the Bureau and lecture material, including motion pictures and lantern slides, was lent freely to voluntary assistants.

WILD LIFE PROTECTION

Investigation concerning fluctuations in the population of the snowshoe rabbit or varying hare in Canada was continued and the data obtained were forwarded for compilation to Mr. Charles Elton, Director, Bureau of Animal Population, Oxford University, Oxford, England.

Continued co-operation was given to the Northwest Territories Administration in problems relating to wild life.

The National Parks Bureau was represented at the following conservation and scientific conferences relating to wild life:—

The Fifty-seventh Stated Meeting of the American Ornithologists' Union, Berkeley and San Francisco, California, June 19-24, 1939.

American Fisheries Society, San Francisco, California, June 26-27, 1939.

The International Association of Game, Fish and Conservation Commissioners, San Francisco, California, June 29-30, 1939.

The Wild Life Conference of Game Officials of the Prairie Provinces, Winnipeg, Manitoba, November 2-3, 1939.

The 5th North American Wildlife Conference, Washington, D.C., March 18-20, 1940.

A draft Act for the control of interprovincial shipments of game and furs, now known as the Game Removal Act was placed before the provinces and practically complete concurrence has been reached.

Three officers of this Division are members of the Interdepartmental Committee on Phenology, the purpose of which is to consider the feasibility of collecting phenological data on a subject that is of interest to the many departments of government concerned with biological problems.

Two officers of this Division are members of the Interdepartmental Reindeer Committee. Four meetings of this Committee were attended during the year.

ADVISORY BOARD ON WILD LIFE PROTECTION

The Advisory Board on Wild Life Protection, an interdepartmental committee organized December 28, 1916, held four meetings as follows: May 15, June 27, and October 6, 1939, and March 8, 1940. A few of the subjects dealt with were assistance to the National Forestry Program Camps by recommending subjects and lectures on wild life conservation; proposals for national activity in wild life research; danger to the eastern slope of the Rockies from destruction of forests and consequent erosion if herbivores are not kept in control by their natural enemies; reservation of areas in the Northwest Territories as game sanctuaries; development of an eider-down industry in southern Baffin Island; changes in the Northwest Game Regulations; beaver reserves and seasons; conservation of caribou, Coronation Gulf region; predator control and payment of bounties; wild life conditions in Banff National Park, and scientific reports relating to the Arctic patrol, 1939, dealing with (a) wild life, (b) plankton, (c) molluscs, and (d) parasitology.

Dr. Harrison F. Lewis, Chief Federal Migratory Bird Officer for the Provinces of Ontario and Quebec, was appointed a member of the Board, the only change in personnel during the year.

APPENDIX

THE ALPINE CLUB OF CANADA

(From the report of the Chairman of the Club-House Committee)

The total number of members and guests registered at the Club-House during the season was 221, of which 47 were members. The season opened badly, the attendance during July being very poor, but during August the house was well filled, so that at the end of the season the net results were comparatively favourable.

The following provinces and countries were represented in registration:—

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-fourth annual camp was held from July 15 to 29, near the head of the Ice River Valley in Yoho National Park. Unfortunately the first two days were wet, which upset the transport arrangements. However, the weather cleared early in the week and continued fine for the rest of the time on the lesser peaks. Altogether 128 persons, including the staff, were placed under canvas, representatives attending from the Alpine Clubs of England, America, and France; the Royal Geographical Society, the Appalachian Mountain Club, B.C. Mountaineering Club, the Mazamas, the Sierra Club, and the Obsidians.

The high camp equipment was pitched on the Vaux snowfield at an elevation of about 9,000 feet, and was visited by about 40 people. During the second week a fly camp was established at about 7,500 feet above Zinc Gulch, from where parties climbed Goodsir and Zinc. Fifteen climbed the south tower of Goodsir, a very creditable achievement, as the peak was not free from fresh snow before the end of the second week.

Peaks climbed were: Ennis, Vaux, Hanbury, Garnet, Butwell, "G1", Zinc, Goodsir (South Tower) and "Marten's", the latter being a first ascent of an unnamed peak at the head of Marten's Creek, which proved to be a most interesting rock climb. The annual meeting of the club was held at the Goodsir's camp on July 23, 1939.

DOMINION FOREST SERVICE

The outbreak of war directed attention to the favourable position held by Canada's forest resources in relation to the war effort. Products of our forests enter into many phases of war-time preparation and production. The forests provide materials for aircraft, ship, and motor-vehicle construction; for hangar and camp buildings; for containers for munitions, as well as charcoal for gas masks and an increasing number of other derivatives essential for defence. The Dominion's war economy also benefits by the favourable balance of trade in forest products and by the exceptional tourist appeal of our forest-clad mountains and forest-bordered lakes and streams.

While the importance of our forests in the war effort is generally recognized, it is well to bear in mind that these valuable resources will be called upon to assist in the readjustment after the war. The most productive use to which over one-third of the land area of the Dominion can be put is the growing of forests and its full use will require forest management on a scale difficult to

realize. This management must not be based solely on production of raw materials for industry but rather on a multiple-use basis, having in mind the tourist business, wild life conservation, stream-flow protection and regulation, soil erosion, and the tempering of excessive climatic changes.

In the industrial phase, Canada's place in world markets must be strengthened and enlarged by improving the quality of her products and at the same time by making them available at a favourable competitive price. This can only be attained by constant research not only in the yield-capacity of our vast forests but in the economical and full utilization of the wood grown.

The Dominion Forest Service is a research and fact-finding organization charged with the task of conducting studies and investigations into the production of raw materials from the forests, and utilization thereof. Forest experiment stations and forest products laboratories are the media through which findings are tested and confirmed.

The year under review was notable for the inauguration of the National Forestry Program. Following the outbreak of war assistance was given to the war departments in matters relating to forest resources and products, including a review of the aircraft spruce situation in British Columbia and the preparation of a new grading rule, the designing and testing of munitions containers, the provision of specifications for lumber purchases, and the giving of technical advice on the suitability of Canadian woods for various war purposes. Officers of the Forest Service supervised the undertaking of forestry work projects in enemy aliens' internment camps established at two forest experiment stations.

NATIONAL FORESTRY PROGRAM

During the spring of 1939 the Dominion Forest Service worked out the details and supervised the operation of the National Forestry Program. This program was made possible by the joint action of the Department of Labour and the Department of Mines and Resources. The purpose of the scheme was twofold: first, the mental and physical rehabilitation of young men between the ages of 18 and 25 years who were unable to find gainful employment, and, second, the provision of a measure of assistance in forest conservation throughout Canada by utilizing the services of these young men in the construction of fire-protection improvements, silvicultural operations, recreational development, and conservation of fish and game.

The National Forestry Program was divided into two sections, namely, Dominion and Provincial. Under the Dominion section, work was carried out at Dominion forest experiment stations and in national parks. This section was under the immediate direction of the Dominion Forest Service and accounted for the employment of 1,000 enrolees.

The costs under the Dominion section were borne totally by the Federal Government. In the Provincial section the work was carried out on provincial forests, the costs being borne equally by the Provincial and Dominion Governments. The immediate direction of work on provincial areas was a function of the provincial authorities, but the Dominion Forest Service was charged with the approval of plans for such work, as well as with inspections. Some 4,000 enrolees were employed with the provincial services.

The program called for work, recreation, and training for a period not exceeding five months. The rate of pay was \$1 per day, with board, lodging, and medical services. Enrolees under the scheme, after their applications were approved for circumstances and character, were required to pass a medical examination before being taken on strength.

The undertaking was a complete success. It resulted not only in a vast improvement in the physical condition and morale of these young men, thus better fitting them to seek employment, but also resulted in the accomplishment of much useful work in forest conservation.

FOREST ECONOMICS

The Division of Forest Economics compiles and analyses statistics of forest resources, rates at which products of the forest are being used and destroyed, the progress of industries using wood as their chief raw material, and the trends of domestic and foreign trade in wood and its derivatives. It is customary to present each year some of the more important statistics relating to Canada's forests and forest industries during the latest years of record. These are as follows:—

Average Annual Depletion, 1929-38

	Millions of cubic feet
Volume utilized	2,546
Merchantable timber burned	391
Young growth burned	349
Destroyed by insects, fungi, etc.	700
	3,986

Total depletion, including utilization and waste, amounted to 2.3 per cent of the estimated volume of accessible merchantable timber.

GROWTH

It has been estimated that the annual depletion can be replaced by an average annual growth of only 8 cubic feet per acre. But actual utilization is confined to accessible areas, rather than spread over the whole forest, and a large part of the loss from fire and pests also occurs on the accessible lands. Consequently, growth on the whole forest may easily balance total depletion, although, at the same time, depletion may be far too heavy on the accessible lands.

FOREST INDUSTRIES

Summary of Statistics of the Forest Industries, 1938

	Number of Employees	Salaries and Wages	Net Value of Products
		\$	\$
Woods operations.....	93,000	74,000,000	148,265,857
Lumber industry.....	31,182	25,345,064	39,264,528
Pulp and paper industry.....	30,943	42,619,311	89,034,186
Wood-using industries.....	30,601	26,984,592	39,747,208
Paper-using industries*.....	11,661	13,234,150	25,402,119
Total.....	197,387	182,183,117	341,713,898

* Exclusive of books and printed matter. The figure given for men employed in woods operations is an equivalent calculated on a man-year basis.

THE LUMBER INDUSTRY

The lumber industry was somewhat less active in 1938 than in the preceding year. Production of sawn lumber fell from 4,005,601 M ft. b.m. in 1937 to 3,768,351 M ft. b.m. in 1938, and the value of all sawmill products was reduced from \$104,849,785 to \$92,855,906, a decrease of 11.4 per cent.

THE PULP AND PAPER INDUSTRY

Production of the pulp and paper industry was also lower in 1938 than in 1937. Total production of wood-pulp fell from 5,141,504 tons to 3,667,789 tons, and that of paper was reduced from 4,345,361 tons to 3,249,358 tons. Gross value of all products of the pulp and paper industry decreased from \$226,244,711 in 1937 to \$183,897,503 in 1938, a drop of 18.7 per cent.

Production of pulpwood in Canada totalled 6,306,747 cords, valued at \$53,761,999, in 1938, as compared with the record cut of 8,298,165 cords, valued at \$63,057,205, in 1937.

TRADE IN FOREST PRODUCTS

The favourable balance obtained from external trade in wood and the products derived from wood amounted to \$222,871,620 in 1939.

Exports of Wood, Wood Products, and Paper
(Exclusive of books and printed matter)

	Calendar Years	
	1938	1939
	\$	\$
Raw materials (logs, bolts, pulpwood).....	17,734,535	18,221,853
Products prepared in woods (poles, hewn ties, etc.).....	2,055,620	2,593,149
Sawmill and planing-mill products (lumber, shingles, etc.).....	47,380,549	63,105,771
Manufactured wood products (doors, furniture, etc.).....	2,889,062	2,374,043
Pulp, paper, and manufactures thereof.....	140,603,514	155,127,766
Total.....	210,663,280	241,422,582

The proportion of the total value of Canadian exports of products of the forest and forest industries sold to countries of the British Empire was slightly lower in 1939 than in the previous year. The United States continued to be our best customer for these products, accepting approximately two-thirds of the total value.

Per Cent of Value of Exports of Forest Products to the Principal Importing Countries

	Calendar Years	
	1938	1939
United Kingdom.....	18.2	18.1
Other British countries.....	9.5	8.4
United States.....	66.4	68.4
Other foreign countries.....	5.9	5.1
	100.0	100.0

AERIAL FOREST SURVEYS

The duoscope, an instrument developed by the Forest Service to permit of the transfer of details from photograph to map sheet in a single operation, has proved an effective means for obtaining quick results and reducing costs.

During the year a binocular attachment was designed and added to the former model with successful results. A photo-electric planimeter was originated and brought to a workable stage of development. This instrument makes possible the measurement of mapped areas, at a speed hitherto unattainable, through the use of a simple principle. A wedge scale was developed for making fine measurements on aerial photographs, and an alignment chart was devised to facilitate calculations of tree heights from images so measured.

Observations were made in the field as an aid to the preparation of volumetric estimates and to assist in the identification of species and forest types. A new formula devised by the Forest Service for estimating diameters of trees from aerial photographs was checked by ground measurements.

Forests were mapped for forest-inventory purposes on 930 square miles in Nova Scotia, where interest in timber supplies has been quickened by war developments. On the Petawawa Forest Experiment Station 60 square miles were mapped in great detail, including the delimitation of forest-site classifications developed in the field. Maps of an area of 53 square miles in New Brunswick were made in co-operation with a pulp and paper company as a test of the value of aerial photographs for operating purposes. Thirty-eight square miles in Ontario were mapped to test the accuracy of volumetric estimates. At the request of the Indian Affairs Branch of this Department, 100 square miles were mapped to ascertain the supplies of fuel-wood available near Oka, Quebec. Ten square miles were mapped in the Gatineau district near Ottawa for the Federal District Commission.

SILVICULTURAL RESEARCH

It is the policy of the Dominion Forest Service to determine through research, and to apply on demonstration areas, measures necessary for the handling of forest lands under forestry principles. Methods thus determined are made available to administrative and utilization organizations. To this end five forest research experiment stations have been established, each station representing a different major forest region. Methods of improving production of second-growth stands are of primary interest. Study of practical methods of managing mature stands to ensure ample and continuous future supplies constitutes the second field of research. These two fields involve basic work in biology, ecology, and mensuration. Studies of timber types and age-classes not represented on any of the five forest experiment stations are conducted on outside areas in co-operation with provincial services and the industries.

A Classification for Forest Research Projects has been developed this year, and has been published as Research Note No. 61. It provides that every silvicultural research project shall be allocated to one of ten major divisions, namely, Botany, Ecology, Silviculture, Mensuration, Forest Influences, Protection, Administration, Economics, Technology, and Utilization.

At a conference of interested scientists in the Department of Mines and Resources, the Department of Agriculture, and the National Research Council, the problem of extending and co-ordinating phenological data was discussed at length. A working committee was appointed to study standardization of forms, determination of index phenomena, selection of key stations, and means of assembling and analysing data. Satisfactory progress is being made. In the meantime phenological data are being taken at each experiment station.

The program of forest tree breeding, started two years ago in co-operation with the Tree Breeding Sub-committee of the Associate Committee on Forestry, under the National Research Council, has made marked progress. It includes projects in selection and testing of superior natural species types for hybridization or direct utilization; production of new forms through hybridization or induced

chromosome doubling, and testing of new forms for quality, adaptation, growth-rate, and disease resistance. Substantial progress has been made in developing spruce by cross-pollination and by propagation from cuttings. Efforts are being made to develop, by cross-pollination with Asiatic species, strains of white pine resistant to blister-rust.

About 10,000 hybrid poplars have been produced in a search for rapid-growing, rot-resistant species of high quality for match-stock and for pulpwood. Species with qualities suitable for use in prairie shelter-belts are also being sought. Work is also proceeding to determine the effect of different soil media on rooting. Various admixtures of fine sand, coarse sand, loam, clay, peat, moss, peat humus, and sawdust are being tried. Some conclusive results have been obtained.

The irregularity and uncertainty of white pine reproduction following cutting and fire is disturbing. This succession of white pine is another project being conducted in co-operation with the Associate Committee on Forestry of the National Research Council. Investigations were conducted in the Ottawa Valley region.

In a search for species of high quality, many exotic species, principally pines and spruces, are being raised from seed in the nurseries at the Petawawa, Acadia, and Kananaskis stations. Several Asiatic white pines and some Douglas firs from British Columbia grown at Petawawa are very promising. A seed-dissemination study was undertaken at Petawawa to determine the distance to which pine and spruce seed will be carried by the wind. A series of plots was established at each station to study the relative value of exposing mineral soil by mechanical means and by burning to induce reproduction of pine and spruce; this project should throw valuable light on the problem of reproduction following cutting.

Marked progress has been made in nursery and planting technique. It has been found that, at Petawawa, autumn is the better season for sowing pine, though spring is more favourable for spruce. Basswood seed requires from two to four years to germinate. To overcome poor drainage, seed-beds should be raised above ground-level. Sawdust mixed in heavy soils improves the seed-bed for spruce and pine.

White pine cannot be grown successfully in pure stands because of white pine weevil attacks. In an endeavour to overcome this difficulty, 35 acres of poplar stands at Petawawa were heavily thinned and under-planted with white pine. The Entomological Division, Science Service, Department of Agriculture, is giving co-operation. A similar project is under way at the Acadia station in the wire birch type. Ten thousand red and white pine seedlings were planted, experimentally, to reclaim sand plains at Valcartier station.

Over 300 acres of 35-year-old jack pine stands near the Petawawa Military Camp were heavily thinned by relief labour. Over 900 cords of the thinnings were utilized for fuel. The purposes were protection, improvement of growth, and aesthetic improvement. Permanent records were taken for two improvement-cutting experiments of about 35 acres each in a mixedwood stand 50 to 60 years old, at Petawawa. Much of the material removed was sold as logs or fuelwood. The net cost of improvement was \$3.16 and \$3.33 per acre, respectively.

A more practical operation on a larger scale was conducted in the winter of 1939-40, the final phase continuing this season. From a somewhat older stand the large poplar was removed for match stock. A second operation is now removing the smaller poplar and tops left from match-stock operations, as peeled pulpwood. The dual operation provides a net return of \$5 to \$10 per acre, and has left a stand of pine and spruce advance-growth sufficient for complete stocking. Similar thinning, improvement cutting, and harvest cutting operations were con-

ducted at the Acadia station in accordance with the working plans and for investigative purposes. In Riding Mountain National Park, 2,500,000 feet board measure of spruce and jack pine was marked and cut as provided by the working-plan budget. Poplar fuel-wood operations were conducted on a silvicultural basis to provide a new crop of sound timber. A series of sample plots was established in stands of stagnated lodgepole pine and Douglas fir at Kananaskis to study the effect of thinning as a means of stimulating growth and improving quality.

The survey of balsam fir on cut-over lands of the Upper Gatineau watershed to determine the most important factors influencing balsam fir buttrot, started last year, was concluded. A relationship between site-type and buttrot has been found. This project was conducted co-operatively by the Dominion Forest Service, the Science Service of the Department of Agriculture, and the Canadian International Paper Company.

The Entomological Division of the Science Service of the Department of Agriculture is prosecuting investigations of white pine weevil, tent caterpillar, red pine saw-fly, and larch saw-fly from the laboratory at the Petawawa station. Similarly, the plant-pathological unit of the Division of Botany is devoting attention to decay in poplar, beech canker, and the inherent resistance of tree species to disease.

The following Research Notes were issued: 57, Thinning and Pruning of Red Pine Plantation at Rockland; 58, General Outline for Reproduction Studies; 59, Some Simple Management Methods Applied to Farmers' Woodlots; 60, Some Observations on a Visit to New England; 61, Classification for Forest Research Projects.

FOREST PROTECTION

The Dominion Forest Service carries on research work in forest-fire protection at its forest experiment stations and also at other points, in co-operation with forest industries, provincial governments, and the National Research Council. Studies deal with the improvement of methods, equipment, and technique for detecting and suppressing forest fires, and increasing efficiency of fire-protective effort. The annual statistics of forest-fire losses in Canada are compiled from information collected from provincial and other forest-protective organizations.

The year 1939 was, on the whole, a favourable one from the point of view of forest-fire protection. Though Alberta experienced its fourth consecutive bad fire year, the losses in all other provinces were considerably below normal. The total number of fires reported in Canada was 5,613, compared with an average of 6,139 for the period 1930-39. Eighty-six per cent of these fires were attributed to human agencies, and the remaining 14 per cent to lightning. The total loss and damage, including cost of fire-fighting, was \$2,729,321, compared with an average of \$4,961,405 for the ten-year period 1930-39. Detailed statistics of forest-fire losses and causes for Canada as a whole in each of the ten years 1930-39, will be found in Tables 1 and 2 (pp. 123 and 124). Table 3 (p. 125) gives the corresponding figures by provinces as to the number of fires, the proportion due to lightning, the areas burned, and the fire losses.

A short description, by provinces, of the fire season follows:—

British Columbia.—The year was a favourable one, the loss and damage from forest fires being much below the average for the past ten years. During the early spring the rainfall was less than normal, but this was followed by a wet May and June. In July the rainfall on Vancouver Island and in the northern portion of the province was twice the normal, but dry conditions prevailed in the interior. August and September were generally dry, except in the north, which, throughout the season, experienced more rainfall than usual.

Alberta.—This province experienced the fourth consecutive bad fire year. The damage amounted to nearly one and a quarter million dollars. This is a reduction from more than two millions in the previous year, but is much in excess of the ten-year average. Low precipitation during the winter, together with subnormal rainfall in the northwest throughout the year, resulted in the occurrence of forest fires in every month of the year.

Saskatchewan.—The fire season of 1939 was much less severe than those of previous years. Though the total area burned was slightly greater than in 1938, the value of timber destroyed was less. Weather and fire-hazard conditions during the fire season were favourable, there being no prolonged dry, hot periods.

Manitoba.—The fire situation for the province as a whole was slightly better than that of 1938. The cost of suppression was higher than usual because of the number of ground fires which required attention for long periods after their spread was controlled. The dry autumn of 1938 and the low rainfall and high temperatures in April 1939 combined to produce a dangerous spring fire situation in the southern and western portions of the province. Insufficient rain during the latter part of June and during July caused a serious situation in the southeastern district which spread from the International Boundary northwards to the mining area in the eastern section of the province.

Ontario.—The fire season of 1939 was a particularly favourable one in Ontario. Very few periods of high fire-hazard developed, and there were only three fires which exceeded a thousand acres in extent. The total area burned over during the year was the smallest on record.

Quebec.—The longest dry periods occurred in May and June, when 87 per cent of the forest fires took place. This dry spring period was confined largely to the lower St. Lawrence region. In the rest of the province, and for the remainder of the season throughout the province, the rainfall was generally normal or above normal, with the exception of a few brief periods of dry weather at some points.

New Brunswick.—The records for 1939 showed a marked reduction in fire costs and damage over 1938 in spite of a greater number of fires. The spring hazard lasted from the middle of May to the middle of June, when general rains occurred. In the northern portion of the province, where some of the most destructive fires have occurred in the past, heavy rainfall during July and August rendered the area comparatively safe. The summer was drier than normal in the southern part of the province, but the fires which occurred were controlled with a minimum of damage owing to prompt action by the fire-fighting forces.

The prohibition of spring burning operations during the months of May and June was well observed, and was a controlling factor in the reduction of loss from land-clearing fires.

The forest-fire hazard research station near Fredericton was operated as usual, and, in addition, the network of weather stations continued to submit daily reports on weather conditions throughout the province. Hazard charts were developed from these reports, and it has now become possible to advise rangers in advance of hazardous conditions with the result that proper precautions can be taken to meet emergencies. It is felt that this feature has been worth while and has saved its cost many times over.

Nova Scotia.—The fire season of 1939 was an unusually long one in Nova Scotia, and fires occurred in every month from April to November. The worst month was August, when 135 fires occurred. The weather was much drier than normal throughout the season, and this resulted in the largest number of fires since 1934. The damage and loss, however, was kept well below the average for the past ten years.

Dominion Protected Lands.—Fire protection on National Parks, Indian reserves, and Dominion forest experiment stations is administered by the Dominion Government. Fires which occurred in these areas are not included in the statistics of the provinces in which such lands are located, but are shown separately in Table 3 (p. 125).

FOREST-FIRE RESEARCH

The use of the system for measuring and forecasting forest-fire hazard that has been developed at the Petawawa Forest Experiment Station for the guidance of forest officers in the administration of fire-protection was further extended during the year. Twenty-eight weather stations for the use of this system have been established by the New Brunswick Forest Service under the technical direction of Dominion officers; these cover the forested areas in that province. The forested areas in Quebec are now covered by a network of 107 weather stations using the system, under the supervision of provincial officers. During the year the system was extended to the Riding Mountain National Park in Manitoba and Prince Albert National Park in Saskatchewan. Four weather stations were established in each park, under the direction of the Forest Service.

A preliminary inspection was made of fire-types in Banff, Jasper, and Waterton Lakes National Parks, and tentative sites were selected for weather stations for the operation of the system of fire-hazard measurement. As the forest and climatic conditions in these areas differ greatly from those in the East, where the system was developed, it was necessary to establish a fire-hazard research station at the Kananaskis Forest Experiment Station in Alberta to adapt the system for use in this region.

Basic research in forest-fire hazard was carried on by the Forest Service in New Brunswick, at the Petawawa (Ontario) and Kananaskis (Alberta) Forest Experiment Stations, and at Riding Mountain National Park (Manitoba).

As a result of studies at Petawawa and the National Research Laboratories and of co-operation by manufacturers, a new light-weight, self-priming centrifugal power-pump has been produced for forest-fire fighting. Another result of co-operation by manufacturers has been the development of a light portable one-man hose-reel for picking up wet hose on rough ground after a fire. It is expected that this reel will prolong the life of forestry hose, which up to the present has been subject to heavy depreciation from wear and tear in use.

Studies were continued at the Petawawa Forest Experiment Station in the use of chemicals in forest-fire protection.

Mimeographed publications were issued on forecasting weather and forest fire-hazard from local observations, fire-hazard tables with supplements, and the practical value of fire-hazard records and forecasts.

WHITE-PINE BLISTER RUST

A reconnaissance of a sample area of 2,000 square miles of white pine territory bordering the Upper Ottawa between Fort Coulonge and Mattawa showed 10 to 20 per cent of the white pine affected in areas contiguous to settlement, but only 1 to 2 per cent on Crown land areas. This seems to be owing to the presence in the settled areas of the domestic black currant, which is by far the worst spreader of the disease of any of the species of Ribes. The survey shows, further, that if the moist, low-lying third of the pine lands (wherein the Ribes are largely concentrated) is given rust-protection, the problem may be satisfactorily solved. Incidentally, the survey shows that the white pine (mature stands of which now occupy only 2 per cent of the original forested area) is capable of reproducing itself as is shown by the presence of white pine seedlings

and saplings from scattered seed-trees. The situation seems to call for the development of a system of co-operation between interests, governmental and private, involved in saving the white pine as a commercial asset. This procedure has proved most satisfactory for the control of this disease in the United States.

By reason of the peculiar habitat of western white pine (*Pinus monticola*) its protection against the rust seems scarcely feasible, but the eastern species (*Pinus Strobus*) is easily accessible, and the eradication from its vicinity of all species of Ribes, which constitute the secondary host for this fungus disease, would ensure the safety of the species. The great value of the tree, the stand of which is estimated to have a volume of 8,000,000,000 feet board measure of saw-timber and 10,000,000 cords of smaller material, is self-evident. Experimental work at the Petawawa forest experiment station, where the better stands have been given primary treatment, shows the cost to average 20 cents per acre.

TABLE 1

Statement of Forest Fires in Canada by Years for the 10-year Period 1930-39, with the Average for the Period

Item	Year										Total	Average
	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939		
Fires under 10 acres							4,031	3,886	4,476	3,990		
Fires 10 acres and over.....							1,915	2,063	2,171	1,623		
Total number of fires.....	6,805	6,965	6,298	6,298	5,911	4,955	5,946	5,949	6,647	5,613	61,387	6,139
Total area burned.... acres	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	1,115,179	22,106,915	2,210,691
Merchantable timber—												
Area burned..... acres	746,129	394,824	708,085	204,405	321,414	172,592	919,764	662,792	722,199	199,288	5,051,492	505,149
Timber burned..... M ft. b.m.	779,081	538,551	569,126	255,383	899,545	98,971	2,077,584	408,942	2,160,192	196,803	7,984,178	798,418
Timber burned..... cords	2,043,142	1,241,647	2,705,374	650,318	836,554	785,552	3,524,493	4,354,820	2,557,780	911,051	19,610,731	1,961,073
Estimated stumpage value. \$	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	599,315	25,545,845	2,554,584
Young growth—												
Area burned..... acres	577,980	590,234	586,141	220,620	242,101	191,940	739,701	2,035,830	719,461	326,358	6,230,366	623,037
Estimated value..... \$	1,456,135	1,215,682	1,209,063	454,648	573,455	326,423	1,284,102	1,161,861	1,286,512	448,924	9,416,805	941,680
Cut-over land—												
Area burned..... acres	427,285	535,418	772,625	331,614	562,446	258,964	303,348	188,385	548,792	266,542	4,195,419	419,542
Estimated value..... \$	275,578	219,776	615,605	187,303	246,031	262,725	66,253	155,276	328,737	767,787	3,125,071	312,507
Non-forested area burned... acres	918,794	573,442	397,069	251,918	349,156	232,687	1,063,833	1,384,424	1,135,316	322,991	6,629,630	662,963
Other property burned, value \$	506,779	363,516	264,769	162,075	149,923	355,541	84,560	151,809	827,804	283,798	3,150,574	315,057
Total damage..... \$	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	2,099,824	41,238,296	4,123,830
Actual cost of fire-fighting.... \$	1,135,909	931,504	683,650	509,939	827,451	526,743	1,206,863	878,563	1,045,637	629,497	8,375,756	837,576
Total damage and costs.. \$	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	2,729,321	49,614,052	4,961,405

TABLE 2

Statement of Forest Fires in Canada by Causes for the 10-Year Period 1930-39

Cause	Year																				Total No. Fires	Average 1930-39	
	1930		1931		1932		1933		1934		1935		1936		1937		1938		1939			No.	%
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Camp-fires.....	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	1,108	20	12,181	1,218	20
Smokers.....	790	12	998	14	809	13	893	14	971	17	985	20	947	16	860	14	980	15	1,004	19	9,237	924	15
Settlers.....	954	14	1,097	16	1,385	22	1,265	20	946	16	1,143	23	567	9	973	16	1,154	17	845	15	10,329	1,033	17
Railways.....	731	11	625	9	354	6	312	5	255	4	192	4	176	3	232	4	176	3	185	3	3,238	324	5
Lightning.....	1,483	22	880	13	651	10	940	15	957	16	331	7	1,529	26	832	14	1,046	16	796	14	9,445	944	15
Industrial operations.....	137	2	133	2	91	1	94	1	198	3	123	2	132	2	190	3	176	3	112	2	1,386	139	2
Incendiary.....	522	8	674	10	746	12	511	8	349	6	400	8	608	10	383	6	558	8	465	8	5,216	522	9
Public works.....	98	1	97	1	47	1	56	1	104	2	35	1	42	1	88	1	57	1	75	1	699	70	1
Miscellaneous known.....	266	4	368	5	243	4	300	5	365	6	324	6	288	5	528	9	488	7	590	10	3,760	376	6
Unknown.....	559	8	612	9	643	10	725	12	655	11	547	11	472	8	628	11	622	9	433	8	5,896	590	10
Totals.....	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	5,613	100	61,387	6,139	100

TABLE 3
Statistics of Fires by Provinces, 1939
 Averages given are those for the 10-year period, 1930-39

Item	British Columbia		Alberta		Saskatchewan		Manitoba		Ontario	
	1939	Average	1939	Average	1939	Average	1939	Average	1939	Average
Fires—										
Total number.....	1,704	1,714	499	354	194	238	501	379	961	1,609
Caused by lightning..... %	29	27	4	4	3	7	3	13	19	20
Area burned (acres)—										
Merchantable.....	12,210	73,682	99,744	110,139	50,237	49,395	14,943	33,572	4,382	182,686
Young growth.....	33,935	90,571	128,768	135,322	108,364	220,578	27,958	36,297	5,742	83,389
Cut-over.....	135,150	236,828	40,853	17,034	17,897	11,835	6,803	3,445	11,450	24,611
Non-forested.....	12,173	43,016	159,774	157,948	39,286	135,075	81,628	153,562	7,524	107,807
Total.....	193,468	444,098	429,139	420,443	215,784	416,883	131,332	226,877	29,098	398,494
Damage..... \$	372,724	1,039,536	1,249,879	746,352	47,564	221,111	96,012	121,282	78,597	1,314,649
Cost of fire-fighting..... \$	233,324	200,320	140,653	69,317	6,886	59,620	37,633	30,640	74,062	292,995
Total damage and costs..... \$	606,048	1,239,855	1,390,532	815,669	54,450	280,731	133,645	151,922	152,659	1,607,644

Item	Quebec		New Brunswick		Nova Scotia		Dominion Lands					
							National Parks		Indian Lands		F. Expt. Stations	
	1939	Average	1939	Average	1939	Average	1939	Average	1939	Average	1939	Average*
Fires—												
Total number.....	856	1,060	256	269	442	386	120	79	71	45	9	6
Caused by lightning..... %	3	5	8	13	0	0	4	9	18	15	0	17
Area burned (acres)—												
Merchantable.....	9,068	40,968	1,344	7,577	781	1,558	6,409	2,876	170	2,292	0	449
Young growth.....	15,119	36,352	3,958	7,010	1,926	6,021	329	5,262	257	1,457	2	864
Cut-over.....	49,761	112,268	1,079	10,516	722	1,485	2,753	872	74	615	0	35
Non-forested.....	6,353	19,894	6,324	24,754	5,406	12,577	3,562	6,161	959	1,539	2	719
Total.....	80,301	209,483	12,705	49,857	8,835	21,641	13,053	15,172	1,460	5,903	4	2,067
Damage..... \$	202,758	519,221	21,183	82,869	6,336	27,386	22,992	34,900	1,772	10,984	7	6,154
Cost of fire-fighting..... \$	82,768	114,947	11,727	27,256	23,238	25,918	14,878	12,032	4,320	4,084	8	574
Total damage and costs.. \$	285,526	634,168	32,910	110,126	29,574	53,304	37,870	46,932	6,092	15,068	15	6,728

* Exclusive of 1933.

FOREST PRODUCTS LABORATORIES

The work of the Forest Products Laboratories pertains principally to scientific and technical problems arising in the manufacturing and marketing of products derived by mechanical and chemical processes from Canadian woods. Of special importance is improvement in existing practices and the curtailment of the waste that occurs in logging and manufacturing. An essential function of the Laboratories is collaboration with similar organizations in other countries.

The main laboratories are located in Ottawa. A branch laboratory is operated in Vancouver in association with the University of British Columbia. A pulp and paper laboratory is maintained in Montreal and is operated in collaboration with the Canadian Pulp and Paper Association and McGill University.

Following are brief references to some of the problems which have received attention during the year.

MAIN LABORATORIES (OTTAWA)

DIVISION OF WOOD PRESERVATION

Timber for use in repairs to ships of the Canadian navy was impregnated with fire-retardant chemicals and kiln-dried. The war also stimulated a demand for fire-retardant paints for wooden buildings. Tests were made for the Department of National Defence to determine the most effective fire-retardant paints at present on the market.

Cedar pole stubs treated by seven different processes, together with untreated controls, were installed in the test plot at the Experimental Farm, Ottawa. The problem to be solved is how best to arrest decay in the butts of some of the 10,000,000 untreated poles at present in use in Canada.

Twenty-five charges of red pine poles were treated in an experimental cylinder in the laboratory in order to determine (1) the degree of air-seasoning required before treatment, and (2) the best method of curtailing "bleeding" of the creosote after treatment.

Zinc chloride, chromated zinc chloride, zinc silico-fluoride, and lead silico-fluoride have been examined by similar methods to determine their toxicity and resistance to leaching. The tests on zinc chloride, the preservative properties of which are well known, served as controls.

Definite information on service life is required in order to estimate when and where treated timber can be used to advantage. With the co-operation of engineers in Government departments and commercial companies, 639 groups of timbers have been selected, and the life obtained carefully recorded from year to year. The timbers under observation include railway ties, telephone poles, piling, caps, stringers, and wharf decking located between Halifax and Vancouver.

At the request of the Department of Public Works, toxicity tests were made on timber treated in France by a creosote vapour process. It is claimed that the creosote vapour penetrates the wood and so protects the timber from decay and that this process requires much less creosote than is used in the standard pressure processes.

It is customary to estimate the average service life of creosoted poles as from 35 to 40 years. Individual poles in England have been reported as still sound after 63 years' service. When it was reported that some creosoted poles in Western Canada were failing after 10 years' service, this unusual result was investigated. It was found that the failure can be attributed to incomplete sapwood penetration and the use of an oil less toxic to wood-destroying fungi than standard coal-tar creosote.

White pine and maple planks, 3 inches by 9 inches by 5 feet, steeped in brine for from 3 to 4 days in connection with studies on the chemical seasoning of timber, were examined to determine the distribution of sodium chloride before and after seasoning. It was found that seasoning caused little or no change in the distribution of the salt, most of which was concentrated in the outer quarter-inch of the cross-sections. This information is of value in connection with consumer objections to the presence of salt in chemically seasoned timber.

For many years freight charges have greatly affected the cost of creosote used in treating plants in the Prairie Provinces. Therefore, the development of local plants producing a medium-temperature tar and a light type of creosote from lignite coal was watched with interest. Although timber could be treated with either the medium tar or the lignite distillate, neither of these products would pass the standard specifications for creosote in use by the railways and other consumers of treated timber. However, by mixing about 80 parts of the tar with 20 parts of the creosote, a very satisfactory treating mixture can be obtained; and, by blending 25 parts of the lignite distillate with 25 parts of standard creosote and 50 parts of crude oil, an economical treating mixture can be obtained. Blending the tar and crude oil is not possible owing to the formation of sludge.

DIVISION OF TIMBER MECHANICS

Experiments were carried out to check certain methods of conducting tests used in Canada with different methods which have been recommended in Europe. It was found that the two methods gave closely similar results.

Tests on Eastern cedar poles supplied by one of the large power companies showed almost negligible deterioration in ageing of the upper portion of the pole. The tests yielded valuable data covering the decay at or near the ground-line and the effect of the practice of periodically shaving off decayed material in this vicinity.

In co-operation with a Committee on Logging Sleighs of the Woodlands Section of the Canadian Pulp and Paper Association, the Laboratories prepared a new design of single-horse sleigh, and a large number of sleighs were built by pulp and paper companies according to the approved design.

Work was carried out on glues and gluing methods applicable to the use of plywood in the construction of aircraft. Special attention was given to the effect of high moistures and high temperatures on glue bonds.

On request, a new design of cheese box was prepared for the Department of Agriculture for export shipments.

In co-operation with the American Society for Testing Materials, an investigation was carried out with respect to standards for testing corrugated-board containers.

At the request of the National Building Code Committee and the National Housing Administration, a series of tests was made to determine the relative rigidity of frame walls covered with various kinds of sheathing, such as shiplap, fibre-boards (domestic and imported), plywood, and other materials.

The introduction of the ring-connector in timber construction has revolutionized design of many heavy timber structures and enabled timber to enter a wider field of construction. Tests of the added strength of joints assembled with ring-connectors were completed in order to supply designing engineers with more specific data than have heretofore been available regarding the fabrication of Canadian structural species with ring-connectors.

A representative of the laboratory attended an international conference on standardization of methods of timber testing in England.

Since the outbreak of war, a large part of the work of the division has pertained to design, testing, and specifications in connection with special war structures, aircraft, shipping containers, and other such matters.

DIVISION OF LUMBER SEASONING

Further study was made of the kiln-drying of white pine, fairly conclusive results being obtained with respect to the drying of stock under 2 inches in thickness. Special attention was paid to avoidance of brown stain in drying green and partly air-seasoned stock. Progress was made in drying 3-inch deals, but further study is required.

Work was completed on the drying for the Department of National Defence of 3-inch and 4-inch oak squares for artillery wheels.

A special study was made of the kiln-drying of 6-inch by 6-inch by 33-inch hard maple billets and of the drying of teak treated with a fire-retardant.

Surface and end-checks in air-seasoning have been responsible for as much as 70 per cent degrade in the shipment of white pine deal overseas. This material is costly, and losses incurred because of this degrade are heavy. After a survey of two yards, a change in the method of piling was recommended and adopted.

An experiment in a hardwood lumber yard with a grooved crosser designed in the Laboratory showed satisfactory results in preventing serious losses from the development of crosser-stain in sap maple of high value for specialty purposes.

Tests of white pine of 3-inch thickness treated with sodium chloride and allowed to air-season for one year, showed that the salt undoubtedly had a good effect in preventing checks, but that the lumber did not dry any faster than untreated material. Shrinkage of the wood was unaffected. While seasoning, most of the salt was carried to the surface, an advantageous point in that the wood after dressing would contain very little of the chemical. This verified previous findings in maple which had been kiln-dried after salt treatment.

A natural-circulation kiln of inexpensive construction was designed for emergency use where it is found expedient to kiln-dry stock rather than to follow the customary practice of air-seasoning.

DIVISION OF WOOD CHEMISTRY

A study was continued with respect to the resin and carbohydrate content of pine lumber from logs which have been handled in various ways prior to sawing and with lumber which has been subjected to different methods of seasoning. The purpose in view is to find the underlying cause for the variation that occurs in the susceptibility of such lumber to blue-stain and to resin exudation which interferes with satisfactory finishing.

A review was made of developments which have taken place throughout the world in the use of producer-gas from wood or charcoal in internal-combustion engines as a substitute for gasoline or diesel oil, and a report was prepared. Contact has been established with other investigators in this field.

Fish-floats of eastern cedar and western red cedar used at depths of 90 fathoms were found to fail frequently through absorption of water or collapse on account of the great pressure sustained. A treatment was developed in the Laboratories which greatly improves the service of such floats.

During the latter part of the year attention was given to a number of special matters including the following: (a) the manufacture and export of charcoal for special purposes (b) potash from wood ashes (c) the production of pine tar from Canadian woods, and (d) the activation of charcoal.

DIVISION OF TIMBER PHYSICS

A study was made of spruce and balsam fir from an area where conditions of growth resulted in timber of unusually high density. It was found that such material contained a large amount of compression-wood, a defect which appreciably depreciates the value of the material for lumber or pulp.

A study of the variation in density of spruce and balsam fir from the principal spruce districts of Eastern Canada which was carried out in co-operation with a number of pulp companies was finished and a report prepared for publication. The information is being used widely by pulp companies in evaluating pulpwood and in estimating annual wood requirements.

The study of resin exudation in white and red pine was continued; it included experiments to eliminate or curtail trouble on this account on painted surfaces.

A study of the effect of using linseed oil and lubricating oil in wood for concrete forms to prevent shrinkage showed little if any merit in such practice. The use of seasoned lumber was recommended.

Co-operation was extended to the National Research Council in their study of the relative qualities of native and hybrid poplars.

DIVISION OF WOOD UTILIZATION

A study was made in eleven representative spruce mills of Eastern Canada to determine the amount of material destroyed at present in refuse burners that might profitably be used in the manufacture of chemical pulp. It was found that about 520 cords of sound spruce are wasted for each million feet, board measure, of lumber produced. In 1937 this waste in Eastern Canada had a potential value of about \$3,000,000. Steps were taken to improve this situation by promoting closer co-operation between the sawmill and pulp industries.

Studies were also made at the sawmills mentioned for the purpose of determining the relative costs of converting logs of different sizes into lumber, and thus ascertaining the minimum size of log which can economically be handled at a sawmill of a given type. This was done as a preliminary step in a broader study aimed at promoting the more rational selection of raw materials for the various wood-using industries so that ultimately each may obtain that class of material which is best suited to its needs.

Experiments in the use of sawdust as a domestic fuel, commenced during the previous year in co-operation with the Fuel Research Laboratories, Bureau of Mines, were completed. The results show that sawdust from pine, spruce, sugar maple, or yellow birch makes a satisfactory fuel even when in the "green" condition, provided that suitable grates are used. When the proper type of sawdust burner is attached to a furnace, sawdust can be burned with an efficiency equal to that obtained from the same furnace burning cordwood of the same species.

Experiments carried out in co-operation with the Division of Dairy Research, Science Service, Dominion Department of Agriculture, to test the suitability of certain West Coast woods for butter boxes were completed. The tests showed that Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), grand fir (*Abies grandis*) and amabilis fir (*Abies amabilis*) were all satisfactory woods for this purpose and none imparted any appreciable flavour to butter, especially when metal-foil butter-wraps were used.

DIVISION OF TIMBER PATHOLOGY

A brown cubical rot of standing balsam fir has been definitely associated with *Coniophora cerebella*. This fungus has also been isolated from untreated jack pine railway ties.

The fungus *Trametes serialis* (as described by Cartwright in 1930) has been identified as a cause of purple discoloration in Douglas fir; it was also isolated from Douglas fir from a building, and from untreated jack pine railway ties.

Work was continued on the study of red-stain in jack pine and its development in creosoted and untreated railway ties under service conditions.

A study was made of spore distribution in two lumber yards. It was found that from 12,000 to 1,000,000 spores fell on one square foot of lumber per day. Moisture and yard sanitation were found to be important factors. Fifteen per cent of the fungi belonged to the class which includes wood-destroyers.

Specific inquiries were dealt with during the year with reference to the nature and control of sapwood stain; the pulping value of decayed wood; the protection of pulpwood in storage; decay in pulpwood, poles, and building timbers; discolorations in oak, jack pine, Douglas fir, birch, and maple, and mould and decay in wooden food-containers.

COMMITTEE WORK

Members of the staff of the Laboratories served on the following committees:—

The Canadian Engineering Standards Association.—Committees on Structural Timbers, Wood Poles, Wood Piling, and Fire Tests for Structural Material.

The National Building Code Committee.—Sub-committees on Wood Construction and Fire Protection, Administrative and Advisory Committees.

The Canadian Electrical Association.—Committee on Overhead Systems.

The American Wood Preservers Association.—Committee on Painting of Creosoted Wood.

The Canadian Government Purchasing Standards Committee.—Sub-committees on Paint and Pigment Specifications, Paper Quality and Specifications for Chemicals.

The Canadian Pulp and Paper Association.—The Committee on Logging Sleighs, the Joint Committee of the Woodlands and Technical Sections, The Joint Administrative Committee of the Pulp and Paper Institute, and The Subcommittee on Culls.

The American Society for Testing Materials.—Committees on Shipping Containers, Timber, and Paper and Paper Products (Fibre Containers).

PUBLICATIONS

The following special publications were issued from the Ottawa Laboratories:—

Wood Taint in Butter Boxes. (Mimeographed.) (In co-operation with Department of Agriculture.)

Some Economic Aspects of the Use of Spruce Sawmill Waste for Chemical Pulp in Quebec and the Maritime Provinces.

The Kiln-drying of White Pine.

Chemical Seasoning of Lumber.

The Effect of Immersion in Deep Water of Cedar Fish Floats and Some Linseed Oil Treatments of Western Red Cedar. (Mimeographed.)

Spruce Gum. A Review of the Literature Concerning the Oleoresinous exudation from Red, Black, and White Spruce. (Mimeographed.)

Possibilities of the Use of Producer-Gas from Wood and Charcoal in Canada. (Mimeographed.)

The Strength of Dowel Joints. (Mimeographed.)

The Strength of Glued Joints.

Concentration of Water-soluble Preservatives in Treated Timbers. (Mimeographed.)

Distribution of Moisture in Poles with and without Sand-Creosote Collar. (Mimeographed.)

Fire-retardant Paints. (Mimeographed.)

VANCOUVER LABORATORY

The Vancouver Laboratory is operated as a branch of the Ottawa Laboratories in co-operation with the University of British Columbia.

DIVISION OF TIMBER MECHANICS

Standard tests were carried out on western white pine, Douglas fir (mountain type), and yellow cedar; and special tests were carried out on Sitka spruce and western hemlock.

A study was advanced on the effect of the heart stain sometimes found in Douglas fir upon the strength of the wood.

In view of the importance of Sitka spruce for aeroplane construction, special attention was given to the effect of high kiln-temperatures on the strength of this species.

Tests were carried out on glued joints of various types submitted, and assistance was given in correcting trouble which had developed during gluing operations. Studies are in progress on three-ply Douglas fir glued by a "cold-press" process using a resin-blood glue.

At the request of the British Columbia Lumber and Shingle Manufacturers' Association, further tests on Douglas fir and western hemlock timbers of structural size were undertaken.

A great deal of time was devoted to assisting lumber firms, inspectors of aircraft, manufacturers of aircraft, and others in connection with the specification and testing of aeroplane spruce and other war materials.

DIVISION OF TIMBER PRODUCTS

Lumber Seasoning.—The study of moisture absorption, in unheated storage, of red alder, broad-leaved maple, western birch, and 3- and 4-inch western hemlock was continued.

An investigation was made into the cause of deterioration in partly seasoned western hemlock shipped to South Africa, and procedure regarding handling prior to shipment was recommended. This has been followed with improved results.

The investigation of the rusting of canned goods during ocean shipment in different kinds of cases was continued throughout the year in co-operation with the Research Committee of the Association of Marine Underwriters of British Columbia.

A test pile of Douglas fir and western hemlock ties was erected at a local creosoting plant to test the rate of air seasoning prior to preservative treatment.

A study was initiated to determine schedules, suited to modern kiln-drying practice, for seasoning Sitka spruce for aeroplane purposes without injury to the lumber.

Certain types of edge-grain Douglas fir were found to be subject to splitting in drying, as a result of which serious loss was caused. This matter was investigated with a view to detecting stock liable to splitting, and to kiln-drying it under a special schedule.

A satisfactory drying schedule was developed for kiln-drying 3-inch and thicker Sitka spruce aeroplane stock.

The following additional matters received attention: drying yellow cedar for venetian-blind slats, kiln-drying maple furniture lumber and hardwood veneer, and kiln-drying western hemlock for export.

The use of artificially induced humidity for the drying of western red cedar shingles in mechanical-circulation kilns was investigated, several test runs being made in a large dry-kiln.

Several kiln-runs were made on lumber immersed for varying periods in a salt solution. The results indicate that salt treatment retards surface checking to a marked extent, but causes a great deal of corrosion on metal work in the kiln.

A study was initiated in co-operation with a wood-preserving company to determine the effect of seasoning on Douglas fir treated with zinc chloride, for use in aeroplane hangars.

Utilization.—Information was assembled on the quantity of waste resulting from the manufacture of shingles and on the use of compressed "shingle hay" for insulation purposes.

Data were also assembled for the British Columbia Forest Branch on the utilization of red alder, broad-leaved maple, and western birch, as a result of which these species will be included in future cruise maps prepared by the Provincial Forest Branch.

Wood Pathology and Wood Structures.—Studies were continued on the cause and significance of streaky Douglas fir. Chemical analyses were made of wood constituents in the streaks which may have a bearing on this form of coloration.

Many minor problems were dealt with; those of chief importance were: brown-stain in a shipment of western red cedar shingles to the Atlantic Coast; the fungicidal properties of stain intended to camouflage western hemlock used for the storage of war supplies in the open; heart stain in western birch logs shipped to the Orient for match manufacture, to determine if this stain indicated decay; examination of lumber bulk-piled in large volume awaiting shipment owing to war emergency, to determine the incidence of decay.

One charge of western hemlock, balsam, and western red cedar containing various rot organisms, was dried for 6 days at a temperature of 130° F. and a constant relative humidity of 50 per cent. These drying conditions were found to be sufficient to sterilize the lumber.

Six shipments of Douglas fir were sent to the Forest Products Research Laboratory at Princes Risborough, England, for durability tests in comparison with Baltic species.

A study was completed on the relative efficiency of different chemicals for preventing sap-stain and mould on western white pine, western hemlock, and Douglas fir.

General.—Several serious paint failures reported to the Laboratories, chiefly on western red cedar siding, were found on examination to be caused by faulty methods of construction whereby paint was applied to the outside of the house before the interior was properly dried out.

Information on the protection from teredo attack of wharves and fender cribs in exposed areas by the use of dynamite was assembled for the Department of Public Works

Assistance was given to a local veneer factory on the properties, uses, and availability of western birch for very thin veneer and plywood for aeroplane par s.

COMMITTEE WORK

Members of the staff of the Laboratory served on the following committees: Grading Rules Committee of the British Columbia Lumber and Shingle Manufacturers Association, Research Committee of the Association of Marine Underwriters of British Columbia, and Examining Board for Graders of the British Columbia Lumber and Shingle Manufacturers Association.

PUBLICATIONS

The following special publications were issued from the Vancouver Laboratory:—

- Cross-grain in Lumber; Its Effect upon Strength. (Mimeographed.)
- The Seasoning of Douglas Fir Timbers and Western Red Cedar Poles. (Mimeographed.)
- Sap Stain and Mould Prevention. (Mimeographed.)
- Outline of Wood Waste Utilization in British Columbia.
- Chemicals in the Seasoning of British Columbia Timbers.

THE PULP AND PAPER DIVISION, MONTREAL

The work of this Laboratory is carried out in collaboration with the Canadian Pulp and Paper Association and McGill University.

MECHANICAL PULPING STUDIES

Important data concerning the effect of stone sharpness, pressure, speed, and type of abrasive upon production and quality of pulp were obtained from experiments with a miniature grinder. Interesting results have been obtained by grinding wood longitudinally instead of transversely as in normal grinding practice. Pulp thus prepared differs markedly from normal groundwood pulp and is being studied with a view to eventual reduction or even elimination of chemical pulp in newsprint. Further tests have been made on pulpstones made from domestic garnet and high early-strength cement which were submitted for examination.

CHEMICAL PULPING STUDIES

Chemical pulping studies were directed to the mechanism of sulphite pulping, and also to an examination of factors which influence the yield and quality of sulphite pulp. Progress has been made in the evaluation of a modified sulphite process; certain technical difficulties have been encountered which may hinder large scale application of the process, but there is reason to believe that these difficulties can be overcome. An investigation of the effect of chipper knives on the pulping qualities of wood showed that compressive stressing of the wood by the knives may result in considerable degradation in both sulphite and kraft pulp. Considerable work was carried out on the preparation and nitration of wood-pulps for explosives.

PRINTING STUDIES

The investigation of the properties of paper which affect its printing qualities and of the effect of variations in furnish, stuff-processing, sizing, fillers and paper-making and surfacing processes, was continued in order to obtain data to assist in the selection and preparation of different types of paper for printing operations. Accurate measurements of ink transfer, blackness of impression, and printing smoothness have been made at known printing pressures to assist

in evaluating printing qualities of newsprint samples. An attempt has been made to measure the printing quality of paper or the faithfulness with which an impression can be reproduced, by scanning a sample of printed matter with an electric eye arranged to measure reflectivity of very small areas and record the results as a sample traverses the instrument.

POST-GRADUATE STUDENT INVESTIGATIONS

A number of students of McGill University were afforded facilities in the Laboratory to carry out investigations of problems closely allied with the interests of the pulp and paper industry, for thesis work for post-graduate degrees. Five of the investigators spent a large part of the academic session on war problems, suggested by the Advisory Committee of Industrial Chemists, functioning under the National Research Council of Canada.

GENERAL

The use of aluminium foil in calibrating Mullen testers was extended to most of the Canadian mills, as the result of work carried out in this Laboratory. A method of disintegrating pressed lapped groundwood was developed which delivers pulp with substantially the same physical properties as the slush stock from which the laps were formed. In collaboration with the Department of Public Works an empirical method was devised for differentiating paper-mill waste from natural detritus in samples from deposits in a harbour system where pulp-mills are located. As in previous years, the Division continued to perform testing services without charge for members of the Canadian Pulp and Paper Association, calibration of freeness testers, pulp-evaluation apparatus, pulp-fibre classifiers, oil-absorption testers, and replacement parts were also carried out. "Shingle hay" from western red cedar was satisfactorily converted on the laboratory scale into both insulating and hard-pressed boards, by the use of standard processing procedures.

At the request of the Canadian Government Purchasing Standards Committee, a detailed report by Dr. H. W. Johnston was prepared covering the investigations leading to the preparation of Tentative Specification 9-GP-1: "Instructions for the use of Tentative Specifications 9-GP-1-1939 (issued March 31, 1939), for the purchase by the Government of Fine Writing and Ledger Papers." Mechanical and chemical pulping tests were carried out on samples of white spruce, black spruce, and balsam fir containing high percentages of compression-wood.

COMMITTEE WORK

Representatives of the Laboratory served on committees of the following organizations:

The Canadian Pulp and Paper Association.—Committee on Industrial Waste, Wood Chemistry Committee.

The Canadian Government Purchasing Standards Committee.—Sub-committee on Paper Quality.

PUBLICATIONS

The following special publications were issued by this Laboratory:—

A Study of the Mechanism and Kinetics of the Sulphite Process; Advances in the Chemistry of Wood; The Measurability of Printing Quality; The Effect

of Chipping on the Suitability of Wood for Sulphite Pulping; Cellulose and Other Chemicals from Wood (excluding paper) (Mimeographed); Ink Transfer and Printing Pressure on Newsprint (Mimeographed); Blackness of Print and Printing Pressure on Newsprint (Mimeographed).

PUBLICATIONS OF THE DOMINION FOREST SERVICE

During the year the following printed publications were issued: Bulletin 94, *Density and Rate of Growth in the Spruces and Balsam Fir of Eastern Canada*; Bulletin 95, *The Penetration into Wood of Cooking Liquors and Other Media*; Bulletin 96, *Animal Glues and Their Use in Woodworking*; Circular 55, *Wooden Tanks in Industry*; Forestry Topic 6, *The Christmas-Tree Industry in Canada* (revised edition). A translation into French of *Canadian Woods* was issued under the title of *Les Bois du Canada*. A further reprint of *Forestry Lessons* was made and distributed, and Bulletin 61, *Native Trees of Canada*, was also reprinted.