

PROVINCE OF BRITISH COLUMBIA
DEPARTMENT OF LANDS AND FORESTS

HON. R. G. WILLISTON, *Minister*

E. W. BASSETT, *Deputy Minister of Lands*

Report of the Lands Service

containing the reports of the

Lands Branch, Surveys and Mapping Branch,
and Water Rights Branch

together with the

University Endowment Lands

Year Ended December 31st

1957



PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY

VICTORIA, B.C., January 31st, 1958.

*To the Honourable FRANK MACKENZIE ROSS, C.M.G., M.C., LL.D.,
Lieutenant-Governor of the Province of British Columbia.*

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Annual Report of the British Columbia Lands Service of the Department of Lands and Forests for the year ended December 31st, 1957.

R. G. WILLISTON,
Minister of Lands and Forests.

VICTORIA, B.C., January 31st, 1958.

*The Honourable R. G. Williston,
Minister of Lands and Forests, Victoria, B.C.*

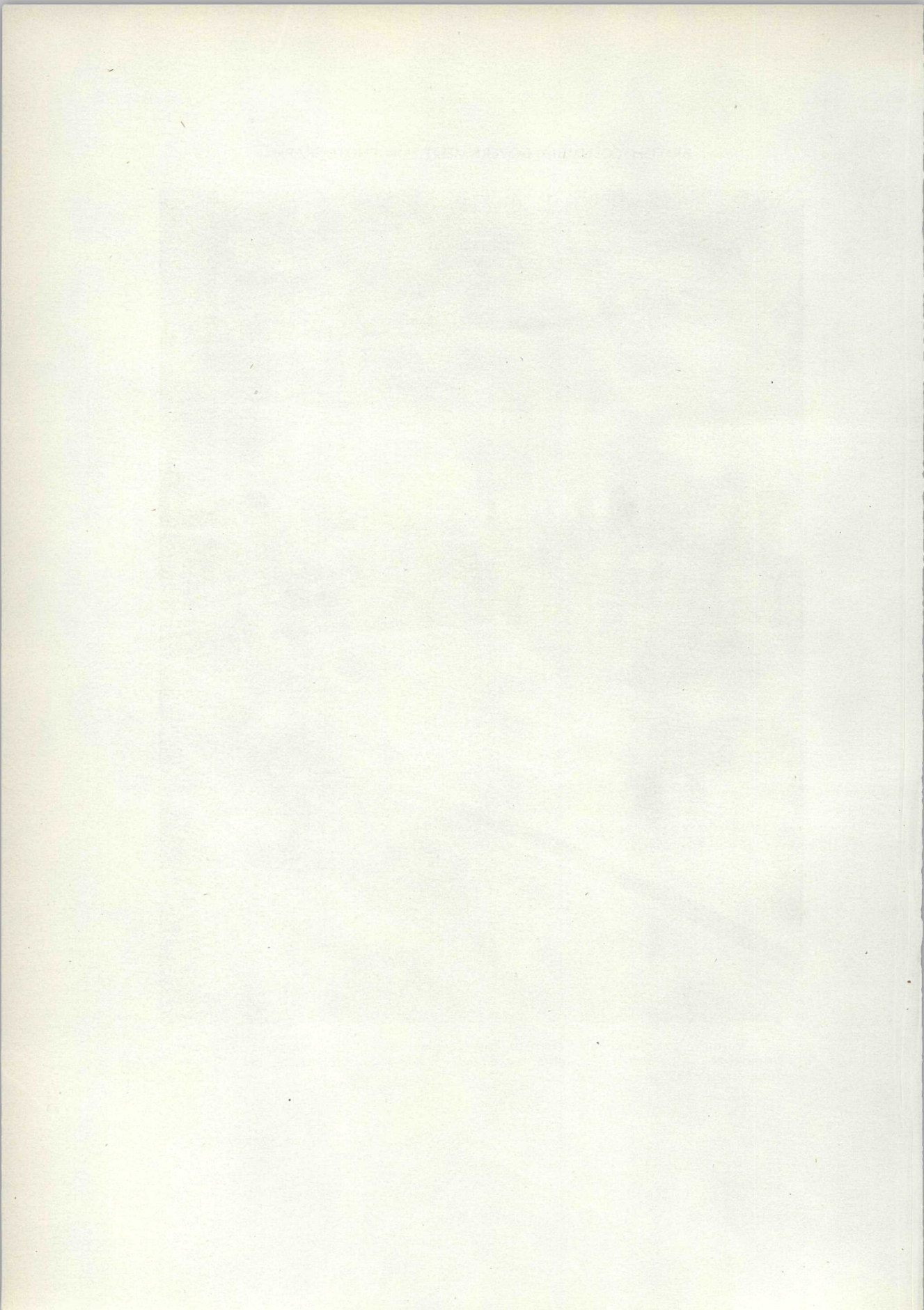
SIR,—I have the honour to submit the Annual Report of the British Columbia Lands Service of the Department of Lands and Forests for the twelve months ended December 31st, 1957.

E. W. BASSETT,
Deputy Minister of Lands.

BRITISH COLUMBIA GOVERNMENT AIR PHOTOGRAPH



Partially completed restoration of Fort Langley, site of the inauguration of the original colony of British Columbia, November 19th, 1858. Oblique air photo taken June 4th, 1958; altitude, 500 feet.



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MINISTER OF LANDS AND FORESTS

Hon. R. G. Willison

ORGANIZATION

BRITISH COLUMBIA LANDS SERVICE
DEPARTMENT OF LANDS AND FORESTS
Victoria, B.C.

Year ending December 31st, 1957

B.C. LANDS SERVICE

Deputy Minister of Lands
(E.A. Bassett)

Ast. to the Deputy Minister of Lands
(H. Torrance)

Accounting Division
Chief Accountant
(S.G. Wilson)
Asst. Accountant
(M.E.C. Maclean)

Personnel Office
(J.H. Palmer)

Mail & File Room
(J.A. Underwood)

University Endowment Lands
Manager
(W.E. Ferguson)

Land Sales
Fire Dept.
Maintenance

B.C. FOREST SERVICE

Deputy Minister & Chief Forester
(C.D. Orchard)

* Also functions for the
B.C. Forest Service

BRANCHES

LANDS

Superintendent of Lands
(C.T.W. Bylop)

Ast. Superintendent of Lands
(D. Borthwick)

Land Inspection Division

Chief Land Inspector
(L.D. Fraser)

Ast. Chief Land Inspector
(W.R. Redel)

Land Inspectors

G.T. Atamanenko-Williams Lake
F.M. Cunningham-Vancouver
J.A. Esler -Williams Lake
R.F. Gilmour -Quesnel
D.A. Goodwin -Courtenay
D.G. Havard -Smithers
D.A. MacLennan -Pouce Coupe
R.N. Mackenzie -Fort St. John
W.A. Minion
Jan.-April -Kamloops
G.H. Wilson
June-Dec. -Kelowna
A.F. Smith -New Westminster
J.S.D. Smith -Nelson
D.I. Snider -Prince George
W.E. Stewart -Fort St. John
G.H. Wilson
Jan.-June -Clinton
G.A. Rhodes
July-Dec.

Lands Administration

Admin. Assistant
(D. Stuart)

Sections

Leases
(W.J. Holman)
Purchases
(W.J. Long)
Crown Grants
(S.C. Hawkins)
Pre-Emptions
(R. Rutherford)
Easements
(N. Allen)
Registers
(H.K. Kidd)

Legal Surveys
Chief of Div.
(D. Peermann)

Geographic
Chief of Div.
(W.R. Young)

Topographic
Chief of Div.
(A.G. Stoddart)

Air
Chief of Div.
(W. Hall)

Supervising Surveyor
(W.A. Taylor)

Supervisor Map Production
(H.L.E. Hooper)

Supervising Surveyor
(E. R. Reim)

SURVEYS AND MAPPING

Director of Surveys and Mapping
Surveyor General
Boundary Commissioner for B.C.
(G.S. Andrews)

Ast. Director of Surveys and Mapping
(A.H. Halls)

SURVEY DIVISIONS

Adjudications Officer
(S.A. Harris)

Legal Surveys
Chief of Div.
(D. Peermann)

Geographic
Chief of Div.
(W.R. Young)

Topographic
Chief of Div.
(A.G. Stoddart)

Air
Chief of Div.
(W. Hall)

Supervising Surveyor
(W.A. Taylor)

Supervisor Map Production
(H.L.E. Hooper)

Supervising Surveyor
(E. R. Reim)

WATER RIGHTS

Comptroller of Water Rights
(A.P. Paget)

Project Engineer
(G.J.A. Kidd)

Solicitor
(A.K. Sutherland)

Deputy Comptroller &
Chief, Operations Div.
(V. Raudsepp)

Chief, Hydraulic
Investigations Div.
(T.A.J. Leach)

Water Resources
Complications -
Senior
Hydraulic Engineer
(J.H. Dougherty-Jones, Jr.)

Fraser River Board
Working Group--
Senior
Hydraulic Engineer
(G.E. Simons)

Hydrology Section
Meteorologist
(H.I. Hunter)

Improvement Districts
Senior Hydraulic Engineer
(H.L. Zittel)

H.D. Debeck - Kamloops
R.G. Harris - Kelowna
Improvement Districts
Senior Hydraulic Engineer
(H.L. Zittel)

District Engineers
C. Errington - Victoria
R. Pollard
J.P. Riley
Nov.-Dec.

REPORT OF THE BRITISH COLUMBIA LANDS SERVICE

E. W. BASSETT, DEPUTY MINISTER OF LANDS

The volume and variety of activities by the British Columbia Lands Service—land and water surveys, mapping, and alienations from the Crown—form a strong indication of economic conditions in the Province. In summing up the accomplishments of the Lands Service in 1957 it is a pleasure to record that the great interest in land and water acquisition, development, and use has continued unabated and has even exceeded last year's record high. The details of these accomplishments and the increased public service rendered by the Lands Service are presented in the following pages under the respective reports of the Lands, Surveys and Mapping, and Water Rights Branches. It is appropriate here, however, to cite some examples of the work carried out by these branches to illustrate the nature and scope of their activities.

The Lands Branch processed nearly 20 per cent more applications to purchase Crown lands than were dealt with in 1956. Along with the keen demand for Crown lands is a corresponding competition from various resource-users. The Lands Branch is therefore careful to resolve the many conflicts which arise between applications for timber sales, grazing administration, foreshore use, and other interests of a contentious nature. Such intricate problems in land-use administration have required the convening of a number of special public meetings and hearings during the past year.

Due to the volume of land work in the Cariboo District it was found necessary to create a new land recording district, with headquarters at Williams Lake. The new district, which comprises portions of the Quesnel and Lillooet Land Recording Districts, has vastly improved services to the public, particularly to residents of the Chilcotin and Williams Lake areas.

A review of the number and type of examinations handled by the Land Inspection Division reveals that applications for pre-emption rose sharply in the Peace River area, while on the Lower Coast, as well as in many parts of the Interior, summer-home sites and foreshore leases were particularly in demand.

The Surveys and Mapping Branch contains four divisions—Topographic, Legal Surveys, Geographic, and Air. These survey divisions produce the basic framework upon which the orderly development of the Province must depend.

In 1957 the Topographic Division completed the field control for twelve standard topographic map-sheets, representing an area of some 4,200 square miles. Among the many areas in which field control was established was that for pondage maps along the Peace and Finlay Rivers and that in the Lower Fraser Valley. The latter was undertaken in co-operation with the Federal Government and the Provincial Water Rights Branch as part of the preparation of ten detailed (1:25,000) map-sheets. The Division was able to test a recently acquired Tellurometer, a newly developed distance-measuring instrument which is capable of obtaining geodetic accuracy. The British Columbia-Yukon-Northwest Territories Boundary Commission surveyed 57 lineal miles along the 60th parallel. The westerly section between the Takhini and Hendon Rivers, an area of extremely rugged topography, had not been surveyed prior to 1957.

In connection with applications to purchase Crown lands, the Legal Surveys Division surveyed 18,500 acres, mostly in the Peace River District. Survey ranged from Little Prairie, Moberly Lake, and Groundbirch to the Upper Halfway River area. In continuance of policy of co-operation with the Department of Highways, the Legal Surveys Division, in 1957, surveyed the rights-of-way of 35 miles of newly constructed highways.

Notable among the many accomplishments of the Geographic Division during the year were the calculation and adjustment of the control network established by the Topographic Division for the British Columbia Power Commission in the Bute Inlet-Chilko Lake area. This work is illustrative of the co-operation extended by this Division to other branches of Government in the public interest. Besides the work of its Trigonometric Control Section, the Geographic Division continues its services as the major map making and publishing agency in British Columbia. During 1957 three new 2-miles-to-1-inch map-sheets were published covering respectively Yale, Sugar Lake, and Vernon. These carefully prepared sheets contain a wealth of information about terrain and the various cultural features superimposed on the land and have proven particularly useful to administrators and district officials. Also published were a new 10-miles-to-1-inch map-sheet and a completely new and very useful single-sheet map of the Province. The 10-mile maps, which are available in two landform editions, have proven very popular with the general public as well as with technical personnel. The Division has continued its work on the popular new Land Series Bulletins, two of which were published in 1957.

Although generally unfavourable weather conditions prevailed during 1957, the Air Division carried out a total of over 18,000 square miles of photography, over one-third of which was new 20-chain photography for forest-inventory mapping. Besides this notable accomplishment, the Air Division completed over 26,500 square miles of new 40-chain interim mapping. The Air Photo Library recorded a total of 39,000 air photographs loaned, about 25 per cent more than the number of loans recorded in the previous year.

It is a pleasure to mention that, along with its many other services during the past year, the Surveys and Mapping Branch provided facilities and instructors for a draughting course for junior draughtsmen. This course, under the co-sponsorship of the Canadian Vocational Training and the Civil Service Commission, provides chosen applicants with intensive summer training in map-draughting and in elementary computation.

The Water Rights Branch added significantly to its inventory of potential water usages in British Columbia. Such inventory information is indispensable to many industrial and agricultural developments in the Province. In addition, District Engineers provide a continually increasing service to the public by carrying out such duties as dam inspections and investigations associated with the control and development of water resources.

The volume of work involved in the administration of the "Water Act," under which the Branch functions, showed an increase in almost all phases over that of the last few years. A total of 934 water licences were issued and some 687 new applications for licence were received.

The incorporation, operation, and supervision of improvement districts and water-users' communities continues to be a growing part of Branch work. During the year nine new community waterworks projects and three schemes for improving existing systems were investigated and are, or shortly will be, under construction. Seventeen new improvement districts were formed, bringing the total to 219.

The snow forecasting service, which has been an added function of the Water Rights Branch during the past few years, has proven extremely valuable to British Columbians. Snow-survey information, which is made available to all interested persons, furnishes up-to-date information on the accumulation of snow and the amount likely to occur as run-off. Indications of the flood potential are also made, and it is gratifying to record that the accuracy of the 1957 stream-flow forecasts was particularly good.

Details of the operations of each branch of the British Columbia Lands Service are contained in the following pages.

LANDS BRANCH

Note 1

THE LANDS BRANCH

At the time of the Fraser River gold-rush in 1858 the demand for land in British Columbia was greatly intensified and pre-emptions predated surveys. Within four years 254 pre-emptors had taken up more than 50,000 acres of land. To facilitate the transfer of real estate and provide for the registration of titles, the "Land Registry Act" was passed in 1860. The Government of the Province of British Columbia was now in the real-estate business in a big way; the more than 366,000 square miles of land and water that constitutes British Columbia was the real estate in question.

With the entrance of British Columbia into Confederation in 1871, the demand for land quickened to a rush, and over the next thirty years the land-settler (and the promoter) succeeded the gold-miner in importance. Railroads were built and land grants passed, cities came into being, and companies became established. Land was at the core of all developments.

The task of land administration became very heavy and necessitated the formation of a Department of Lands in 1908. In 1912 a Forest Branch was included in the Department of Lands. To-day the Department of Lands and Forests exercises control of more than 90 per cent of the surface of British Columbia.

How does the Lands Branch fit into the total organization of the British Columbia Lands Service of to-day? The relation may be expressed briefly. **The Lands Branch has jurisdiction in matters pertaining to the disposition of Crown land, and is charged with so administering and disposing of the land that the general welfare, present and future, of the Province must be protected at all times.**

When an individual, or group, desires to purchase or lease Crown land, the application is directed to the Superintendent of Lands, head of the Lands Branch. His authority governs the following matters:—

- Sale, lease, and pre-emption of Crown lands for such purposes as agricultural, industrial, commercial, and home-sites.

- Preparation and issuance of Crown grants under the "Land Act," the "Mineral Act," and the "Taxation Act."

- Preparation and issuance of right-of-way easements for power, telephone, pipe lines, etc.

- Reservation of suitable Crown lands and foreshore for national defence, use and enjoyment of the public, forestry experimentation, fisheries research work, highways, etc.

- Granting railway rights-of-way under various Statutes.

- Protection of historic sites from alienation.

- Reservation and conveying of Crown lands for such purposes as school-sites, cemeteries, and fair grounds.

- Leasing of land and foreshore for such varied purposes as wharf-sites, booming-grounds, canneries, oyster and other mollusc fisheries, and for boat-houses, quarry-sites, cattle-ranching, trappers' cabins, ship-building, and aircraft bases.

To perform these and other functions efficiently, the Lands Branch works in close co-operation with a great number of other agencies, such as municipal and city administrations, town-planning authorities, the British Columbia Forest Service, the Branches of Water Rights and Surveys and Mapping within the British Columbia Lands Service, and all the departments in the Government of the Province, notably Public Works, Education, Attorney-General, and now Agriculture.

Outside the Provincial departments there is much business transacted with Federal departments, such as the Department of National Defence, the Veterans' Land Settlement Act administration, the Public Works Department, and the Indian Affairs Branch of the Department of Citizenship and Immigration.

Direct service to the people of British Columbia is the first duty of the Lands Branch and this takes the bulk of the time of the Lands Branch personnel. Associated with this prime duty is the important function of the maintenance of the records, which in many cases are the only ones in British Columbia showing the correct legal status of the surface of the Province.—
Reprinted from 1952 Report.

LANDS BRANCH

C. T. W. HYSLOP, B.S.A., P.A.G., SUPERINTENDENT OF LANDS

The original land office for the sale of lands in what is now the Province of British Columbia was that of the Hudson's Bay Company in Fort Victoria, Vancouver's Island, and it was from this beginning that the Lands Branch came into being. The first land grant was effected in 1849, when Queen Victoria granted the entire area of Vancouver's Island to the Hudson's Bay Company for the purpose of establishing a colony.

A number of parcels of the lands in this colony were sold to private individuals by the Hudson's Bay Company between the years 1850 and 1860, at which time the company authorized the colonial government to make disposition of Crown lands. Parcels of land on Vancouver's Island were disposed of in the years following 1860, but no grant to these lands was made until after the Hudson's Bay Company formally reconveyed the colony to the Crown in 1867. This confusion of the granting of titles was fortunately avoided when the Mainland Colony of British Columbia was formed in 1858, and that Colony issued its own Crown grants between the years 1858 and 1866, when it united with the Colony of Vancouver's Island to form the single Colony of British Columbia.

It is fitting that a hundred years later this Branch is in a favourable position to aid many Centennial Committees in the rural areas of British Columbia to carry out their programmes of building community halls and recreational grounds for the centennial celebration by providing suitable crown lands.

The work of the Lands Branch during the past year has continued to increase in complexity as a result of the economic expansion of the Province's resources.

Due to the large volume of land work in the Cariboo area, it was necessary to create a new land recording district with headquarters at Williams Lake. This new district comprises portions of the Lillooet and Quesnel Recording Districts. In addition to facilitating administration, the creation of this district vastly improves public services, particularly to residents of the Chilcotin and Williams Lake areas.

As a result of contentious applications, it was necessary to hold two hearings under the provisions of section 141 of the "Land Act." These hearings concerned applications located at Horseshoe Bay, in the Municipality of West Vancouver, and Secret Cove, in Group 1, New Westminster District.

Special meetings to investigate contentious land matters were also held at Gun Lake, Mara, and Campbell River.

The granting of easements of right-of-way to pipe-line companies continued during the year and covered the application of the Inland Natural Gas Company from Savona to Nelson and the major portion of the Westcoast Transmission Company's right-of-way from the Peace River country to the Lower Mainland. Small remaining areas of right-of-way are still required to be dealt with for these two companies, and it is anticipated that they will be finalized in 1958.

During 1957 certain easements were also granted to the Trans Mountain Oil Pipeline Company in conjunction with its looping programme to facilitate the transmission of oil from Alberta to Vancouver. It is anticipated that this looping programme will continue into 1958.

Considerable time was spent in studying easement-rate rental schedules in order to formulate an equitable rental table covering easements granted on both land and foreshore.

In co-operation with the Surveyor of Taxes Office, the study of foreshore lease rental rates, which was started in 1956, was continued and many refinements made to the appraisal process which has been developed over the past two years.

The reserves of Crown lands have occupied a considerable portion of the Department's time in order to facilitate road construction by the Department of Highways, and also to satisfy the requirements of the Pacific Great Eastern Railway Company. Many reserves were also created for the Federal Departments of Transport and Public Works in conjunction with public wharves and mooring-sites.

The proposed industrial project in the Rocky Mountain Trench also required special attention of the Department in placing the reserves on Departmental records.

In keeping with the programme of improving and renovating the Departmental records, the official registers of the Quesnel, Lillooet, and Williams Lake Land Recording Districts were completely rewritten during 1957. The Department is currently engaged in rewriting the registers of the Alberni Land Recording District, and it is anticipated that this will be completed by the winter of 1958.

A progressive plan of official equipment modernization has been undertaken in the general office, and during the past year modern Kardex files have been installed to record purchases and pre-emptions. It is planned to extend this system during 1958 to cover lease applications.

The Department was the host to the Western Land Directors' Conference, which was held from June 24th to June 28th, 1957. The Directors and Assistant Directors of Land for Alberta, Saskatchewan, and Manitoba attended. The interexchange of ideas regarding status, policy, and practice relating to land matters was of great benefit to all the delegates.

Most sections of the Administrative Division of the Lands Branch have shown an over-all increase in volume of work performed during the past year. A brief outline of each section follows:—

Purchase Section.—A total of 2,465 applications to purchase Crown lands were processed during the year, an increase of 18 per cent over 1956. Twenty-three public auction sales of Crown lands involving 362 lots were held at various centres in the Province.

Lease Section.—Six hundred and thirty-four applications to lease Crown lands were processed during the year, an increase of 10 per cent over 1956. There has been a considerable increase in the number of cases involving the unauthorized use of Crown foreshore that has required detailed correspondence and investigation.

Crown Grant Section.—A total of 1,426 Crown grants were issued during the year. This is a decrease of 6 per cent over the previous year and resulted from a marked decrease in the number of Crown grants issued for reverted mineral claims caused by an amendment to the "Mineral Act."

Pre-emption and Reserve Section.—Three hundred and seventy-two reserves were placed on Crown lands during the year, an increase of 10 per cent over the previous year. One hundred and nine applications to pre-empt lands were received during the year, as compared to fifty-four for the year 1956. The majority of these applications were located in the Peace River District.

Easement Section.—One hundred and thirty-two applications for easement and right-of-way were received during 1957, as compared with ninety-six for the previous year. The number of easements granted decreased from seventy-five in 1956 to sixty-one in the current year. This resulted from the holding in abeyance of a number of easements for transmission-line right-of-way pending the study and adoption of a revised rental schedule.

Status Section.—There was a marked increase in the number of register entries made, although there was a small decrease in the number of land parcels statused during the year.

The over-all work load of the Department was generally greater in 1957 than the previous year. It is particularly noted that public inquiries requiring special status numbered 1,690, as compared to 1,551 in 1956. Over 17,000 letters were handled from the general public and other Government agencies in addition to the preparation of 324 Orders in Council.

It might be mentioned that, due to illness and transfers, there has been considerable turnover in staff. This constant readjustment of personnel to fit individual positions has tended to slow the work-flow in the Branch because of the extra time required to fill the positions through the Civil Service Commission and time required for job-training.

The tables on the following pages indicate in detail the work carried out by the Administrative Division of this Branch. The report of the Inspection Division is presented separately by the Chief Land Inspector.

STATISTICAL TABLES

COLLECTIONS

Table 1.—Summary of Recorded Collections for the Year Ended December 31st, 1957

“Land Act”—	
Land leases, rentals, fees, etc.	\$472,415.55
Land sales	507,996.33
Sale of maps and aerial photos	52,179.94
Water rentals and recording fees	1,152,370.05
	<hr/>
	\$2,184,961.87
“University Endowment Lands Administration Act”	223,506.71
Refunds—Advances and votes	45,966.82
	<hr/>
Total collections	\$2,454,435.40

Table 2.—Summary of Total Collections for Ten-Year Period 1948–57, Inclusive





















1948		\$975,772.41
1949		1,045,969.03
1950		1,159,988.86
1951		1,692,737.85
1952		2,761,152.78
1953		3,705,480.02
1954		2,065,181.52
1955		2,248,293.16
1956		2,518,722.51
1957		2,454,435.40
	<hr/>	
Total		\$20,627,733.54
Ten-year average, \$2,062,773.35.		

Table 3.—Sundry Revenue for the Year Ended December 31st, 1957

Collections under "Land Act"—

Leases, land-use permits, fees, etc.	\$366,854.23
Crown grant fees	15,470.00
Occupational rental	9,751.82
Royalty	28,101.18
Reverted mineral claims	2,460.77
Survey fees	5,296.34
Sundry	44,481.21
Total	\$472,415.55

Table 4.—Summary of Sundry Revenue Collections for Ten-year Period 1948–57, Inclusive

1948		\$288,901.91
1949		322,683.92
1950		387,435.19
1951		916,338.98
1952		1,694,073.93
1953		1,608,773.65
1954		330,397.09
1955		425,595.79
1956		576,331.17
1957		472,415.55
Total		\$7,022,947.18
Ten-year average, \$702,294.71.		

LAND SALES

Table 5.—New Land Sales and Values during the Period January 1st to December 31st, 1957

Month	Country Land Sales						Town-lot Sales		Sales under "Mineral Act "		Grand Total	
	Reverted		Crown		Total		No.	Value	No.	Value	No.	Value
	No.	Value	No.	Value	No.	Value						
January	20	\$10,202.20	42	\$24,903.35	62	\$35,105.55	17	\$3,717.00	1	\$258.25	80	\$39,080.80
February	15	13,906.00	36	18,727.00	51	32,633.00	41	21,758.00			92	54,391.00
March	16	11,653.00	26	32,016.10	42	43,669.10	31	14,580.00			73	58,249.10
April	28	16,327.00	51	27,157.45	79	43,484.45	15	3,472.00			94	46,956.45
May	28	20,525.28	66	39,141.03	94	59,666.33	21	4,632.00	1	246.20	116	64,544.53
June	20	15,340.48	28	14,875.70	48	30,216.18	16	4,850.00			64	35,066.18
July	10	4,210.00	51	18,666.85	61	22,876.85	16	5,190.00			77	28,066.85
August	27	16,048.40	32	11,055.30	59	27,103.70	19	10,604.00	1	127.60	79	37,835.30
September	13	8,677.00	13	4,269.20	26	12,946.20	10	3,331.00			36	16,277.20
October	25	13,584.50	33	16,143.75	58	29,728.25	16	4,764.66			74	34,492.91
November	17	10,209.00	108	45,485.20	125	55,694.20	37	7,085.00	1	53.00	163	62,832.20
December	16	15,319.50	37	15,708.00	53	31,027.50	11	3,075.00			64	34,102.50
Totals	235	\$156,002.36	523	\$268,148.95	758	\$424,151.31	250	\$87,058.66	4	\$685.05	1,012	\$511,895.02
1944:	Total sales, 923; value, \$150,392.36.											
1945:	Total sales, 1,056; value, \$213,669.29.											
1946:	Total sales, 1,615; value, \$327,434.75.											
1947:	Total sales, 1,796; value, \$834,021.66.											
1948:	Total sales, 1,452; value, \$394,408.52.											
1949:	Total sales, 1,181; value, \$358,009.05.											
1950:	Total sales, 1,296; value, \$422,559.20.											
1951:	Total sales, 1,129; value, \$398,561.63.											
1952:	Total sales, 1,464; value, \$724,957.68.											
1953:	Total sales, 1,743; value, \$745,874.44.											
1954:	Total sales, 1,043; value, \$391,989.96.											
1955:	Total sales, 1,084; value, \$578,487.16.											
1956:	Total sales, 935; value, \$546,702.70.											
1957:	Total sales, 1,012; value, \$511,895.02.											

1944: Total sales, 923; value, \$150,392.36.
 1945: Total sales, 1,056; value, \$213,669.29.
 1946: Total sales, 1,615; value, \$327,434.75.
 1947: Total sales, 1,796; value, \$834,021.66.
 1948: Total sales, 1,452; value, \$394,408.52.
 1949: Total sales, 1,181; value, \$358,009.05.
 1950: Total sales, 1,296; value, \$422,559.20.

1951: Total sales, 1,129; value, \$398,561.63.
 1952: Total sales, 1,464; value, \$724,957.68.
 1953: Total sales, 1,743; value, \$745,874.44.
 1954: Total sales, 1,043; value, \$391,989.96.
 1955: Total sales, 1,084; value, \$578,487.16.
 1956: Total sales, 935; value, \$546,702.70.
 1957: Total sales, 1,012; value, \$511,895.02.

Table 6.—Country Land Sales, 1957

	Acres
Surveyed	66,410.33
Unsurveyed	14,118.13
Total	80,528.46

Table 7.—Certificates of Purchase Issued, 1957

Land Recording District	Number of Sales
Alberni	33
Atlin	—
Cranbrook	25
Fernie	14
Fort Fraser	49
Fort George	107
Golden	17
Kamloops	51
Kaslo	7
Lillooet	113
Nanaimo	32
Nelson	10
New Westminster	22
Osoyoos (Vernon)	5
Peace River	132
Prince Rupert	48
Quesnel	58
Revelstoke	7
Similkameen	51
Smithers	69
Vancouver	77
Victoria	8
Williams Lake	77
Total	1,012

Table 8.—Town Lots Sold, 1957

Town	Lots	Value
Alberni	6	\$275.00
Anaconda	2	100.00
Athalmer	2	250.00
Balfour	2	150.00
Beaverdell	1	30.00
Bella Coola	1	10.00
Bralorne	2	200.00
Clinton	7	85.00
Coalmont	3	75.00
Cumberland	3	800.00
Elko	18	600.00
Endako	4	80.00
Extension	11	745.00
Falkland	3	1,164.00

Table 8.—Town Lots Sold, 1957—Continued

Town	Lots	Value
Fernie	1	\$100.00
Fort Fraser	5	210.00
Fort St. James	10	3,145.00
Grand Forks	7	165.00
Gibsons Landing	3	925.00
Golden	8	580.00
Granthams Landing	2	450.00
Harding Bay	10	600.00
Hazelton	59	815.00
Hedley	1	195.00
Hope	7	2,500.00
Houston	24	905.00
Kaslo	47	35.00
Le Jeune Lake	5	250.00
Lone Butte	1	50.00
Lower Post	4	275.00
Masset	16	720.00
Merritt	5	520.00
Midway	17	1,225.00
Moyie	1	50.00
New Denver	2	50.00
New Hazelton	52	460.00
New Westminster	5	2,500.00
Osoyoos	1	10.00
Parksville	12	280.00
Pemberton	8	2,508.00
Port Alberni	2	1,140.00
Port Coquitlam	17	250.00
Port Clements	28	1,075.00
Port Edward	15	1,045.00
Port Hammond	4	16.66
Port Hardy	32	1,325.00
Prince George	104	38,723.00
Prince Rupert	9	1,860.00
Princeton	11	395.00
Qualicum Beach	1	50.00
Queen Charlotte	12	370.00
Revelstoke	4	210.00
Savona	8	1,877.00
Shawnigan Lake	5	300.00
Sidney	5	25.00
Silverton	1	40.00
Skidegate	3	90.00
Smithers	163	6,740.00
Stewart	89	55.00
Summit Lake	1	570.00
Telkwa	3	75.00
Terrace	7	4,300.00
Topley	10	180.00
Trout Lake	2	85.00

DEPARTMENT OF LANDS AND FORESTS








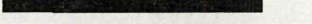


Table 8.—Town Lots Sold, 1957—Continued

Town	Lots	Value
Tulameen	13	\$635.00
Vananda	3	200.00
Vanderhoof	8	400.00
Walhachin	2	170.00
Wardner	4	205.00
Wellington	1	125.00
Willow River	2	75.00
Wilmer	11	365.00
Totals	958	\$87,058.66

Table 9.—Land-sales Collections, 1957 (Collections under
"Land Act" (Principal and Interest))

Country lands—		
Reverted	\$159,612.46	
Crown	247,349.45	
		\$406,961.91
Town lots		110,947.10
Surface rights of mineral claims		3,246.42
Indian reserve cut-off		1,670.22
Total		\$522,825.65

Table 10.—Summary of Land Sales for Ten-year Period
1948–57, Inclusive

1948		\$379,650.48
1949		375,254.88
1950		366,458.62
1951		382,256.61
1952		619,263.14
1953		594,004.08
1954		488,303.49
1955		605,469.42
1956		573,976.49
1957		522,825.65
Total		\$4,907,462.86
Ten-year average, \$490,746.29.		

LEASES

Table 11.—New Leases Issued, 1957

	Number	Acreage
Hay and grazing	136	49,287.22
Agriculture	12	3,452.20
Quarrying, sand, gravel, etc.	8	598.10
Home-site	4	50.50
Booming and log storage	40	1,036.23
Oyster, clam, and shell-fish	13	272.20
Cannery	—	—
Fish-trap—salmon-fishing station	2	2.63
Foreshore—miscellaneous	28	150.96
Land—miscellaneous	33	1,958.88
Totals	276	56,808.92

Table 12.—Temporary Tenure Leases Renewed, 1957

Number	72
Acreage	4,492.33

Table 13.—Land-use Permits issued, 1957

Number	22
Acreage	59.70

Table 14.—Licences of Occupation Issued, 1957

Number	11
Acreage	3,352.64

Table 15.—Assignments Approved, 1957

Leases, land-use permits, licences of occupation, etc.	138
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Table 16.—Easements Granted, 1957

	Number	Miles	Acres	Fees	
				Consideration	Annual
<i>Foreshore</i>					
Sewer outfall	7	1.105	4.115	—	\$40.00
<i>Land</i>					
Electric-power lines	2	40.30	578.212	—	\$210.00
Access road and water pipe-line	1	2.32	12.494	—	10.00
Water pipe-line	1	.205	.05	—	—
Gas pipe-line	28	107.413	779.35	\$18,112.54	—
Land-use permit	1	6.223	5.00	25.00	—
Construction, inspection, etc., of sewer-mains, telephone-lines, etc.	1	.505	2.08	—	—
Oil pipe-lines	3	13.843	98.28	\$2,237.70	—
Totals	37	170.809	1,475.466	\$20,375.24	\$220.00
Grand totals	44	171.762	1,479.581	\$20,375.24	\$260.00

Total received, \$20,635.24.

DEPARTMENT OF LANDS AND FORESTS

Table 17.—Sundry Lease Collections ("Land Act")

Leases, land-use permits, fees, etc.	\$366,854.23
Occupational rentals	9,751.82
Royalty	28,101.18
Total	\$404,707.23

Table 18.—Summary of Home-site Lease Collections for
Ten-year Period 1948–57, Inclusive

1948	\$2,265.74
1949	1,926.99
1950	2,040.33
1951	2,123.65
1952	1,398.80
1953	1,394.30
1954	1,562.60
1955	1,267.52
1956	2,050.56
1957	1,464.90
Total	\$17,495.39
Ten-year average, \$1,749.53.	

PRE-EMPTIONS

Table 19.—Pre-emption Records, 1957

Land Recording District	Pre-emption Records Allowed		Pre-emption Records Cancelled		Certificates of Improvements Issued	
	Number	Ten-year Average	Number	Ten-year Average	Number	Ten-year Average
Alberni	—	—	—	—	—	0.2
Atlin	—	—	—	0.9	—	—
Cranbrook	—	0.1	—	—	—	0.1
Fernie	—	—	—	—	—	—
Fort Fraser	—	3.1	5	6.9	1	3.1
Fort George	—	9.2	12	20.6	3	7.2
Golden	—	1.3	—	1.2	1	1.4
Kamloops	—	2.6	3	6.4	—	4.7
Kaslo	—	—	—	—	—	0.1
Lillooet	—	6.9	—	14.9	3	8.3
Nanaimo	—	0.3	—	0.9	1	0.5
Nelson	—	0.2	1	0.7	—	0.1
New Westminster	—	0.5	2	4.7	1	2.5
Osoyoos	—	0.4	—	1.2	—	1.9
Peace River	65	56.3	29	39.5	31	35.5
Prince Rupert	—	0.2	—	—	—	0.5
Quesnel	—	10.3	6	17.1	2	9.2
Revelstoke	—	—	—	0.1	—	1.0
Similkameen	—	0.6	—	3.8	—	1.1
Smithers	—	0.6	2	1.4	—	0.9
Telegraph Creek	—	—	—	—	—	—
Vancouver	—	0.3	1	1.3	—	1.0
Victoria	—	—	—	—	—	0.2
Williams Lake ¹	1	—	—	—	3	0.3
Totals	66	92.7	61	121.6	46	79.8

¹ Williams Lake established April 1st, 1957.

Table 20.—General Summary of Pre-emption Records

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	Ten Years	
											Total	Average
Pre-emption records allowed	171	145	141	85	87	53	97	48	35	66	928	92.8
Certificates of improvements issued.....	108	109	133	92	69	77	71	41	52	46	798	79.8











CROWN GRANTS

Table 21.—Crown Grants Issued, 1957

Purchases (other than town lots).....	663
Town lots.....	396
Pre-emptions.....	58
Mineral claims (other than reverted).....	146
Mineral claims (reverted).....	99
"Public Schools Act".....	10
"Veterans' Land Settlement Act".....	11
Home-site leases.....	12
Pacific Great Eastern Railway.....	3
Supplementary timber grants.....	3
Surface rights ("Mineral Act").....	4
"Coal and Petroleum Act".....	3
Miscellaneous.....	18
Total.....	1,426

Certified copies of Crown grants issued, 6.

Table 22.—Crown Grants Issued for Past Ten Years

1948		2,063
1949		1,602
1950		1,580
1951		1,740
1952		1,872
1953		1,829
1954		1,276
1955		1,498
1956		1,518
1957		1,426
Total.....		16,404

Ten-year average, 1,640.

Table 23.—Total Area Deeded by Crown Grant, 1957

	Acres
Purchases (other than town lots)	66,826.10
Pre-emptions	8,553.32
Mineral claims (other than reverted)	5,864.39
Mineral claims (reverted)	4,031.60
"Public Schools Act"	39.92
"Veterans' Land Settlement Act"	969.49
Home-site leases	137.66
Pacific Great Eastern Railway	493.99
Supplementary timber grants	516.29
Surface rights ("Mineral Act")	196.65
"Coal and Petroleum Act"	1,920.00
Miscellaneous	357.60
Total	89,907.01

Table 24.—Reserves, 1957

	Applications Received	Reserves Completed
Use, recreation, and enjoyment of the public	194	140
British Columbia Department of Highways (rights-of- way, gravel-pits, etc.)	85	73
Federal Government (defence purposes, wharf-sites, etc.)	44	31
Miscellaneous (Forest Service Ranger stations, road access, reforestation, etc., Game Commission, water-power projects, etc.)	107	128
Totals	430	372

LANDS BRANCH

GG 23

GENERAL SUMMARY

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	Ten Years	
											Total	Average
Pre-emption records issued	171	145	141	85	87	53	97	48	35	66	928	92.8
Certificates of improvements issued	108	109	133	92	69	77	71	41	52	43	798	79.8
Certificates of purchase issued	1,452	1,181	1,296	1,129	1,465	1,743	1,043	1,084	935	1,012	12,399	1,239.9
Crown grants issued	2,063	1,602	1,580	1,740	1,872	1,829	1,276	1,498	1,518	1,426	16,404	1,640.4
Total acreage deeded by Crown grants	85,083.97	219,662.12	75,712.61	77,516.18	98,602.84	99,036.36	73,461.69	65,941.81	80,308.03	89,907.01	965,232.62	96,523.3
New land sales—												
Number	1,452	1,181	1,296	1,129	1,429	1,743	1,043	1,084	935	1,012	12,304	1,230.4
Value	\$394,408.52	\$358,009.05	\$422,559.20	\$398,561.63	\$702,776.75	\$745,874.44	\$391,989.96	\$578,487.16	\$546,702.70	\$511,895.02	\$5,051,264.43	\$505,126.44
Leases under "Land Act"	333	362	325	360	301	353	366	311	264	276	3,251	325.1
Acreage leases, "Land Act"	113,600.07	86,851.40	84,086.47	128,778.45	45,110.72	46,089.55	50,064.80	67,195.22	51,301.73	56,808.92	729,887.33	72,988.7
Temporary tenure leases renewed					115	75	52	62	65	72		
Land-use permits		9	8	18	14	28	27	25	21	22		
Licences of occupation, easements, etc.		8	18	32	21	40	35	40	87	55		
Clearances of reverted mineral claims		299	312	916	514	461	400	663	783	361		
Reservations for use and enjoyment of public and other purposes		188	157	227	202	332	440	392	422	430		
Land-revenue collections	\$689,296.72	\$730,333.12	\$792,880.30	\$1,334,941.72	\$2,346,204.42	\$2,948,803.88	\$1,667,772.96	\$1,927,097.58	\$2,268,719.53	\$2,184,961.87	\$16,891,012.10	\$1,689,101.21
Gross collections	\$975,772.41	\$1,045,969.03	\$1,159,988.86	\$1,692,737.85	\$2,761,152.78	\$3,705,480.02	\$2,065,181.52	\$2,248,293.16	\$2,518,722.51	\$2,454,435.40	\$20,627,733.54	\$2,062,773.35

LAND INSPECTION DIVISION

L. D. FRASER, B.Sc.A., P.AG., CHIEF LAND INSPECTOR

The Interior of the Province experienced a very abnormal amount of rain during the months of June, July, and August. In the Peace River area, for example, the rainfall from May to October was 21.2 inches, as compared to a normal rainfall of 12 inches. Since most of the side-roads in the Interior are not surfaced with gravel, access over these roads during wet weather was severely restricted. As a result, the volume of field work was directly affected. The untimely accidental death of Mr. W. A. Minion, Land Inspector at Kamloops, left the Division short of one man for the early part of the field season. A replacement for the vacancy at Kamloops was not acquired until mid-July. Sickness and changing stenographic help further interfered with the over-all work output.

In 1956, 2,829 land examinations were made, whereas in 1957 the number of field inspections completed was 2,499. The 13.6-per-cent decline in work output can be largely attributed to the excessive rainfall and the difficulty experienced in filling Land Inspector vacancies.

In addition to the above-mentioned examinations completed by the Land Inspectors, the Forest Service staff completed 128 examinations. Sixty-three of these were on the west coast outside of the existing land inspection district boundaries and sixty-five were examinations within the various land inspection districts.

PROBLEMS OF THE DIVISION

The backlog of outstanding inspections at the end of the year was 526. While the amount of this backlog is very similar to the average carry-over for the last three years, it is nevertheless regrettable that this figure cannot be considerably reduced. In effect, this backlog is equivalent to three and one-half man-years of work, and it is unfortunate that the Division has been unsuccessful in its attempt to increase the staff so as to deplete the outstanding inspections and thus provide a more prompt service to the public. Experience in the past has shown that the output per man varies inversely as the number of outstanding examinations in the district. The fall-off of work output when there is a large backlog of outstanding examinations is directly related to the added administrative work created. The Inspector is constantly being harassed by the public as well as the Department to make specific examinations. As a result, it is impossible to organize field work so that several examinations can be completed on the one trip; rather, the Inspector is called upon to dart from place to place in his district, disrupting any planned examination schedule.

STENOGRAPHIC ASSISTANCE

In order that the Inspector can devote more of his time in the field, it is necessary that suitable stenographic help be supplied to each district office. Office routine work, such as filing, typing, colouring maps, answering general correspondence, etc., can be handled very efficiently by a trained stenographer. It is therefore desirable that each one-man district office be supplied with half-time stenographic help and each two-man district office with permanent stenographic help. During the past year some of the district offices were handicapped because of the lack of proper stenographic assistance. It is desirable that this situation be remedied in the future.

TRAINING

Proper training of Land Inspectors in the science of appraising is becoming more and more apparent. On Vancouver Island and the Lower Mainland the need is already upon us. It also became apparent this past summer that appraisal training would be

invaluable to all of our men in the Interior. The demand for commercial and industrial lands in the Interior is rapidly increasing as the natural resources of the Province become developed and avenues of communication are established. The need for appraisal training of Land Inspectors as well as other Government personnel engaged in land and building valuations was recognized by the Civil Service Commission, and it is indeed gratifying to note that the first course in appraising is being presented in February, 1958, under the auspices of the Civil Service Commission and the Canadian Vocational Training Branch. It is the desire of this Division that a second course be presented the following year in Appraisal 2. Our eventual hope is that the Land Inspector will become an accredited appraiser.

ACCOMPLISHMENTS

This Division, with the co-operation of the Department of Finance, devised a new approach to the valuation of booming and log-storage grounds. The approach was implemented on an experimental basis at first but has now been put into general use throughout the Province. It is hoped that with the use of this schedule, comparative values will be established on log-storage grounds throughout the Province and that on the basis of the resulting values a direct relationship will exist between actual value, assessed value, and lease rental.

STAFF

W. A. Minion, B.S.A., P.Ag., Land Inspector, Kamloops, since 1953, was drowned in a boating accident on Kamloops Lake on April 9th, 1957, while on a business trip to inspect a parcel of land on the north side of the lake near Frederick. He was accompanied by H. K. DeBeck, Forest Agrologist at Kamloops, and the applicant, J. H. A. Marini, who were also drowned in the same mishap. Mr. Minion's untimely and tragic death was a great loss to this Division in particular and agriculture in general. He served as a flying officer from 1942 to 1945 with the Royal Canadian Air Force and was a veteran of overseas service.

Mr. DeBeck, who was well known by all members of the Land Inspection Division, will also be sorely missed, as many of the Land Inspectors had worked closely with him on various applications where grazing interests were involved.

G. T. Atamanenko was transferred temporarily from Williams Lake to Kamloops to take charge of the office until a permanent appointment could be made.

G. H. Wilson was transferred in July from Clinton to Kamloops to replace Mr. Minion.

G. A. Rhoades was appointed Land Inspector—Grade 1, to fill the vacancy at Clinton.

Throughout the year it became necessary to transfer temporarily the following Land Inspectors to assist in certain districts where the work load became excessive: F. M. Cunningham, Vancouver, assisted in Victoria, Prince George, and New Westminster; G. T. Atamanenko, Williams Lake, assisted in Kamloops and Clinton; R. N. Mackenzie, Fort St. John, assisted in Smithers and Prince George; W. B. Stewart, Fort St. John, assisted in Prince George; D. A. MacLennan, Pouce Coupe, assisted in Prince George; R. F. Gilmour, Quesnel, assisted in Prince George; and D. E. Goodwin, Courtenay, assisted in Victoria. Two Assistant Land Inspectors—namely, M. F. Robson and L. Goodale—both university undergraduates, were employed to assist in the Clinton, Kamloops, and Kelowna districts.

SUMMARY

A review of the number and type of examinations revealed that applications for pre-emptions had risen sharply, particularly in the Peace River area. On the Lower Coast, summer-home site and foreshore leases were particularly in demand. In the Interior, summer-home site and grazing leases comprised most of the applications.

The shortage of staff and the more precise and demanding type of reporting expected have placed an added burden on the fieldmen and created considerable administrative work at headquarters. It is sincerely hoped that sufficient personnel will be acquired in 1958 to relieve the situation that developed in the past year.

LAND INSPECTION

Land inspections carried out during the year 1957 are tabulated as follows:—

Purchases—

Agriculture (other than grazing).....	345
Access (roads, etc.).....	11
Commercial (resorts, service-stations, hotels, airfields, etc.)	70
Community (cemeteries, church-sites, parking areas, etc.)	31
Grazing (pasture, range).....	181
Home-sites (permanent)	334
Industrial (mill-sites, power-sites, manufacturing plants, etc.)	64
Summer home or camp-site	220
Wood-lots or tree-farms	13

Leases—

Land—

Agriculture (other than grazing).....	53
Commercial (resorts, service-stations, hotels, airfields, etc.)	6
Community (parks, cemeteries, dump-sites, etc.).....	7
Fur-farming	—
Grazing (pasture, range, hay-cutting, etc.).....	167
Home-sites (section 83 of the "Land Act").....	14
Home-sites (permanent, other than section 83 of the "Land Act")	13
Industrial (mill-sites, power-sites, manufacturing plants, etc.)	18
Summer home or camp-site	25
Quarrying (sand, gravel, limestone, diatomaceous earth, etc.)	17

Foreshore—

Booming and log storage or log-dumping	114
Commercial (boat rentals, marine service-station, wharves, etc.)	30
Industrial (mill-sites, canneries, factory sites, wharves, etc.)	15
Quarrying (sand and gravel from river-beds)	5
Oyster and shell-fish	22

Land-use permits	21
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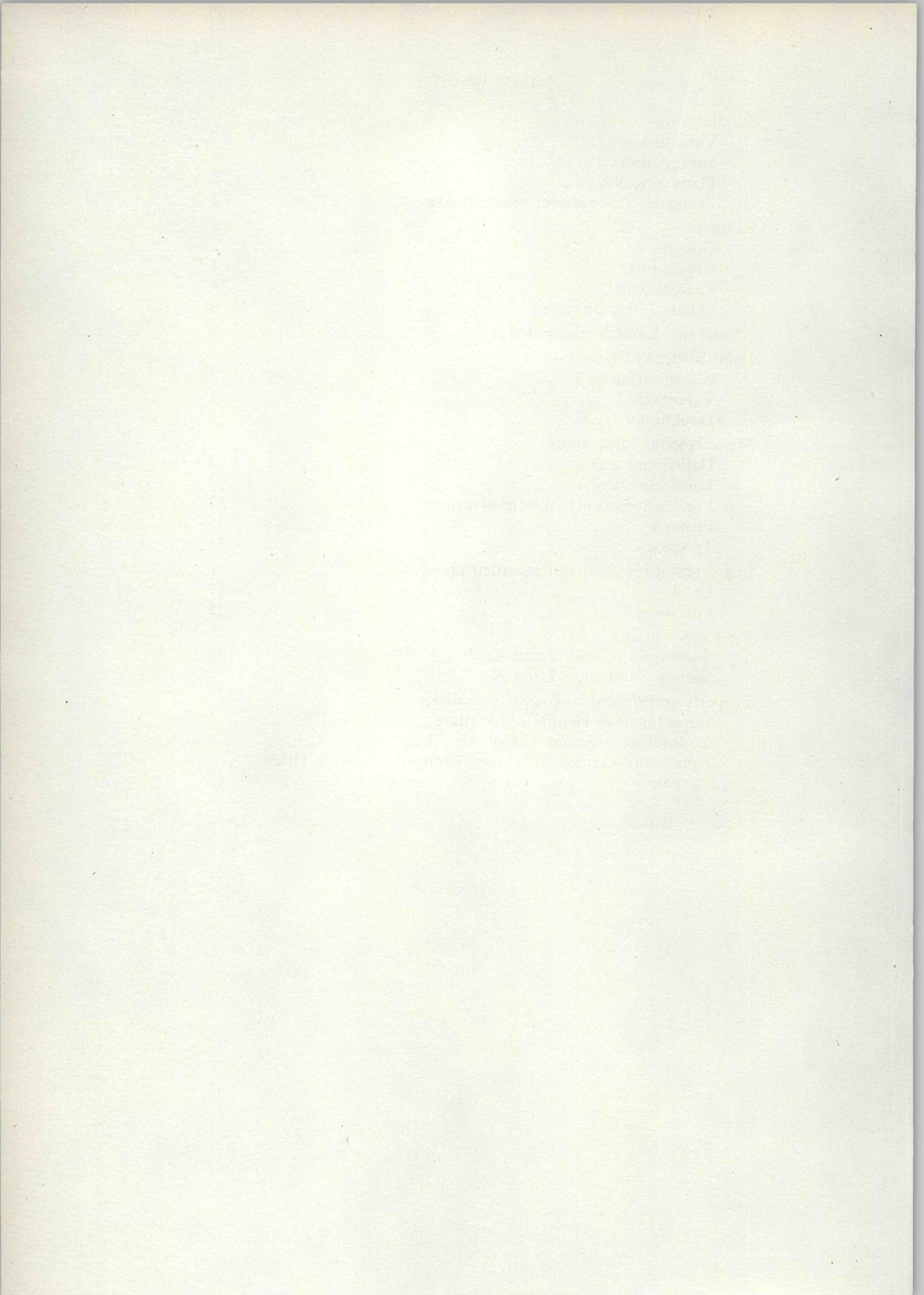
Licence of occupation	13
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Easements	2
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Pre-emptions—

Applications	64
Annual inspections (including applications for Crown grant)	119

Subdivisions—	
Valuations	27
Survey inspection	5
Plans cancellation	1
Proposals (lake-shore, residential, etc.)	14
Reserves—	
Grazing	1
Gravel-pits	26
Recreational	9
Others (state purpose)	9
“Veterans’ Land Settlement Act”	3
Land Settlement Board—	
Classification	1
Valuations	1
Doukhobor lands	---
Miscellaneous inspections—	
Delinquent accounts	12
Land-use surveys	3
Land values (current market values)	32
Protests	35
Trespass	33
Lease rental reviews (not recorded above)—	
Land	11
Foreshore	28
Pre-Crown grants—	
Section 53 of the “Land Act”	169
Section 83 of the “Land Act”	7
Property transferred to Crown valuations—	
Department of Health and Welfare	1
Repurchase (section 135 of the “Land Act”)	1
Applications under other Acts (Escheats, Quieting Titles, etc.)	12
Total	2,434



SURVEYS AND MAPPING BRANCH

Because the activities of man are kept orderly through a well-defined system of land surveys, the Surveys and Mapping Branch is called upon to act as the connecting-link that binds together many primary operations within departments of government and between government and the general public.

Specifically, through land surveys, Crown and other lands, including water, are located and identified accurately on the surface of the Province, and so made ready for alienation in any of a variety of different ways. Further, a background of suitable maps and survey data is provided to assist in the intelligent development of lands so acquired, and in the wise administration of the natural resources associated with them.

In post-war years a great upsurge in the economic development of British Columbia's natural resources has taken place. Each year shows increased activity in the disposition of Crown lands for various purposes, ranging from the smallest individual application for a home-site to industrial requirements involving many square miles of land.

In any of these transactions the Surveys and Mapping Branch plays an important part, because it has the responsibility of clearing, as to status, all such applications for Crown lands, whether small or large. This function involves complete record-keeping of all official survey data by all sources, including a graphic record of all Crown-land alienations, whether surveyed or unsurveyed.

Equally important, on the other hand, is the responsibility for the establishment, extension, and recording of mapping control. These basic duties prescribe, among other things, the preparation of basic triangulation networks and aerial photography at suitable scales, the making of control traverses, the delineation and maintenance of interprovincial boundaries, and the production of standard photo-topographic mapping, interim base-mapping, and cadastral surveys of Crown lands. The data are then condensed and presented in lithograph map form.

The main objectives, then, of the Surveys and Mapping Branch are first to provide complete, accurate, and readily available maps on adequate scales with allied data, for administrative control of resources and Crown-land transactions, and, secondly, to maintain this information up to date by keeping abreast of continuous cultural development.

A survey inventory of such a standard is obviously of primary advantage in encouraging the present development of our natural resources, and further developments which seem "just around the corner."

A brief summary of the functions of the Branch follows, and the breakdown is provided by Divisions:—

I. Administration.—General co-ordination of the four Divisions of the Branch, being Legal, Geographic, Topographic, and Air; delineation and maintenance of boundaries under the Provincial Boundary Commissioner—namely, (a) Alberta-British Columbia Boundary and (b) British Columbia-Yukon-Northwest Territories Boundary.

II. Legal Division.—Regulations for surveys under the various Provincial Acts, such as Land, Land Registry, Mineral, Petroleum and Natural Gas; instructions to British Columbia land surveyors regarding surveys of Crown lands and subsequent check of field-notes and plan returns of same; preparation and custody of official plans; preparation and maintenance of Departmental reference maps, mineral reference maps, and composite (cadastral) maps; clearance by status of all applications concerning Crown lands; field surveys and inspections of Crown lands, highway rights-of-way, etc.; preparation of legal descriptions as required; operation of blue-print and photostat sections.

III. Geographic Division.—Map compilation, drawing and negative engraving, editing, and reproduction; map checking, distribution, geographical naming—Gazetteer of British Columbia; field and culture surveys for preparation of lands bulletins and map areas; preparation of legal descriptions for and delineating administrative boundaries; editing and distribution of annual Lands Report; trigonometric computation and recording of same; general liaison between this Department and Federal and other mapping agencies on exchange of survey and mapping data.

IV. Topographic Division.—Propagation of field control—namely, triangulation, traverses, photo-topographic control; compilation and fair drawing of manuscripts for standard topographic mapping; special field control for composite and multiplex mapping and other special projects.

V. Air Division.—Aerial photographic operations involving maintenance and operation of three aircraft; photographic processing, air-photo distribution, and Provincial air-photo library; compilation of interim aerial base maps, primarily for British Columbia forest inventory; tri-camera control propagation; multiplex aerial mapping of precise large-scale detail projects; instrument-shop for repairs, maintenance, and development of technical equipment.

SURVEYS AND MAPPING BRANCH

G. S. ANDREWS, M.B.E., B.Sc.F., P.ENG., B.C.R.F., B.C.L.S., F.R.G.S., DIRECTOR,
SURVEYOR-GENERAL, AND BOUNDARIES COMMISSIONER

Operations of the Surveys and Mapping Branch followed the same general pattern and about the same volume this year as in 1956. Details of work in the field and in the office may be found in the separate reports of the four divisions, which follow.

The field season, June through to September, was characterized this year by poorer than average weather in the form of a series of interlocking storms which, during July and August, moved eastward across the Province, mainly between latitudes 55° and 58°. Adverse effects of this weather were felt by the photographic detachments of the Air Division, by the control parties of the Topographic Division, especially in mountains south of the Peace River, and by the parties of the Legal Surveys Division working in the north. Reduced accomplishment and higher over-all unit costs in these operations were for this reason inevitable, and remind us that surveying is closely akin to farming in its dependence on weather, a primary factor, still very much uncontrolled by man.

The charter of three helicopters for the full four-month season was a record for the Branch. One machine was financed by funds from the Water Rights Branch in connection with detailed topographic mapping in the valleys of the Parsnip and Peace Rivers above Hudson Hope for dam-sites and pondage studies. The second machine was financed for three out of four months by the British Columbia-Yukon-Northwest Territories Boundary Commission for a retracement and restoration survey of the north Provincial boundary along the 60th parallel west of Windy Arm on Tagish Lake. The fourth month for this machine and the full time of a third machine were financed from the regular field appropriation of the Topographic Division. A Legal Survey party in the Upper Halfway River area made emergency use of a helicopter operating out of Pink Mountain (Mile 147) on the Alaska Highway, when prolonged heavy rains and raging streams temporarily severed its line of communication by pack-horse. This extensive experience with helicopter operations confirmed our past findings that the calibre of helicopter personnel (pilots and engineers) assigned to survey operations in mountain areas is of greater importance as a factor of efficient operation than the actual tariff paid for the machines in dollars.

The unavoidable rise in costs of legal surveys of Crown lands, especially in remote areas such as in parts of the Peace River District, is a matter of much concern. Even when this work is restricted to concentrated groups of parcels, the cost per acre for legal surveys into district lots pertaining to applications for Crown lands is often higher than the statutory sale price per acre under the "Land Act" and in excess of the presently used surcharge for survey per acre. For remote and isolated applications for Crown land, as for leases under the "Petroleum and Natural Gas Act," it is quite possible that modern air photographs and photogrammetry will provide the practical answer to survey. Lot corners and boundaries may be identified on official air photographs and co-ordinated with the country-wide survey control by precise photogrammetry.

For the second consecutive year, compilation of composite maps by the Legal Surveys Division has been in abeyance due to the lack of staff. These maps, at 500 feet per inch, of settled areas show all subdivisions of land compatible with the scale, adjusted and co-ordinated from all official records, and with air-photo information for travelled roads, erosion, and accretion of water boundaries. They are invaluable for assessors, Village Commissioners, approving officers, community planning, surveyors and allied interests.

Anticipating future use of electronic computing-machines for high-speed processing of the rather involved mathematical adjustment of survey control data, the Geographic Division arranged for the supervisor of its Computing Section to participate in a special

night course offered at the University of British Columbia during the winter months of 1957/58. It is hoped, with the co-operation of Professor T. E. Hull, who is in charge of the course, and other survey participants, that a programme for the basic adjustment of a single quadrilateral of triangulation may be developed and tested on the computing-machine as a practical object for the course. More advanced work in the future would anticipate programmes for handling a series or a network of such quads.

A major problem in the operations and finances of the Air Division arose this year due to an abrupt change in the specifications for air photos and map compilation required for a new phase of the Provincial forest inventory. Heretofore the basic programme of air photography and interim mapping, at a scale of one-half mile per inch, has been financed to a large extent by Federal-Provincial moneys available for the National forest inventory under the Canada Forest Act, and has constituted the main activity of the Air Division, both in the field (air photography) and in the office (map compilation). The versatile usefulness of this programme, however, was such that its resultant air photos, some 200,000 now in the Provincial Air Photo Library, and maps, some 1,500 reproducible fair-drawn master sheets on file in the Department, have been of primary importance to all other Government departments and private interests concerned with the opening-up of the country and the wise use of natural resources. Unfortunately the northern third of the Province between the 57th and 60th parallels of latitude has not yet been covered by this basic air-mapping programme—a region of importance now and in the immediate future.

The new forest-inventory programme initiated this year calls for specialized narrow-angle air photography at a larger scale, one-quarter mile per inch, and is to be confined to productive forest lands south of latitude 57° as delineated by the earlier basic mapping. This photography is not adaptable to other versatile uses, such as detailed contour mapping. The amount of country required to be covered annually is such that it would absorb the full potential of the two photo aircraft now operated by the Air Division.

The coincidence of the air survey requirements of the forest-inventory programme with general-purpose basic mapping of the northern third of the Province, with its very important financial contribution, is obviously now at an end. To carry on the programme into the north, additional money for both field and office operations will be required, together with approval to convert and operate an additional Anson V aircraft for photography. The latter, CF-BCA, is available on transfer from the Highways Department, having been replaced by a higher-performance amphibious aircraft. The cost of converting this Anson for photography would be modest, as would be the annual cost of maintenance and operation for photography thereafter. To offset the loss of the forest-inventory refund for continuation of the basic interim air mapping in the north at a scale of one-half mile per inch, an additional annual allotment of moneys will be required. The total would be much less than the cost of one mile of first-class highway construction in average British Columbia terrain.

Electronics are playing an increasingly important role in survey operations. Mention has been made of electronic computers for speeding up laborious and involved survey computations. A new electronic device, called the "Tellurometer," for measurement of distances ranging between 1,000 feet and 25 miles has recently been perfected in South Africa. This instrument, comprising master and remote units which are set up at the extremities of the line to be measured, has proven to be capable of phenomenally high precision. Each unit is sufficiently compact, light in weight, and sturdy to be transported by back-pack if necessary. One of these outfits, ordered as soon as funds were authorized for the current fiscal year, was received toward the end of the field season, too late for operational use, but in subsequent tests and training it has confirmed its remarkable accuracy and simplicity of operation. Significant improvements in the flexibility, accuracy, and economy of our future control surveys are anticipated by the use of this equipment.

Efforts to test an automatic recording electronic altimeter for survey aircraft were not successful this year due to the equipment, borrowed for the purpose from the Royal Canadian Air Force, being somewhat too primitive, complicated, and difficult of adjustment for effective installation in our Anson aircraft. Improved equipment of this kind, more compact and lighter in weight, is now available from manufacturers, and offers worth-while possibilities for recording a profile of the terrain passed over by an aircraft flying at constant known altitude. The value of such data for vertical control in mapping may be comparable in usefulness, if not in absolute accuracy, to that of the Tellurometer for horizontal distance measurement.

Another application of electronics is being developed by the Air Division instrument-shop in the construction of an automatic dodging control for printing enlarged photographs from the air negatives by electronic scanning which automatically controls the strength of actinic light in relation to variations in density of the air negative. Such a device improves the tonal qualities of the air photos by recovering detail in the shadows and in the highlights, which under ordinary printing would be lost. It will replace manual dodging now used, which, although expertly done by skilled operators, is subject to human fatigue and requires long training.

Philip Marmaduke Monckton, British Columbia land surveyor in the Legal Surveys Division, became due for statutory retirement at the end of May, but by special Order in Council was retained in the service for an additional six months to cover the ensuing field season and the preparation of his resultant notes and plans. Prior to Mr. Monckton's entering the service of the Department in July, 1941, he had been engaged as a private surveyor on many Departmental assignments in all parts of the Province, including extensive exploratory surveys in the north. He served in the armed forces during both world wars. His intimate acquaintance with little-known parts of the Province and his lively sense of humour will be sorely missed in the Branch.

The loss of a valued member of the staff was suffered in the untimely death of Edward John Gray on October 3rd in his forty-fifth year. Mr. Gray, as instrument-maker, performed highly skilled and specialized services in the maintenance, repair, and adjustment of survey instruments for all divisions of the Branch and, as occasion required, for other departments of the Government. Mr. Gray joined the service in 1949. He is survived by his wife and two sons. At the year's end, a replacement for him has not been found.

BRITISH COLUMBIA-YUKON BOUNDARY SURVEY

By A. F. SWANNELL, B.C.L.S.

This survey is a continuance of the restoration and retracement survey programme initiated in 1956 of the original survey of the subject boundary between Teslin Lake and Takhini River. In addition to the retracement survey, the 9-mile gap between Monuments 118 and 119 was to be run and monumented.

As in 1956, I was loaned, along with George New, B.C.L.S., my assistant, by the Topographic Division to do this work for the British Columbia-Yukon-Northwest Territories Boundary Commission. J. E. Curtis, another staff member of this Division, acted on the party as computer.

This year's work differed considerably from any previously carried out on the boundary in recent years because of the ruggedness of the terrain. In this mountainous region, ground measurement would have been most difficult to obtain, more especially because the boundary being largely above timber-line, would have made any chaining process very vulnerable to the attendant winds. Lengthy and arduous climbs would be a daily occurrence. Consequently, it was decided upon triangulation methods for the most part to obtain the distance measure.

The generalities of my instructions were:—

- (a) To establish a triangulation network of third-order precision, or better, in continuance of the previous year's triangulation along the boundary to Hendon River, this network to be tied to the geodetic network in the vicinity of Bennett Lake:
- (b) Where feasible, co-ordinated positions of existing monuments were to be obtained by triangulation methods directly from this control triangulation or by secondary triangulation figures to enable an accurate determination of distance between the original St. Cyr monuments:
- (c) Where (b) above was impractical, such as in the lower wooded areas, or where the existing monument was in a position not readily accessible by triangulation, the co-ordinated position for the monument was to be obtained by direct ground measurement:
- (d) To connect the unsurveyed gap existing between Monuments 118 and 119 by a straight line of monuments:
- (e) To renew the existing monuments in their original position and to re-establish any which may have been lost, as closely as practicable in their original positions:
- (f) To carry trigonometric levels to ascertain the elevation of each boundary monument.

The crew assembled at Whitehorse on the night of June 10th, and on June 14th actual work started on the boundary, with the camp established on the west shore of Windy Arm at the old townsite of Wynton. For the most part of the season the crew members numbered ten and were comprised, besides myself and assistant, of one computer, two instrumentmen, two survey helpers, a cook, and, with the arrival of the helicopter on June 19th, the pilot and mechanic.

During the course of the season five main camps were established at convenient intervals along the boundary. This meant speedy and efficient daily deployment by the helicopter, chartered from Vancouver Island Helicopters Limited, and at no time was any observing party too remote from the main camp in case of some eventuality. To supply us, both with provisions and gasoline for the helicopter, float-plane service was used, and, as in 1956, excellent service was given by Peterson's Air Service, of Atlin.

Triangulation was carried from last year's net to the Hendon River, a distance of approximately 57 miles. This main net consisted of seventeen main quadrilateral and thirty-five main triangulation stations. Final positions are now obtainable for this work as far west as the geodetic net in the vicinity of Bennett Lake, to which a tie was made.

Beyond or west of here, non-closure results only are obtainable.

Fixation of the original St. Cyr monuments was accomplished by triangulation methods, from which the distance between monuments may be calculated. Inclusive of the thirty-five main triangulation stations and monuments, a total of 127 stations were occupied. Only between Monuments 71 to 72, 72 to 73, 73 to 74, 74 to 75, 79 to 80, and 80 to 81 were ground methods used for obtaining the distance. Monument 108 was the only monument no trace of which was found of the original 120 monuments that were to be renewed during the course of this and the previous season's work. This monument is believed, from information in the original notes, to have been established in a river-bed of a glacial stream and subsequently had been washed out on flood stage. It was impossible to determine its exact original position because of the sometimes large discrepancies found both in distance and azimuth between monuments along this boundary. Re-establishment was made in a safe situation on the banks of the stream on the line between Monuments 107 and 109.

Azimuths of the courses between monuments were determined by the occupation of each monument in turn, and where obtainable the angle was read between adjacent monuments and, in fact, to all monuments visible at the time of observation from the occupied position. These determinations of azimuth were originally derived from Polaris observations and were subsequently controlled by periodic observations for azimuth along the boundary. As like the previous season, high clouds and overcast limited the number of these, but successful observations were obtained at Monuments 72, 77, 85A, 98, 108, 116, and 119.

The 9-mile unsurveyed gap between Monuments 118 and 119 now has four monuments established on the straight line between them—namely, Monuments 118A, 118B, 118C, and 118D. Two original monuments were found which do not show on the original plan. These were occupied, accepted, and treated as an original monument and given the designating numbers 90A and 95A. In addition to the original monuments and those just mentioned, ten new monuments (79A, 85A, 93A, 93B, 93C, 94A, 100A, 101A, 116A, and 116B) were established to effect intervisibility of adjacent monuments as called for in the detailed instructions. This intervisibility is not effected in one case: that of Monument 90A, which, however, sees other than the adjacent monuments both to the east and west. There is a distinct break in intervisibility between Monument 115 and 116. On this course the boundary passes over an ice-capped mountain where it was useless to establish another monument. Fortunately a main triangulation station (Zenith) is at the south edge of the ice-cap approximately half-way between the two monuments and 1,300 feet south of the line between them, so this triangulation station makes a suitable reference to the boundary at that point. It is here that the boundary attains its maximum elevation of that part surveyed, triangulation station "Zenith" being 7,360 feet above sea-level. Monument 120 is the highest monument established, its elevation being 7,333 feet.

Little of the boundary along the section worked on this year was below timber-line. In places where it was, such as adjacent to Windy Arm, Bennett Lake, and Partridge Lake, a 6-foot sky-line was cleared through the timber.

Apart from the high overcast, the weather was excellent this season. The anticipated wind was not as persistent as usual, nor as strong, so it was not a very serious factor to contend with, nor were the low clouds. Of eighteen adverse days, only five definitely grounded us and resulted in nothing done. The heavy snow conditions of the previous winter were not evident on our arrival; the snow was going fast and, in fact, had left to an

extent not attained until mid-August of the previous year. The ice had left the lakes on June 7th, so this factor did not retard us in any way. It was this all-round favourable weather factor which contributed so much to the success of the season's project, in fact enabled the work to be completed.

LEGAL SURVEYS DIVISION**D. PEARMAIN, CHIEF**

The Legal Surveys Division, under the direction of the Surveyor-General, is responsible for cadastral surveys of all Crown lands of the Province. This entails the issuing of instructions to the land surveyors engaged to make each survey and supplying them with copies of the field-notes and plans of adjoining or adjacent surveys. After the completion of the survey, the returns are forwarded to this office for checking and plotting. Included in the above returns are all right-of-way surveys, such as for highways, railways, transmission-lines, etc. During the year, 488 sets of instructions were issued. This is an increase of eighty-seven over last year and amounts to an increase of 21 per cent.

In 1957, 508 sets of field-notes covering the surveys of 660 lots were received in this office and duly indexed, checked, plotted, and official plans prepared therefrom. Of the above-mentioned surveys, 507 were made under the "Land Act" and 153 under the "Mineral Act." At the present time there are approximately 94,060 sets of field-notes on record in our vaults.

There were 317 plans received from surveyors covering surveys made under the "Land Registry Act." These were duly checked and indexed, and certified copies deposited in the respective Land Registry Offices.

In order that a graphic record may be kept of alienations of both surveyed and unsurveyed Crown lands, a set of reference maps must be maintained covering the whole of the Province. These show all cadastral surveys which are on file in the Department. These maps are kept up to date by adding new information as it accrues from day to day. Prints of these maps are available to the public. (*See Indexes 1 and 2, contained in envelope, inside back cover of this Report.*)

From the above reference maps, together with other information and facilities maintained by this Division, it is possible to give an up-to-the-minute status on any parcel of Crown land in the Province.

All applications to purchase or lease Crown lands or foreshore which are received by the Lands Branch and all applications to purchase Crown timber received by the Forest Service are channelled through this Division for clearance. The orderly processing of these applications requires that an exhaustive status be made from the reference maps, official plans, and Land Registry Office plans. A synopsis of the clearances processed during the year will be found in Table A.

It has been necessary during the year, for status purposes, to obtain from the various Land Registry Offices 497 plans; copies of these have been made, indexed, and filed as part of our records.

This Division co-operates with other departments of Government by preparing and checking legal descriptions which they require. Those assisted in this way were the Attorney-General's Department (descriptions of Small Debts Courts), the Agriculture Department (descriptions of disease-free areas and pound districts), the Department of Municipal Affairs (descriptions for the incorporation or amendment of municipal areas), the Forest Service (descriptions of Provincial forests and working circles), and our own Lands Branch (descriptions for gazetted reserves of land from alienation, etc.). This year it has taken 228 man-hours to prepare the descriptions referred to above.

BLUE-PRINT AND PHOTOSTAT SECTION

This Section continues to supply a service to all departments of Government, as well as supplying all the prints and photostats required by the Surveys and Mapping Branch. The total number of prints made during the year was 166,334, in the preparation of which 106,798 yards of paper and linen were used. The increase in the number of prints made this year as against 1956 was 9,998, which is an increase of approximately 6.5 per cent.

The number of photostats made during 1957 was 48,290. This is a decrease of approximately 2 per cent over the previous year.

During the year a photographic rotary printing-machine was purchased. This makes it possible for the production of films and contact photographic work up to 42 inches in width and of any length. With this machine we are now preparing photographic linen transparencies of maps and plans, and these are recognized as the best available at present.

COMPOSITE MAP SECTION

This Section is responsible for the compilation and tracing of composite maps, at a scale of 1 inch to 500 feet, of the more thickly subdivided areas of the Province and generally in unorganized territory. (See Index 3.) Our next project under this type of mapping is the area between Trail and Nelson along the Columbia and Kootenay Rivers; part of the necessary field work has already been accomplished.

However, due to the urgency of compiling and retracing some of our reference maps which have become worn and dilapidated through the constant use which they receive, and through the increase of our other duties, it has been necessary to suspend the compilation of composite maps for the present time.

It is regrettable that this was necessary; but for the orderly processing of the large volume of land-application clearances, it is imperative that the reference maps be kept in the best possible condition.

LAND EXAMINATION PLAN SECTION

This Section is responsible for the preparation of plans for the use of the Land Inspectors in the inspection of applications for Crown lands. The increase of the work accomplished by this Section since its inception is shown as follows:—

Year	Plans Prepared	Year	Plans Prepared
1953	1,192	1956	2,340
1954	1,552	1957	2,290
1955	2,030		

GENERAL

The programme initiated a year ago in conjunction with the Victoria Land Registry Office, whereby this Division prepares for them, through the processes available in our Blue-print and Photostat Section, linen transparencies of certain registered plans which, through the course of time and continual usage, have become somewhat tattered and torn, was carried on during the year. The number of plans renewed this year was seventy-eight.

Through an arrangement worked out between the Department of Lands and Forests and the Department of Highways and concurred in by the Department of National Defence, it was found to be expedient for the proper understanding of the jurisdiction of the above-mentioned departments that copies of the plans of the survey of the Alaska Highway should be deposited in the Land Registry Office at Kamloops. Linen transparencies of the said plans, covering approximately 600 miles of right-of-way, were prepared in this Division and duly deposited at Kamloops.

Through the curtailment of facilities and space in the Property Room in the Main Building, it was found necessary to remove our supply of standard posts, B.C.L.S. bars, etc., to the warehouse at 859 Devonshire Road in Victoria West. The orderly receiving and shipping of these posts is now being carried out from that location.

A detailed synopsis of the surveys made by this Division follows.

TABLE A.—SUMMARY OF OFFICE WORK FOR THE YEARS 1956 AND 1957,
LEGAL SURVEYS DIVISION

	1956	1957
Number of field-books received.....	320	508
„ lots surveyed.....	445	660
„ lots plotted.....	425	656
„ lots gazetted.....	336	566
„ lots cancelled.....	35	63
„ mineral-claim field-books prepared.....	93	194
„ reference maps compiled or renewed.....	23	11
„ applications for purchase cleared.....	2,279	2,473
„ applications for pre-emption cleared.....	91	156
„ applications for lease cleared.....	1,160	1,200
„ coal licences cleared.....	18	2
„ water licences cleared.....	69	49
„ timber sales cleared.....	7,164	6,330
„ Crown-grant applications cleared.....	1,651	1,258
„ reverted-land clearances.....	880	260
„ cancellations made.....	4,591	5,582
„ inquiries cleared.....	2,004	1,806
„ placer-mining leases plotted on maps.....	91	<i>Nil</i>
„ letters received and dealt with.....	4,937	5,316
„ land-examination plans.....	2,340	2,299
„ Crown-grant and lease tracings made.....	1,040	1,660
„ miscellaneous tracings made.....	115	242
„ Government Agents' tracings and prints made.....	286	325
„ photostats made.....	49,413	48,290
„ blue-prints made.....	156,336	166,334
„ documents consulted and filed in vault.....	82,118	125,607

FIELD WORK

The field programme included fifty-three surveys of a varied nature, including large and small subdivisions, foreshore areas, inspection surveys, and road locations and profiles for the University Endowment Lands master-plan survey.

Field inspections made at the request of the Registrars of Titles remained the same as last year, at five, with the office examination of plans from the same source continuing. The Department also initiated three field inspections of surveys submitted for approval.

In addition, four parties were engaged in the Peace River District surveying a total of eighty applications to purchase and lease Crown land.

Highway surveys on a co-operative cost basis with the Department of Highways netted 35 miles of new road surveyed by two Departmental surveyors.

One land surveyor left the Division in April for greener fields, and it was not possible to attract another surveyor to fill the position, resulting in a reduction of field work accomplished. P. M. Monckton, B.C.L.S., who officially retired in May, was persuaded to stay on until the end of the year, when the Division was left without the services of this experienced surveyor.

Besides the creation of new corners by survey, the re-establishment of old section and district lot corners continues on a modest scale in connection with other work. During the year 216 such corners were renewed.

SUBDIVISION, FORESHORE, AND PLANNING SURVEYS

During the year R. W. Thorpe, B.C.L.S., carried out three surveys at the request of the Forest Service. These were for two Ranger station sites at Powell River and Chilliwack and an extension to the tree nursery at Duncan. For the Lands Branch, a subdivision at Savona Ferry Townsite was completed to accommodate squatters on Crown land, and a small subdivision was made in the Alberni Valley. An area of approximately 25 acres adjoining the highway near Port Alberni was contoured preparatory to a pending subdivision.

Under the "Land Act," a portion of the frontage of Le Jeune Lake was subdivided into twenty-eight summer-home site lots, and adjoining these a public reserve of 96 acres was laid out. A similar survey, involving twelve lots, was carried out on Cuisson Lake. A preliminary survey was conducted in the False Creek area at Vancouver to determine the extent of fill recently deposited between Granville Island and the southerly shore.

Two extensive inspection surveys—one at Cowichan Lake and the other north of Mill Bay—were carried out at the request of the Inspector of Legal Offices.

At the request of the Lands Branch, D. W. Carrier, B.C.L.S., laid out twenty-four parcels for summer homes in the vicinity of Ruby and Sakinaw Lakes on the Sechelt Peninsula. At Babine Lake, eighty-four summer-home site lots were surveyed. In the Chilcotin District, eight home-sites were laid out on Puntzi Lake, twelve on Alexis Lake, and ten on Fletcher Lake. At Little Prairie, eighty-eight town lots were created as an extension to the townsite. Two district lots situated on the Batnuni Road about 90 miles west of Quesnel were surveyed at the request of the Forest Service.

An inspection survey of a "Land Act" survey in the vicinity of Quesnel resulted in a complete resurvey of the lot in question.

Early in the year G. T. Mullin, B.C.L.S., conducted a preliminary survey of approximately 2,000 acres of the University Endowment Lands. This survey consisted of the establishment of the outside boundaries and the traversing and profiling of the centre lines of the main roads of the area to be developed as shown on the designing engineer's plan. In conjunction with this, a network of bench-marks was established through the area for future use.

Subdivisions made under the "Land Registry Act" were conducted at Pender Harbour, Sanca Creek, Deer Park, Nakusp, and Howser.

Foreshore surveys were made at Tyee Lake, Lardeau, and Howser.

Thirty-six summer-home site lots were surveyed at Tyee Lake.

At the request of the Kamloops Registrar, an inspection survey was made in the vicinity of Summerland.

During the year P. M. Monckton, B.C.L.S., made a preliminary survey of a large area near Alberni which is being considered for eventual subdivision. A reposting survey of a large part of the townsite of Smithers was carried out. At the request of the Lands Branch, nine lots were surveyed in the vicinity of Clinton and a cemetery-site at Zeballos. At the instigation of the Forest Service, six surveys were carried out at Squamish, Francois Lake, Seymour Lake, and Ucluelet. The outer boundaries of Extension townsite were re-established as a preliminary to a reposting survey.

At the request of the Forest Service, the boundaries of the forest nursery and Ranger school at Green Timbers were resurveyed by A. P. McLaughlin, B.C.L.S., and the corners of the lots concerned were marked by permanent monuments. At the request of the Lands Branch, seven home-sites were surveyed at Ruby and Sakinaw Lakes.

Late in the fall a resurvey of Lot 55, Wellington District, was completed by H. V. Buckley, B.C.L.S.

HIGHWAY SURVEYS

A start was made this season on the survey of the Princeton-Merritt Highway, and 17.5 miles were completed from Princeton to the south end of Allison Lake. A tie was

made to the survey of the Hope-Princeton Highway. This survey was conducted by M. Perks, B.C.L.S.

A new tripod beacon was erected on triangulation station "Missezula" for identification on air photographs. Due to the presence of timbered ridges between the station and the highway, it was considered too time-consuming to make a tie in conjunction with the highway survey.

A small subdivision was made at Coalmont at the request of the Department of Highways.

A survey of a 17-mile section of the Northern Trans-Provincial Highway from 6 miles east of Vanderhoof to Engen was carried out by C. R. W. Leak, B.C.L.S., plus the addition of a 100-foot wide strip of extra right-of-way which the Department of Highways desired to have added to 14 miles of highway which was surveyed in 1956. During this survey, seventy-three district lot corners were re-established and marked by permanent monuments.

CROWN-LAND SURVEYS FOR SETTLEMENT

Surveys of applications for Crown lands in the Upper Halfway River valley, Peace River District, were carried out by A. P. McLaughlin, B.C.L.S. Sixteen lots in all were surveyed in this area, and they were tied to the geodetic station at Pink Mountain. It was found impossible to complete this assignment due to excessive rainfall in July and August, which kept the rivers in flood and semi-flood and thus upset the work programme.

The work assigned to H. V. Buckley, B.C.L.S., consisted of the survey of applications in the Cache Creek area, north-west of Fort St. John. In all, some 8,000 acres were surveyed. Owing to the adverse weather conditions which existed this year, he also accomplished less than was planned.

The survey of nineteen applications for Crown lands was carried out by A. W. Wolfe-Milner, B.C.L.S. These were situated in the vicinity of Little Prairie and East Pine and covered a total area of 3,850 acres. They comprised applications varying in size from 8 acres to 640 acres. These surveys were carried out in the fall, and it is interesting to note that only one day was lost through the stress of weather.

A. Daniluck, B.C.L.S., surveyed twenty-four lots totalling 2,900 acres in the vicinity of Moberly Lake and Groundbirch, in the Peace River District.

TOPOGRAPHIC DIVISION

A. G. SLOCOMB, B.C.L.S., CHIEF

The old saying, "Everybody complains about the weather, but no one does anything about it," was only partly true this year. Rain and low clouds plagued everyone, particularly in the vicinity of the Rocky Mountains. What can be done about it, however, is a story that still has to be written. The purchase of a Tellurometer should provide the theme. This distance-measuring instrument operates on radio microwaves of 10 cm. wavelength. It measures slope distance which may be reduced to the horizontal with adequate accuracy by means of barometric height differences. Visibility is of no account, although, in general, line-of sight conditions are required. Designed primarily to meet the requirements for an instrument of geodetic accuracy over useful geodetic distances, observations can be made through haze, mist, smoke, and light rain with first-class results. Heavy rain might reduce the accuracy somewhat, but a result can be obtained. This instrument was received too late to be included in the current year's field work, but in preliminary tests and training operations no difficulty was encountered to obtain the accuracies claimed, using novice operators and often under adverse weather conditions. Transportation between mountain peaks, now normally by helicopter, would appear to be the only source of delay to be solved in the future if this instrument lives up to expectations.

During the summer's operations the Department's Beaver CF-FHF flew 346 hours and the chartered helicopters (three) totalled 771 flying-hours. Control for twelve standard National Topographic map-sheets was completed. In addition, mapping control was obtained to produce pondage maps along the Parsnip and Peace Rivers for the Water Rights Branch. Control for the production of ten 1:25,000 map-sheets in the Lower Fraser Valley was completed. The contract for the photographs and the compilation of these maps comes under the supervision of the Army Survey Establishment, Ottawa. This was a combined operation with the Army Survey, Ottawa, the Water Rights Branch of the Provincial Government, and ourselves participating.

The Sukunka River area in the Rocky Mountains covered Map-sheets 93 P/3, 4, 5, 6, and 93 O/1 and 8. (See Fig. 1.) A. D. Wight, B.C.L.S., was in charge, and he reports as follows:—

"The area was void of old surveys except for the perimeters which were earlier covered on the north and west by the 1928 Pacific Great Eastern Railway resources survey, followed by the right-of-way traverse along the John Hart Highway. The main geodetic triangulation net now supersedes the original P.G.E. triangulation along the John Hart Highway. The eastern boundary adjoins the Topographic Division's 1956 work. A line of geodetic levels, run along the highway, provided first-order elevations, while the geodetic triangulation net provided the first-order base and positions.

"A series of six quadrilaterals bridged the gap from the Provincial 1956 main triangulation on the eastern perimeter to the geodetic net in the west. The majority of the secondary stations were fixed by a minimum of two three-angled triangles, one side being common to both the triangle and the main network of quadrilaterals. They were positioned to provide horizontal control for the vertical air photos for multiplex extensions. A panorama of terrestrial photographs were exposed from each triangulation station to supply the vertical angles necessary to compile elevations for vertical control.

"The terrain was ideally formed for photo-topographic control, particularly in the western section, where a series of paralleling ridges spaced from 4 to 5 miles apart ran in a north-westerly direction. The eastern slopes of the Rocky Mountains were not so ideally formed, but had sufficient clear-topped mountains for this procedure. Helicopter landings were good, and in most cases within a few minutes' walk of the objective.

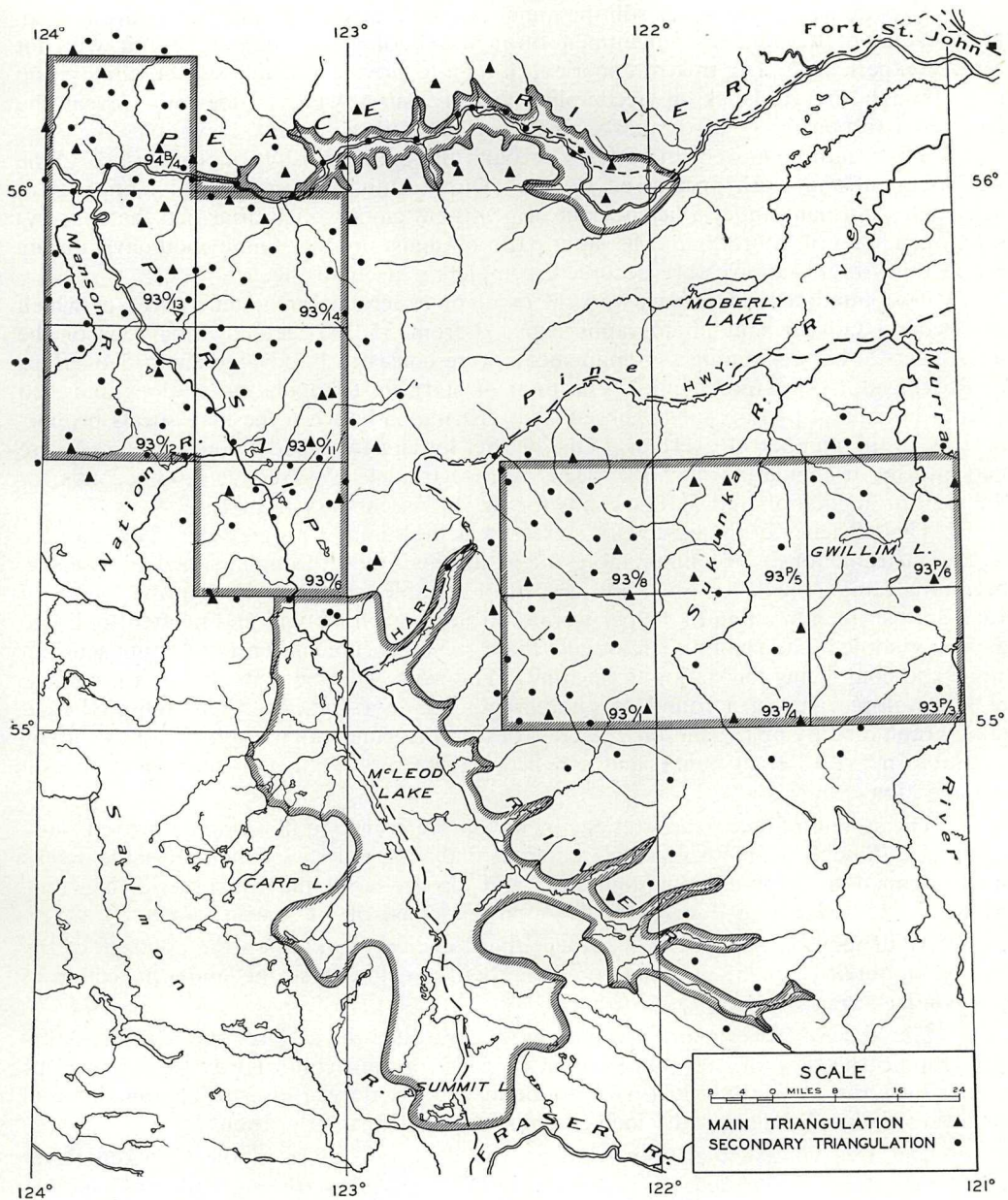


Fig. 1.

"A supply camp was established at Tudyah Lake to purchase and deliver all necessary supplies to this crew and to the party working in the Rocky Mountain Trench. The Beaver aircraft and all vehicles were based at this camp.

"Experienced personnel is still the major problem facing the party chiefs in the field. Our system of training instrumentmen through schooling is valuable, but it will not replace experience. The trek of experienced men to private practice still continues, and even though the yardstick of accomplishment measures well, it does not reveal the additional responsibility of the party chief working with a 'green' crew.

"The weather showed little mercy through the major portion of the season. June was marginal and work progressed slowly. During July and the first half of August, activity lay dormant under a heavy layer of persistent cloud which drenched the countryside to the point of saturation. The latter part of August produced nine good days, during which thirty-four stations were occupied, completing six map-sheets.

"Two hundred and seventy vertical overlaps cover this area, ninety-five of which are Federal Government photographs exposed from 35,000 feet covering four of the map-sheets. The remaining two map-sheets were consistently covered by 175 overlaps of Provincial 18,000-foot flying. The total of sixty-six triangulation stations and 120 rolls of horizontal photographs exposed were distributed between the map-sheets proportionally to the number of overlaps. One district lot and two geodetic bench-marks were tied into the triangulation network. The average triangle closure was 4.03 seconds for the main triangulation and 5.38 seconds for the 118 secondary triangles.

"The efficiency of the field work increased as the summer progressed. This was due to the instrumentmen becoming more adept at their jobs through gained experience, becoming familiar with the area, and a spell of suitable weather. During the month of June an instrumentman and a helper were sent out to each station, and it often took two days to complete one station. In August these same instrumentmen were being sent out alone and completing the station in one day. The work required consisted of a minimum of ten multiple angles, a round of photographs, camera stations where required, and photograph identifying the station. A crew of four instrumentmen, each capable of doing a station in five to eight hours, and a helicopter are a very efficient unit for mountain triangulation.

"The system of occupying stations by day in preference to fly camping proved satisfactory, with several advantages. It eliminated the long, lonely, uncomfortable weeks spent camped on exposed mountain-tops, and also reduced the helicopter flying-time. A total of 233 helicopter-hours were flown on this phase of the season's job.

"By the end of August it was evident that the crew working on the pondage of the Rocky Mountain Trench could not complete their assignment, so the southern section of this pondage area was reassigned to us.

"The Federal Government had previously controlled the area for standard 1:50,000 topographic sheets with 100-foot contours. This existing control was to be used for horizontal positions and vertical control obtained to produce a 20-foot contour interval at the scale of 1,000 feet to the inch extending to 2,600 feet elevation.

"The area consisted of approximately 1,800 square miles in the Crooked River and Parsnip River watershed. It is covered by 370 vertical overlaps of British Columbia Land Service photography. The dense forest-cover and the large area involved made barometric elevations the only feasible way to control the major portion of the area. Openings in this forest mat were provided only by lakes and swamps. The helicopter was therefore converted from skids to pontoons to permit water landings.

"Barometric elevations require all possible refinements to produce vertical control with a suitable accuracy for 20-foot contours. The vertical range was favourable, being limited to a difference in elevation of about 500 feet. The second important refinement was to limit the range of the roving barometer to a maximum of 10 miles from the base

barometer. This was accomplished by using a modification of the leap-frog system, which we called the 'travelling-base system.'

"The John Hart Highway traverses the centre of this area, and along it the geodetic bench-marks are located. This provided a series of known elevations from which barometric loops were run. Adjacent loops had common points, which produced independent elevations for these points. The agreement between these independent values was generally good, but when an appreciable difference occurred, additional loops were run into the point until a reliable value was established. Two hundred and five barometric values were thus obtained, thirty of which had two or more independent values. The average agreement for those points with multiple values was ± 4 feet. A further test of the accuracy was made by plotting a gradient for each river and stream that had a series of barometric elevations. All these elevations plotted within a few feet of a mean curve drawn through the plotted elevations. The only positive check was at one of F. O. Speed's new stations where the barometric and trigonometric elevations agreed to a foot. The final proof will not come until the elevations are used in the multiplex; however, from all indications the values obtained will be suitable. Further refinement on this accuracy could be accomplished in the future by the purchase of the more modern instant reacting barometers that will read directly to 2 feet.

"A second helicopter, available after the completion of the British Columbia-Yukon Boundary survey, was used to occupy nine triangulation stations in the Upper Parsnip River and its tributaries. The headwaters of these rivers extended the job up the valley well into the Rocky Mountains. In this area the rough terrain made barometric elevations unreliable and terrestrial photographs more accurate and economical.

"This vertical control job occupied approximately three weeks and required 100 hours of helicopter flying-time. The pilot for the major portion of this time was the late Ted Henson, of Vancouver Island Helicopters, his last large flying job.

"The remaining week of the helicopter contract was used in the Clinton area on Map-sheet 92 P/4. Experimental use of the Tellurometer, the new electronic distance-measuring device of first-order accuracy, was carried out. The shortage of time prevented any appreciable amount of control being completed with this instrument. However, sufficient was accomplished to give an insight into the revolutionary aspects this instrument will have on future mapping control jobs. One small crew in a very short season of good weather could do sufficient work to overtax the present plotting and draughting facilities of the entire Division."

F. O. Speed, B.C.L.S., was in charge of the Parsnip River-Peace River area. He controlled Map-sheets 93 O/6, 11, 12, 13, 14, and 94 B/4, and in addition obtained control for the 1,000-foot-to-1-inch pondage maps, which are to be produced with a 20-foot contour interval up to the 2,600-foot level. (See Plate 1.)

The base camp at Tudyah Lake supplied Mr. Speed, and he had one helicopter permanently all summer, also a 38-foot river-boat powered with a 25-horsepower Johnson outboard motor. His preliminary work was to obtain the vertical control in the area around Tudyah Lake southwards to Summit Lake for the Water Rights Branch pondage map. This consisted of the photo identification of the Canada Geodetic Survey's bench-marks located along the John Hart Highway and the obtaining of barometer elevations, using the helicopter for transportation of the operator and the roving barometers.

The single-base method was first used, then the two-base method, but the results were not satisfactory as the weather was unsettled and unsuitable for barometer work. It also became evident that to obtain vertical control to the required accuracy, the barometers had to be placed on the ground at the lakes. The method of hovering 5 feet above the lake did not give a satisfactory result. It was then decided to temporarily suspend work on this phase of the mapping operation until the helicopter could be equipped with pontoons and the weather had become more stable for the barometer work.

The triangulation network of the P.G.E. resources survey of 1929 provided a scattering of old triangulation stations in the Rocky Mountain Trench which ran diagonally through the central portion of these map-sheets. Even though this triangulation network was not always satisfactory position-wise, it was not practical to superimpose a new main triangulation network over the old accepted and adjusted one.

Because of poor weather and other commitments, it was impossible to complete a secondary triangulation network down the Clearwater and Peace Rivers, which would have greatly helped in the adjustment of some of the secondary triangulation stations.

The second main camp was erected at the confluence of the Nation and Parsnip Rivers, as its central location aided the helicopter operation; also, it provided a close and convenient landing and loading area for the Beaver float-plane.

Inclement weather during June and July prevented any appreciable progress in the mapping. Crews had to be returned to the main camp because high winds and rain had destroyed their tents in the mountain fly camps. During this period, only valley work was possible as the tops of the mountains were invisible, being constantly shrouded in clouds.

To extend the valley work, the third main camp was set up at Finlay Forks. On completion of the Map-sheets 93 O/6, 11, 12, 13, and 94 B/4 by the early part of September, work was commenced to extend a triangulation network down the Peace River from stations "Scarp" and "Hearne" near Finlay Forks to the triangulation stations "Portage" and "Bullhead" near Hudson Hope. We were able to complete Map-sheet 93 O/14 by setting additional triangulation stations in conjunction with this network.

In order to close this triangulation network it will be necessary to extend either southwards to the primary geodetic triangulation stations "N. Cruiser" and "Bickford" or eastwards along the Peace River to the primary geodetic triangulation stations "Skin" and "Peace" located near Charlie Lake.

In 1956, R. G. Fernyhough (Water Rights Branch) tied in to the triangulation stations of "Portage" and "Bullhead" and Geodetic Bench-marks 689H and 690H, terminal monuments of a spur line to the head of the Peace River-Canyon. Ties were made to some of R. G. Fernyhough's bench-marks along the Peace River and also to his triangulation stations "Terrace" and "Scarp."

A total of 585 vertical air photographs were controlled and 680 horizontal ground photographs were taken from the triangulation stations. Three hundred and seventeen triangulation stations were occupied; this included the reoccupying of many of the 1929 P.G.E. resources survey triangulation stations.

Because the crew had had a very limited experience with stereoscopic photographic identification and were unable to positively identify mapping control in mountainous areas, low-level identification photographs of each station had to be taken from the Beaver aircraft to enable this work to be done in the office.

The Geographic Division had requested that a block of lots west of Hudson Hope be tied into our triangulation network to assist in the fixing of the location of petroleum permits. It was possible to locate and tie in one corner post to triangulation station "Carol."

Also completed was a small legal survey subdivision of Lot 7463 at Finlay Forks, as requested by the Survey-General. A tie was made between triangulation station "MacDougall" and the Federal water-gauge at Finlay Forks.

The early history of this area is well recorded in the books of Alexander Mackenzie and William Butler. The route taken in 1793 by Alexander Mackenzie on his historic journey to the Pacific Ocean was up the Peace and Parsnip Rivers. The names of the early gold-miners Jacques Pardonet and Pete Toy, along with Charles Ducette, a boatman of Alexander Mackenzie, can now be found on our present-day maps, whereas the old Indian name of Unshagah (Unjigah) River is now known as the Peace River, this name having been derived from Peace Point, the place where the Knisteneaux and Beaver Indians settled their dispute. The Finlay River is named after James Finlay, who travelled

the river in 1797. On the Peace River there are only two rapids of any importance—the Finlay Rapids, which are located just below the confluence of the Parsnip and Finlay Rivers, and La Rapide Qui Ne Parle Pas, which are approximately 32 miles down-river and now known as the Ne Parle Pas Rapids. On July 11th, 1875, Alfred R. C. Selwyn, of the Federal Government Geological Branch, accompanied by Professor John Macoun, climbed a mountain now named Mount Selwyn, which is located near Finlay Forks.

The Parsnip River is still used for river-boat freighting, with the boats loading at the Parsnip River Bridge on the John Hart Highway. The supplies are freighted as far north as Fort Graham and Fort Ware. Float-planes are also used extensively in the area, and Pacific Western Airlines make scheduled flights from Prince George with mail and passengers. Easy accessibility from the east is provided by the valley through which the Peace River leaves the Rocky Mountain Trench and passes through the Rocky Mountain Range to emerge on the eastern slopes of the range at Hudson Hope. This route is mainly used by river-boats bringing in fishing parties and vacationers. The road from Hudson Hope ends approximately 2 miles west of Gold Bar, at Beatty's farm at Allard Creek, thereby making it possible to put the river-boats in the Peace River above the unnavigable Peace River Canyon.

During the past few years a considerable amount of surveying and investigation have been done in connection with the proposed dam-sites on the Peace River.

A. M. Barber, B.C.L.S., completed three projects—the first a triangulation tie between the Provincial net at the junction of the Kechika and Gataga Rivers and the geodetic network at Muncho Lake. Using a helicopter for transportation and enjoying fine weather, this 50-mile tie was completed in fifteen days. Twelve stations were occupied, ten of which produced four fully read quadrilaterals. Moving to Prince George, Mr. Barber and his crew completed control for a special 200-feet-to-1-inch map with a 5-foot contour interval requested by the Regional Planning Board. By the end of July Mr. Barber was ready to move to his third area, a 50-square-mile section around Lac la Hache, requested by the Water Rights Branch for its studies of the San Jose River drainage. This was to be plotted at the scale of 500 feet to 1 inch with a 10-foot contour interval. Following this operation, Mr. Barber took charge of the Tudyah Lake base camp for the balance of the field season.

K. M. Bridge, B.C.L.S., was in charge of the Lower Fraser Valley survey. Control was obtained by traverse and level. His efficient and well co-ordinated traverse party regularly averaged 5 miles a day, and on some as much as 8 or 9 miles were completed.

Azimuths were run with a Wild T16 and a Wild traversing kit. Distances were double-chained with an agreement of 1 in 5,000 or better. Levelling was done with Zeiss levels. Transportation on the job was by two Land Rovers. The party also had a Volkswagen bus and an International half-ton truck.

Existing control was very scarce, except for the boundary monuments along the 49th parallel. Because of the large number of roads and the general flatness of the area, traverses were run to control the photography. The traverses were tied to the boundary monuments and to geodetic station "Burke."

Some 300 miles of traverses were run to control the area, including 40 miles of levels north of the Fraser River. The vertical control south of the river was done the previous winter by C. A. Matson, B.C.L.S. One hundred and seven permanent monuments were tied in, and in addition some twenty legal survey monuments were tied into the traverse.

The work on the whole went well, with minimum time lost for travelling and moving. The party moved north to Haney for about two weeks while the work was being done north of the river, but it was found to be more convenient and economical to commute via ferry from Fort Langley. There was no time lost due to weather, as there was always computing and office work to be done. Air photographs used during the summer were flown in 1954, and lacking in detail because of the large amount of development in the

area. The new flying which was to be done during the summer (contract) was not done until the day the field work was completed. The original intent was to control photographs flown north and south at approximately 10,000 feet above sea-level, but the contracting firm flew the area at 17,500 feet above sea-level, east and west, so consequently the majority of the control fell in the wrong places and twice as much work was done than would have been necessary if the field party had been informed of the change in plans.

The Multiplex Section had a busy year, but was handicapped somewhat because the new addition to its building was not completed to allow full utilization of all available machines. Four large tables and four small tables were in constant use, and the summary that follows gives details of the year's production from them. The remaining four small tables were temporarily housed in a room on the first floor of Temporary Building No. 3. This room is unsuitable for multiplex operation, and, therefore, these machines were only employed for training and for plotting projects of low precision. It is to be hoped that the completion of the multiplex building will be done as soon as possible.

A further investigation was carried out concerning the distortion existing in the multiplex model. It was found that certain modifications to our projectors were indicated, and it is expected that upon their completion future mapping projects will be processed more efficiently than in the past.

Record No.	Project	Authority	Scale	Vertical Interval	Area (Sq. Mi.)
M 36	Moose River.....	Water Rights Branch.....	1"=1,000'	20', 40'	48.6
M 37	Mount Robson.....	Water Rights Branch.....	1"=1,000'	20', 40'	77.5
M 38	McLennan River.....	Water Rights Branch.....	1"=1,000'	20', 40'	64.1
M 39	Dease River dam-sites.....	Water Rights Branch.....	1"= 500'	20'	33.0
M 42	Peace River dam-sites.....	Water Rights Branch.....	1"= 600'	20'	63.0
M 45	Prince George West.....	Regional Planning Board.....	1"= 200'	5'	6.0 ¹
M 49	Garibaldi Park.....	Parks Department.....	1"=1,000'	20', 40'	20.0 ¹
M 50	Dawson Creek-Stony Lake.....	Topographic Division.....	1"=2,640'	30', 100'	3,100.0
			1"=1,320'		
M 54	Big Bar.....	Mines Department.....	1"=2,640'	100'	79.0
M 58	Coast Sheets 92M/3, 4, 5.....	Topographic Division.....	1"=2,640'	100'	857.0
	Total area.....				4,348.0

¹ Approximately.

The draughting office is responsible for the fair drawing of the National Topographic Series manuscripts, drawn to the scale of 1 inch to one-half mile, also the compilation of the cadastral surveys on all National Topographic Series manuscripts produced by the Federal Government at the same scale.

With the transferring of the Multiplex Section early this year to the Topographic Division, the amount of work has greatly increased by the additional duty of preparing tracings of all the multiplex large-scale mapping. A total of fifty-one sheets were completed.

The Division now has completed 166 metal-backed manuscripts, six of which were finalized during the year, plus forty-seven old photo-topographic manuscripts and thirty part sheets. There are forty-eight manuscripts in the course of compilation.

The Federal Government now has seventy-four manuscripts on hand for printing which are in various stages of lithography.

Compilations of cadastral surveys on Federal Government manuscripts this year totalled forty-eight at the scale of 40 chains to 1 inch and two sheets at the scale of 2 miles to 1 inch.

Copies of the multiplex large-scale mapping and the above-mentioned completed manuscripts are available upon request.

LIST OF BRITISH COLUMBIA TOPOGRAPHIC MANUSCRIPTS SHOWING DATE SURVEYED

(See Index 4.)

Sheet	Date	Sheet	Date
82 F/3	1951	92 O/7, part	1950
82 F/4	1944, 1947	92 O/8	1950
82 K/11, W.	1952	92 O/9	1951
82 K/12	1952	92 O/16	1951
92 B/5	1937, 1938, 1955	93 A/2, part	1936
92 B/6, W.	1955	93 A/5	1935
92 B/11, W.	1955	93 A/6	1935
92 B/12	1938, 1955	93 A/7, part	1936
92 B/13	1942, 1943, 1951	93 A/10, part	1934
92 B/14	1951	93 A/11	1933, 1934
92 C/8	1937, 1938	93 A/12	1931, 1933, 1934
92 C/9	1937, 1938	93 A/13	1934
92 C/10	1937, 1938	93 A/14	1933, 1934
92 C/11	1938	93 A/15, part	1934
92 C/13	1938	93 B/1	1951
92 C/14	1938	93 B/8	1952
92 C/15	1937, 1938	93 B/9	1950
92 C/16	1937, 1938, 1942	93 B/16	1950
92 E/1	1942	93 G/1, part	1933
92 E/7	1946	93 G/2, part	1933
92 E/8	1943, 1946	93 G/7, part	1933
92 E/9	1938, 1946, 1947	93 G/8, part	1933
92 E/10	1947	93 G/14	1948
92 E/14	1948	93 H/3, part	1934
92 E/16	1947	93 I/8	1956
92 F/1	1942	93 I/9	1956
92 F/2	1938, 1940, 1942	93 I/10	1956
92 F/3	1938, 1940, 1941	93 I/15	1956
92 F/4	1942	93 I/16	1956
92 F/5	1937, 1938, 1943	93 J/2	1949
92 F/6	1937, 1940, 1941, 1943	93 J/3	1949
92 F/7	1942, 1943	93 K/1	1946
92 F/8	1942, 1943, 1950	93 K/2	1946
92 F/9	1950	93 L/2	1951
92 F/10	1950, 1953	93 L/7	1951
92 F/11	1934, 1935	93 L/8	1951
92 F/12	1936, 1937, 1938	93 L/9	1951
92 F/13	1935, 1936	93 L/10	1950, 1951
92 F/14	1935	93 L/11	1950
92 F/15, part	1950	93 L/14	1950
92 F/16, part	1950	93 M/5	1949
92 G/4	1942, 1943	93 M/12	1949
92 G/5	1950, 1952	93 O/1	1957
92 G/7, part	1940	93 O/6	1957
92 G/10, part	1940	93 O/8	1957
92 G/11	1952	93 O/11	1957
92 G/12	1950, 1952	93 O/12	1957
92 G/13	1950, 1952	93 O/13	1957
92 G/14	1952	93 O/14	1957
92 H/1	1920, 1923, 1949	93 P/1	1956
92 H/2	1923, 1949	93 P/2	1956
92 H/3	1924, 1931, 1948, 1949	93 P/3	1957
92 H/4	1948, 1956	93 P/4	1957
92 J/15	1948, 1949	93 P/5	1957
92 J/16	1948, 1949	93 P/6	1957
92 K/1, part	1950	93 P/7	1956
92 K/3	1949	93 P/8	1956
92 K/4	1949	94 B/4	1939, 1957
92 K/5	1949	94 C, parts	1939
92 K/6	1949	94 E, parts	1939
92 L/1	1932	94 F, parts	1939
92 L/2	1931, 1932	94 L, parts	1940, 1941
92 L/3	1948	94 M, parts	1941
92 L/4	1948	102 I/8	1935, 1937
92 L/6	1931, 1934	102 I/9	1935, 1936, 1937
92 L/7	1931	102 I/15	1937
92 L/8	1932	102 I/16	1936, 1937
92 L/10, part	1931, 1940, 1956	103 I/2	1949
92 L/11	1940	103 I/7	1948
92 L/12	1935, 1936	103 I/10	1947
92 L/13	1936	103 P/9	1949
92 M/3	1957	103 P/10, E.	1950
92 M/4	1957	103 P/14, E.	1950
92 M/5	1957	103 P/15	1950
92 O/1	1950	104 A/2, W.	1950
92 O/2	1947	104 A/3	1950

LIST OF BRITISH COLUMBIA TOPOGRAPHIC MANUSCRIPTS SHOWING
DATE SURVEYED—*Continued*

Sheet	Date
104 A/5, E.	1950
104 A/6	1950
104 A/11, W.	1951
104 A/12	1951
104 A/13, W.	1951
104 B/16	1951
104 G/1	1951
104 G/8	1951
104 G/9	1951
104 G/14	1951
104 G/15	1951
104 G/16	1951
104 H/12, W.	1951
104 H/13, W.	1951
104 J/2, W.	1952
104 J/3	1952
104 J/4	1952

Sheet	Date
104 J/5	1952
104 J/12	1952
104 J/13	1952
104 K/16, E.	1952, 1953
104 N/1	1952, 1953
104 N/2	1953
104 N/3, E.	1953
104 N/5	1952
104 N/6	1952, 1953
104 N/7, part	1953
104 N/11, W.	1952
104 N/12	1952
104 N/13	1952
104 P, part	1941
104 P/15	1941
104 P/16, part	1941

LIST OF LARGE-SCALE MAPPING

(See Index 6.)

No.	Name	Scale	Contour Interval	Number of Sheets	Date
X 1	Goldfields.....	1"= 800' 1"= 900' 1"=1,000' 1"=1,320'	100'	---	-----
S.P. 1	Richmond.....	1"= 200' 1"= 600'	Mosaic	---	-----
S.P. 2	Lower Fraser Valley.....	1"=1,000'	5'-50' then 50'	18	1957
1	Squamish.....	1"=20 ch.	20'	(¹)	1952
2	Aleza Lake.....	1"= 550'	20'	---	1951/52
3	Tamihi Creek.....	1"=10 ch.	100'	---	1950
4	Earle Creek.....	1"=10 ch.	50'	---	1951/52
5	Lawless Creek.....	1"=10 ch.	50'	13	1951
6	Kemano.....	1"=1,300'	50'	---	1952/53
7	Mount Farrow.....	1"=13 ch.	500'	1	1951
8	Moran Dam-site.....	1"= 100'	5'	1	1951/52
9	Salmo.....	1"=1,000'	50'	38	1952
10	Moran Pondage.....	1"= 500'	20'-40'	8	1952
11	University Lands.....	1"= 100'	5'	---	1952
13	Trout Lake.....	1"=1,000'	50'	---	1953
14	Fraser Pondage.....	1"= 500'	10'-20'	6	1951
15	Fraser Pondage.....	1"= 500'	20'-40'	13	1953
16	Gulf Islands.....	1"=1,320'	50'	---	-----
17	Agassiz.....	1"= 200'	5'	28	1953
18	Delta Municipality.....	1"= 200'	Spot heights	73	1953/54
19	Doukhobor Lands (two areas).....	1"= 400'	5'-10'-20'	---	1953/54
20	Brooks Peninsula.....	1"=1,320'	100'	---	1953/54
21	Agassiz (Extension).....	1"= 400'	20'-100'	(²)	1954
24	Moran Pondage.....	1"= 500'	20'-40'	11	-----
28	Clearwater.....	1"= 500'	20'-40'	12	-----
M 2	Morice Lake.....	1"=1,000'	50'	---	1954/55
M 3	Naver Creek.....	1"=1,320'	50'	---	1955
M 4	Chilcotin River.....	1"= 500'	20'-40'	6	1955
M 5	Gaspard Creek.....	1"= 500'	20'-40'	1	1955
M 6	Churn Creek.....	1"= 500'	20'-40'	1	1955
M 7	Willow River.....	1"=1,000'	50'	---	1955/56
M 8	Upper McGregor River.....	1"=1,000'	20'	3	1956
M 9	Sinclair Mills.....	1"= 500'	20'	39	1956
M 11	Hobson Lake.....	1"=1,000'	50'	8	1955
M 12	Moran-Lytton.....	1"= 500'	20'-40'	23	1955
M 13	Pentiction-Osoyoos.....	1"= 500'	10'	11	1954
M 14	Kelowna.....	1"= 500'	10'	5	1954
M 15	Westbank.....	1"= 500'	10'	2	1954
M 16	Lower McGregor River.....	1"=1,000'	20'	7	1956
M 17	Creston.....	1"= 500'	5'-10'-15'	7	1954
M 21	Clearwater.....	1"= 500'	20'-40'	20	1955
M 24	San Jose.....	1"= 500'	10'	8	1956
M 26	Taghum.....	1"= 300'	5'-10'-20'	---	-----
M 27	Peace River Pondage.....	1"=1,000'	20'	---	1958
M 28	Stikine River Pondage.....	---	---	---	-----
M 29	Naramata.....	1"= 400'	10'	2	1956
M 30	Goat River.....	1"= 200'	Planimetric	4	1956
M 34	Fruitvale.....	1"= 500'	10'-20'	2	1957
M 36	Moose River.....	1"=1,000'	20'-40'	4	1957
M 37	Mount Robson.....	1"=1,000'	20'-40'	5	1956/57
M 38	McLennan River.....	1"=1,000'	20'-40'	3	1956/57
M 39	Dease River Dam-site.....	1"= 500'	20'	9	1956/57
M 40	Chilliwack River.....	1"= 600'	20'	7	1956
M 42	Peace River Dam-site.....	1"= 600'	20'	10	1957
M 43	Alert Bay.....	1"=1,320'	50'	---	1956
M 44	Prince George East.....	1"= 200'	5'	2	1958
M 45	Prince George West.....	1"= 200'	5'	8	1958
M 54	Big Bar.....	1"=2,640'	100'	1	1957
M 56	Lac la Hache.....	1"= 500'	20'	10	1958
M 59	Eaglet Lake.....	1"=1,320'	20'	2	1958
M 62	Alberni.....	1"= 500'	10'	2	1958
M 63	Parsnip River Pondage.....	---	---	---	-----
M 64	Clearwater.....	---	---	---	1958
M 66	Glen Lake.....	1"= 400'	10'	---	1958
M 67	Chemainus River.....	1"= 400'	10'	4	1958

¹ One of Map 5E.² See No. 17.

GEOGRAPHIC DIVISION

W. R. YOUNG, B.C.L.S., CHIEF, AND PROVINCIAL REPRESENTATIVE ON
CANADIAN BOARD ON GEOGRAPHICAL NAMES

Reports of previous years have outlined in detail the functions of this Division, and the yearly activities have been described under the sectional headings of Administration, Computations, Geographer, Geographical Naming and Map Checking, Map Compilation and Reproduction, and Map Distribution. The same order will be followed in reporting the activities for the year 1957, and it therefore seems unnecessary to repeat the Division's functions since, as the sectional activities are dealt with in the following pages, they will be self-evident.

Briefly, the Division concentrated on the production of new National Topographic Series maps of 1 inch to 2 miles; however, due to the need for reprinting many of the older-type maps in short supply but still in demand, only three were published. Seven others are in hand, and it is expected that at least two more will be published before the end of the fiscal year.

In addition to the reprints referred to, work was continued on the 1-inch-to-10-miles and National Topographic Series 1:250,000 maps, together with new editions of general maps. The usual amount of work was also undertaken for other departments for special projects.

The yearly records show a considerable increase in the number of maps received into stock as compared with 1956, while the number of maps issued during the same period was approximately 4,000 less than in 1956, but, strangely, although map prices have not changed (except in one instance), the value of the maps distributed remained the same.

The Gazetteer staff was again kept busy with name-checking in connection with Provincial publications and maps of the Province being printed at Ottawa.

Normal calculations were carried out in connection with field surveys of the Branch, and the task of converting all boundaries of petroleum and natural gas permits to the unit and zone system was completed in conformity with the "Petroleum and Natural Gas Act."

Other activities of the Division, together with more details of those already mentioned, are dealt with under the headings referred to above.

ADMINISTRATION

While not seriously affecting production, staff changes continue to be a problem. The Assistant Mathematical Computer and one senior computer left the Service, whilst two trained cartographic draughtsmen left the Division—one resigned for reasons of health and one transferred within the Branch. Fortunately the two computers have been replaced, but only after a considerable waiting period; only one of the draughtsmen has been replaced as yet.

By degrees, the adoption of negative engraving techniques in the reproduction of maps is becoming more widespread, and they are being applied to more of the Division's work. The advantages of such techniques are apparent in the resulting fineness and uniformity of line work on published maps.

The Division was fortunate in being able to send the Mathematical Computer on a course conducted by the University of British Columbia Evening Division in connection with electronic digital computers, which included practical application in the use of the ALWAC computer at the University. The course proved to be of considerable value, and it is hoped that it can be followed up by more particular assistance in the application of such equipment to our specific requirements.

COMPUTATIONS

Some increase in the Topographic Division's field work for standard mapping control has resulted in more of what we have come to think of as "normal" calculations;

i.e., extension of the Provincial main triangulation network and calculation of secondary stations as basic control for mapping. In addition, and as a result of the triangulation extension, much of the Rocky Mountain Trench triangulation together with John Hart Highway and Alaska Highway monuments were converted to final geodetic survey datum—no small task. Other work included the conversion to the new system of all remaining petroleum and natural gas permits (already mentioned) and calculation of a control network in the Bute Inlet-Chilco Lake area, calculation and adjustment of British Columbia-Yukon Boundary control from Atlin Lake westwards, and calculation of control in connection with the proposed Granduc tunnel in the vicinity of Stewart. Details are carried in the statistical tables following this report.

GEOGRAPHER

Two new land bulletins were prepared and published during the year, namely, No. 4 (Vancouver Island) and No. 5 (Quesnel-Lillooet); both have received favourable comment regarding their presentation of up-to-date information and have been much in demand since their publication. Field studies were carried out in connection with the Okanagan Bulletin Area, and additional information was obtained at the same time in the Kamloops Bulletin Area; texts and maps for both are well in hand and will be ready for publication shortly.

The Geographer has been asked to serve on a Centennial Year committee whose task is to prepare descriptive texts in connection with historic sites throughout the Province. This task, which at first seemed quite simple, has, as perhaps similar committee members in the past could have predicted, assumed proportions beyond all original expectations.

GEOGRAPHICAL NAMING AND MAP-CHECKING

The tables following this report show the volume of maps and charts checked for geographical names, together with the total number of names checked and new names added to the records.

In addition to checking and revising proofs of new Divisional maps before printing, this Section checked and, where necessary, revised proofs of fifty-seven new maps of parts of British Columbia being prepared by the Army Survey Establishment of the Department of National Defence and Department of Mines and Technical Surveys, Ottawa, and six Topographic Division manuscripts were checked before being shipped to Ottawa for reproduction.

Field culture checks were again carried out in connection with National Topographic 1-inch-to-2-miles mapping and covering the areas 82 E/SE (Grand Forks) and 82 F/SW (Trail). When published, these maps will largely replace several sheets in the old Regional series, namely, 4A, Rossland (now very much out of date), 4K, Kettle Valley (out of print), and 4B, Nelson.

MAP COMPILATION AND REPRODUCTION

As mentioned earlier in this report, the Cartographic Section is by degrees increasing the use of negative engraving and photo-mechanical methods of map compilation and reproduction, employing them now in certain map series where they were previously thought to be unsuitable. However, it has been a disappointment to the Division that, as yet, there has been no opportunity to acquire or have access to modern photographic equipment nearer than Vancouver which is capable of handling large compilations. Apart from the convenience of having such equipment close at hand, the risks inherent in moving compilations off the Island can be grave. Changes in temperature and humidity can quite easily cause damage to "patch-ups" and change in scale of materials, causing, at the best, extra work and, at the worst, poor register in the published map.

A good year's work was nevertheless completed by this Section, fourteen maps being published during the twelve-month period, three of which were in the National Topographic 1-inch-to-2-miles series; seven others are in hand. Two sheets in the National Topographic 1:250,000 series were also published, together with the third (three editions) in the new 1-inch-to-10-miles series and two completely new compilations of basic Provincial maps—one at 1-inch-to-55-miles scale and the other (the very popular Map 1J) at 1-inch-to-30-miles scale, plus two land bulletin maps. Of the older-type regional Pre-emptors' Series maps, four were republished, two with major revisions; a fifth, also with major revisions, is in hand.

Seventy-seven Provincial Topographic manuscripts were printed by the Canadian Government agencies during the year; of these, thirty-four were new publications and forty-three were 1-inch-to-1-mile scale maps converted to 1:50,000 scale. We received major stocks of all of these in return for our co-operation in checking and colour-proving and for our work in preparing the manuscripts. In addition, Ottawa agencies published three maps in British Columbia at 1:250,000 scale and seventeen at 1:50,000 scale. One hundred and three additional Provincial Topographic manuscripts in the National Topographic 1:50,000 series, either new or revised editions, are in hand for publishing at Ottawa.

Separate from the maps referred to above, the Army Survey Establishment at Ottawa has recently instituted a new type of map following the National Topographic Series but known as Provisional maps. These maps, comprising all their completed but previously unpublished manuscripts, are lithographed in two colours (black and light blue) with contours. During the year we received small stocks of one at 1:250,000 scale and seventy-one half-sheets at 1:50,000 scale.

Similarly, the Department of Mines and Technical Surveys is converting to 1:50,000 scale, without revision and also in Provisional editions, certain old 1-inch-to-1-mile scale maps. Ten such sheets have been produced to date, and all maps of this type have been shown in a special key on the Index to Published Maps contained in a pocket inside the back cover, Index 14.

As in the past, this Division undertook many miscellaneous draughting and other tasks for other departments, the total such being eighty-six, comprising 1,063 man-hours for a work value of \$2,654.

The usual assistance was given where required in the preparation of descriptions for administrative district boundaries and in assembling, editing, and distributing the Lands Service Annual Report.

MAP DISTRIBUTION

A total of 55,167 maps were distributed during the year, and 181,412 maps were taken into stock; very little change in the distributed maps compared with 1956, but a considerable increase in the number added to stock, a situation accounted for largely by the conversion of National Topographic 1-inch-to-1-mile editions to 1:50,000 scale which are published in half-sheets, thus doubling the number of maps for an equivalent area.

Of the 55,167 maps issued, 38,358 were sold and 16,809 were issued departmentally or by way of automatic mailing-lists in the case of new publications. Total value of maps issued was \$20,441.95.

Details regarding maps published and in hand are contained in the tables following this report, and indexes of published maps available, together with information regarding prices, scales, dates of publication, etc., are contained in a pocket inside the back cover, Indexes 8 to 14.

STATISTICAL

COMPUTATIONS

Least-square Triangulation Adjustments Completed

Net	Locality	Type of Bearings	Number of Triangles Involved
Provincial Main.....	South of Peace River Block.....	True	186
Provincial Main.....	British Columbia-Yukon Boundary	True	48
Provincial Main.....	Rocky Mountain Trench (portion)	True	77
Provincial Main.....	Finlay Forks-Skeena River.....	True	98
Provincial Secondary.....	Homathko-Chilco Lake.....	Grid	115
Provincial Secondary.....	Bute Inlet.....	Grid	43

The following tables give comparisons with the previous five-year period:—

COMPUTATIONS

	1952	1953	1954	1955	1956	1957
Triangles adjusted by least squares.....	614	409	28	518	814	567
Stations calculated from rectangular co-ordinates.....	1,484	1,300	537	810	536	669
Ties to cadastral surveys.....	170	189	114	49	32	70
Elevations of stations determined.....	643	131	143	239	82	325
Index cards—						
New.....	1,342	1,561	1,192	1,415	1,093	1,637
Old (rewritten).....	506	450	830	576	888	613
Total on file.....	19,391	20,952	22,144	23,559	24,652	26,289
Requests for control attended to.....	272	287	314	378	461	403

CANADIAN BOARD ON GEOGRAPHICAL NAMES

Number of map sheets or charts checked.....	39	56	102	83	61	54
Number of names checked.....	6,403	7,052	11,683	8,766	6,664	8,884
Number of new names recorded.....	252	351	442	655	247	306

MAP STOCK AND DISTRIBUTION

Maps issued to departments and public.....	45,724	40,733	43,741	48,043	59,290	55,167
Maps received into stock.....	73,981	92,456	97,274	84,573	129,901	181,412
Total value of maps issued.....	\$13,450	\$14,184	\$17,382	\$18,995	\$20,525	\$20,441

GEOGRAPHICAL WORK FOR OTHER DEPARTMENTS AND PUBLIC

Total number of items.....	40	31	68	60	84	86
Total value of work.....	\$1,024	\$4,400	\$1,361	\$1,990	\$2,687	\$2,654

LETTERS

Letters received and attended to.....	5,234	4,987	7,356	5,783	5,419	5,516
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MAPS PUBLISHED DURING 1957

Maps Reproduced and Printed by the Geographic Division, Victoria

Map No.	Name	Scale	Remarks
1J	British Columbia	1 in. to 30 mi.	New edition.
1CX	British Columbia land recording districts	1 in. to 55 mi.	New edition.
1F	West-Central British Columbia planimetric	1 in. to 10 mi.	New edition.
1FL	West-Central British Columbia landforms	1 in. to 10 mi.	New edition.
1FLS	West-Central British Columbia, special, landforms in brown	1 in. to 10 mi.	New edition.
3E	Peace River	1 in. to 4 mi.	Reprint, no revisions.
3G	Quesnel	1 in. to 3 mi.	Reprint, status revision.
3J	North Thompson	1 in. to 3 mi.	Reprint, no revisions.
4b	Fernie	1 in. to 2 mi.	Reprint with revisions.
92J	Pemberton (first edition)	1:250,000	Reprint, no revisions.
93M	Hazelton (second edition)	1:250,000	Six colours, contoured.
82 L/SE	Sugar Lake (first edition)	1 in. to 2 mi.	Six colours, contoured.
82 L/SW	Vernon (second edition)	1 in. to 2 mi.	Six colours, contoured.
92 H/NW	Yale (first edition)	1 in. to 2 mi.	Six colours, contoured.

Provincial Government Topographic Manuscripts Reproduced and Printed at 1:50,000 Scale by the Canadian Government, Ottawa

Map No.	Name	Map No.	Name
92 B/13, E. & W.	Duncan (second edition).	92 K/6, E. & W.	Sonora Island (first edition).
92 B/14, E. & W.	Galiano Island (first edition).	92 L/6, E. & W.	Alice Lake (second edition).
92 C/10, E. & W.	Carmanah (second edition).	92 L/7, E. & W.	Nimkish (second edition).
92 C/14, E. & W.	Barkley Sound (second edition).	92 L/8, E. & W.	Adam River (second edition).
92 E/1, E.	Vargas Island (second edition).	93 K/1, E. & W.	Vanderhoof (second edition).
92 E/8, E. & W.	Hesquiat (second edition).	93 K/2, E. & W.	Fraser Lake (second edition).
92 E/10, E. & W.	Nootka (second edition).	93 L/10, E. & W.	Quick (first edition).
92 F/2, E. & W.	Alberni Inlet (second edition).	93 L/11, E. & W.	Telkwa (first edition).
92 F/3, E. & W.	Effingham (second edition).	93 L/14, E. & W.	Smithers (first edition).
92 F/4, E. & W.	Tofino (second edition).	102 I/9, E. & W.	San Josef (second edition).
92 F/6, E. & W.	Great Central (second edition).	103 P/9, E. & W.	Kispiox River (first edition).
92 F/7, E. & W.	Horne Lake (second edition).	103 P/10, E.	Cranberry River (first edition).
92 F/9, E. & W.	Texada Island (first edition).	103 P/14, E.	White River (first edition).
92 F/10, E. & W.	Comox (first edition).	103 P/15, E. & W.	Brown Bear Lake (first edition).
92 F/11, E. & W.	Forbidden Plateau (second edition).	104 N/7, W.	Bell Lake (first edition).
92 F/12, E. & W.	Buttle Lake (second edition).	104 N/11, W.	Surprise Lake (first edition).
92 F/14, E. & W.	Oyster River (second edition).	104 N/12, E. & W.	Atlin (first edition).
92 G/5, E. & W.	Sechelt (first edition).	104 N/13, E. & W.	Mount Minto (first edition).
92 K/3, E. & W.	Quadra Island (first edition).	104 P/15, E. & W.	Lower Dease River (second edition).
92 K/4, E. & W.	Salmon River (first edition).	104 P/16, E. & W.	Lower Post (second edition).
92 K/5, E. & W.	Sayward (first edition).		

MAPS IN COURSE OF REPRODUCTION

Maps Being Reproduced by the Geographic Division, Victoria

Map No.	Name	Scale	Remarks
1A	British Columbia wall map	1:1,000,000	In lithography.
1JR	British Columbia relief	1 in. to 30 mi.	Compilation complete.
1G	East-Central British Columbia planimetric	1 in. to 10 mi.	Compilation complete.
1GL	East-Central British Columbia landforms	1 in. to 10 mi.	In compilation.
2C	Northerly Vancouver Island	1 in. to 4 mi.	Minor revisions.
3H	Tête Jaune	1 in. to 3 mi.	Minor revisions.
93C	Anahim Lake (second edition)	1:250,000	Compilation complete.
82 E/NE	Upper Kettle River (first edition)	1 in. to 2 mi.	In lithography.
82 E/SE	Grand Forks (first edition)	1 in. to 2 mi.	In compilation.
82 F/SW	Trail (first edition)	1 in. to 2 mi.	In compilation.
92 B/NW, SW	Victoria (second edition)	1 in. to 2 mi.	Compilation complete.
92 G/SE	Langley (first edition)	1 in. to 2 mi.	In lithography.
92 I/SW	Lytton (first edition)	1 in. to 2 mi.	Compilation complete.
92 I/NW	Ashcroft (first edition)	1 in. to 2 mi.	Compilation complete.

Provincial Government Manuscripts Being Reproduced by the Canadian Government, Ottawa, at 1:50,000 Scale

Map No.	Name	Map No.	Name
82 K/11, W.	Trout Lake (first edition).	93 B/8, E. & W.	Soda Creek (first edition).
82 K/12, E. & W.	Beaton (first edition).	102 I/8, E.	Cape Parkins (second edition).
92 B/5, E. & W.	Sooke (second edition).	103 I/2, E. & W.	Kitimat (first edition).
92 B/6, W.	Victoria (second edition).	103 I/7, E. & W.	Lakelse (second edition).
92 B/11, W.	Sidney (second edition).	103 I/10, E. & W.	Terrace (second edition).
92 B/12, E. & W.	Shawnigan (second edition).	104 A/2, W.	Kwinageese River (first edition).
92 C/9, E. & W.	San Juan (second edition).	104 A/5, E.	Bowser Lake (first edition).
92 E/14, E. & W.	Port Eliza (second edition).	104 A/6, E. & W.	Bell-Irving River (first edition).
92 F/1, E. & W.	Nanaimo Lakes (second edition).	104 A/11, W.	Taft Creek (first edition).
92 G/7, E. & W.	Coquitlam (second edition).	104 A/12, E. & W.	Delta Peak (first edition).
92 G/11, E. & W.	Squamish (first edition).	104 A/13, W.	Mount Alger (first edition).
92 G/12, E. & W.	Sechelt Inlet (first edition).	104 B/16, E. & W.	Bob Quinn Lake (first edition).
92 G/13, E. & W.	Jervis Inlet (first edition).	104 G/8, E. & W.	Refuge Lake (first edition).
92 G/14, E. & W.	Cheakamus River (first edition).	104 G/14, E. & W.	Telegraph Creek (first edition).
92 H/1, E. & W.	Ashnola (first edition).	104 G/15, E. & W.	Buckley Lake (first edition).
92 H/2, E. & W.	Manning Park (first edition).	104 G/16, E. & W.	Klastline River (first edition).
92 J/15, E. & W.	Bralorne (first edition).	104 H/12, W.	Kluea Lake (first edition).
92 J/16, E. & W.	Bridge River (first edition).	104 H/13, W.	Ealue Lake (first edition).
92 L/1, E. & W.	Schoen Lake (third edition).	104 J/2, W.	Classy Creek (first edition).
92 L/2, E. & W.	Woss Lake (second edition).	104 J/3, E. & W.	Tahltan River (first edition).
92 L/3, E. & W.	Kyuquot (first edition).	104 J/4, E. & W.	Kennicott Lake (first edition).
92 L/4, E. & W.	Brooks Peninsula (first edition).	104 J/5, E. & W.	Ketchum Lake (first edition).
92 L/11, E. & W.	Port McNeill (second edition).	104 J/12, E. & W.	Dudidontu River (first edition).
92 L/12, E. & W.	Quatsino (second edition).	104 J/13, E. & W.	Prairie Lake (first edition).
92 L/13, E. & W.	Shushartie (second edition).	104 K/16, E.	Nahlin River (first edition).
92 O/1, E. & W.	Yalakom River (first edition).	104 N/1, E. & W.	Nakina Lake (first edition).
92 O/8, E. & W.	Empire Valley (first edition).	104 N/2, E. & W.	Nakina (first edition).
92 O/16, E. & W.	Springhouse (first edition).	104 N/3, E.	Sloko River (first edition).
93 B/1, E. & W.	Williams Lake (first edition).	104 N/5, E. & W.	Teresa Island (first edition).

AIR DIVISION

W. HALL, P.ENG., B.C.R.F.

During 1957 a major policy change was effected as regards air photography and hence air operations.

The Forest Surveys Division was organized to complete its preliminary forest-inventory programme, using 40-chains-to-1-inch scale photographs, during the fiscal year 1957/58 and at the same time to start the next phase of the programme involving revision and maintenance. For this purpose, 20-chains-to-1-inch scale photographs were required for more precise measurements and detailed interpretation.

To cater to this requirement, the Air Division equipped each aircraft with a modified f 24 type camera, fitted with selected f 2.5 Aero Ektar lenses and standard Wratten 12 filters. The lenses are 7-inch focal length; hence prints close to the desired 20-chains-to-1-inch scale can be obtained from our normal flying height of 19,000 feet above ground.

One aircraft was allotted exclusively to this 20-chain programme, while the other was detailed to obtain standard wide-angle 40-chains-to-1-inch photography for mapping in the area to the north of Smithers, and to obtain 20-chains-to-1-inch photography as an alternate as weather permitted.

As a result of this allocation of aircraft, 7,040 square miles of new block photography and 3,400 square miles of revision photography at a 40-chain scale was obtained, bringing the total area covered by British Columbia Government photographs up to 265,000 square miles. In addition, 7,580 square miles of 20-chains-to-1-inch photography for forest inventory was obtained. (See Indexes 15 to 18, contained in pocket inside back cover.)

It is interesting to note that only 66 per cent, or 5,000 square miles, of the total area covered by 20-chain photography was of actual productive forest land. The reason for this small percentage is that in areas with broken topography, such as in the Vancouver and Nelson Forest Districts, much of the productive forest land is found in long narrow valleys separated by high barren ridges. In order to cover all these separated valleys, as well as the many small isolations of forest land, it was necessary to, in effect, "block" fly the entire area. Hence a large portion of the flying and photography was over barren ground.

The efficiency of this photography could be greatly improved if these less important narrow belts of forest land could be eliminated and photography concentrated over the major valleys.

It is evident from this year's experience that even with the two Anson aircraft operating full time on this project, some expedients will be necessary in order to meet the full requirements of the forest surveys each year, and to meet the full demand for photography from various Government departments it will be necessary to operate a third photographic aircraft or, alternatively, to obtain aircraft capable of better performance.

In the office the compilation of 40-chains-to-1-inch interim maps continued to receive the full attention of the mapping personnel. As a result, some 26,520 square miles of new mapping were produced during the year and 6,300 square miles of maps were recompiled or revised. This brought the total area mapped up to 194,000 square miles. (See Index 5.)

In addition to this, the 20-chains-to-1-inch photographs were plotted and principal-point lay-downs supplied to Forest Surveys. These lay-downs were controlled using points selected from the original 40-chains-to-1-inch maps, so the two series will be in full sympathy, one with the other.

Production of prints from the Processing Laboratory totalled 158,723 of all types. Out of this total, 152,556 prints were of the standard 10- by 10-inch size, representing an increase of 14,336 over 1956. This production is the full capacity of our existing facilities. In order to cope with the increased requirements of some 40,000 prints a year

caused by the 20-chains-to-1-inch forest-inventory photographs, it will be necessary to have one more enlarger and improved developing and washing facilities. This problem is in hand, and it is hoped to have the Processing Laboratory reorganized in time for the 1958 season photography.

The Machine-shop, besides its normal maintenance work, is presently engaged in the design and construction of a new fixed-focus enlarger incorporating the LogEtron automatic dodger. This electronic scanning device will, it is hoped, do away with the necessity of manual dodging and permit the use of less skilled personnel for its operation.

For details of the various operations, reference should be made to the accompanying appendices.

PRODUCTION RECORD, 1957, AIR PHOTO PROCESSING LABORATORY

	1946-55	1956	1957	Grand Total
Processing completed—				
Air films (averaging 117 exposures).....	1,855	111	148	2,114
Air films (obliques averaging 40 exposures).....	33	10	6	49
Mountain station films (6 exposures each).....	2,510	387	278	3,175
Printing completed—				
Standard prints (5 by 5 inches enlarged to 9 by 9 inches).....	942,098	137,190	152,556	1,231,844
Contact prints (5 by 5 inches).....	42,829	731	1,172	44,732
Contact prints (large to 20 by 24 inches).....	1,271	384	463	2,118
Enlargements (various sizes to 30 by 30 inches).....	11,107	1,524	2,018	14,649
Mountain station enlargements (11 by 14 inches).....	13,627	2,926	1,561	18,114
Lantern-slides (2 by 2 inches).....	346	<i>Nil</i>	22	368
Autopositive films (various sizes to 30 by 40 inches).....	4,123	980	593	5,696
Miscellaneous photographs, copies, and Kelsh plates.....	1,102	538	338	1,978
Requisitions completed.....	11,914	2,526	2,270	16,710

ORDERS FOR STANDARD PRINTS (9 BY 9 INCHES) FROM
BRITISH COLUMBIA NEGATIVES, 1957

	Reprints		Loans	
	Requisitions	Number	Requisitions	Number
Private—				
Individuals.....	603	3,105	253	3,581
Companies and organizations.....	110	7,888	38	559
Mining.....	97	8,276	29	455
Oil and natural gas.....	64	29,364	16	1,963
Schools and universities.....	46	1,214	32	839
Towns and cities.....	23	228	4	73
Real estate.....	52	927	104	506
Commercial air survey.....	123	5,089	87	1,379
Forest industries.....	192	6,752	149	1,704
Totals.....	1,310	62,843	712	11,059
Federal Government agencies—				
Department of Mines and Technical Surveys.....	12	4,078	6	13
Department of National Defence.....	8	155	6	134
Department of Agriculture.....	11	2,432	3	50
Department of Fisheries.....	11	190	2	55
Fraser River Board.....	2	61	26	595
Miscellaneous.....	37	719	31	349
Totals.....	81	7,635	74	1,196
Provincial Government—				
Surveys and Mapping Branch.....	125	6,389	350	8,417
Library copies.....	146	12,505	—	—
Land Inspection Division.....	24	5,179	10	155
Water Rights Branch.....	85	2,318	115	1,017
Lands Branch (miscellaneous).....	8	23	—	—
Department of Public Works.....	10	21	3	9
Department of Highways.....	53	1,128	71	1,269
Forest Surveys.....	68	18,753	192	2,118
Forest districts.....	73	28,061	4	47
Forest Engineering.....	32	826	71	1,062
Forest Service (miscellaneous).....	51	1,015	70	907
Department of Finance.....	70	3,929	49	834
Department of Agriculture.....	25	178	9	102
Department of Mines.....	32	1,003	74	6,790
British Columbia Power Commission.....	24	330	77	1,367
Regional Planning.....	44	154	119	810
Parks and Recreation.....	18	111	172	1,253
Pacific Great Eastern Railway.....	3	77	9	181
Miscellaneous.....	19	78	6	45
Totals.....	910	82,078	1,401	26,383
Grand totals.....	2,301	152,556	2,187	38,638

1957 AIR OPERATIONS COST SUMMARY BY PROJECTS

	Accomplishment			Aircraft-hours	Number of Exposures	Cost of Flying	Cost of Photography	Total Cost, Flying and Photography
	Square Miles	Lineal Miles	Stations					
A. Basic vertical cover (approximately 40 chains to the inch)—				Hr. Min.				
1. New cover (interim mapping)—								
Sustut River, "D" Block	5,120			42 05	1,312	\$4,780.83	\$3,429.70	\$8,210.53
Vancouver Island, West Coast	1,920			10 00	378	1,135.95	988.13	2,124.08
Totals	7,040			52 05	1,690	\$5,916.78	\$4,417.83	\$10,334.61
Average cost (approximate)	\$1.46				\$6.12			
2. Improvement flying								
3. Revision (Taxation Assessment), E. & N. Land Grant	3,400			16 15	743	\$1,845.90	\$1,942.27	\$3,788.17
Average cost (approximate)	\$1.11				\$5.10			
B. Basic tricamera cover								
C. Triangulation control identification (interim mapping)—								
Sustut River, "D" Block			45	9 40	206	\$1,098.08	\$538.50	\$1,636.58
E. & N. Land Grant			65	14 25	439	1,637.66	1,147.59	2,785.25
Mount Hobson			1	0 40	10	75.72	26.14	101.86
Totals			111	24 45	655	\$2,811.46	\$1,712.23	\$4,523.69
Average cost (approximate)			\$40.75		\$6.91			
D. Forest Inventory projects (approximately 20 chains to the inch)—								
1. New cover (Forest Surveys)—								
Vancouver, Sub-zone 916	3,175			50 05	2,972	\$5,689.18	\$7,769.12	\$13,458.30
Cape Scott, part Sub-zone 918	200			4 20	218	492.24	569.88	1,062.12
Quesnel East, Sub-zone 933	1,650			53 25	2,830	6,067.84	7,397.91	13,465.75
Prince George East, Sub-zone 935	1,392			27 40	1,324	3,142.77	3,461.07	6,603.84
Babine, South, Sub-zone 949	76			4 35	141	520.64	368.58	889.22
Babine, Rupert, Sub-zone 950	640			15 25	612	1,751.25	1,599.84	3,351.09
Kootenay, Nelson, Sub-zone 973	450			13 40	300	1,552.45	784.24	2,336.69
Totals	7,583			169 10	8,397	\$19,216.37	\$21,950.64	\$41,167.01
Average cost (approximate)	\$5.48				\$4.90			
2. Improvement flying								
E. Forest Engineering projects—								
Morice Lake Road		32		1 40	39	\$189.31	\$101.95	\$291.26
Cape Scott		6		1 00	20	113.59	52.28	165.87
Ahbau Lake Road		34		5 50	100	662.63	261.41	924.04
Totals		72		8 30	159	\$965.53	\$415.64	\$1,381.17
Average cost (approximate)		\$19.18			\$8.69			
F. Multiplex mapping projects—								
1. New cover—								
Water Rights Branch—								
Lac la Hache		36		4 15	112	\$482.77	\$292.76	\$775.53
Peace River pondage		186		7 35	131	861.43	342.41	1,203.84
Dease-Stikine-McDame		147		7 55	237	899.29	619.50	1,518.79
Regional Planning—Miworth-Prince George-Foreman		30		3 35	52	407.04	135.93	542.97
Industrial Regional Development—Prince George West		14		6 30	65	738.35	169.90	908.25
Land Settlement Board—Prince George East		2		4 00	10	454.38	26.14	480.52
Lands Branch—Alberni V.L.A.		3		0 45	10	85.19	26.14	111.33
Map amendment—Okanagan River		18		1 05	23	123.05	60.12	183.17
Totals		436		35 40	640	\$4,051.50	\$1,672.90	\$5,724.40
Average cost (approximate)		\$13.12			\$8.94			
G. Special projects—								
Water Rights Branch—								
McDame Creek extension		36		2 00	50	\$227.19	\$130.71	\$357.90
Fraser River high water		80		1 10	35	132.52	91.49	224.01
Interim mapping—Power-line, Vernon-Kamloops		60		2 20	130	265.05	339.83	604.88
Boundary Commission—British Columbia-Yukon Boundary		592		18 55	437	2,148.83	1,142.37	3,291.20
Geographic Branch—Gabriola Island		16		0 25	16	47.33	52.28	99.61
Fraser River Board—Fraser River low water		80		1 55	55	217.72	143.78	361.50
Department of Mines—Ainsworth-Kaslo	100			5 00	100	567.98	261.41	829.39
Pacific Biological Station—Eel-grass, Boundary Bay		20		2 00	111	227.19	290.16	517.35
Legal Surveys Division—Merritt-Princeton Highway		55		3 25	95	388.11	248.34	636.45

1957 AIR OPERATIONS COST SUMMARY BY PROJECTS—*Continued*

	Accomplishment			Aircraft-hours	Number of Exposures	Cost of Flying	Cost of Photography	Total Cost, Flying and Photography
	Square Miles	Lineal Miles	Sta-tions					
G. Special projects— <i>Continued</i>								
Taxation Assessment — Spallumcheen Municipality	95			Hr. Min.				
Internal—Ultra-high level, Victoria	2			3 10	190	\$359.71	\$496.68	\$856.39
Totals	197	939		1 00	3	113.59	7.84	121.43
Average cost (approximate)	\$9.17	\$6.49						
H. Miscellaneous projects—								
Internal—								
Aircraft maintenance and testing				18 20		\$2,082.56		\$2,082.56
Camera maintenance				6 10		700.49		700.49
Administration flights				22 40		2,574.80		2,574.80
Nanaimo obliques				2 20		265.05		265.05
Forest Research—								
Experimental colour				2 05		263.65		263.65
Experimental black and white				0 45		85.19		85.19
Travel Bureau—								
Gulf Islands obliques				0 35		66.26		66.26
Vancouver obliques				1 00		113.59		113.59
National Research Council—Salmon Glacier				8 10		927.69		927.69
Water Rights Branch—Prince George reconnaissance				7 00		795.16		795.16
Forest Engineering—Budworm reconnaissance				0 15		28.39		28.39
Vancouver Sewerage—Experimental				0 45		85.19		85.19
Greater Victoria Water Board—Victoria obliques				0 40		75.72		75.72
Public Works Department—Victoria obliques				0 30		56.79		56.79
Totals				71 15		\$8,093.53		\$8,093.53
Grand totals	18,220	1,447	111	419 00	13,510	\$47,596.29	\$35,316.40	\$82,912.69

WATER RIGHTS BRANCH

Note 3

THE WATER RIGHTS BRANCH

As the title of the Water Rights Branch suggests, the people and industries of British Columbia have a "right" to the "use" of water in this Province. At first reflection, the right to use water might be considered as basic as the right to use air or to admire the scenery. And so it is, but because it is a commodity which everyone must have, it becomes necessary for government to control its use or the "haves" would be making a great deal of money selling it to the "have nots." The Water Rights Branch is the agency of the Provincial Government which administers the control of the use of water. The Branch administers the "Water Act," which has been developed by legislation into an excellent administrative vehicle, used as a model in the initiation of other similar Acts in other countries.

The main principles of the "Water Act" are:—

- (1) The property in and the right to the use and flow of all water at any time in any stream in the Province are for all purposes vested in the Crown in the right of the Province.
- (2) Licence-holders have a right to the use of water under the terms and conditions of the licence.
- (3) A licence-holder's priority of right is generally based upon the date his application was recorded by a Water Recorder. Earlier licences have priority over licences issued later.
- (4) Retention of a water licence is dependent upon the beneficial use of the water, payment of the rentals, and observance of the regulations of the "Water Act." No one can adopt a "dog in the manger" attitude to this Province's water.
- (5) Every licence and permit that is made appurtenant to any land, mine, or undertaking shall pass with any conveyance or other disposition thereof. Ownerships of licences are therefore automatically transferred with their appurtenant land, mine, or undertaking.

The administration of the "Water Act" is carried out by the Comptroller of Water Rights. He and his staff are located at a headquarters office in Victoria, and at district offices in Victoria, Kamloops, Kelowna, and Nelson.

There is much correspondence, field investigation, and record-keeping of an exacting nature associated with this administration because all details of every application must be carefully reviewed before licences are issued. The filing and recording of all the mass of data associated with water use is, in itself, an assignment of no small magnitude.

Much of the vast industrial expansion presently occurring in this Province is associated with the use of British Columbia water, and the Government and its Civil Service are therefore called upon to assist and direct this expansion in the public interest.

The Water Rights Branch therefore has a technical function as well as an administrative one and is called upon to carry out many investigations and studies of a scientific nature. The fact that almost every executive in the Water Rights Branch is a professional engineer is indicative of the technical nature of the work. These executives of the Branch take active part on a number of important boards and committees dealing with the disposition of the Province's water resources.

The Comptroller of Water Rights has a technical staff consisting of a Deputy Comptroller and Chief, Operations Division; Chief, Hydraulic Investigations Division; Branch Solicitor; District Engineers; Senior Hydraulic Engineers; Project Engineer; and a number of hydraulic engineers, technicians, and draughtsmen. This staff carries out many assignments in the irrigation, domestic water-supply, hydro-electric, dyking and drainage, and other fields.

WATER RIGHTS BRANCH

A. F. PAGET, P.ENG., COMPTROLLER

The year 1957 witnessed a new high point in Branch activities. The man-power of the organization was constantly being deployed and redeployed in an effort to cope with the now ever-increasing flood of work consequent to the population and industrial growth of the Province. The demands on the water-supply in some areas appear to have used up all the available local resources, and studies are now being made to find other economical sources to augment local deficiencies. Much work went forward on studies of the Provincial hydro-electric power potential, which is now estimated to be not less than 40,000,000 horse-power (estimated potential in 1952, 10,000,000 horse-power).

The Comptroller and senior Branch officers served on many boards and committees of international, national, provincial, and local significance dealing with water resources and hydrology. The snow-survey programme was continued and slightly expanded, and produced excellent advance information on summer flows. The inspection programme on dams and hydraulic structures in the interest of public safety was carried out as well as possible with the limited staff available to the District Engineer at Kamloops and at Kelowna, in whose territories most of these structures are located.

Much work was required with improvement districts, both in respect of administration and financing, and investigation of existing works toward rehabilitation, or the feasibility of providing new installations.

Revenue for the year 1957 received from fees and rentals, \$1,152,371, exceeded last year's amount by about 10 per cent.

A brief résumé of the work of the staff prepared by the individuals concerned shows more exactly the ramifications and magnitude of the problems that were encountered.

Thanks for the co-operation and help of other Government departments must be expressed, especially that furnished by the Department of Mines in geological appreciations of major dam-sites now under study by Branch engineers.

IMPROVEMENT DISTRICTS

There are 219 improvement districts incorporated under the "Water Act." The main purposes for which improvement districts are incorporated are irrigation, waterworks, fire protection, garbage collection, sewage-disposal, street-lighting, and the granting of financial aid to hospitals.

Improvement districts incorporated this year are North Saanich Fire Protection District, Western Latoria Road Waterworks District, Westbank Waterworks District, Skeena Hospital Improvement District No. 17, Ioco Waterworks District, South Peace Hospital Improvement District No. 18, Fort Nelson Improvement District, Bilston Creek Improvement District, Mount Baker Trail Land Protection District, Ponderose Heights Waterworks District, Cherry Creek Waterworks District, Spences Bridge Waterworks District, Upper Terrace Waterworks District, Albion Dyking District, Dragon Lake Improvement District, Chetwynd Waterworks District, and Bow Horn Bay Fire Protection District.

Pursuant to section 58 of the "Water Act," a sum of \$754,815 was advanced to improvement districts by the Province of British Columbia to provide fire protection, financial aid to hospitals, and street-lighting, and will be collected by the Province by way of taxes over a period of time from one to twenty years, depending on the capability of the area to repay.

Pursuant to the "Improvement Districts Assistance Loan Act," chapter 38 of the Statutes of British Columbia, 1945, and amendments thereto, in 1957 the Province of British Columbia guaranteed debentures of improvement districts (with respect to both principal and interest) in the principal amount of \$2,361,000, as hereinafter set out, after

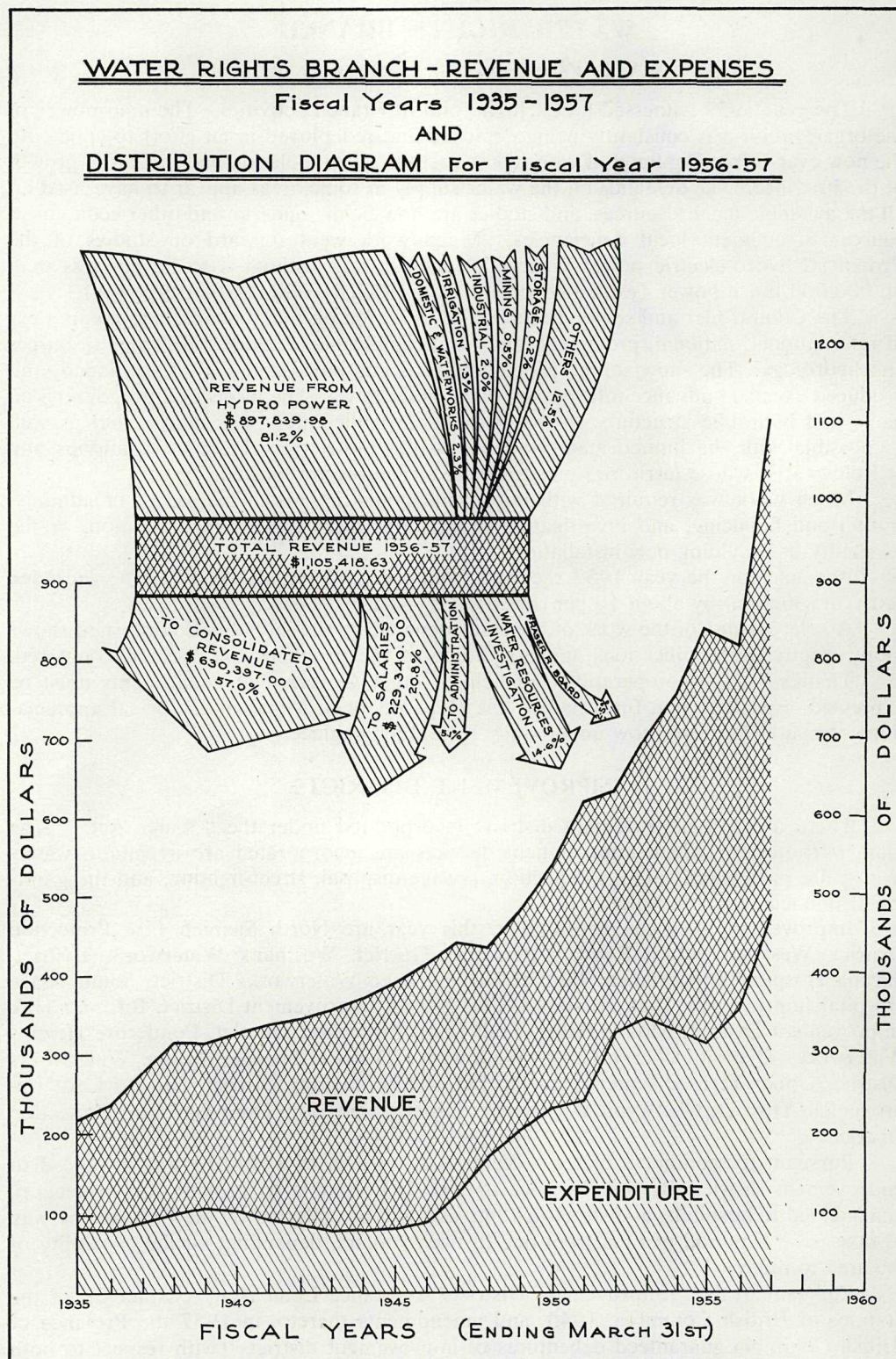


Plate 1.

this Branch recommended the feasibility of the projects and, further, that the areas could liquidate the debentures as they become due.

Waterworks, irrigation, and dyking districts.....	\$1,126,000
Hospital improvement districts.....	1,235,000
Total.....	\$2,361,000

INTERNATIONAL WATERS

For background information and descriptions concerning rivers in British Columbia falling within the category of international streams, the reader is referred to the previous issues of the Annual Report, particularly those of the last three years.

GENERAL

Early in 1957, as a result of agreement reached between the Governments of Canada and the United States, a start was made to discuss at the diplomatic level the problems associated with international rivers. Preliminary exploratory talks between the representatives of the two countries were held in Ottawa and in Washington, D.C.

Although it was not possible for the Province to participate directly in the talks, a close contact was established in an advisory capacity with the Canadian team to provide every possible assistance and to ensure that the Provincial view-point would receive adequate consideration.

PLANNING ACTIVITIES

As pointed out in previous Annual Reports, there are many agencies and organizations involved in the planning activities associated with the potential development of the Columbia River. Several engineering committees and study groups, some of which are international, have been formed to investigate various aspects. As well as these, individual organizations are also carrying out studies and preparing reports. The progress during the past year of those of particular significance to the Water Rights Branch, inasmuch as they involve staff participation, are summarized briefly.

PROVINCIAL GOVERNMENT STUDIES

As reported in the last Annual Report, the Provincial Government has instigated an engineering and economic review of the hydro-electric power situation in the southern part of the Province. The studies are being carried out mainly through a firm of consulting engineers under the direction of the Comptroller of Water Rights.

The resources of the Columbia basin in Canada are receiving particular attention in these studies to determine from a Province-wide point of view the potentialities of the various alternative methods of development, taking Provincial power requirements into consideration and the integration of Columbia projects with existing power systems and other power resources within the Province. The important elements of timing, transmission requirements, operation, and economics of individual projects as they fit into the over-all development are being considered. It might be expected, with the different terms of reference and other factors being considered from an over-all provincial viewpoint, that the studies may eventually indicate a plan or elements of a plan of development which is somewhat different than what has previously been proposed by other agencies.

Preliminary designs, cost estimates, and construction schedules are being worked out for all sites together with power studies to allow comparisons between the various alternative methods of development. Load estimates for the various load centres are being prepared and transmission requirements are being studied. Available hydro resources elsewhere in the Province are being considered.

Some field work was carried out during the year, mainly on the geological and transmission aspects of the investigation. This involved sample surveys of alternative

transmission-line routes and some sub-surface exploration by drilling at sites in the Columbia basin.

Considerable assistance has been obtained from other departments of Government, most noteworthy of which are the Department of Mines, which has provided advice and carried out geological studies, and the Bureau of Economics and Statistics, which has obtained data and directed the load-estimating and power-market studies.

INTERNATIONAL COLUMBIA RIVER ENGINEERING COMMITTEE

As described in previous Annual Reports, this Committee was formed as a field agency of the International Joint Commission to conduct studies and investigations of the water resources of the Columbia basin and to determine what might be an ultimate plan of development of these resources from an international point of view. The Committee is composed of field representatives of the responsible federal departments of both countries together with the Deputy Minister of Lands representing the Province of British Columbia. The Committee reports to a board composed of senior federal officials from both countries who in turn report to the International Joint Commission.

It was mentioned in the last Annual Report that the efforts of the Committee in the past had been directed mainly toward collecting the necessary basic data required for planning purposes. This phase has been mainly completed as far as the Committee is concerned, and work during 1957 was concentrated in carrying out the engineering and economic studies to determine alternative plans of development based on the assumption that all elements would be part of an international system with fully integrated operation.

Preliminary design and costing of each project included in the alternative plans are under way together with detailed power studies. It is interesting to note that the power studies, which involve long and complex computations, are being carried out using an electronic computing-machine located at Portland, Ore.

It was anticipated that an over-all report setting forth the international plans of development of the whole Columbia basin would be completed by the summer of 1958 and would be followed by the various appendices covering the details of projects located in each of the sub-basins. However, toward the end of the year it became necessary to carry out studies of a further alternative plan of development, and the over-all report is now scheduled for completion at the beginning of 1959.

OPERATIONS DIVISION

V. RAUDSEPP, P.ENG., DEPUTY COMPTROLLER OF WATER RIGHTS
AND CHIEF, OPERATIONS DIVISION

The Operations Division performs the administrative duties arising from the "Water Act" and the regulations issued under that Act, and provides engineering advice to the improvement districts, the water-users' communities, and the individual water licensees. The Division comprises the following:—

- (1) The offices of the five District Engineers at Nelson, Kelowna, Kamloops, Victoria, and Prince George. The position of the District Engineer at Prince George was approved this year, and the office will be in operation early next year.
- (2) General Office supervised by Chief Clerk.
- (3) Administrative Draughting Office under Chief Draughtsman.
- (4) A section under a Senior Hydraulic Engineer to supervise and advise the improvement districts in engineering matters.

The staff of the Operations Division in 1957 has been continuously and heavily taxed to full capacity. Although in general the Division successfully coped with the various problems, this was achieved at the cost of having to leave some important activities in abeyance, such as determination of engineering and financial requirements regarding the replacements of existing irrigation and waterworks systems of the improvement districts.

The following tables, which provide statistical information, show an increase in some phases in our work. In addition, the problems of water administration continue to become more complex as a result of urbanization and industrialization of the Province.

During the year nine new community waterworks projects and three schemes for rehabilitation of the existing systems were investigated and are now under construction or will be constructed next year by the improvement districts.

Changes in staff of the Operations Division in 1957 were extensive. Nine resignations, amounting to 25 per cent of the total establishment, were sustained. These changes occurred in the following categories: Draughtsmen, 2; clerical-secretarial, 6; engineers, 1. There was a complete change of staff at the Nelson District office.

GENERAL OFFICE

	1953	1954	1955	1956	1957
Applications for licences	775	584	635	747	687
Applications for apportionments	30	17	48	25	32
Applications for change of appurtenancy	22	16	30	11	16
Applications for change of works	42	33	27	17	45
Applications for extension of time	422	490	544	632	590
Change of ownership, address, etc.	766	965	618	794	1,902
Cancellations and abandonments	292	327	205	111	211
Right-of-way over Crown lands	137	137	108	93	125
Total licences issued	1,087	1,041	875	832	891

New water-licence indexes, both alphabetical and numerical, were completed during the year.

DRAUGHTING OFFICE

Water applications cleared and plotted on maps.....	687
Conditional-licence plats compiled and traced.....	570
Final-licence plats compiled and traced.....	364
New water-rights maps compiled and traced.....	8
Water-rights maps revised or renewed.....	18
Reference maps renewed.....	22
Water clearances (cancellations, change of ownership, etc.)..	2,113
Land clearances (purchases, Crown grants, leases, timber sales, etc.).....	5,007
New improvement district plans compiled and traced.....	15
Improvement districts (amended).....	19

During the year many inquiries by the public and other departments were taken care of. The usual requests for maps and other information by our District Engineers were also attended to during the year.

Considerable time was spent during the year checking petitions and drawing up legal descriptions for improvement districts.

IMPROVEMENT DISTRICT ENGINEERING SECTION

GENERAL

The purposes for which this Section was set up were outlined in the 1956 Annual Report of this Branch.

The Section has continued with the work initiated last year, and a list of the investigations of new projects carried out and reports submitted will be found under the report of the Hydraulic Investigations Division.

In several instances our reports have already been followed up by the communities concerned, and of these, Naramata, in the Okanagan area, and Eagle Heights District, near Duncan, have started construction work on their projects.

A questionnaire form was sent out to the improvement districts formed for irrigation purposes during the year and results compiled as a report showing the financial state and the condition of their water installations. The report indicates that in the neighbourhood of \$4,500,000 is required in the way of financing for immediate replacements and rehabilitation of expended works of the established irrigation districts in the Province.

NARAMATA IRRIGATION DISTRICT REHABILITATION

The preliminary report on the rehabilitation of the irrigation and domestic water-supply system of the Naramata Irrigation District was completed early in the year. The total estimated cost of the design contained in the report was \$323,000, which could be supported by water charges amounting to \$20 per acre per annum for irrigation and \$54 per connection per annum for domestic service. The area capable of being served is 915 acres, presently irrigated, plus an expansion possibility of some 75 acres.

The design was revised at the request of the Trustees, to show the effect of retaining portions of the existing system considered to have five to ten years of remaining life. The revised estimate was \$271,000.

Separate reports were prepared on the cost of chlorinating the water-supply and on screening and settling provisions for the system.

The district has engaged its own engineer to draw up final detailed plans and specifications and has now let a contract for construction.

CUISSON CREEK PROPOSED IRRIGATION PROJECT

Data on the proposed irrigation project on Cuisson Creek near Alexandria was revised. On the basis of subsequent stream-flow data obtained and on a further reconnaissance made in conjunction with the "Prairie Farm Rehabilitation Act," the estimate of the area that could be successfully irrigated from Cuisson Creek has been reduced from 2,680 to 1,000 acres. Since the reduced estimate is based on a record of flows obtained over a comparatively wet cycle of years, 1947 to 1955, the development of even this area would be hazardous and the cost of development would make the project uneconomical under existing conditions.

PORT HARDY WATERWORKS

A report was prepared covering the design and cost estimate for a water-supply system to supply the fifty-two residences and other installations of the community of Port Hardy, on the northerly part of Vancouver Island. The proposed supply was by pumping through an infiltration gallery from a small surface stream near the community to a 6,000-gallon storage-tank, from which the distribution system would be supplied by gravity. The water is characterized by a red coloration due to its high iron content and a low pH value, both of which are objectionable. Because of economic considerations, however, chlorination to safeguard the bacteriological quality was the only treatment recommended.

MAMQUAM WATERWORKS DISTRICT

A preliminary design and cost estimate was prepared for the Mamquam Waterworks District, near Squamish. The design assumed a bulk supply under sufficient pressure from the works of the Pacific Great Eastern Railway Company serving the railway yards and Village of Squamish from Stawamus River. The distribution system would be required to serve seventy-eight connections initially and was designed for 140 connections. The estimate of capital cost required was \$27,766, which could be supported by annual charges of \$45 per connection for ordinary domestic service.

EAGLE HEIGHTS WATERWORKS DISTRICT

A system to supply sixty residential connections by pumping from a drilled well beside the Cowichan River was designed for the Eagle Heights community, near Duncan. The cost was estimated at \$23,048.

This scheme was considered marginal only, financially, and would depend on supplementary income obtained from the owners of land intending to subdivide in order to be successful. The owners have met their financial requirements, and they have now formed a district, engaged their own engineer, and construction is now in progress.

MEADOWBROOK WATERWORKS DISTRICT

A waterworks system to serve the Meadowbrook Waterworks District, near Kimberley, was designed to serve the existing seventy-two residences with an expansion potential of 100 per cent. The cost was estimated at \$50,562, which could be supported by water charges amounting to \$48 per annum for ordinary household services.

The supply would be by pumping from an infiltration gallery placed in the bed of Kimberley Creek to a 20,000-imperial-gallon wood-stave tank, thence by gravity to the district's distribution system.

WESTSIDE IMPROVEMENT DISTRICT

The design of a pipe distribution system submitted last year to the Westside Improvement District was revised, on the request of the Trustees, to serve 70 acres under sprinkler, the remaining 40 of the 110 acres presently irrigated remaining under ditches.

This district is presently negotiating with the old Columbia Valley Irrigated Fruitlands Company for acquisition of its assets.

VICTORIA DISTRICT OFFICE

C. Errington, P.Eng., District Engineer

The Victoria District office administers the "Water Act" in an area of approximately 50,000 square miles and includes the relatively thickly populated and rapidly developing Lower Fraser Valley, the Sechelt Peninsula, and Vancouver Island, and extends from Vancouver north-westerly up the coast for some 350 miles.

WORK CARRIED OUT DURING THE YEAR

During the period from November 1st, 1956, to October 31st, 1957, some fifty special studies, investigations, and reports were made; this included attending to twenty-seven disputes or inquiries of a contentious nature—a great majority of these were amicably settled. On three occasions, work was done under the "Ditches and Watercourses Act." Six meetings in connection with improvement districts were attended.

There were 280 applications received. Of these, 250 were reported on and twelve recommended to be refused. There were 188 final-licence reports made. Some 228 extensions of time and eighteen amendments to the water licences were made during the period. Seventy-one licences were abandoned or cancelled. There are 4,187 licences in existence in the Victoria District; of this number, 1,586 are conditional and 2,601 have been finalized.

KELOWNA DISTRICT OFFICE

R. G. Harris, P.Eng., District Engineer

The Kelowna office, administering an area of approximately 15,000 square miles, comprises the Kettle River, Similkameen, and Okanagan drainage-basins, and in addition the Shuswap River drainage-basin from Sicamous to its source and that part of the Columbia River drainage-basin from Boat Encampment, the northerly limit of the Columbia River, to a point about 15 miles south of Arrowhead on the Upper Arrow Lake.

GENERAL

Sixty-four group meetings were held, of which fifty-two were with existing improvement districts or proposed districts.

A total of thirty-seven dam inspections were made. Several of these inspections were on one or two dams requiring extensive repairs or reconstruction, notably Penticton Creek Dam No. 1 and Chain Lake Dam. Three dams were deemed to be a hazard and were condemned.

During the last few years the routine work has increased greatly. In addition, more engineering investigations are being carried out. Consequently, it is becoming more difficult to keep up with the work with the present staff, in particular the routine inspections of dams.

SUMMARY OF YEAR'S ROUTINE WORK

The following is a summary of the routine work carried out by the Kelowna office for the period from November 1st, 1956, to October 31st, 1957:—

Applications received	103
Applications inspected	84
Final-licence reports	73
Amendments to water licences	24
Dam inspections	35
Proposed dam-sites inspected	2
Miscellaneous investigations and surveys	41

MAJOR ENGINEERING INVESTIGATIONS

Irrigation and Domestic Water-supply, City of Armstrong and Municipality of Spallumcheen

Storage possibilities at the headwaters of Fortune Creek to augment the water-supply for the City of Armstrong and the Municipality of Spallumcheen were investigated. Of three small lakes considered for storage, two were investigated, and it was estimated that 270 acre-feet could be stored. This estimate was based on a ground and air study of the sites and computations of the watershed run-off.

Woods Lake Water Company Pipe-line

A pipe-line approximately 1,000 feet in length was designed as a replacement for a wooden flume.

Westbank Irrigation District Rehabilitation

During the summer of 1955 the area was air-photographed and the necessary control surveys made. Subsequently, base maps at a scale of 500 feet to 1 inch were prepared. A meeting of the Reclamation Committee was held in November, 1955. The purpose of this meeting was to provide the basic data—water duties, type of system, etc.—for rehabilitating the system.

A tentative design and approximate estimate of cost of an all-pressure system for sprinkler irrigation has now been prepared; however, a more detailed design and cost is to be prepared this winter. The district proposes to replace part of its works in 1958.

Westbank Waterworks District Rehabilitation

This district, which was formerly the Westbank Co-operative Water Users, was incorporated as an improvement district in January, 1957. It is situated within the Westbank Irrigation District.

A plan showing the existing works has now been prepared, and it is proposed to design a replacement system this winter. The district's only source of supply is Westbank Spring. A new intake, consisting of a system of tile drains, has now been constructed.

Larkin Waterworks District

Following reports of leakage in the main line and lack of water at the higher elevations of the district, an inspection was made of the system. A composite map of the district has now been prepared and a survey will be made in 1958, with the view of recommending improvements to the system.

Christina Waterworks District Rehabilitation

This district is situated at the south end of Christina Lake, about 15 miles east of Grand Forks. The present system is now giving very poor service, particularly during the winter, when the pipes freeze. Several meetings have been held over the past three years. In addition, a survey was made by this office in 1956, and in 1957 three alternative designs were prepared.

Crozier Waterworks District Rehabilitation

This district is comparatively small, only seven users being served at the present time. The source of supply is Crozier Springs. The district is now replacing its system with plastic pipe.

KAMLOOPS DISTRICT OFFICE

H. D. DeBeck, P.Eng., District Engineer

The Kamloops office is charged with the administration of the "Water Act" throughout an area of approximately 75,000 square miles of Central British Columbia,

comprising the drainage-basin of the Fraser River and its tributaries from Spuzzum up-stream, with the exception of the watersheds of the Shuswap River and the Stuart and Nechako Rivers above their confluence. There are eight water districts in this area. Although the City of Kamloops is not at the geographical centre of this area, it is near the centre of the Dry Belt, where the water use is greatest and the supply most critical. In July, 1957, the Kamloops District office was moved to accommodation provided in the new Government Office Building at Kamloops.

STORAGE DAMS

Much of the water used for irrigation is taken from small streams in which the supply is very limited except during the spring freshet. To provide adequate water-supply during the summer when it is most needed, many users have constructed storage dams to retain the spring-freshet water for later use. Since such dams can impose a serious hazard to life and property down-stream, the construction of new dams and the maintenance of existing dams is supervised by the Water Rights Branch in the public interest.

During the year an index of storage dams was completed, listing 431 storage dams under licence in the district. On the basis of this index, it is hoped to set up a programme of regular inspections, with a frequency of inspection suited to the conditions at each dam. The magnitude of such a task will be apparent when it is realized that most of the dams are at high altitudes and many can still only be reached on foot or on horseback. The only dam failure reported during the year was that of a small abandoned dam on Fifty-seven Mile Creek near Clinton. Although the dam had been considered one which imposed a minimum hazard, considerable damage was done to farm land down-stream.

LAND REGISTRY OFFICE SEARCHES

The Kamloops District office has been made responsible for searching the title to the land appurtenant to any water licences within the Kamloops Land Registration District. This has involved a considerable amount of work, since most licences require a title search as a result of subdivision of the appurtenant land. In addition to searches for licences within the Kamloops District office, nearly fifty searches were carried out during the year for licences within the jurisdiction of other district offices.

SUMMARY OF WORK

The following is a summary of the work carried out by the Kamloops office for the period from November 1st, 1956, to October 31st, 1957:—

New applications investigated and reported on	91
Conditional licences inspected	71
Final-licence surveys made	39
Miscellaneous surveys and investigations	11
Dam inspections	52
Proposed dam-sites inspected	4
Complaints investigated	24
Well-logs collected of new test-wells	10
Meetings with improvement districts	9

SPECIAL STUDIES

Savona Community Domestic Water-supply

Following a request from a committee organizing an improvement district at Savona for a feasibility survey and report on their contemplated waterworks system, a field investigation was carried out in July, and subsequently plans, drawings, and system design studies were carried out intermittently and completed at the end of September.

The design submitted proposes a pumped domestic water-supply from Kamloops Lake by means of two alternative systems of supply, the first being a minimum system to serve ninety-two buildings, and the second being a system to serve the area in the vicinity of the Canadian Pacific Railway station only, containing seventy-five buildings. All designs and plans have been completed and the preparation of cost estimates is nearing completion.

Domestic Water-supply for the Proposed Hillcrest Waterworks District

The proposed Hillcrest Waterworks District comprises a subdivision located on the Cariboo Highway about a mile south of 100 Mile House, containing at present ten houses and seven business premises. A survey was made of the route of a proposed pipe-line to provide a domestic water-supply from two springs, and a report on the feasibility of the proposal will be prepared early in 1958.

Tranquille Lagoon

In June an investigation was made of the sewage lagoon constructed for the Tranquille Sanatorium on the north bank of Kamloops Lake. The dyke enclosing the lagoon was examined to ensure stability, durability, and impermeability. Periodic inspections are being maintained to ensure same.

NELSON DISTRICT OFFICE

R. Pollard, P.Eng., District Engineer (January to October), and
J. P. Riley, P.Eng., District Engineer

The Nelson office administers Water Rights Branch matters over some 25,000 square miles in the south-eastern part of British Columbia, comprising the Kootenay Land District, excepting Revelstoke.

A large portion of the population within the Nelson District is situated in the West Kootenay area, and it is from this region that the vast majority of the water licences and other problems pertaining to this office originate.

During the year there was a complete change of staff at the Nelson office. On October 31st, R. Pollard, former District Engineer at Nelson, retired after thirty-one continuous years with the Water Rights Branch. Except for a short period in Victoria, all of this time was spent at the Nelson office. In January, S. Jackson, who had been Assistant District Engineer at Nelson for a period of five years, was transferred to Victoria. His position in Nelson is now occupied by D. E. Smuin. The office secretary, Mrs. F. M. Davis, came to the Branch in August.

SUMMARY OF YEAR'S WORK

Following is a tabulation of work carried out by the staff of the Nelson office for the period from November 1st, 1956, to October 31st, 1957:—

New applications investigated	129
Final-licence surveys	87
Flooding investigations	1
Pollution investigations	9
Miscellaneous investigations and complaints	200
Meetings with the improvement districts	5
Engineering advice to improvement districts, design of works, etc.	1

HYDRAULIC INVESTIGATIONS DIVISION

T. A. J. LEACH, P.ENG., CHIEF, HYDRAULIC INVESTIGATIONS DIVISION

Basic to sound water-resource administration is the need for a proper inventory of what you have and how it can be used. This brief description sums up the main function of the Hydraulic Investigation Division, but in addition to assessing the waters in more virgin areas of the Province, the Division's engineers are also studying existing water uses.

At present the Hydraulic Investigation Division is divided into three main sections, whose contributions to resource development in 1957 are contained in the pages which follow.

The Water Resources Compilation Section is the oldest of the three sections. During the last year it has carried out a number of investigations, including hydro-power surveys within the Fraser, Dease, Stikine, and Peace River watersheds.

In the more habitated areas of the Province, such as the Lower Mainland and Vancouver Island, the Section has been concerned with local flooding conditions, particularly those caused by the heavy fall and winter rainfalls.

Reports prepared from data obtained in these surveys and investigations are made available to the public at a nominal cost for assembly only.

The Hydrology Section has for a number of years prepared snow-survey bulletins during the winter and spring months. The information contained within these bulletins is obtained through the efforts of local snow surveyors, who sample some eighty-one snow courses throughout the Province. The data provide an estimate of the total volume of water that the major rivers may discharge during the period from April to July or April to August, inclusive. Indicative of the interest in this phase of the work is the present mailing-list, totalling some 400 names. While the Section's main concern has been in the field of snow hydrology, it is also interested in rain run-off, particularly in the coastal areas.

The Fraser River Section, as the name implies, was set up recently to assist the Fraser River Board. The Board, through its Federal and Provincial agencies, is engaged at present in preparing a preliminary report to be completed by June, 1958.

Whereas in the past the Water Rights Branch studies have been limited to at-site hydro-power, engineers are now getting into multiple water-use studies, including system power proposals where a number of hydro-plants on a river are electrically interconnected.

In summary, it might be said that the ultimate aim of water-resource inventory is the preparation of a broad master plan for the development of each watershed. Such plans, when made available early in the history of the Province, will serve as a guide to water licensing authorities.

These are a few of the major problems facing the Branch to-day and which are reflected in the reports which follow. Increasing populations have in turn been reflected in more demands for water investigations, and in some cases field inventories have gotten ahead of office analysis due primarily to engineering staff shortages.

WATER RESOURCES COMPILATION SECTION

The Water Resources Compilation Section is composed of hydraulic engineers, technicians, and draughtsmen. The Section is charged with carrying out field investigations and preparing reports on irrigation, hydro-power, domestic water-supply, flooding, drainage, and allied subjects. This year seventy-five new reports were prepared and sent to interested parties. In addition to new reports, eighty reprints of older reports were assembled and distributed, also 125 requests for copies of "Water Powers of British Columbia" were answered. Further, engineering advice, other than in report form, was given to the public and other Government departments on many questions of an hydrologic or hydraulic nature.

The investigations carried out in 1957 are described in the following pages.

PEACE RIVER POWER INVESTIGATIONS

(See Plate 2.)

In 1956 surveys of dam-sites on the Peace River were completed in the upper area near the Wicked River and also in the canyon immediately above Hudson Hope. Maps at 500 feet to 1 inch showing 20-foot contours are now available.

In 1957 the alternative of a diversion of a portion of the Peace River into the Fraser River via Summit Lake was investigated. This included a survey of the canal route from Summit Lake south, requiring photo control of 75 square miles for 1,000-feet-to-1-inch maps.

Horizontal control was tied to the Provincial triangulation, while vertical control is based on geodetic datum.

The approximate power-house site on the Fraser River was marked by a pipe post, positioned horizontally and vertically.

CHILLIWACK RIVER INVESTIGATIONS

The study initiated during the summer of 1956 was continued as an office study during 1957, and a report was completed on the flood-control and hydro-electric power aspects. The most feasible development for power generation was found to include a storage dam on Chilliwack Lake and a power tunnel leading to a power-house immediately up-stream of Nesaskwach Creek. This part of the development would have a head of 620 feet and an installation of about 45,000 horse-power. There would be another dam at the confluence of the Chilliwack River with Chipmunk Creek, and a power tunnel would lead from there to a power-house on the banks of the Fraser River about 1 mile down-stream from the Wahleach power-house. This power-house would operate under a head of more than 1,100 feet and would have an installation of about 180,000 horse-power. The mean annual output of the two diversions was estimated to be more than 768,000,000 kilowatt-hours. However, the engineering problems of the development would be difficult, especially those associated with lowering the level of Chilliwack Lake, the possible sedimentation in the small Chipmunk reservoir, and provision for the passage of fish.

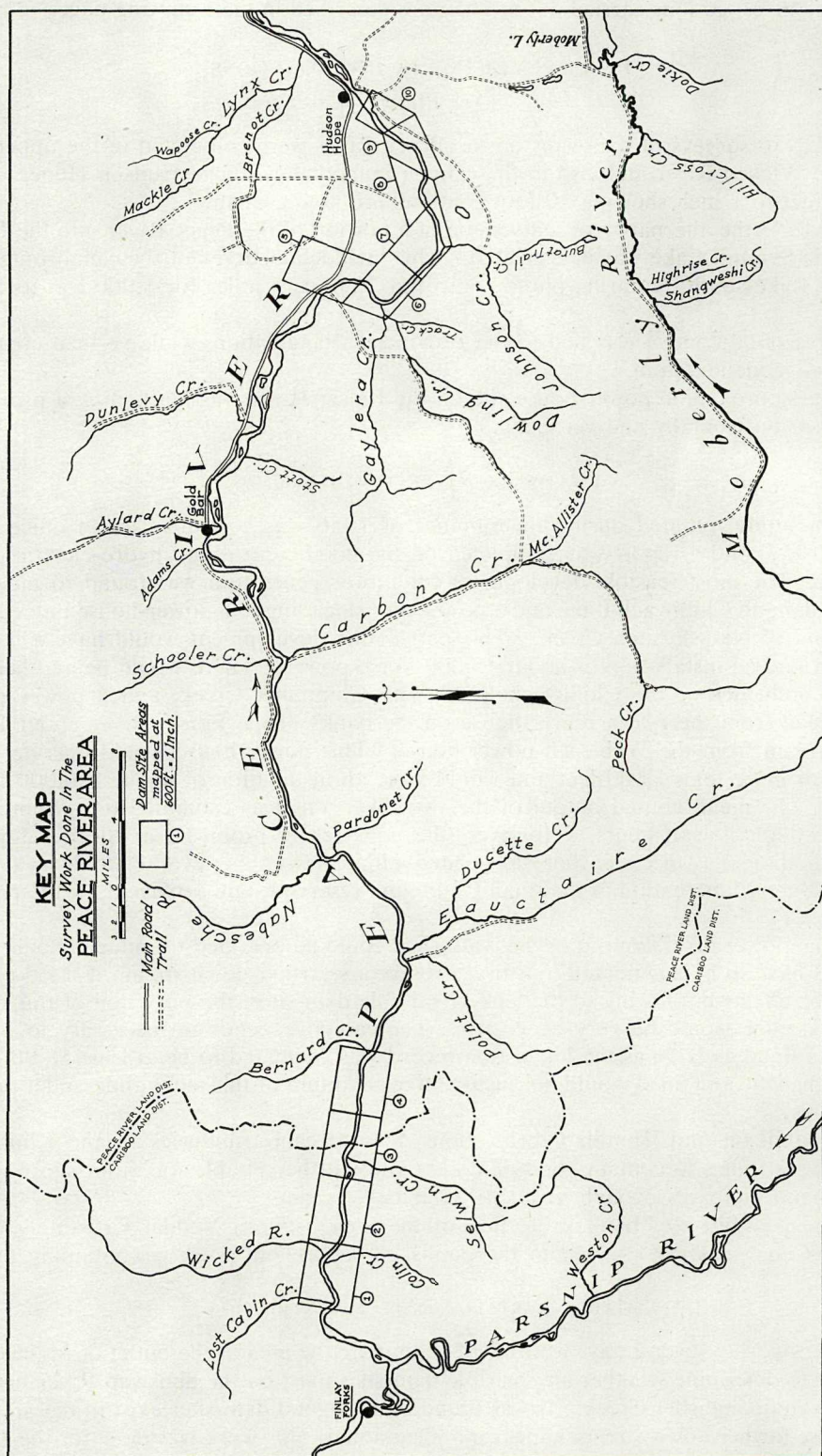
This power diversion out of the watershed could be operated to reduce flooding, but it would have to be augmented by storage reservoirs farther down-stream if flood-control was to be effective. Owing to the lack of suitable dam-sites, the provision of this down-stream storage would be very expensive. The capital expenditure necessary to protect against a flood as large as the highest on record was estimated to be at least \$8,900,000, and the benefits obtained would not justify an expenditure of this magnitude under present conditions.

Lihumitson and Tamihi Creeks, both down-stream tributaries of the Chilliwack River, were found to contain good dam-sites and will be suitable for water-supply when the demand increases enough to justify their development.

The possibility of bank protection of the area between Vedder Crossing and the Vedder Canal was not covered in the published report, but work is continuing on this problem.

MABEL LAKE DAM-SITE INVESTIGATION

During May several days were spent examining the area at the outlet of Mabel Lake in order to determine whether any feasible dam-sites exist on the Shuswap River between the lake and Kingfisher Creek. It was found that no good dam-sites exist in the area and that those farther down-stream appear more suitable. This work was done for the Fraser River Board.



INVESTIGATIONS OF VANCOUVER ISLAND HYDROLOGY

An office study was made of the hydrology of those rivers on Vancouver Island which the British Columbia Power Commission uses, or contemplates using, for power generation. Included in the study were the Campbell, Salmon, Sproat, Stamp, Ash, Somass, Puntledge, Kokish, and Nimpkish Rivers. An attempt was made to show what hydrologic and meteorological data are available and the correlations that exist between the various drainage systems. A scheme of stream-gauging stations, snow courses, and temperature and precipitation stations was suggested in order that short-term flood forecasts could be made, as well as long-term volume run-off predicted. Since the report was written, four snow courses have been set up by the British Columbia Power Commission.

BILSTON CREEK IMPROVEMENT DISTRICT DRAINAGE

Detailed field investigations, including a topographic survey, were started in the late fall. This work was carried out as a result of a request for engineering assistance wherein cost estimates for remedial work for prevention of flooding could be provided. As the northerly section of the district would appear to be integrally connected with the Langford, Glen, and Florence Lakes drainage areas, the survey was extended to include these sections. Due to lack of funds the preceding portion of the survey was not completed. However, sufficient data have been obtained whereby most of the area can be mapped, thus enabling a study of the hydrology and hydraulics to be made.

At present some 25 square miles have been controlled for multiplex mapping at a scale of 400 feet to 1 inch with 10- to 20-foot contour intervals, and enough additional information was obtained to interpolate 2-foot contour intervals in critical areas.

Profiles were run on Bilston Creek and Langford and Colwood ditches, and elevations and measurements were taken of critical bridges and culverts.

Horizontal control was established by stadia traverses from National Defence monuments, and all traverse stations were controlled by levels tied to geodetic bench-marks.

DEASE-STIKINE HYDRO-POWER PROJECT

The following is a report of the 1957 field season on the Dease-Stikine power project. A survey party of eight members spent a full summer in this area.

The investigation was divided into three parts—(a) topography for the possible canal area; (b) topography for the possible dam-sites on the Tanzilla, Tuya, and Stikine Rivers; and (c) continuation of the level-line from Sawmill Point to Telegraph Creek (*see Plate 3*).

Parts (a) and (b) were controlled for multiplex to produce maps at a scale of 500 feet to 1 inch. This involved fourteen extensions, a total distance of 37 miles. Horizontal control was gained by means of small triangulation nets tied into the Provincial triangulation system. Eight monuments were controlled in this manner with elevation established by level.

(a) Canal Area

The area between Dease Lake and the Tanzilla River (approximately 3 miles in width at the narrowest point) is known as the dividing line between the Arctic and Pacific watershed. This area, flooded largely by terrace deposit, will make possible any proposed diversion of the Dease Lake storage potential southward, by means of a canal, into the Stikine River. Several buildings are located on this strip of land, including the Department of Transport weather station. Near by is a gravel-covered airstrip approximately 3,700 feet in length. A monument was established near the weather station and its elevation determined at 2,639.8 feet. To obtain a complete map of this area, the survey extends from 1 mile north of the head of Dease Lake southward for a distance of 18 miles.

The Tanzilla River, with an estimated width of approximately 80 feet and a depth of about 3 feet, twists and turns in a generally south-west direction. The major part of the lower river-valley consists of swamp and muskeg, and the river-bottom itself is composed of clayey and silty material. Large areas of the forest on the south side of the river have been destroyed by fire.

(b) *Site Topography*

The first site topography was carried out on the Tuya and Tanzilla Rivers, extending from the south boundary of Cariboo Meadows (abandoned) to immediately above their confluence with the Stikine River.

South of Cariboo Meadows the Tuya Valley is narrow and deep with localized layers of boulders and gravel. The valley-bottom is strewn with large granite boulders. At the point where the Dease Lake Road crosses the Tuya River, the gorge is approximately 750 feet in depth.

The Tanzilla at the confluence with the Stikine is also a deeply cut valley about 450 feet in depth and about 1 mile from bank to bank. The slopes are silt, but the narrow river flows swiftly over a bed of gravel and boulders. Both valleys are visible from the Dease Lake Road, which winds its way across the plateau between these rivers. A great fire destroyed most of the forest in this area and deeply scarred the surrounding country. Three monuments were established horizontally and vertically and can be seen from the neighbouring mountains.

Time permitted one dam-site survey on the Stikine River, extending a distance of 8 miles south from the Talthan-Stikine confluence. Both rivers have cut deep gorges of from 200 to 400 feet in depth. The banks are fine silt and basalt rock with local areas of alternate layers of lava rock and gravel.

In the 1958 season it is planned to control the entire length of the Stikine River from Klappan River to Telegraph Creek.

(c) *The Level-line*

During the 1956 survey season, Monument 33 was established at the present end of the Stewart Highway by the wharf at Sawmill Point. In the 1957 season this line was extended, first, along the east shore of Dease Lake, then over the Dease Lake Road into Telegraph Creek, with the last bench-mark near the C.N. radio-telephone station. Eight monuments were controlled both horizontally and vertically and an additional ten monuments with vertical control only were established at 5-mile intervals on the Dease Lake-Telegraph Creek Road. The total length of 99 miles was divided into sections of 1 mile each, and two lines of levels run simultaneously in the same direction using two rodmen. A tolerance of 0.040 VM ($M = \text{distance in miles}$) was the required agreement between the elevations ascertained by the two runs. The levelling operation was carried out using two Zeiss Ni2 automatic levels and two section rods having foot graduations on one face and meters on the reverse.

It can be reported that the precise level-line for this project has now been completed.

The rugged terrain and semi-isolated position presented many difficulties of transportation and supply. These problems were overcome through the kind co-operation of the Department of Highways at Cassiar and Telegraph Creek.

DEASE RIVER DAM-SITE INVESTIGATIONS

(See Plate 3.)

During July a visit was made to the Water Rights Branch survey party in the Dease and Stikine areas and the dam-sites in the Dease Valley were inspected, together with the saddle area at the south end of Dease Lake; in addition, portions of the Stikine River itself were examined, although more careful study will have to wait until more mapping is available. The Dease River has a flat gradient and the floor of the valley is filled with alluvium to an unknown depth, no bedrock being visible anywhere on the valley-floor.

between Dease Lake and the Liard River, although the valley-walls are composed of sound rock in some areas. Consequently, there are no good dam-sites along its length, although further investigation may reveal that it would be possible to build an earth-fill dam at several sites. Until the mapping of the saddle area is completed and office studies are made, the feasibility of the various alternatives is unknown.

Regardless of whether the diversion of the Dease River to the Stikine is feasible or not, the power potential of the Stikine River above Telegraph Creek appears considerable. The collection of stream-flow records for the Dease and Stikine Rivers has only begun within the past several years, and until some years of record are available, it will be difficult to predict the magnitude of the power potential.

WATER-SUPPLY IN THE COMOX VALLEY

The Comox Valley area lies on the east side of Vancouver Island, roughly 140 miles north of Victoria, and includes the Cities of Courtenay and Cumberland, the Village of Comox, and the Royston Improvement District. Preliminary investigations were carried out during the summer of 1957 concerning the feasibility of forming a greater water board for the district, and at a meeting held in the Courtenay City Hall on August 8th, discussions were initiated amongst representatives from all the centres concerned.

The communities at present, with the exception of the Royston Improvement District, derive their water-supplies from independent sources. Courtenay draws water from an intake on the Browns River; Cumberland, which also supplies Royston, from a system of dams and lakes lying to the south-west of the city; and Comox Village from two recently commissioned deep wells.

While the existing schemes appear adequate for present requirements, future needs must inevitably dictate modifications and enlargement, and the incorporation of all sources of supply under one greater water board may prove to be in the best interest of all concerned.

During the course of the investigations, existing water schemes were inspected, potential dam and intake sites were visited, and data relating to consumption figures, population, distribution, pressures, etc., were obtained from the local authorities.

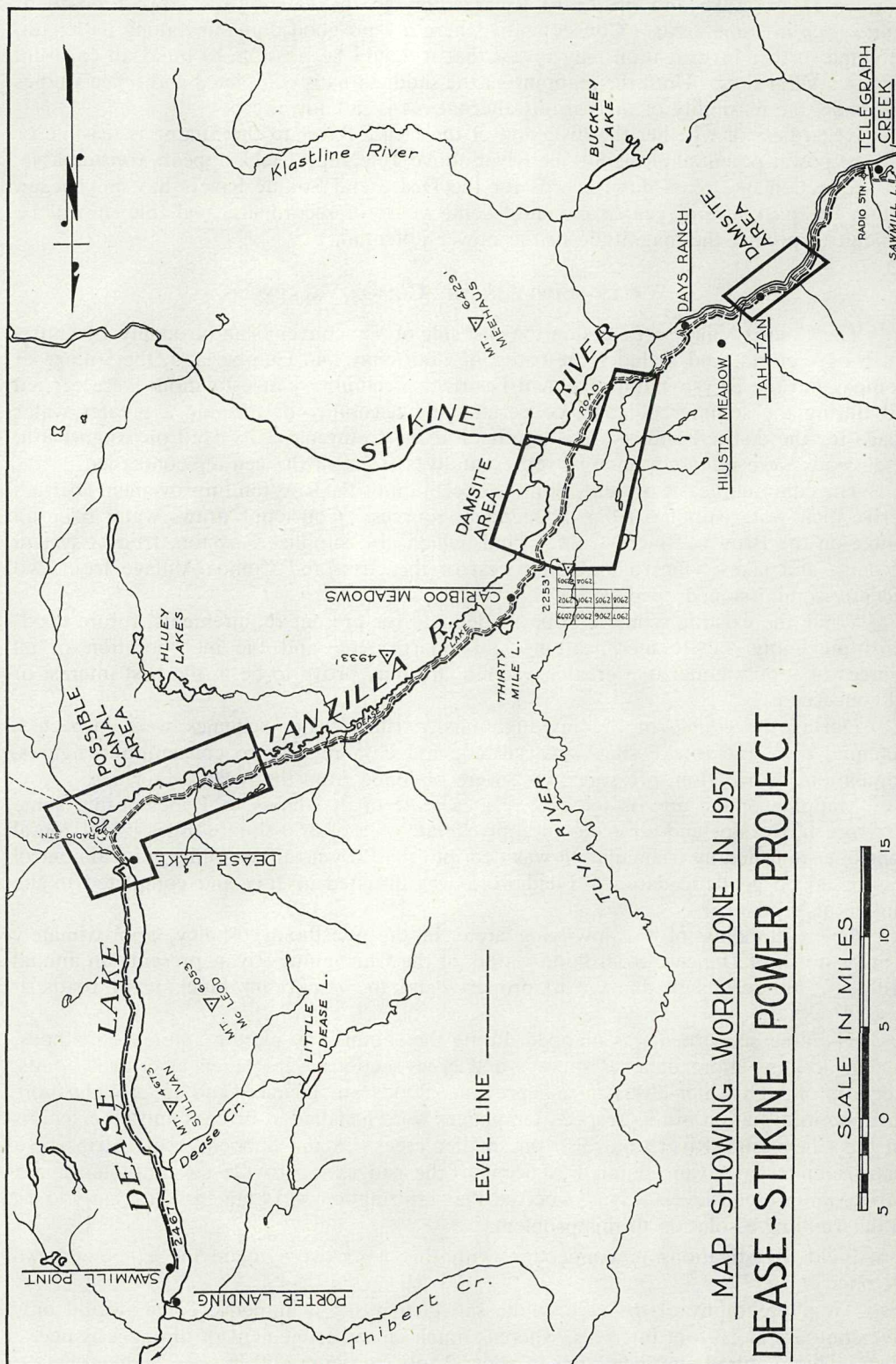
Mapping of the area is under way at a scale of 20 chains to 1 inch, using some sixty-seven overlaps and covering an approximate area of 360 square miles. Horizontal control established by triangulation was tied into the Provincial net, while vertical control was based on geodetic datum. Field work was initiated in July and completed in the middle of September.

Severe flooding of the low-lying areas in the Westholme Valley, approximately 8 miles north of Duncan, from flood-waters of the Chemainus River, presents an annual problem, and results in damage to property and the temporary blocking of roads at several points.

The area concerned was mapped during the summer by photogrammetric methods, and in addition more detailed surveys and cross-sections were taken at critical points. Records of high water-levels during previous floods are meagre, and to provide more accurate information in this respect, ten gauges were installed at bridges and other points on the Chemainus River, and also on smaller creeks in the flooded area. Strips of a water-soluble paint were painted adjacent to the gauges to provide an additional check on maximum flood-levels. It is expected that information so obtained will greatly assist in determining a solution to this problem.

Field investigations in connection with this work were made in September and October of 1957.

Air photography of the area, while satisfactory for planimetric detail, would only give contours at 10-foot intervals, whereas much closer definement of drainage is necessary. This required spot-heighting to show 2-foot contours and less.



Profiles were also run along the Chemainus River and the upper portions of Bonsall Creek, and critical elevations at bridges and culverts were taken.

Primary horizontal control was supplied by precise traverses initiated at Boundary Monument 765J, which has a co-ordinated position, while secondary control was by stadia traverses.

SNOW SURVEYS AND FORECASTS

Eighty-one snow courses will be in active operation for the 1958 sampling season. During the past summer eight new courses were established, one discontinued, and one relocated. The British Columbia Power Commission has installed new courses at June Lake (93), Burman Lake (94), Upper Thelwood Lake (95), and Memory Lake (96) on the Buttle Lake-Ash River watersheds for the purpose of forecasting future water-supply. They have also established permanent courses at Park Mountain (91) and Barnes Creek (90) for their British Columbia Interior Whatsan development. One more course was added to our Fraser network at Highland Valley (92), just east of Ashcroft, and one located at Log Cabin (97), just off the right-of-way of the Yukon-White Pass Railway near Bennett, B.C.

The data for all snow measurements made since snow surveying began in British Columbia, up to and including 1957, are now compiled and will be published as a summary in the near future.

Accuracy of the 1957 Run-off Forecasts Based on Snow-survey Data

The results of the 1957 stream-flow forecasts were as follows: All of the fourteen forecasts made were less than 15 per cent in error; ten forecasts, 10 per cent or less in error; and seven forecasts less than 5 per cent in error.

The following table gives a comparison of forecasted and actual 1957 volume flows:—

Accuracy of Run-off Forecasts, 1957

No.	Gauging-stations	Forecast, 1,000 Ac.-Ft.	Actual, 1,000 Ac.-Ft.	Difference	
				1,000 Ac.-Ft.	Per Cent
1	Columbia River at Nicholson ¹	2,193	2,178	+15	+0.7
2	Columbia River at Revelstoke ¹	17,232	17,839	-607	-3.4
3	Columbia River at Birchbank ¹	39,839	38,188	+1,651	+4.3
4	Kootenay River at Wardner ¹	4,250	3,865	+385	+10.0
5	Elk River at Stanley Park ¹	1,198	1,051 ²	+147	+13.9
6	Lardeau River at Gerrard ¹	626	(³)	—	—
7	Duncan River at Howser ¹	1,881	1,851	+30	+1.6
8	Slocan River at Crescent Valley ¹	1,890	1,717	+173	+10.0
9	Inflow to Kootenay Lake ¹	16,190	15,601	+589	+3.8
10	Inflow to Okanagan Lake ⁴	300	337	-37	-11.0
11	North Thompson River at Barriere ⁴	7,500	8,417	-917	-10.9
12	Fraser River at Hope ¹	51,000	52,700	-1,700	-3.2
13	Inflow to Stave Lake ⁴	1,149	1,028	+121	+11.8
14	Inflow to Powell Lake ⁴	978	1,071	-93	-8.6
15	Inflow to Lois Lake ⁴	240	232	+8	+3.4

¹ April to August, inclusive, flows.

² Flow for April, estimate.

³ Gauge discontinued September, 1956.

⁴ April to July, inclusive, flows.

FRASER RIVER BOARD SECTION

In 1955 a revitalized Fraser River Board began to carry out extensive studies and flood-control, power potential, and other resource-benefit investigations on the Fraser River system. In 1956 the Board, acting under specific terms of reference, had made available to the Federal and Provincial Governments in its interim report on "Investiga-

tions into Measures for Flood Control in the Fraser River Basin" the results of earlier research.

In further compliance with these same terms of reference, the Fraser River Board has been conducting studies in preparation for a second and interim report "with respect to the effective regulation of the river system for flood control and power and the resultant effect on navigation, fisheries, silting, erosion and irrigation . . . for completion . . . not later than 30th June, 1956."

While the published report deals almost entirely with the flood problem on this great river, this second report will cover many of the associated problems listed in the terms of reference. It can be appreciated that the production of large blocks of power from extensive hydro-electric generating-stations which might be established within the Fraser River system would have an appreciable effect upon the economy of the Province. Such an effect might be both beneficial and adverse. Cheap electrical energy represents an attraction to heavy industry, and this Province can readily absorb substantial amounts of this commodity. The subsequent establishment of such industrial areas produces a development of many secondary industries which swarm to those parts where surplus power at reasonable rates may be obtained. Further, it may be seen that related industries in the Province may benefit by the availability of cheap energy.

However, this is not the whole story. The construction of dams upon the Fraser River system will have some effect upon a firmly established fishing industry born out of the tremendous runs of sockeye salmon and other species which annually migrate upon the Fraser River. While it is not expected that the problem of fish versus power will be resolved in the forthcoming report, it is hoped that many of the basic points will be discussed and the issues clarified.

Associated problems will also receive attention in this interim report, and it is anticipated that, amongst other things, the amount of flood-control which can be obtained by the regulation of the Fraser River for power purposes will be covered in some detail.

FRASER RIVER SURVEYS

Bowron River Dam-sites

Completion of the Bowron River survey included the mapping of Sites 109 and 109K, some 30 miles down-stream from Bowron Lake.

Upper Fraser River Dam-sites

The possibility of a dam on the Fraser River at Olsson Creek (a short distance down-stream from the confluence of the Fraser with the McGregor River) was investigated. Such a storage reservoir, with a top elevation of between 2,100 and 2,150 feet, would require a second dam at Eaglet Lake.

The Fraser River gradient in this area is very low (about 1:5,000), and such a reservoir extending up-stream would reach beyond Grand Canyon on the main river and flood the lower canyon of the McGregor River to a depth of 50 feet. This large reservoir could completely regulate the watershed.

Mapping of the Olsson Creek site and some sub-surface exploration of the Eaglet Lake site have already been undertaken, and this work is continuing in 1958.

INVESTIGATION OF EXISTING HYDRO-POWER INSTALLATIONS IN BRITISH COLUMBIA

(See Plates 4 and 5.)

The hydro-power developments of the Province of British Columbia, from which is derived about 90 per cent of the revenue of the Water Rights Branch, constitute one of the important phases of the Branch's work.

A major item has been the preparation of an extensive questionnaire designed to cover all aspects of a power development, which has been sent to all major utilities and power-users for completion. This should provide the Water Rights Branch with up-to-date and accurate information on each large hydro-development, which will be augmented by ground inspections as opportunity permits.

Familiarization with and inspection of new power developments is another important phase of this assignment. Among those visited during the year have been the British Columbia Electric Company's Cheakamus development and the modernization of the Clowhom Falls plant. An examination of Alcan's Kenney Dam and Skins Lake Spillway was made in August, 1957, while the Powell River Company's developments were visited during September.

Changes have been initiated in the maintenance of statistics dealing with power developments, and mechanical tabulation is being utilized to a much greater extent. The long overdue checking and recording of power licences and production figures, the verification of rentals, etc., are now under way.

The development of hydro-electric power in British Columbia from 1920 to 1956 is shown graphically in Plates 4 and 5 in terms of annual production in kilowatt-hours and of installed turbine capacity in horse-power, with a comparison shown between four major groups of companies. It will be noted that total installation in the Province now exceeds 2,600,000 horse-power, three times as great as the 800,000-horsepower capacity of 1945. A similar increase is shown in the actual consumption of electrical energy, which has jumped from 3,083 million kilowatt-hours in 1945 to 9,314 million kilowatt-hours in 1956.

While no trends have been established for future guidance, the documentary submission by the Government of British Columbia to the Royal Commission on Canada's Economic Prospects predicted that by 1975 more than half the Province's vast potential of over 40,000,000 horse-power in hydro-power will be developed. This increase over to-day's installed capacity signifies unprecedented activity throughout the Province and is ample justification for the efforts of the Water Rights Branch to maintain accurate and up-to-date information on all power development.

DEVELOPMENT OF HYDRO-POWER IN B.C. INSTALLED TURBINE CAPACITY 1920-56

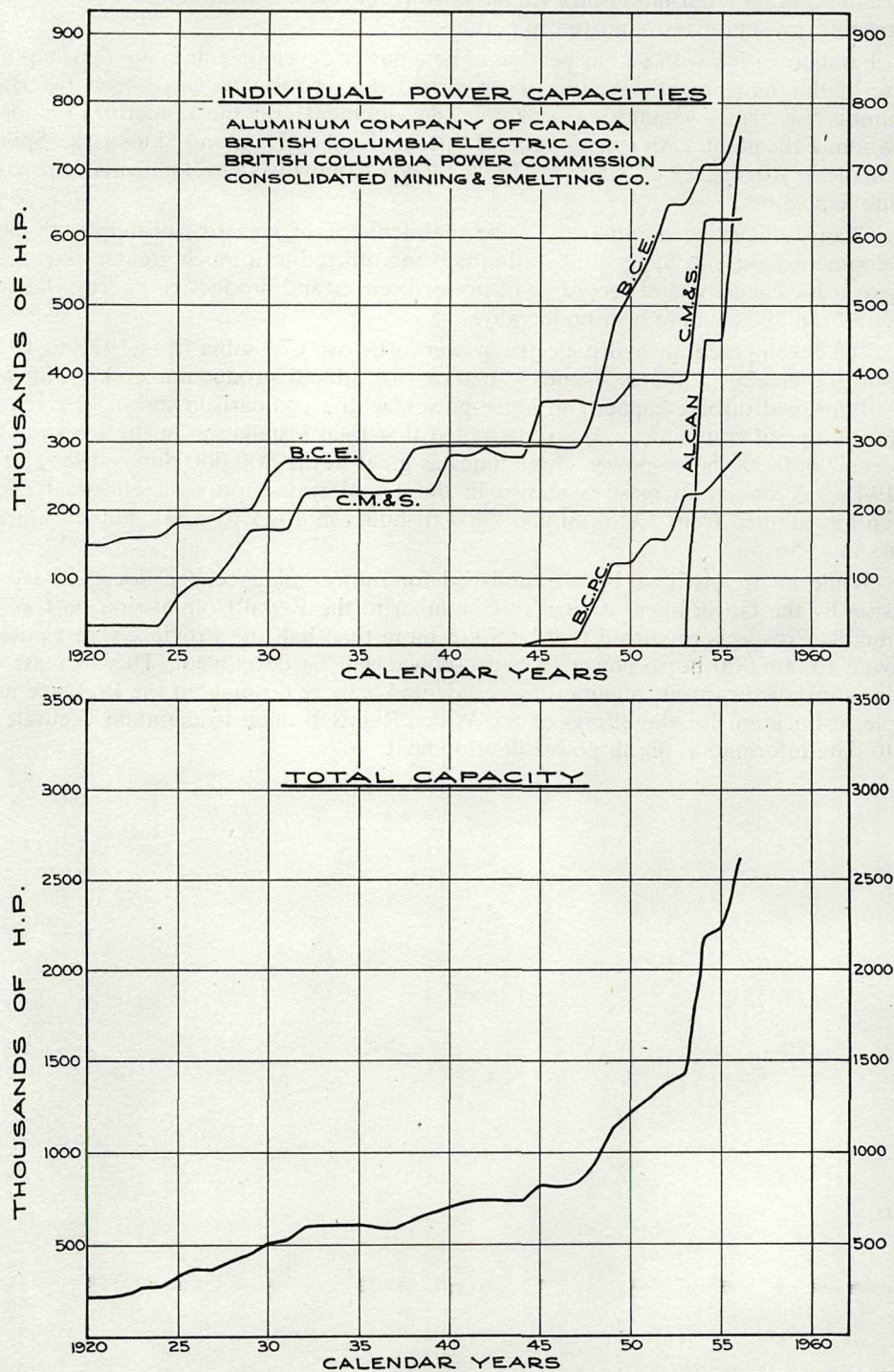


Plate 4.

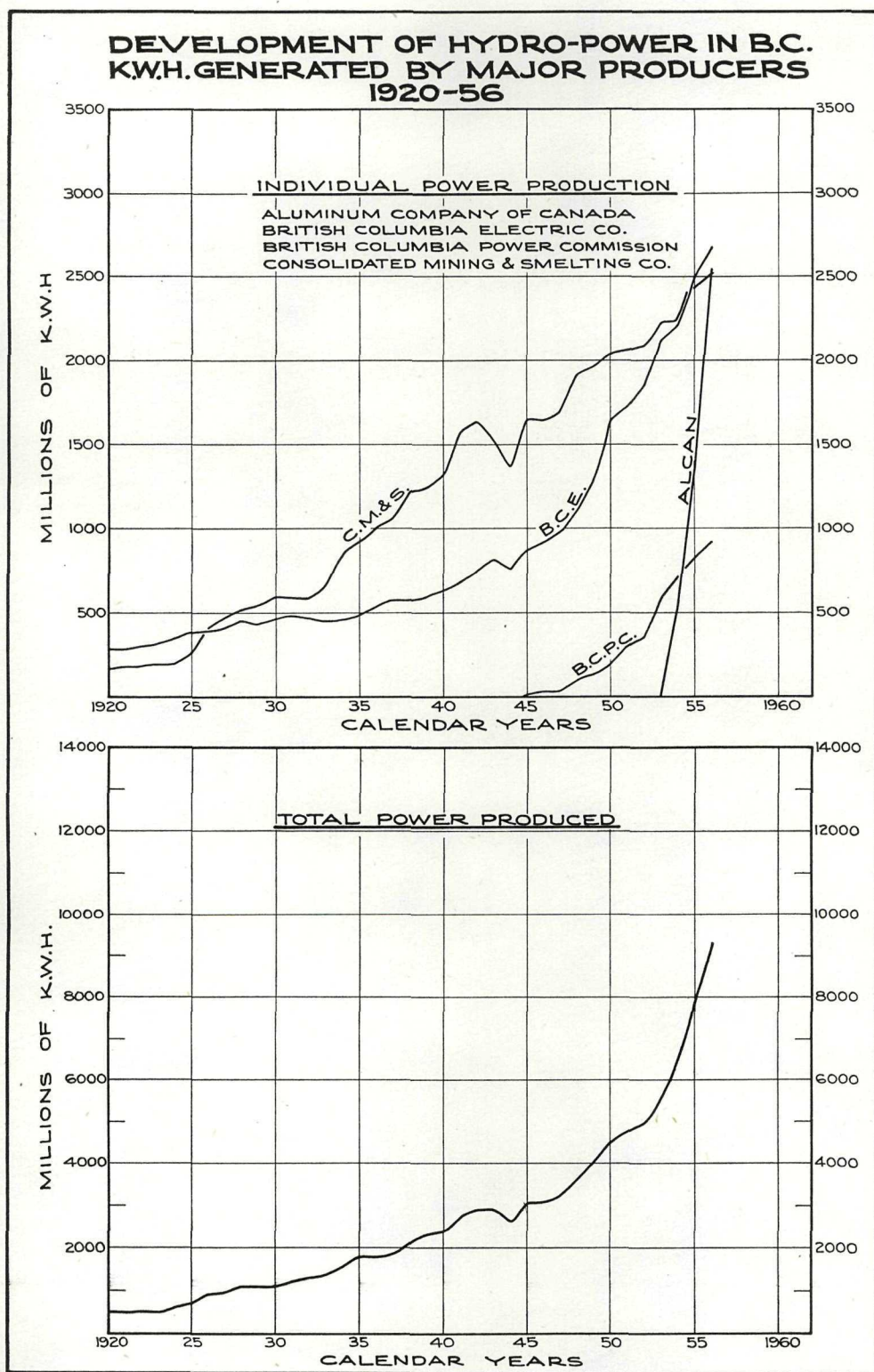
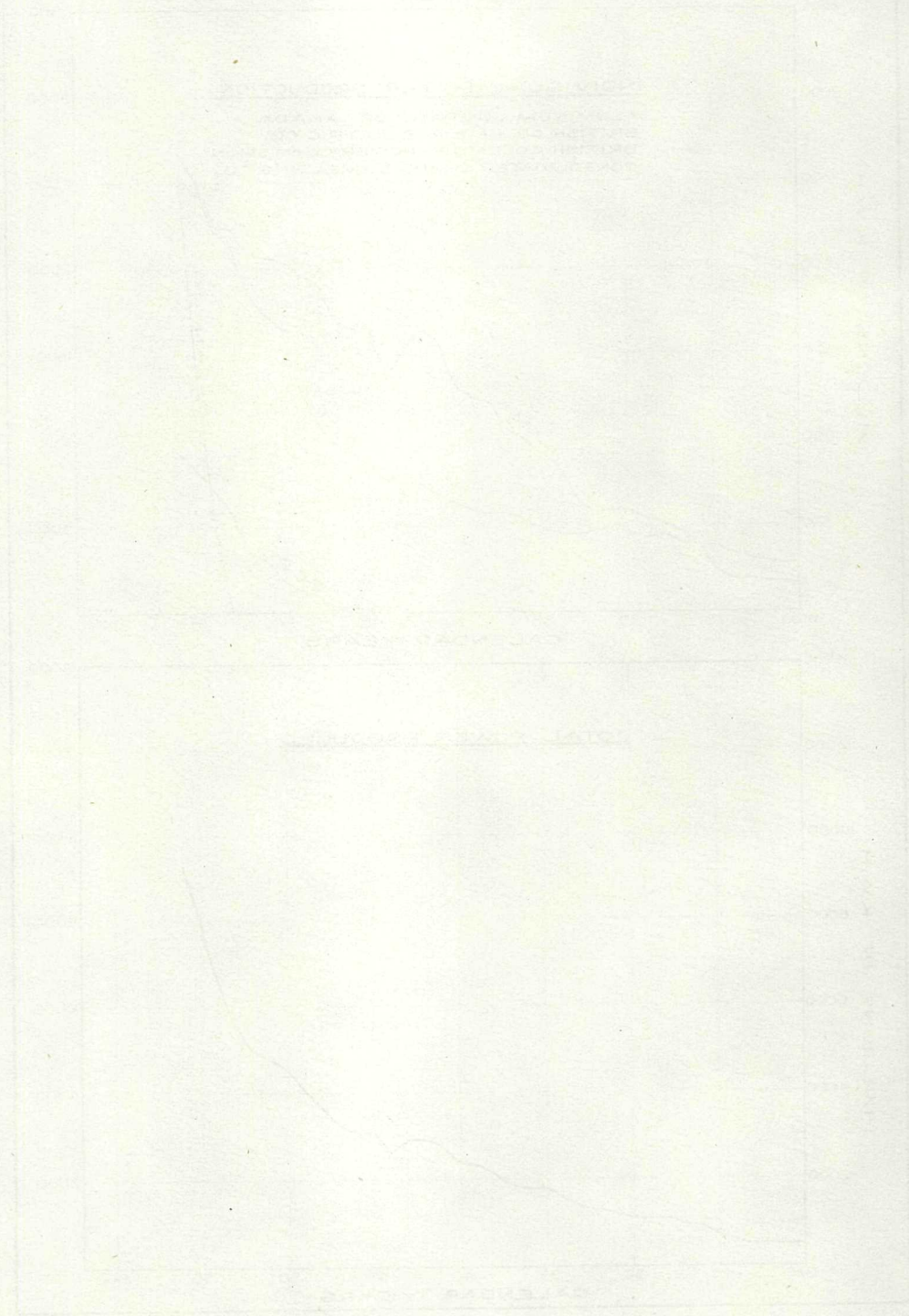
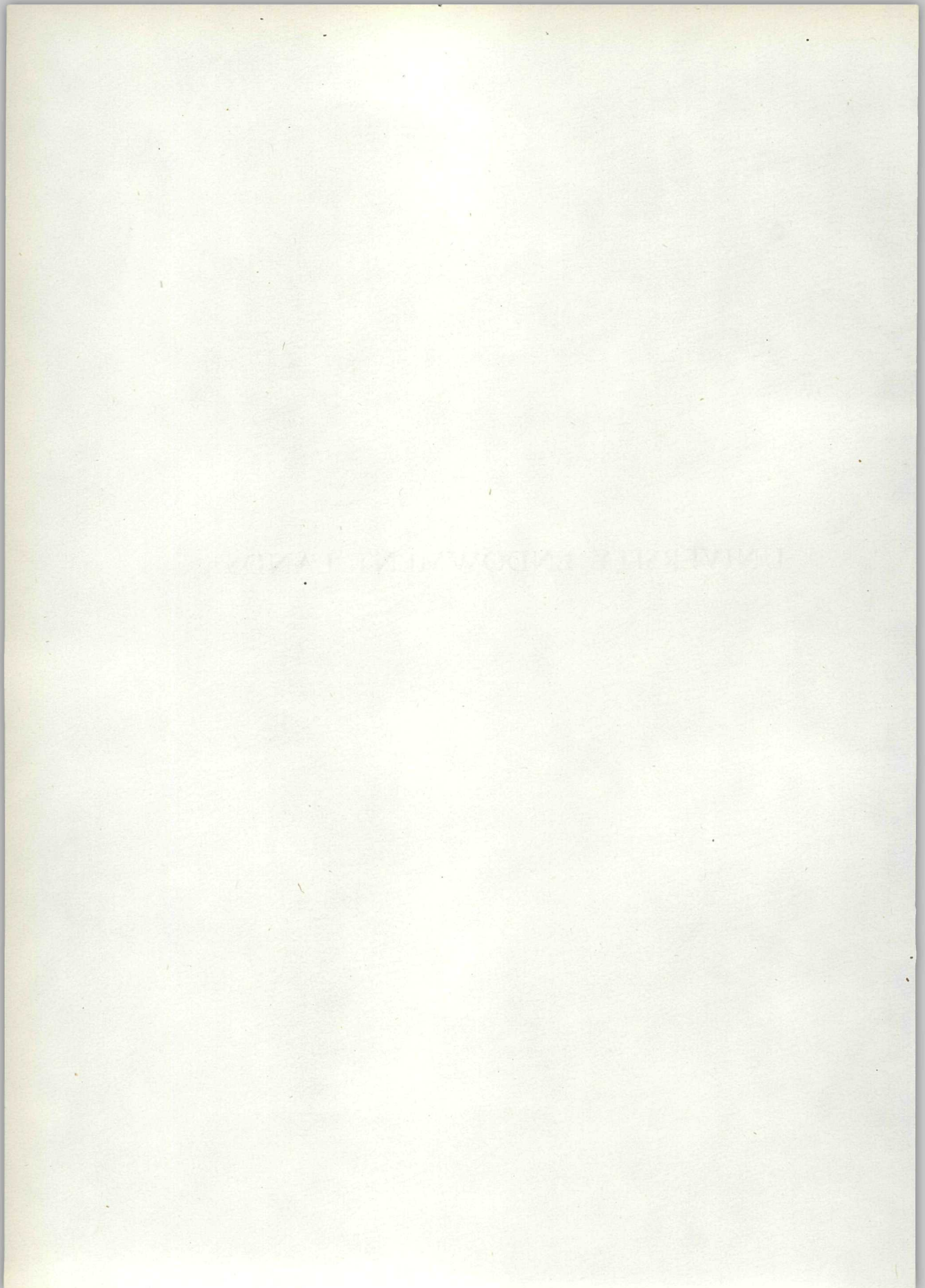


Plate 5.

DEVELOPMENT OF THE LAKES IN THE
NORTHWESTERN PART OF THE PROVINCE



UNIVERSITY ENDOWMENT LANDS



UNIVERSITY ENDOWMENT LANDS

M. E. FERGUSON, MANAGER

The University Endowment Lands, as the name implies, was originally created for the purpose of establishing an endowment for assisting the University. Unfortunately, no specific terms of reference were set out to show exactly what kind of assistance was intended, and, as a result, considerable controversy has existed over the years. This is just one of many vital problems that must be dealt with when planning future expansion and operations and is one of many reasons why an earlier decision was not reached. We are hopeful that next year will see some decision reached regarding future operations, and that, if economic conditions justify, we may even get started on additional subdivisions.

General operations of the year were rather normal, and, as such, nothing of too great importance occurred. Probably the most outstanding occurrence was the completion of arrangements with the City of Vancouver whereby the City Fire Department will answer calls to the University area, campus, or residential area at an agreed charge based on man-hours involved for each call. This arrangement is only for a three-year period, but it should provide adequate protection until we have an opportunity of deciding on a more definite future programme.

During the past year another rather important advancement was made when we became an official member of the Greater Vancouver Sewerage and Drainage Board.

Once again the year's operations were carried out with very little increase in the mill rate, but unless additional property can be added to the next year's assessment roll, it seems almost certain the rising cost of materials, services, and wages will force an even greater increase in taxes or a reduction in services provided.

During the year a Centennial Committee was elected, and they will be in charge of our participation in British Columbia's greatest anniversary celebrations. The memorial undertaking, which has been approved and funds provided for, calls for returfing of the 3.5-acre play-field at the elementary school and generally improving the field, including construction of a cinder track for track and field events if funds permit. This project will be done through the office and staff of the University Endowment Lands.

The following tables will show we are almost at a standstill so far as building and construction, but this will continue until we have additional property for sale since there are no building-sites left to build on.

STATISTICAL

TABLE A.—LOT SALES

There were no lot sales in Units 1 and 2 for the years 1955, 1956, 1957.

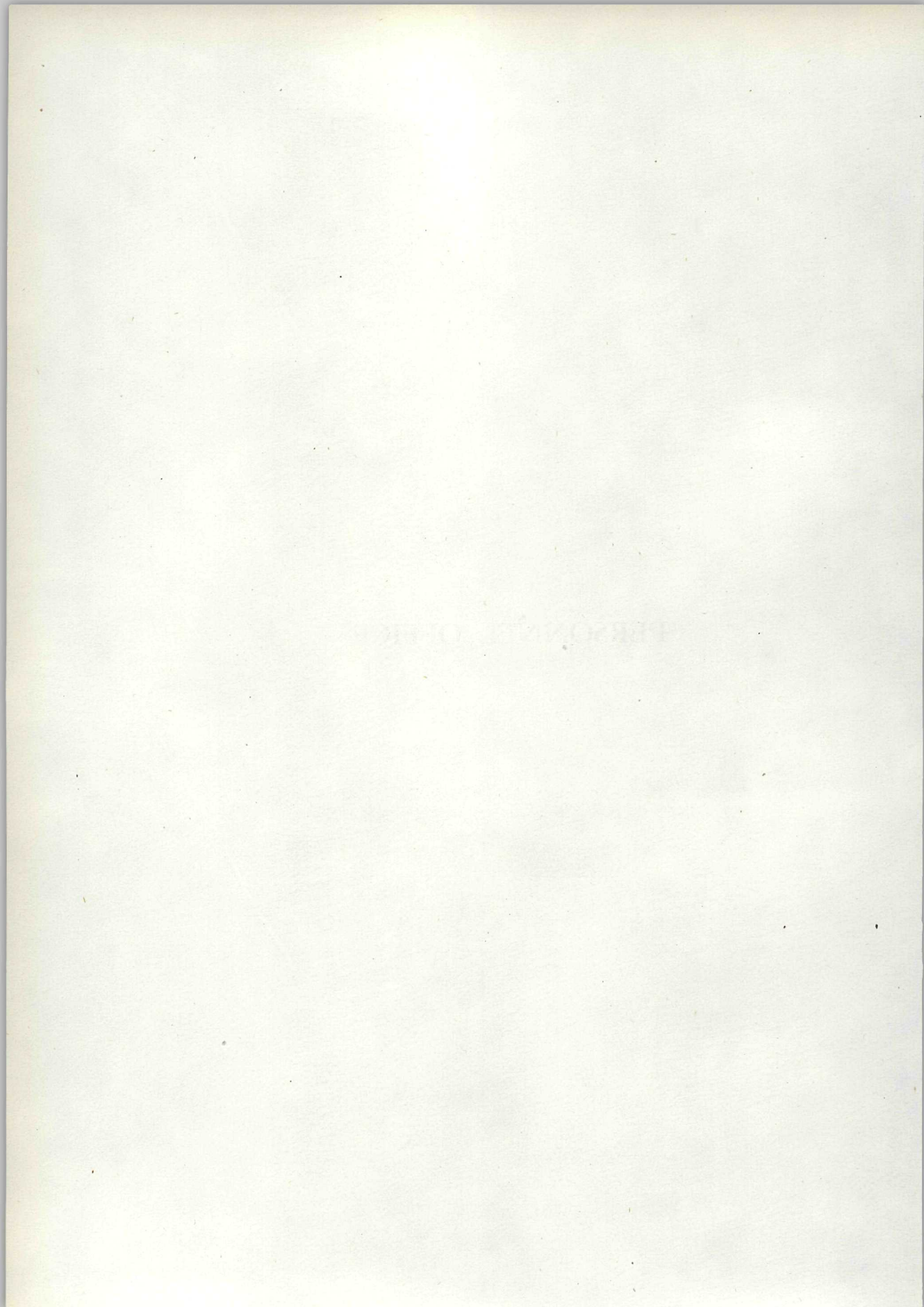
TABLE B.—NUMBER AND VALUE OF BUILDING PERMITS ISSUED DURING THE YEARS ENDED DECEMBER 31ST, 1955, 1956, AND 1957

	1955		1956		1957	
	Number	Value	Number	Value	Number	Value
New schools.....	1	\$54,654.00	1	\$149,681.00	—	—
Swimming-pools.....	2	7,700.00	3	23,500.00	1	\$6,500.00
New houses.....	3	116,000.00	3	115,000.00	3	67,000.00
New apartments.....	—	—	—	—	—	—
New fraternities.....	—	—	—	—	1	42,000.00
Alterations.....	10	91,990.00	12	58,100.00	14	31,100.00
New stores.....	—	—	—	—	—	—
Garages, etc.....	7	6,450.00	9	6,880.00	10	6,850.00
Totals.....	23	\$276,794.00	28	\$353,161.00	29	\$153,450.00

TABLE C.—SUMMARY OF REVENUE RECEIVED DURING PAST TEN YEARS TO DECEMBER 31ST, 1957

Year	Sales of Repossessed Houses		Local Improvement Taxes		Loans		Land Sales		99-year Lease Rentals	Water Accounts	Sundry Rents or Leases	Miscellaneous and Permits	Total
	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest					
1948.....	\$8,204.84	\$690.98	\$16,220.80	\$79.25	\$22,670.47	\$5,043.26	\$44,722.29	\$1,885.19	\$1,763.17	\$16,700.35	\$6,958.35	\$21,817.18	\$146,756.13
1949.....	1,497.77	301.11	7,738.75	296.25	10,490.64	3,844.78	53,728.77	2,164.24	2,124.35	19,575.15	4,920.85	67,993.74	174,676.40
1950.....	893.96	196.60	6,907.25	132.22	9,277.24	4,112.89	103,706.07	3,141.09	2,636.89	24,426.14	4,751.00	51,551.79	211,732.14
1951.....	1,077.09	180.71	7,486.32	281.84	10,283.18	4,337.31	51,526.79	1,963.96	1,888.52	31,543.82	8,926.00	118,433.58	237,929.12
1952.....	1,007.57	127.37	7,795.55	58.12	5,790.49	3,672.77	77,500.20	2,325.31	1,364.13	33,339.72	8,201.00	151,758.28	292,940.51
1953.....	898.82	64.72	10,762.31	100.54	10,353.55	3,426.02	37,652.77	868.48	914.57	32,260.34	10,261.49	11,835.99	119,399.60
1954.....	430.70	107.41	9,532.13	92.99	21,254.60	2,806.22	11,612.02	106.36	976.26	22,151.77	10,981.01	7,693.94	87,736.31
1955.....	531.64	6.60	11,250.35	126.28	5,505.39	2,070.89	15,544.43	411.79	561.53	43,078.28	7,311.23	6,632.94	93,031.35
1956.....	.....	.....	7,487.45	29.94	8,719.99	2,713.73	1,575.00	.....	818.10	62,401.20	7,379.23	8,404.33	99,528.97
1957.....	.....	.....	7,819.29	36.77	5,908.69	1,022.42	1,000.00	135.00	.....	62,205.11	11,564.73	10,302.65	99,994.66
Totals.....	\$14,542.39	\$1,675.50	\$93,000.20	\$1,234.20	\$110,254.24	\$33,050.29	\$398,568.34	\$13,001.42	\$13,047.52	\$347,681.88	\$81,254.89	\$456,424.42	\$1,563,725.19

PERSONNEL OFFICE



PERSONNEL OFFICE

J. H. PALMER

STAFF CHANGES

The year's separations reached a record number of sixty-nine. Two of these were retirements, one being that of P. M. Monckton, Surveyor, Legal Surveys Division, and the other R. Pollard, District Engineer, Water Rights Branch, Nelson, after thirty-two years of service. Two deaths through illness occurred—E. J. Gray, instrument-maker, Air Division, and J. A. Underwood, Supervisor, Mail and File Room, who had thirty-seven years of service behind him. W. A. Minion, Land Inspector, Kamloops, suffered accidental death by drowning during the course of his field duties. His loss, as well as that of the others mentioned above, is a serious one, both personally and departmentally.

Of the remaining separations, two were involuntary, nine were transfers to other departments, and fifty-three were for various reasons, usually to accept other employment.

Eighty new appointments and transfers were made and eleven promotions were implemented as a result of Civil Service competitions. Forty-two individual reclassifications were implemented.

The foregoing figures do not include approximately 100 temporary personnel who were hired as survey assistants or for special duties for short periods.

ESTABLISHMENT

A net increase of twelve positions resulted from the deletion of the four-man Property Room staff from this Service and its transfer to the Forest Service, and the addition of sixteen positions. Of these sixteen, nine were merely inductions of continuously employed personnel formerly in the outside staff and the remaining seven were new altogether.

TRAINING

Five senior personnel successfully completed the first year of the Executive Development Training Course and commenced their second year's work. Three more were selected for the second course, which started in September.

The Personnel Officer participated on a committee which led to the holding of a course in map draughting under the sponsorship of the Civil Service Commission and the Canadian Vocational Training. Twenty young men qualified, and eight of them were appointed to this Department.

Arrangements were also made for an appraisal institute to be held under the same auspices in 1958, and it is expected that all Land Inspectors will thus obtain an essential qualification.

LABOUR RELATIONS AND GENERAL STAFF MATTERS

Protracted negotiations with the University Endowment Lands Fire Fighters' Association resulted in the largest salary increase to date being granted to first-class firemen. Negotiations with the outside workers there resulted in a salary increase of similar proportions for most classifications.

Considerable difficulty was experienced in recruiting for all classifications, but particularly so in technical, professional, and stenographic positions. The chief problem seemed to be the salaries offered. Several briefs on salary rates from various groups of employees were submitted either through Departmental channels or under the grievance procedure, and the Department itself made recommendations in this regard to the Civil Service Commission.

THE HISTORY OF THE

STATE OF NEW YORK

FROM THE FIRST SETTLEMENT OF THE COLONY TO THE PRESENT TIME. BY JOHN B. HOGGINS, ESQ., ATTORNEY AT LAW. VOL. I. NEW YORK: PUBLISHED BY J. B. HOGGINS, 1850.

CONTENTS

CHAPTER I. THE FIRST SETTLEMENT OF THE COLONY. 1

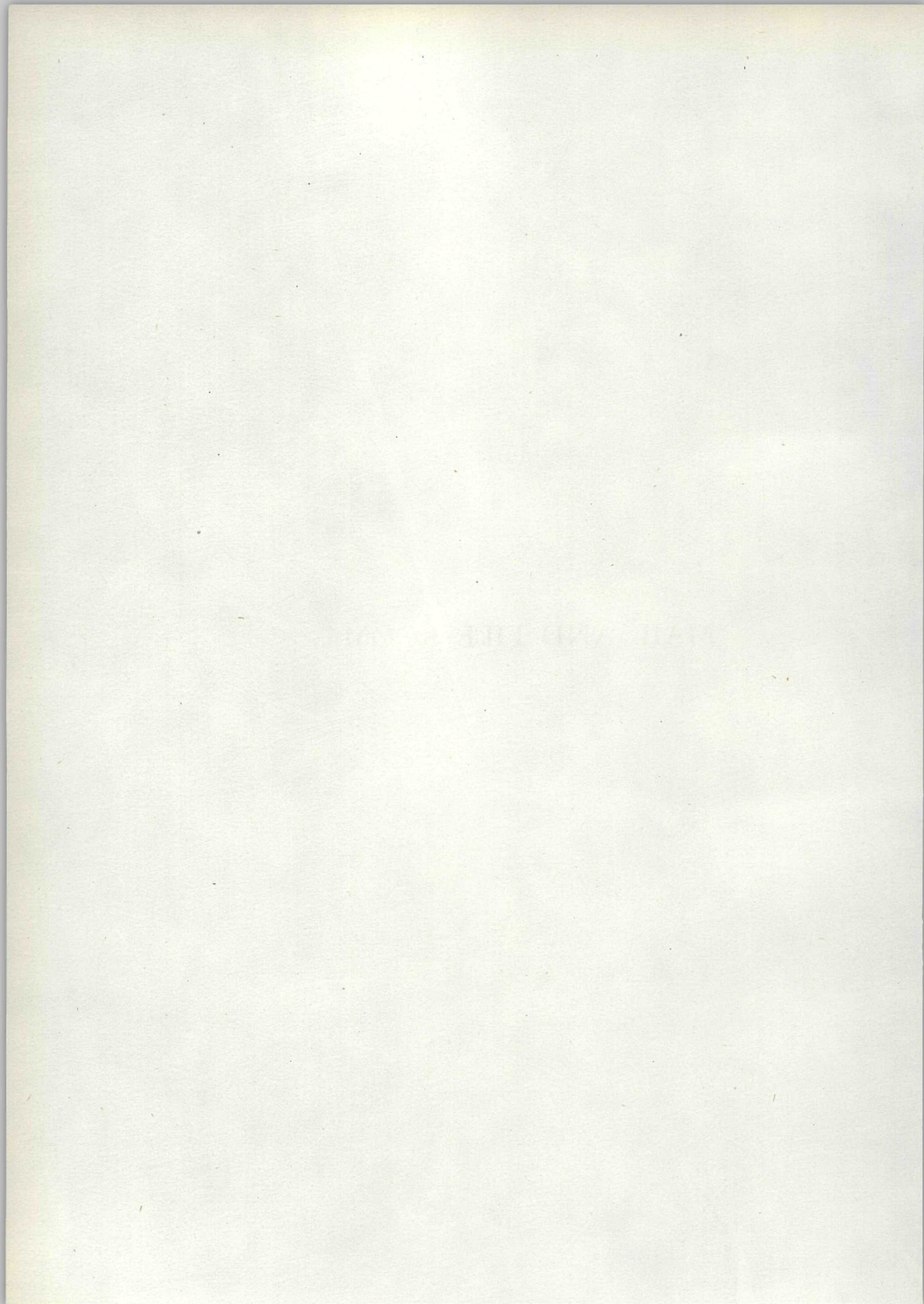
CHAPTER II

THE SECOND SETTLEMENT OF THE COLONY. 1

CHAPTER III

THE THIRD SETTLEMENT OF THE COLONY. 1

MAIL AND FILE ROOM



MAIL AND FILE ROOM

JOHN A. GRANT

The pass-slip system, indicating the location of files in the Department, instituted February, 1957, underwent some changes. Effective December 2nd, 1957, a new file-charge slip with multiple-listing space was brought into use. Under this procedure a charge slip is made out each time a file is passed from one individual to another. The original copy of the charge slip is sent to the file vault and the duplicate is attached to the file, charging it to the new recipient of the file.

The Central Microfilming Bureau began the filming of obsolete "O" files in 1956, and to date 175,000 files have been processed. It is expected the project will be completed by the end of February, 1958.

The anticipated transfer of 240 volumes of Crown grants to the lower vaults will create additional office space in the upper vault. At present over 200 volumes have been microfilmed, and it is anticipated that the undertaking will be completed sometime in 1958, after which reference to the Crown grants will be made by means of microfilm.

LETTERS INWARD

Branch	1956	1957	10-year Average, 1948 to 1957
Lands Service.....	38,571	37,335 ¹	33,214
Forest Service.....	136,061	132,889 ¹	78,012
Water Rights Branch.....	23,755	12,518 ¹	13,410
Surveys and Mapping.....	17,247	14,395 ¹	13,113
Totals.....	215,634	197,137	137,749

¹ Estimated for one month (December) and totalled.

LETTERS OUTWARD (RECORDED)

Branch	1956	1957	10-year Average, 1948 to 1957
Lands Service.....	8,006	9,609 ¹	17,428
Forest Service.....	2,237	2,138 ¹	10,770
Water Rights Branch.....	1,238	1,898 ¹	4,154
Surveys and Mapping.....	-----	-----	3,288
Totals.....	11,481	13,645	35,640

¹ Estimated for one month (December) and totalled.

MISCELLANEOUS REPORTS RECEIVED

Designation	1956	1957	10-year Average, 1948 to 1957
Forest-fire reports.....	5,634	3,238 ¹	2,580
Slash-disposal reports.....	331	540 ¹	655
Logging-inspection reports.....	14,556	16,002 ¹	15,325
Land-classification reports.....	2,829	2,490	2,159
Cruise reports.....	1,957	1,168 ¹	-----
Stumpage-adjustment notices.....	2,200	6,554 ¹	-----
Totals.....	27,507	29,992	20,719

¹ Estimated for one month (December) and totalled.

NEW FILES CREATED

Designation	1956	1957	10-year Average, 1948 to 1957
"0" files.....	4,254	4,482 ¹	4,827
Timber-mark files.....	1,762	1,158 ¹	1,601
Timber-sale files.....	4,270	3,115 ¹	3,404
Totals.....	10,286	8,755	9,832

¹ Estimated for one month (December) and totalled.

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1958