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

YEAR ENDED DECEMBER 31

1961

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in right of the Province of British Columbia.
1962

VICTORIA, B.C., January 31, 1962.

To Major-General the Honourable GEORGE RANDOLPH PEARKES,
V.C., P.C., C.B., D.S.O., M.C.,
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 31, 1961.

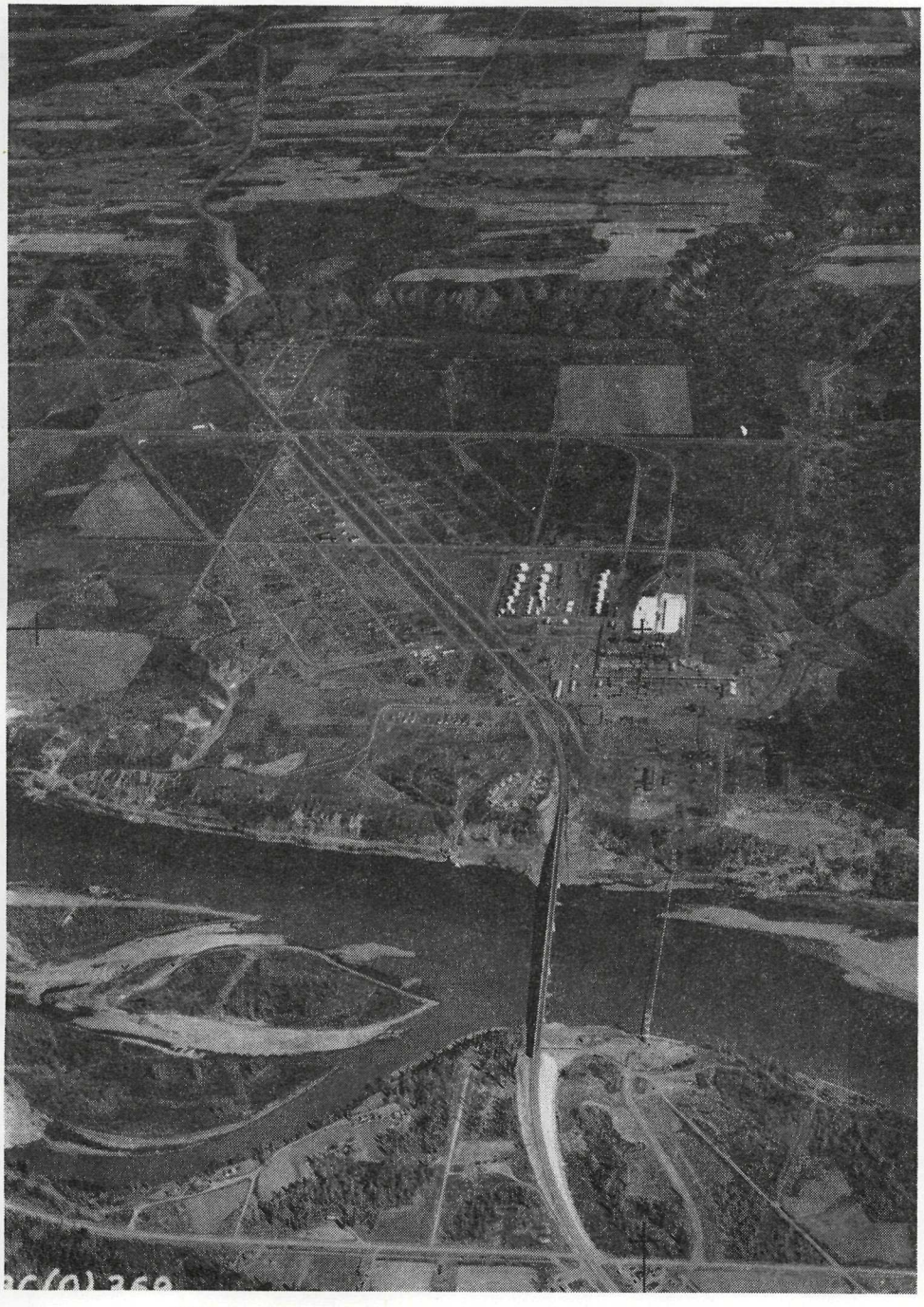
R. G. WILLISTON,
Minister of Lands and Forests.

VICTORIA, B.C., January 31, 1962.

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 31, 1961.

E. W. BASSETT,
Deputy Minister of Lands.



Village of Taylor, looking north across the Peace River.

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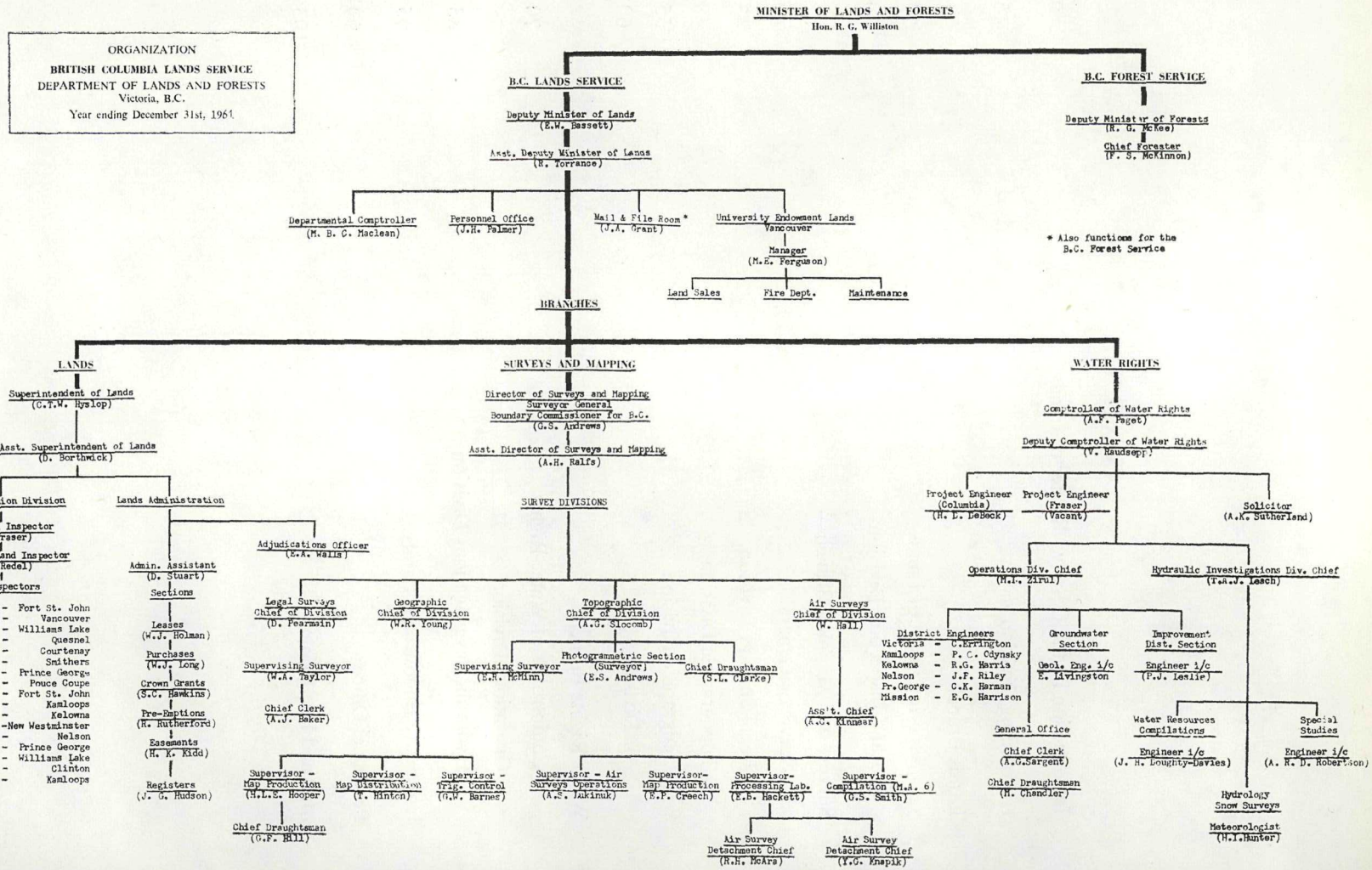
ORGANIZATION

BRITISH COLUMBIA LANDS SERVICE

DEPARTMENT OF LANDS AND FORESTS

Victoria, B.C.

Year ending December 31st, 1961



Report of the British Columbia Lands Service

E. W. Bassett, Deputy Minister of Lands

When reviewing the events and accomplishments of 1961, it is at once apparent that, in the face of continuing heavy increases in the volume and complexity of their work, Lands Service personnel carried out their duties with notable dispatch and efficiency. In particular, many of the senior staff were involved in heavy administrative responsibilities concerning development of the Province's major natural resources, and in this regard they gave unstinting effort.

The Lands Branch continued to experience an upward trend in the number of applications for alienation of Crown land, particularly by leasehold tenure. Applications to lease rose sharply to 2,363 and were, for the first time, more numerous than applications to purchase. Several very large blocks of land for grazing and agricultural purposes were applied for, and careful consideration was necessary to ensure valid and orderly development of the land involved.

The staff of the Land Inspection Division completed 4,075 examinations in 1961, the highest total on record. Additional to their usual field work in connection with land applications, duties of the Land Inspectors included such varied tasks as counselling potential settlers, making appraisals for other Government departments, resolving disputes arising from conflicting land use, and recommending reserves for the use, recreation, and enjoyment of the general public.

The Legal Surveys Division of the Surveys and Mapping Branch checked, indexed, plotted, and made official plans from 457 sets of field-notes covering the survey of 631 Crown lots. Use of the IBM 650 computer operated by the Data Processing Division of the Department of Industrial Development, Trade, and Commerce greatly aided the mathematical checking of field-notes, subdivision plans, and right-of-way plans. After a successful trial period, the computer programme was extended to also include all plans received by the Victoria Land Registry Office.

Records of Crown land alienation continued to be kept up to date on the 210 Provincial Departmental reference maps. During 1961 a start was made on the recompilation of four Departmental reference maps covering the Lower Fraser Valley between Vancouver and Hope. In order to show the complexity of land alienations more clearly, it has been found necessary to redraw these sheets at 4-inches-to-1-mile scale (compared with the existing scale of 1 inch to 1 mile), and their number accordingly is increased to thirty-one.

Field work of the Legal Surveys Division also included subdivision surveys at Bear Lake, Willow River, and Merritt. Two park-sites, two Forest Service Ranger stations, thirty community-use reserves, and 206 roadside lots were also surveyed. In addition, five field parties surveyed 69.19 miles of main Provincial highway.

In spite of an abbreviated field season and temporary loss of the Beaver float aeroplane which was damaged by a fishing-boat, field crews of the Topographic Division established survey control for 29½ standard National Topographic map-sheets. This is a fine accomplishment and compares favourably with the 21½ sheets controlled in 1960. Work was facilitated through the use of helicopters and by concentrating mainly on relatively accessible areas along the coast which could be reached from the vessel "B.C. Surveyor." A total of twenty-six topographic manuscripts at 2-inches-to-1-mile scale was compiled, and eighty-eight plans were draughted at scales as large as 1 inch to 20 feet. The Photogrammetric Section handled twenty-one large-scale plotting assignments and 3,638 square miles of National Topographic coverage.

New regulations governing the survey of well-sites under the *Petroleum and Natural Gas Act* were instituted by the Department of Mines and Petroleum Resources in 1961. The responsibility of examining well-site plans to ensure that they conform to the standards outlined in the regulations was assigned to the Trigonometric Control Section of the Geographic Division.

The Canadian Board on Geographical Names was formally dissolved by the Federal Government, and the Canadian Permanent Committee on Geographical Names was established in its place. The Chief of the Geographic Division was appointed to the Committee as the member for British Columbia.

Seven new Provincial maps were published in 1961 by the Geographic Division, including the fifth sheet of the popular 1-inch-to-10-miles regional series, North-eastern British Columbia (Map 1D). A record total of 87,198 maps was distributed to the general public and to various Government departments.

A notable event in the Air Division concerned replacement of the two Anson V aircraft by Beechcraft D18S (Expeditors) which had been declared surplus by the Royal Canadian Air Force. One Expeditor was converted for camera operations and saw service during the latter part of the 1961 field season. Two Ordinance Survey cameras were acquired on loan from the Royal Canadian Air Force and proved to be very satisfactory for forest inventory photography and general reconnaissance. The Air Photo Library distributed a total of 184,286 reprints and loans of standard 9- by 9-inch air photographs, of which 48,058 were taken by the general public.

Sixteen years of study and negotiation culminated in the signing of the Columbia River Treaty by Canada and the United States on January 17, 1961. The treaty has yet to be ratified before coming into force. The Comptroller and several senior members of the Water Rights Branch participated at the committee and working-group level in drafting of the document. Further to the treaty, applications for water licences were received later in the year for storage projects at Mica Creek, Duncan Lake, and the outlet of Lower Arrow Lake. Public hearings were held by the Comptroller in the Kootenay areas affected by the three proposed dams with a view to full study and consideration prior to any issuance of licence.

The Operations Division of the Water Rights Branch processed 1,102 applications for water licences during 1961. This was 17.4 per cent higher than in 1960 and 6.2 per cent more than in 1959, the previous record year. Establishment of a District Engineer at Mission City brought to six the number of district offices now in existence. In anticipation of the issuance of licences for the use of ground-water, a geological engineer was added to the staff of the Operations Division.

Various engineering and feasibility studies on behalf of the 270 improvement districts in British Columbia or other agencies resulted in thirteen major reports during 1961.

The Hydraulic Investigations Division noted an increase of problems relating to flooding, erosion, and drainage. Flood conditions on the Capilano, Seymour, Alouette, and Cowichan Rivers were examined with a view to establishing better control of their flow. Other major investigations were undertaken at the request of various agencies on the Lillooet River, Fraser River, Kamloops Lake, Lynn Creek, Nicomekl River, Salmon River, Shuswap Lake, and Windermere Lake.

In Northern British Columbia, the Sikanni Chief, Muskwa, Racing, and Toad Rivers were sampled for suspended sediments. Hydro-electric power investigations on northern streams were continued, with large-scale mapping projects being completed for the Stikine and Liard Rivers.

Among the four major water-supply studies recorded in 1961 was a two-volume report on domestic and irrigation water in the Vernon area of the Northern Okanagan.

Besides maintaining its network of snow measurement sites, the Hydraulic Investigations Division examined potential snow courses on the Columbia River watershed which would be needed with the damming of that river. Work also progressed on programming stream-flow forecasts for the IBM 650 computer.

The Water Rights Branch also participated in various flood-control and hydro-electric studies with the Fraser River Board.

The accomplishments cited in this brief introduction are only a sample of the wide range of activities which are the responsibility of the Lands Service, a more detailed account of which is set forth in the following pages.

ACCOUNTING DIVISION

ACCOUNTING DIVISION

M. B. MACLEAN, B.COM., DEPARTMENTAL COMPTROLLER

The year 1961 has been a very active one for the Accounting Division. As shown by the following bar chart, revenue from Lands Service sources has continued to increase. It will be noted particularly that throughout the year there has been a strong and continued interest shown by the public in the leasing of Crown land, and this has resulted in a very substantial increase in revenue under the item " Land leases, rentals, fees, etc." The number of active lease accounts has increased by over 1,000 during the past year.

Table 1.—Summary of Revenue Collections for the Year Ended December 31, 1961

Land leases, rentals, fees, etc.	$1,001,071.13
Land sales	703,705.71
Sale of maps and air photos	60,430.70
Water rentals and recording fees	1,853,653.18
Total	$3,618,860.72

Table 2.—Comparison of Revenue Collections for Ten-year Period 1952–61, Inclusive

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
1958	2,596,050.13
1959	2,687,816.62
1960	3,224,498.27
1961	3,618,860.72
Total	$27,880,491.13

Ten-year average, $2,788,049.11.

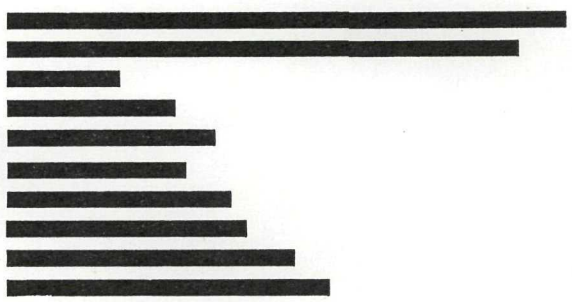
Table 3.—Classification of Revenue Collections for the Year Ended December 31, 1961

Land sales—		
Country lands	$494,846.44	
Town lots	207,747.42	
Surface rights, mineral claims	1,107.80	
Indian reserve cut-off	4.05	
		$703,705.71

Table 3.—Classification of Revenue Collections for the Year Ended December 31, 1961—Continued

Land leases, rentals, fees, etc.—			
Foreshore leases—			
Booming and log storage	$249,941.15		
Commercial (marinas, etc.)	268,927.77		
Oyster	9,361.93		
Miscellaneous (foreshore protection, etc.)	1,105.10		
		$529,335.95	
Land leases—			
Grazing and (or) agriculture	$43,728.11		
Quarrying (limestone, sand and gravel)	25,349.97		
Camp-site (lodge, fishing)	5,010.82		
Home-site	2,499.94		
Miscellaneous (residential, etc.)	61,440.90		
		138,029.74	
Land-use permits		777.50	
Licences of occupation		1,728.77	
Royalty collections		196,342.14	
Easement collections—			
Annual rentals	$3,290.41		
Outright considerations	49,658.31		
		52,948.72	
Fees—			
Crown grant	$10,279.87		
Assignment	1,820.00		
Miscellaneous (lease, search, etc.)	7,130.50		
		19,230.37	
Sundry collections (occupation, rental, survey charges, etc.)		62,677.94	
			$1,001,071.13
Sale of maps and air photos—			
Legal Division		$21,388.53	
Geographic Division		20,723.66	
Air Division		18,318.51	
			60,430.70
Water rentals and recording fees			1,853,653.18
Gross revenue for year			$3,618,860.72

Table 4.—Comparison of Land Leases, Rentals, Fees, etc., Revenue for Ten-year Period 1952–61, Inclusive

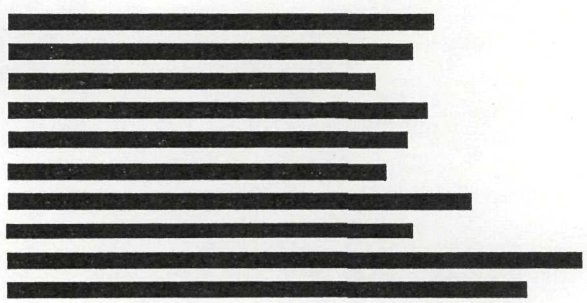


1952	$1,694,073.93
1953	1,608,773.65
1954	330,397.09
1955	425,595.79
1956	576,331.17
1957	472,415.55
1958	605,229.73
1959	668,367.70
1960	842,413.17
1961	1,001,071.13
Total	$8,224,668.91

Ten-year average, $822,466.89.

NOTE.—The years 1952 and 1953 include coal, petroleum and natural-gas revenue.

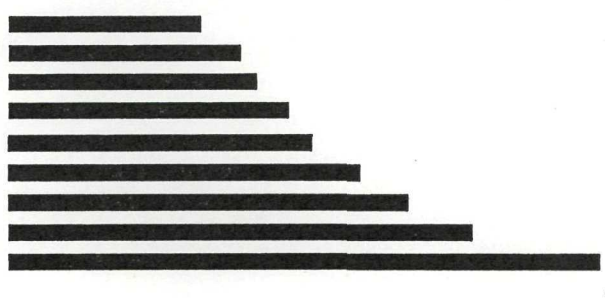
Table 5.—Comparison of Land Sales for Ten-year Period 1952–61, Inclusive



1952	$619,263.14
1953	594,004.08
1954	488,303.49
1955	605,469.42
1956	573,976.49
1957	522,825.65
1958	677,036.15
1959	589,975.24
1960	806,723.54
1961	703,705.71
Total	$6,181,282.91

Ten-year average, $618,128.29.

Table 6.—Comparison of Water Rentals and Recording Fees Revenue for Nine-year Period 1953–61, Inclusive



1953	$700,289.17
1954	813,413.61
1955	849,980.00
1956	1,081,592.07
1957	1,152,370.05
1958	1,256,004.37
1959	1,363,939.33
1960	1,510,277.86
1961	1,853,653.18
Total	$10,581,519.64

Nine-year-average, $1,175,724.40

NOTE.—Revenue for years previous to 1953 available on fiscal basis only.

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.*

Summer-home site, Central British Columbia.

LANDS BRANCH

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

The general work load of the Lands Branch showed a marked increase in 1961, and this is reflected in the total number of applications received, which numbered 6,462, an increase of nearly 10 per cent over the previous year.

The staff of the Administration Division was increased by two clerks during 1961 for a total of thirty-seven.

The following summary is a brief outline of the highlights of the work carried out by the various sections of the Administration Division of the Lands Branch:—

Lease Section.—The work load of this Section has increased 58 per cent—in 1961 2,363 applications to lease were received, as compared to 1,498 in 1960. In the past five years the number of applications has increased over 230 per cent.

Purchase Section.—This Section operated at approximately the same level in 1961 as it did in 1960. A total of 2,165 applications was received in the former year and 2,192 applications in the latter year.

Crown Grants Section.—There was a slight reduction in the number of Crown grants issued during 1961. This is due primarily to a decrease in the number of Crown grants issued covering mineral claims.

Pre-emption and Reserve Section.—This Section processed a total of 804 applications in 1961, as compared to 710 in 1960, an increase of 13 per cent.

Status Section.—A total of 14,611 parcels of land was checked as to status during 1961, an increase of 13 per cent over the previous year. The type of work carried out in this Section becomes increasingly more complex due to the multiplicity of tenures, especially near the settlement areas of the Province.

Easement Section.—There was a slight increase in activity in this Section: 145 applications were received in 1961 as compared to 138 in 1960.

A total of twenty-five parcels of land was offered for purchase by tender, of which nineteen were sold, having a value of $20,840. Ten parcels were offered for leasehold by tender, the majority of which were for grazing purposes.

Twenty public auction sales of Crown lands were held during the year. A total of 302 parcels was offered by auction, and 110 of these were purchased on the day of the sale for $132,517. Nine public auctions of leases were held involving 150 water-front lots, the majority of which fronted on lakes in the Interior of the Province.

A number of subdivisions were planned during the year, and arrangements made with the Department of Highways to construct the necessary subdivision roads. Much greater emphasis is being placed on road access to Crown subdivisions in an effort to co-operate with the Department of Highways.

There has been a marked increase in the number of large applications to lease Crown lands for grazing and agricultural purposes, especially in the Peace River District. In some instances the areas involve extensive acreages. The Lands Branch is having all such applications carefully investigated to ensure that they are bona fide and that a concrete development plan has been formulated and sufficient operating capital is available.

The continued expansion of the petroleum and natural-gas industry in the Province and the resulting construction of pipe-lines has kept the Lands Branch

under pressure to provide the industry with status information covering the Crown lands involved in their projects and in issuing rights-of-way to cover these projects.

Applications to purchase Crown lands lying within sustained-yield units and public working circles in the Central Interior area have created problems resulting from the limitation of annual timber cuts by the Forest Service. Close liaison with the Forest Service is maintained in such areas, and often joint examinations are made by Lands Service and Forest Service personnel to ensure that the disposition of Crown lands is effected in the best public interest.

The past five years have been a period of greatly increased activity in the Lands Branch. Annual revenue collected by the Branch has risen from $980,411.88 to $1,704,776.84, an increase of 73 per cent. Total applications received have risen from 4,555 to 6,462 per annum, an increase of 42 per cent. The number of letters received has risen from 17,077 to 30,272, an increase of 77 per cent.

The following tables indicate in some detail the work carried out by the Administration Division of the Lands Branch. The report of the Inspection Division is submitted separately by the Chief Land Inspector.

Table 1.—Country Land Sales, 1961

	Acres
Surveyed	79,844.05
Unsurveyed	18,062.15
Total	97,906.20

Table 2.—Certificates of Purchase Issued, 1961

Land Recording District	Total
Alberni	55
Atlin	----
Cranbrook	23
Fernie	13
Fort Fraser	68
Fort George	92
Fort St. John	123
Golden	15
Kamloops	41
Kaslo	5
Lillooet	57
Nanaimo	25
Nelson	20
New Westminster	27
Osoyoos	7
Pouce Coupe	69
Prince Rupert	34
Quesnel	50
Revelstoke	20
Similkameen	44
Smithers	50
Telegraph Creek	----
Vancouver	53
Victoria	13
Williams Lake	40
Total	944

Table 3.—Town Lots Sold, 1961

Town	Lots	Value
Alberni	25	$17,525.00
Barkerville	24	600.00
Barriere	8	728.00
Bear Lake	2	400.00
Beaverdell	7	350.00
Blueberry	3	725.00
Carmi	1	36.00
Cascade	7	388.00
Castlegar	2	420.00
Cedar	2	150.00
Chase	1	300.00
Chetwynd	2	500.00
Coalmont	2	150.00
Cowichan Station	13	1,854.00
Elko	11	3,960.00
Extension	12	1,080.00
Falkland	1	250.00
Fernie	6	126.00
Fort Fraser	29	1,320.00
Fort Nelson	31	13,005.00
Fraser Lake	3	130.00
Gold Bridge	10	930.00
Golden	24	1,515.00
Grand Forks	1	25.00
Greenwood	1	50.00
Hazelton	17	435.00
Houston	4	400.00
Huntingdon	3	450.00
Jessica	1	50.00
Keremeos	1	300.00
Lac la Hache	2	675.00
Lower Post	1	75.00
McBride	2	600.00
Merritt	4	779.30
Moyie	2	30.00
Nakusp	11	3,150.00
New Hazelton	2	50.00
Pemberton	2	725.00
Port Alberni	2	655.00
Port Clements	14	450.00
Port Edward	4	895.00
Prince George	205	92,520.00
Prince Rupert	21	9,855.00
Queen Charlotte	24	1,400.00
Rock Creek	1	200.00
Shawnigan Lake	4	1,000.00
Slocan	4	150.00
Smithers	41	6,090.00
Squamish	10	1,151.33

Table 3.—Town Lots Sold, 1961—Continued

Town	Lots	Value
Stewart	15	$2,340.00
Topley	1	105.00
Vanderhoof	1	60.00
Wells	3	275.00
Willow River	1	60.00
Wilmer	12	270.00
Ymir	8	240.00
Miscellaneous	6	2,810.00
Totals	657	$174,762.63

Table 4.—New Leases Issued, 1961

Land—	Number	Acreage
Agriculture	20	4,811.35
Hay and grazing (pasture and hay-cutting)	290	92,101.94
Quarrying (sand, gravel, limestone, etc.)	27	2,044.98
Home-site (section 78, *Land Act*)	7	105.00
Residential	402	707.78
Miscellaneous (resorts, service-stations, camp-sites, mill-sites, etc.)	64	1,134.57
Foreshore—		
Booming, log storage, log-dumping, etc.	99	2,006.80
Oyster and shell-fish	21	426.28
Industrial (canneries, mill-sites, wharves, etc.)	6	278.09
Quarrying (sand, gravel from river-beds)	4	112.24
Commercial (boat rentals, marinas, marine service-stations, etc.)	34	139.25
Miscellaneous (private wharves, boat-houses, etc.)	39	161.15
Totals	1,013	104,029.43

Table 5.—Temporary Tenure Leases Renewed, 1961

Number	100
Acreage	11,014.56

Table 6.—Land-use Permits Issued, 1961

Number	13
Acreage	47.90

Table 7.—Licenses to Occupy Issued, 1961

Number	7
Acreage	201.90

Table 8.—Assignments Approved, 1961

Leases, land-use permits, licences of occupation	316

Table 9.—Easements Granted, 1961

	Number	Miles	Acres
Foreshore			
Access road	1	0.321	1.410
Water pipe-line	1	0.167	0.115
Sewer pipe-lines	3	0.730	1.146
Natural-gas pipe-lines	1	0.037	0.220
Totals	6	1.255	2.891
Land			
Sewer pipe-lines	1	0.131	0.147
Water and sewer pipe-lines	1	0.227	1.380
Television satellite station	2	.....	1.150
Microwave station and road	2	0.454	5.827
Power-line	1	0.050	0.237
Aerial tramway, power-line, and microwave site	1	2.580	55.650
Radio-telephone site	1	.....	0.034
Access road, power-line, and microwave site	1	0.534	5.574
Microwave sites	2	.....	2.745
Cathodic ground beds	3	0.340	0.830
Oil pipe-lines	7	502.980	2,736.686
Natural-gas pipe-lines	9	134.370	325.985
Natural-gas pipe-lines and well-sites	5	26.770	121.380
Totals	36	668.436	3,257.625
Licences of Occupation			
Power-line, access road, and microwave site	1	0.216	2.820
Railway bridge	1	0.265	9.430
Power-line	1	0.114	.....
Totals	3	0.595	12.250
Grand totals	45	670.286	3,272.766

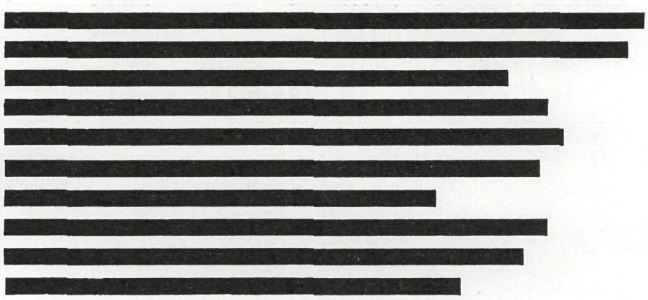
In line with current Departmental policy, thirty-one letters of consent for the construction of access roads were issued during the year.

Table 10.—Crown Grants Issued, 1961

Purchases (country lands)	665
Purchases (town lots)	321
Pre-emptions	28
Surface rights (*Mineral Act*)	7
Public Schools Act	15
Veterans' Land Settlement Act	6
Home-site leases	11
Pacific Great Eastern Railway	5
Supplementary timber grants	2
Miscellaneous	14
Total	1,074

Certified copies of Crown grants issued, 3.

Table 11.—Crown Grants Issued for Past Ten Years



1952	1,872
1953	1,829
1954	1,276
1955	1,498
1956	1,518
1957	1,426
1958	1,043
1959	1,471
1960	1,399
1961	1,074
Total	14,406

Ten-year average, 1,440.

Table 12.—Total Area Deeded by Crown Grant, 1961

	Acres
Purchases (country lands)	69,069.19
Pre-emptions	4,428.00
Surface rights (*Mineral Act*)	271.90
Public Schools Act	68.20
Veterans' Land Settlement Act	805.00
Home-site leases	312.16
Pacific Great Eastern Railway	89.11
Supplementary timber grants	362.40
Miscellaneous	80.57
Total	75,486.53

Table 13.—Pre-emption Records, 1961

Land Recording District	Pre-emptions			C.of I. Issued
	Applications Received	Applications Allowed	Cancelled	
Alberni	----	----	----	----
Atlin	----	----	----	----
Cranbrook	----	----	----	----
Fernie	----	----	----	----
Fort Fraser (Burns Lake)	7	1	----	1
Fort George (Prince George)	23	7	3	----
Fort St. John	53	31	4	4
Golden	1	----	----	----
Kamloops	2	----	----	----
Kaslo	----	----	----	----
Lillooet (Clinton)	2	----	----	----
Nanaimo	----	----	----	----
Nelson	----	----	----	----
New Westminster	----	----	1	----
Osoyoos (Vernon)	----	----	----	----
Pouce Coupe	104	103	50	9
Prince Rupert	1	----	1	----
Quesnel	22	5	1	2
Revelstoke	----	----	----	----
Similkameen (Penticton)	----	----	----	----
Smithers	2	----	----	----
Telegraph Creek (Prince Rupert)	1	----	----	----
Vancouver	----	----	----	----
Victoria	----	----	----	----
Williams Lake	5	----	----	2
Totals	223	147	60	18

Table 14.—Reserves, 1961

	Applications Received	Reserves Completed
Use, recreation, and enjoyment of the public	193	148
British Columbia Department of Highways (rights-of-way, gravel-pits, bridge-sites, etc.)	146	137
Federal Government (defence purposes, wharf-sites, etc.)	65	63
British Columbia Forest Service (Ranger stations, grazing, radio-sites, reforestation, etc.)	95	119
Miscellaneous (Game Branch, water-power projects, garbage-dumps, school-sites, cemeteries, etc.)	82	78
Totals	581	545

General Summary

	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	Ten-year Average
Pre-emption records issued	87	53	97	48	35	66	99	53	77	147	76
Certificates of improvements issued	69	77	71	41	52	43	67	39	27	18	50
Certificates of purchase issued	1,465	1,743	1,043	1,084	935	1,012	1,151	1,114	1,248	944	1,174
Crown grants issued	1,872	1,829	1,276	1,498	1,518	1,426	1,043	1,471	1,399	1,074	1,440
Total acreage deeded by Crown grants	98,602	99,036	73,461	65,941	80,308	89,907	58,798	91,294	79,766	75,486	81,260
New land sales—											
Number	1,429	1,743	1,043	1,084	935	1,012	1,151	1,114	1,248	944	1,170
Value	$702,776.75	$745,874.44	$391,989.96	$578,487.16	$546,702.70	$511,895.02	$676,627.48	$669,899.78	$857,060.67	$673,655.53	$635,496.95
Leases under *Land Act*	301	353	366	311	264	276	479	513	802	1,013	468
Acreage leases, *Land Act*	45,110	46,089	50,064	67,195	51,301	56,808	77,912	51,777	107,474	104,029	65,776
Temporary tenure leases renewed	115	75	52	62	65	72	66	88	103	100	80
Land-use permits	14	28	27	25	21	22	9	8	21	13	19
Licences of occupation, easements, etc.	21	40	35	40	87	55	46	27	35	7	39
Clearances of reverted mineral claims	514	461	400	663	783	361	245	291	303	282	430
Reservations for use and enjoyment of public and other purposes	202	332	440	392	422	430	454	640	550	581	444
Land Act collections	$923,228.41	$944,679.01	$818,700.58	$1,031,056.01	$1,140,178.27	$980,411.88	$1,282,265.85	$1,258,342.94	$1,649,136.71	$1,704,776.84	$1,173,277.65

LAND INSPECTION DIVISION

L. D. FRASER, B.SC.A., P.AG., A.A.C.I., CHIEF LAND INSPECTOR

Annual Reports of previous years have indicated an ever-increasing volume of work being handled by the Land Inspection Division. The year 1961 was by no means an exception as the number of field examinations completed showed a 14.3-per-cent increase over the previous year. This percentage increase, which amounted to 511 additional field examinations, is more than a mere recital of figures when it is realized that the diversity and complexity of many of the examinations are increasing year by year. More accurate and detailed supporting data are being demanded in the fixing of land and timber values, and hence the time spent in gathering and analysing this information is on the increase.

During the past year this Division has undertaken a number of detailed examinations of tributary Crown lands adjacent to proposed rural line extensions. The purpose of these examinations was to estimate the number of potential farm or residential users of power along the line that could be anticipated in the near future. Based on this figure, the Government contributes a portion of the cost of construction of the line and thus relieves the immediate users of the cost of servicing Crown lands suitable for future development. Any costs assumed by the Government are charged against the parcels selected and will be recovered from future purchasers of these Crown lands.

There has been a tendency over the past few years for other Government departments and agencies to call on the Land Inspection Division for assistance in the appraisal and valuation of various properties they wish to buy or sell. It is anticipated that this tendency will increase as more and more Land Inspectors become accredited appraisers. During the past year detailed appraisals have been compiled for the Capital City Planning Board, the Barkerville Restoration Committee, the Land Settlement Board, Forest Service, Parks Branch, the Social Welfare Department, and the Pacific Great Eastern Railway.

The greatest increase in land applications has occurred in the Fort St. John and Pouce Coupe Districts. In the Fort St. John District there has been a 25-per-cent increase in new applications, while in the Pouce Coupe area the increase amounted to 75 per cent. The expanding oil and gas industry, together with the proposed power development on the Peace River, coupled with the availability of considerable areas of land suitable for agriculture and grazing, has attracted new settlers. Much of the land is being disposed of by lease. It would appear that many new settlers have limited capital and find that the leasing of Government land for grazing and agriculture, at reasonable rentals, enables them to put their remaining funds into live stock and machinery.

A brief reference to Table 1 on page 33 clearly indicates that, while the output of the Land Inspection Division has been steadily increasing over the years, the number of outstanding examinations at the end of each year has remained almost stationary. Over the past year, field working conditions were ideal in most areas, and it is felt that the field staff have reached the apex of their capabilities.

A review of the number and type of examinations completed in 1961, and more particularly shown in Table 2, page 34, presents some interesting comparisons. For example, in 1961, 13.8 per cent of all examinations made were pre-Crown grant inspections required for land sold subject to section 53 of the *Land Act*. In 1957, this type of examination comprised less than 7 per cent of the volume of field work. In 1961, 101 reserves for the recreation and enjoyment of the public were recommended by the Land Inspectors. In 1957 only twenty-six such reserves were recom-

mended. The increase in the number of public reserves is largely due to a change in Government policy, whereby all lakes are reconnoitred before further alienations, either by lease or purchase, are entertained to ensure that the needs of the public have been adequately cared for.

STAFF

In 1961 there was no change in the field staff of the Land Inspection Division, which has remained at seventeen District Inspectors. A review of the staff complement of this Division for the past five years reveals some rather startling information. In 1957 the field staff consisted of fifteen permanent Land Inspectors and two part-time summer assistants. Part-time assistance during the summer months was valuable, but the time lost by permanent Inspectors in training these people and the further loss of time in supervising and scrutinizing their reports was considered to be less efficient than hiring permanent staff. In 1958 no summer assistants were hired, but the permanent field staff was increased to seventeen Inspectors. The result of replacing two part-time assistants with two permanent fieldmen actually was a net increase in staff over 1957 equivalent to one permanent Inspector.

In 1957 the Land Inspection Division completed 2,589 examinations and was left with a backlog of 526 outstanding inspections at the end of the working-year. In 1958, with the net increase in staff equivalent to one permanent Inspector, 3,043 examinations were completed, leaving a backlog of 348 inspections. In 1961 the field staff completed 4,075 inspections, leaving an outstanding backlog of 454 examinations at the end of the year. On a comparative basis, 1,486 more examinations were done in 1961 than were done in 1957, with a net increase in staff equivalent to only one permanent fieldman. This phenomonal increase in the output of the Division must be credited to the diligent efforts of the field Inspectors, as well as the fact that most Inspectors have remained in one district for several years and hence their personal knowledge and familiarity with the district have cut examination time to a minimum. Other factors that have assisted the Land Inspector in increasing his output are the construction of new roads, better maps, and the availability of excellent air-photo coverage.

There is an urgent need to compile an up-to-date Land Inspector's manual that will provide written instructions for all aspects of the field work, as well as outline proper office procedure.

Other problems, such as the valuation of microwave and television sites, land-use surveys, the appraisal of forest lands, a study of royalty charges, and a review of the basis for fixing grazing-lease rentals, are in immediate need of attention. Considerable background material must be gathered to support valuation guides and to make recommendations affecting changes in policy.

On August 7, 1961, a Clerk—Grade 2 was appointed to assist in the Chief Land Inspector's office and the Lands general office.

During the past year Mr. A. Paulsen, Land Inspector at Kelowna, was successful in fulfilling all requirements of the Appraisal Institute of Canada and was awarded his A.A.C.I. accreditation. Other Land Inspectors are in various stages of completing the demonstration appraisals that will lead to accreditation if and when accepted. It is hoped that by the end of 1962 the majority of Land Inspectors will have been accredited with the Appraisal Institute of Canada.

DISTRICT PROBLEMS

During the past year it has been necessary to rush temporary assistance to various land inspection districts throughout the Province where the backlog of outstanding inspections had reached a critical stage. Some temporary measure of relief

was provided by shifting Inspectors from other districts where the work load was not quite as critical.

Mr. D. M. Thom, Land Inspector at Kamloops, assisted in the Clinton, Nelson, Prince George, and Williams Lake Districts.

Mr. G. A. Rhoades, Land Inspector at Clinton, assisted in the Williams Lake District.

Mr. A. F. Smith, Land Inspector at New Westminster, assisted in the Victoria, Courtenay, and Smithers Districts.

Mr. D. E. Goodwin, Land Inspector at Courtenay, assisted in the Fort St. John District and undertook a number of examinations in remote areas at the north end of Vancouver Island.

As a result of the extra assistance required in many of the Interior districts of the Province, it was decided to adjust some district boundaries in the hope that the work load will be more evenly distributed. This move was also taken because parts of some districts have now become more accessible from neighbouring districts, and hence less field time would be spent in travelling.

One major problem which is coming to the fore is the means of gaining access to remote areas where road access is not available. This problem has been partially solved through the assistance of the Topographic Division, which has made its float-equipped Beaver aircraft available to the Land Inspector when not employed on other work. Experience has proved than it is sometimes more economic to charter private aircraft to reach remote lakes rather than spend several days trying to reach them by boat or horseback. Helicopters have also proven to be a great time-saver when employed to spot-check soils, timber types, and topographic features in very large acreage applications.

Most of the district offices now have adequate office accommodation. However, it is felt that the offices at Kelowna, Clinton, Quesnel, Smithers, and Pouce Coupe are too small to accommodate the necessary office equipment and still allow a reasonable amount of area for the stenographer and the visiting public. Efforts will be made to expand the office facilities in these five districts at the first opportunity.

Most districts have reported a continuing increase in the number of office calls and personal interviews. The Inspector's knowledge of specific areas and his familiarity with local agricultural practices are information much in demand by prospective settlers. Efforts are made to keep these interviews to a minimum, but in offices located adjacent to the busier travelled routes, the number of people calling has reached the stage where the time involved has seriously cut into the office hours of the Inspector. This problem is particularly acute in the Cariboo, Prince George, and Peace River districts, where there has been an influx of new settlers.

Several Interior Land Inspectors have reported that an increasing amount of time is being spent cruising lodgepole pine stands of small-diameter timber. These small-diameter trees have become attractive to logging operators in view of the marketability of the logs for stud-mills operating in the districts concerned. In the Prince George and Kamloops Forest Districts, stud-mills are utilizing logs down to 8 inches in diameter breast height. Many of the agricultural applications are situated in Forest Service sustained-yield units or in public working circles. Although alienation of small individual parcels of timber would not appreciably affect the sustained yield of the forested area concerned, when these applications are considered collectively, they could appreciably affect the annual cut of the area. More detailed and exhaustive cruises are being requested to establish the present worth of the cover, as well as to ensure that the land has agricultural potential, before a decision

to sell the lands is made. In dealing with forested lands of this nature, the Land Inspector works closely with the Forest Ranger to ensure that it is in the public interest to dispose of the lands concerned.

The Land Inspectors in the Kamloops-Cariboo area have been called upon to submit solutions to a number of grazing conflicts that have arisen. These problems roughly fall into two main types, namely: (1) The resistance offered by established ranchers to the influx of new settlement in land areas that have been used for grazing purposes in the past and (2) problems arising between ranchers themselves as they seek to improve their position by alienating more land by lease or purchase. In this latter category the Department has received a number of complaints regarding the actual use that is being made of certain lands held under lease. In most instances it is alleged that the lessee is making beneficial use of the areas. Before problems of this nature can be settled, the Land Inspector is requested to examine the lease and submit a report detailing his findings. This type of request is time-consuming and controversial as such examinations often entail numerous interviews with the protestant, the lessee, neighbours, and other people who may have had occasion to visit the property.

Table 1 presents a comparison on a year-to-year basis of the volume of field work completed by the Land Inspection Division over the past five years. Table 2 presents a breakdown of the number and type of inspections completed during 1961.

Table 1.—Land Inspection, 1957–61

Land Inspection District	Examinations Made during—					Outstanding at the End of—				
	1957	1958	1959	1960	1961	1957	1958	1959	1960	1961
Clinton	196	173	259	249	234	48	49	31	28	41
Courtenay	158	168	187	219	199	21	31	29	40	18
Fort St. John	279	409	428	435	580	14	33	52	63	60
Kamloops	90	189	154	163	229	90	23	12	10	8
Kelowna	214	175	216	226	198	43	34	39	24	25
Nelson	143	189	201	221	290	26	22	54	38	19
New Westminster	129	149	175	164	133	37	6	8	2	1
Pouce Coupe	226	250	308	330	436	16	11	42	4	44
Prince George	309	342	382	395	503	64	34	66	51	67
Quesnel	112	123	141	205	195	23	14	23	28	24
Smithers	188	205	225	215	217	29	57	33	33	66
Vancouver	173	200	184	258	287	25	7	12	16	11
Victoria	96	116	112	119	129	14	3	11	3	2
Williams Lake	193	318	276	280	389	76	24	50	121	68
B.C.F.S and others	83	37	59	85	56	----	----	----	----	----
Totals	2,589	3,043	3,307	3,564	4,075	526	348	462	461	454

Table 2.—Types of Inspections, 1961

Purchases—	
Agriculture	483
Access (roads, etc.)	9
Commercial (resorts, service-stations, hotels, airfields, etc.)	61
Community (cemeteries, church-sites, parking areas, etc.)	27
Grazing (pasture, range)	283
Home-sites (permanent)	349
Industrial (mill-sites, power-sites, manufacturing plants. etc.)	43
Summer-home or camp site	30
Wood-lots or tree-farms	8

Table 2.—Types of Inspections, 1961—Continued

Leases—	
Land—	
Agriculture (other than grazing)	229
Commercial (resorts, service-stations, hotels, airfields, etc.)	26
Community (parks, cemeteries, dump-sites, etc.)	16
Fur-farming	2
Grazing (pasture, range, hay-cutting, etc.)	527
Home-sites (section 78 of the *Land Act*)	39
Home-sites (permanent, other than section 78 of *Land Act*)	26
Industrial (mill-sites, power-sites, manufacturing plants, etc.)	32
Summer-home or camp site (residential)	214
Quarrying (sand, gravel, diatomaceous earth, etc.)	46
Foreshore—	
Booming and log storage or log-dumping	122
Commercial (boat rentals, marine service-stations, wharves, etc.)	72
Industrial (mill-sites, canneries, factory-sites, wharves, etc.)	19
Quarrying (sand and gravel from river-beds)	1
Oyster and shell-fish	10
Private (floats, boat-houses)	9
Land-use permits	33
Licences to occupy	7
Easements	16
Pre-emptions—	
Applications	136
Annual inspections (including applications for Crown grant)	159
Subdivisions—	
Valuations	30
Survey inspections	5
Plans cancellation	2
Proposals (lake-shore, residential, etc.)	15
Reserves—	
Grazing	6
Gravel-pits	6
Recreational	101
Others	11
Veterans' Land Act	10
Land Settlement Board—	
Classification	5
Valuations	5
Miscellaneous inspections—	
Delinquent accounts	14
Land-use surveys	106
Land values (current market values)	36
Protests	28
Trespass, land	42
Trespass, water	61

Table 2.—Types of Inspections, 1961—Continued

Lease rental reviews (not recorded above)—	
Land	12
Foreshore	73
Pre-Crown grants—	
Section 53 of *Land Act*	423
Section 78 of *Land Act*	28
Section 65(1) of *Land Act*	------
Property transferred to Crown Valuations—	
Department of Health and Welfare	2
Repurchase (section 135 of *Land Act*)	------
Applications under other Acts (escheats, quieting titles, etc.)	20
Total	4,075[1]

[1] Included in this figure are fifty-six examinations completed by the Forest Service and the Department of Finance in remote areas beyond the reach of the local Land Inspector.

SURVEYS AND MAPPING BRANCH

Note 2 THE SURVEYS AND MAPPING BRANCH

The framework of maps and surveys so necessary for the orderly development and settlement of British Columbia is provided through the Surveys and Mapping Branch. That such scientific foundations were necessary even in the earliest days is shown by the fact that in 1851 the position of Colonial Surveyor for the young Crown Colony of Vancouver Island was created. In more than 100 years which have passed since Joseph Despard Pemberton was appointed first Surveyor-General, British Columbia has expanded immensely in all spheres of human endeavour. Much of the foundation for the way of life we have in British Columbia to-day rests on the reliability of our basic surveys. As British Columbia has progressed through time, so the surveys and maps of the Province have increased in magnitude and complexity.

It is the responsibility of the Surveys and Mapping Branch, through the Boundary Commissioner, to establish and maintain co-operatively the boundaries between this Province and the other adjacent Provinces and Territories of Canada. Within the Province, the Branch has established and is ever extending a basic network of triangulation surveys which are fundamental to determining geographical locations and co-ordinating property boundaries. The surveying procedures vary according to the intended purposes. Topographic surveys are constantly improving the portrayal of various physical features. Cadastral (legal) surveys, on the other hand, delineate the parcels of Crown lands subject to alienation under the *Land Act*. Finally, it is necessary to show on published maps the combined survey effort in order to give a visual account of the position of land alienation and geographic features of British Columbia. Maps must satisfy a wide range of uses, whether it be by the sportsman searching for an untapped valley or virgin lake, the homesteader seeking unsettled lands, or the industrialist planning new ways and new places to develop the resources of this Province.

So much for the uses of maps and surveys and their necessity. Also interesting is the great variety of techniques and equipment which must support our complex surveying and mapping organization. This includes photography from aircraft using precise cameras calibrated to less than a thousandth of an inch, modern optical surveyors' theodolites which read directly to seconds of arc, other instruments such as the tellurometer (a distance-measuring device which operates on a principle similar to radar), and plotting devices which are capable of precise mapping directly from aerial photographs. Helicopters and other aircraft speed surveyors to the remotest locations. Surveying is also expanding into the realm of electronic computers which can process the contents of field-notes in seconds compared with hours by manual methods. In all these ways, the science of surveying and mapping continues to serve the people by keeping pace with their needs and with the continual technological advances of our age.

The following is a brief summary of the functions of the various divisions of the Surveys and Mapping Branch:—

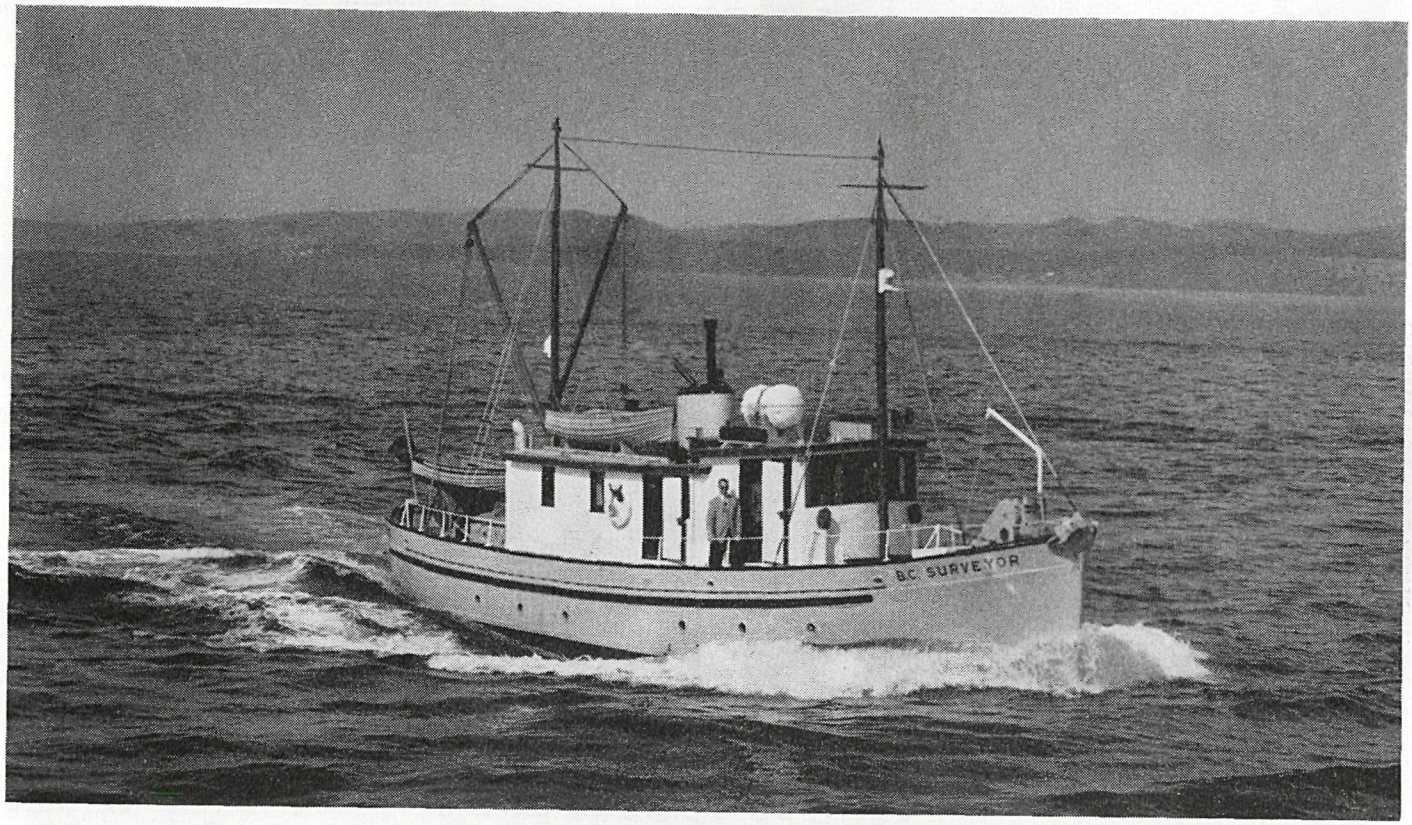
I. Administration.—General co-ordination of the four divisions of the Branch, being Legal Surveys, Geographic, Topographic, and Air; delineation and maintenance of boundaries under the Provincial Boundary Commissioner—namely, (*a*) Alberta-British Columbia Boundary and (*b*) British Columbia-Yukon-Northwest Territories Boundary; interdepartmental and intergovernmental liaison, such as the Fraser River Board.

II. Legal Surveys 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 plans of same; preparation and custody of official plans; preparation and maintenance of Departmental reference maps, mineral reference maps, and composite (cadastral) maps; processing for status of all applications concerning Crown lands; field surveys of Crown lands, highway rights-of-way, etc.; preparation of legal descriptions; operation of blue-print and photostat sections; computational scrutiny of certain land registry subdivision plans; inspection surveys; restoration surveys.

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 land bulletins and maps; preparation of legal descriptions for and delineation of administrative boundaries; compilation and distribution of annual Lands Service Report; trigonometric computation and recording of geographic co-ordinates; general liaison between this Department and Federal and other mapping agencies on exchange of survey and mapping data; checking well-site survey plans under the *Petroleum and Natural Gas Act*.

IV. Topographic Division.—Propagation of field survey control—namely, triangulation, traverses, and photo-topographic control; operation of Beaver float-plane and M.V. "B.C. Surveyor"; helicopters on charter; compilation and fair drawing of manuscripts for standard topographic mapping; special field control for composite and photogrammetric mapping and other special projects; precise mapping from aerial photographs through the use of the most modern plotting-machines.

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 base maps, primarily for the forest inventory; air-photo control propagation; instrument-shop for the repair, maintenance, and development of technical equipment.



Surveys and Mapping Branch motor-vessel " B.C. Surveyor."

SURVEYS AND MAPPING BRANCH

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DIRECTOR, SURVEYOR-GENERAL, AND BOUNDARIES COMMISSIONER

The year 1961 witnessed certain developments characterized by automation which are likely to influence the pattern of surveys and mapping in British Columbia during the new decade just begun. Some of these were anticipated in my report a year ago.

In several forms, automation has already been an established feature of field operations, especially in control surveys for topographic mapping—namely, air transport, radio communication, weather prognostication, air-photo " bridging," as well as in the fundamental tasks of measuring distances and angles. Due to these, it has been possible to cope with increasing demands for such surveys with little, if any, increase in field staff. In fact, it may be remarked with regret that we are no longer able to offer summer employment to students during their vacations, to any significant degree. Aside from aggravating the economic problem of those who must personally earn their higher education, this effect of automation also denies these young men the physical and moral training, unique to survey work, especially in the wilderness, which would be so beneficial throughout their lives, no matter what calling they may follow later. Indeed there may be merit in a suggestion that these surveys should be subsidized to provide character-building experience for the youth of our Province, aside from the benefits of an accelerated mapping programme.

One of the two Anson V aircraft (CF-EZN) acquired in 1949 was replaced successfully by a more modern all-metal Beechcraft (D18S Expediter (CF-BCE). A second identical replacement unit (CF-BCD) was acquired at the same time, anticipating retirement of the second Anson (CF-EZI) during 1962 or soon after. The Ansons have given outstanding service to the Province during the sixteen-year post World War II period to date, having photographed a gross of nearly 500,000 square miles (including revision projects) recorded on some 300,000 high-quality air photo-negatives, at low unit costs unparalleled elsewhere, in spite of the rugged terrain and uncertain weather factors characteristic of British Columbia.

The replacement aircraft were obtained at nominal cost from Crown (R.C.A.F) surplus. The highly specialized installations and modifications necessary for air survey photography were fully and satisfactorily performed in the B.C. Government hangar at Victoria Airport. The necessity of change-over from the Anson was aggravated by deterioration of the laminated wooden structure of the older aircraft due to fungous infection. Due to this change-over from the Anson CF-EZN to the Expediter aircraft CF-BCE not being effective till well on in the season, the complete programme was, for the most part, restricted to one operational Anson, CF-EZI. This reduced the total accomplishment compared to normal years when two aircraft had a full season's operation.

Of significance during the past year has been the adaptation of various survey calculations to speedy and faultless solutions on the IBM 650 electronic computer, recently installed by the Provincial Government. By this means, lengthy and involved computational operation for checking, adjustments, conversions, etc., are now a matter of routine, which with desk computers implied exhaustive labour and time. For each type of computation it is necessary to develop a "programme " which in effect " instructs" the electronic computer (a tireless, agile, obedient, and infallible moron) what to do with the raw data fed in.

A prominent member of our staff, having high mathematical and survey qualifications, has developed and perfected a number of original programmes for the IBM 650 computer, namely:—

" Surmap 02 "—solution and adjustment of traverses.
" Surmap 03 "—plan-checking, closing errors, adjustments, bearings and distances, lengths of curved boundaries, areas.
" Surmap 04 "—reduction of measured distances to sea-level datum.
" Surmap 05 "—conversion of spherical geographical co-ordinates to plane rectangulars and vice versa.
" Surmap 07 "—aerotriangulation, bridging adjustment, horizontal co-ordinates.
" Surmap 07A "—same as " Surmap 07 " for elevations.

By arrangement with the Attorney-General's Department, on a trial basis, all subdivision plans submitted to the Land Registrar, Victoria, have been checked with the " Surmap 03 " programme, with such good results that consideration is now being given to extending this service to the other Land Registry Offices.

Programme " Surmap 05 " has been useful for giving survey control data for our own needs as well as for well-site and right-of-way surveys under the *Petroleum and Natural Gas Act.*

The " Surmap 07 and 07A " programmes are effecting valuable economies in control surveys for topographic mapping, both in the general programme and in special large-scale projects (such as for dam-site reservoirs, etc.).

Aside from the foregoing developments, which certainly have the flavour of automation, and which should be significant in future activities, the year 1961 was marked with considerable success in our many normal tasks, details of which are presented in the accompanying reports of the four divisions.

A modest but welcome increase in the Legal Surveys budget for restoration surveys was devoted to several troublesome areas in the Province. It is hoped that this type of work may gain momentum, since the backlog still awaiting attention is formidable.

Under new regulations (Order in Council No. 2033/61, August 14, 1961) governing drilling of wells, etc., under the *Petroleum and Natural Gas Act,* the location of the well-site by accurate survey rather than lease corners has been given emphasis. The task of checking the resultant survey returns from this type of activity has been assigned to the Geographic Division and constitutes an added burden to its already full load. At the year's end sixty-seven of these well-site surveys had been processed under the new regulations. Indications are that this activity will be sustained, if not accelerated, in the future. The Geographic Division also produced seven new map editions featuring the 2-mile, 4-mile, and 10-mile per inch scale categories.

A variation in the Topographic Division's field programme was the resumption of water-borne access by the use of the launch " B.C. Surveyor " after a lapse of some nine years, during which time the staunch little vessel had been on loan to the Forest Service for inventory surveys. With the " B.C. Surveyor " as a mobile headquarters, mapping control was established for a total of thirteen map-sheets along the west coast—one group in the vicinity of Banks Island and another group near Bella Bella. Unusually good weather during the summer facilitated this work and was one factor in a greater accomplishment than was anticipated. A comparable area—namely, thirteen sheets—was also controlled in the Stuart Lake vicinity, using the Beaver float-plane and a helicopter on short-term contract. This operation suffered some interference from smoke accumulation during the crescendo in forest fire incidence in that area in mid-August.

Referring back to the concluding paragraphs of my report a year ago, four specific items were put forward as worthy objectives for accomplishment now and during the immediate years ahead.

The first of these, restoration surveys, did receive a gratifying impetus in 1961, as has been reported, with favourable indications of continued attention.

In so far as co-ordinating all legal survey corners on the geodetic North American datum, while no formal moves have yet been made, the necessary preliminary work of ties and remonumentation continued, with the final objective still very much in mind.

Regarding the compilation work of our Photogrammetric Section of the Topographic Division, a backlog still persists due to the ever-increasing demands for the larger-scaled engineering maps. The obtaining of a desirable second shift on this type of work has not as yet been possible.

Finally, the extension of tricamera air photography with the Anson CF-EZI was not possible due to the fact, already mentioned, that, for the most part, this aircraft was carrying the whole load of our air-photo programme. The outlook, however, for doing some tricamera photography in the coming season appears hopeful now that the new unit CF-BCE is operational.

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, including those for highways, railways, and transmission-lines. During the year 763 sets of instructions were issued, this being an increase of fifty-four over 1960.

In 1961, 457 sets of field-notes covering the survey of 631 lots were received in this office and duly indexed, checked, plotted, and official plans prepared therefrom. Of the above-mentioned surveys, 601 were made under the *Land Act* and thirty under the *Mineral Act*. At the present time there are approximately 96,875 sets of field-notes on record in our vaults.

There were 444 plans received from land surveyors covering surveys made under the *Land Registry Act*. These were duly indexed and checked, 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 together with reserves, a set of reference maps, 210 in number, covering the whole of the Province must be maintained. These maps show all cadastral surveys which are on file in the Department, and are kept up to date by adding new information as it accrues from day to day. Prints of them are available to the public. A start was made this year on the recompilation of the four reference maps covering the Lower Fraser Valley between Vancouver and Hope. These reference maps are presently drawn at the scale of 1 mile to 1 inch, and on the recompilation will be drawn at the scale of one-quarter mile to 1 inch. By this increase of scale it will take thirty-one maps to cover the area. It is hoped that these larger-scale maps will greatly assist in the statusing of Crown lands, especially those bordering the Fraser River, which will show apparent accretion or erosion.

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. From the 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.

It has been necessary during the year, for status and compilation purposes, to obtain 1,331 plans from the various Land Registry Offices. Copies of these have been made, indexed, and filed as part of the Division's records.

This Division co-operates with the 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 Department of Agriculture (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 tree-farm licences and working circles), and the Lands Branch (descriptions for gazetted reserves, etc.). During the year 146 of the above descriptions were prepared, and this entailed 373 man-hours.

REPRODUCTION SECTION

The Legal Surveys Division, through this Section, continues to supply a service to all departments of Government and to the public, as well as supplying all the prints and photostats, etc., required by the Surveys and Mapping Branch. The total number of prints made during the year was 268,779, which was an increase of 33,631 over 1960, while in the preparation of these prints 131,500 yards or 74.7 miles of paper and linen were used. The number of photostats, films, and auto-positives made was 68,932, which was an increase of 13,502 over the previous year.

It is interesting to note that of the 268,779 prints made during the year, 81,509 were for the Surveys and Mapping Branch, 77,720 for other branches of the Department of Lands and Forests, 98,104 for other departments of Government, and 11,436 for the public. Likewise, of the 68,932 photostats, films, etc., made, 32,849 were for the Surveys and Mapping Branch, 23,435 for the other branches of the Department of Lands and Forests, 5,786 for the other departments of Government, and 6,862 for the public.

The Barcro camera, which is a new addition to our facilities, was put into operation in February and has proven to be a versatile and useful piece of equipment.

COMPOSITE MAP SECTION

This Section is responsible for the compilation and fair drawing of composite maps, mostly at a scale of 500 feet to 1 inch, of the more thickly subdivided areas of the Province, and especially where they occur in unorganized territory.

The project this year was mapping the northerly part of the Sechelt Peninsula and the area south of Powell River. This is covered by thirty-nine sheets, and copies of same are now available.

LAND EXAMINATION PLANS SECTION

This Section is responsible for the preparation of plans for the use of the Land Inspectors in their examination of applications for Crown lands. These plans are a consolidation of all the information available in this Department and pertinent to the application requiring inspection. A synopsis of the work accomplished by this Section during the past six years is as follows:—

Year	Plans Prepared	Year	Plans Prepared
1956	2,340	1959	2,473
1957	2,290	1960	2,609
1958	2,192	1961	2,660

GENERAL

The IBM 650 computer has proved a real boon to this Division. During the past year we have put the mathematical checking of all the field-notes, subdivision plans, and right-of-way plans received in this office through the computer. Also all of the computing for the routes, etc., necessary in the compilation of the composite maps has been done by the IBM 650.

In April of this year the Victoria Land Registry Office was approached and asked if they would acquiesce to a trial period in which the Legal Surveys Division would undertake a mathematical check of all plans presented to that office for deposit. This they readily agreed to, and prints of the plans presented to that office were forwarded here, and one member of our staff undertook the duty of preparing the data sheets and scrutinizing the returns from the electronic computer. The trial

period was successful, and this Division is now continuing on a permanent basis the mathematical checking of all plans presented to the Victoria Land Registry Office.

The receiving and distribution of survey posts, which are stored at 859 Devonshire Road, has operated smoothly and efficiently. The following synopsis shows the quantities of posts shipped during the past year and to whom:—

	Standard Pipe	Standard Rock	B.C.L.S. Bars
Purchased by private surveyors from headquarters	293	123	368
Supplied to Departmental surveyors	880	53	2,250
Shipped to Government Agents for resale	2,480	565	2,410
Totals	3,653	741	5,028

SUMMARY OF OFFICE WORK FOR THE YEARS 1960 AND 1961, LEGAL SURVEYS DIVISION

	1960	1961
Number of field-books received	514	457
,, lots surveyed	858	631
,, lots plotted	623	453
,, lots gazetted	492	445
,, lots cancelled	11	14
,, lots amended	217	157
,, mineral-claim field-books prepared	24	38
,, reference maps compiled or renewed	18	11
,, applications for purchase cleared	2,482	2,368
,, applications for pre-emption cleared	147	196
,, applications for lease cleared	2,453	2,988
,, water licences cleared	14	125
,, timber sales cleared	5,710	5,605
,, Crown-grant applications cleared	1,485	1,129
,, cancellations made	5,521	5,272
,, inquiries cleared	1,807	1,578
,, placer-mining leases plotted on maps	417	324
,, letters received and dealt with	6,513	6,247
,, land-examination plans	2,609	2,660
,, Crown-grant and lease tracings made	3,719	4,106
,, miscellaneous tracings made	18	6
,, photostats made	55,450	68,932
,, blue-prints made	235,148	268,779

FIELD WORK

Activity was maintained in the usual types of surveys carried out. An increased effort was possible in restoration of old corners due to provision of additional funds and the resultant allocation of one survey party to this important work. Assistance in completing our field programme was forthcoming from the Topographic Division, which made a surveyor, his assistant, and their equipment available for a season's work on highway surveys, and another survey party made available by this Division for a month's duration to carry out a survey in a remote area in which they were located.

Subdivisions of Crown Land

At Bear Lake on the John Hart Highway, where a small townsite was created last year, an additional twenty-five lots were added, and a similar development in the Willow River area at St. Mary Lake created forty-two town lots. A subdivision at Merritt, where the interest is dependent on the copper-mining activity, brought the total to ninety-nine town lots. Rural roadside lots almost doubled over last year, totalling 206, at Port Alberni, Woss Lake, Mission Creek near Kelowna, Invermere, Riske Creek, and at Williams Lake. Waterfrontage lots were slightly down at 187, being surveyed at Christina Lake, Cheakamus River, Marshall Lake in the Bralorne area, Tunkwa and Leighton Lakes on the high land south of Savona, at Pilot Bay on Kootenay Lake, at East Barriere, Machete, and Meadow Lakes in the Cariboo, and at Anahim Lake in the Chilcotin. Thirteen large acreage parcels for various purposes were created at the Southern Okanagan Valley Lands Project, at Sooke, and in the Three Valley Lakes area near Revelstoke.

Public, Recreational, and Special Reserves

Reserves for community sanitary use, recreational pursuits, and other special purposes necessitated the surveying of thirty parcels. Most of these were in connection with subdivisions previously mentioned, but additional areas in which this activity took place were at Rock Creek, Westbridge, the Richter Pass, Boswell, on Grouse Island near Quadra Island, on the Mamquam River, at Albert Canyon in the Rogers Pass area, and a lighthouse reserve site on Protection Island in Nanaimo Harbour.

Park and Forestry Sites

Two park-sites, one of just over 8 acres at Prudhomme Lake near Prince Rupert and one of 140 acres at Drywilliam Lake in the Fraser Lake area, were surveyed for the Department of Recreation and Conservation, and two Forest Service Ranger station sites were called for in the Willow River and Tunkwa Lake surveys.

Restoration Surveys

Remonumenting of old section and district lot corners in conjunction with highway surveys resulted in 128 old corners being renewed to present standards. In connection with other miscellaneous surveys previously mentioned, another seventy-two old corners were renewed. The restoration survey party, which tackled two areas at Chief Lake and around the Chilako River, accomplished the setting of sixty-six district lot corners. These areas were selected because they were known to be especially destitute of old corners, and, therefore, the progress is understandably moderate. Contact was maintained between our party and local surveyors in order to plan our work to service the areas in which private surveys were required, in an effort to keep costs down to the public. In addition to this district lot and section activity, four small lots were completely reposted at Nanoose and Clinton, and about forty blocks of lots at Fort Fraser townsite and at South Hazelton were reposted and plans filed of the work in the Land Registry Offices. One hundred and sixty corners were set in these two communities, which are expected to be of considerable assistance to local people in their boundary and survey problems. A further five blocks of lots in Kaleden townsite were reposted by a private surveyor engaged by this Division, to bring to light an ambiguous situation existing there.

Inspections

Inspection survey work was continued at about the same pace as in previous years. In the Victoria area a complaint that survey work was being performed by unqualified personnel in responsible employ was investigated, and the situation has been rectified. Two surveys, one at New Westminster and the other at Francois Lake were inspected at the request of Registrars of the Land Registry Offices controlling those areas, and the questions involved in each case were resolved. Three current surveys were inspected on the initiative of this Division at Metchosin, Nanaimo, and Pender Harbour. The first two resulted from queries which became apparent subsequent to the IBM plan-checking programme, and the last one was prompted by a complaint from a private citizen. Correction to the surveys was required in these three cases. An old survey at Pavilion which was suspect was investigated and found to be correct, although surrounding data heretofore not suspect was in error. Finally an inspection and report was made in the locality of Vernon at the request of the Surveyors' Association. The variety of inspections and the confidence established by this service makes the continuation of it very worth while.

Highways

On the Southern Trans-Provincial Highway, the survey of last year which terminated at Irishman Creek was continued westerly for 7.95 miles to Yahk. A section of the new road from Christina Lake to Castlegar was terminated at Coryell, a distance of 12.3 miles. A further break in the survey of the Southern Trans-Provincial Highway of 7.42 miles was filled in at Rock Creek. On the Rogers Pass section of the Trans-Canada Highway, 12.3 miles were completed, and west of Revelstoke in the Three Valley section another 11.9 miles were accomplished. Further work in both these sections is necessary next year. On the Northern Trans-Provincial Highway, our trend of previous years was continued westerly from Fraser Lake for 12.32 miles. Total mileage for the five highway survey parties was 69.19 miles.

TOPOGRAPHIC DIVISION

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

Field control was completed for 29½ standard National Topographic map-sheets covering approximately 10,000 square miles. In addition, ten large-scale projects were controlled in the McGregor River, Prince George, Quesnel, Hobson Lake, Clearwater River, Fraser River, Kamloops, Nanaimo, Port Hardy, and Nitinat areas.

A shortened field season was planned for this year. However, the return to the Division of the motorship " B.C. Surveyor," a two-month helicopter contract, and the choice of several easily controlled areas resulted in more map-sheets than in a normal four-month season.

Early in May, while the Department's De Havilland Beaver was based at Port Hardy during the course of duties for the Land Inspection Division, a fish-boat collided with the plane, which was moored at the Department of Transport float, and tore off a wing. The Engineering Section of the Forest Service co-operated immediately by dispatching its self-propelled barge from Vancouver to transport the crippled plane to Victoria, where the necessary repairs were to be made. Departmental mechanics did the work and made such excellent progress that only a few days were lost when the Beaver failed to rendezvous at Prince George by the commencement date of the helicopter contract. An insurance claim is presently in the course of being settled.

In the Photogrammetric Section, two National Topographic Series projects were completed, totalling 3,638 square miles. In addition, there were twenty-one large-scale plots, ranging in scale from 50 feet to 1,320 feet to 1 inch. These include pondage maps, spot heighting, and large-scale detailed plots of the Essondale and Tranquille sites.

The Draughting Section reports the completion of twenty-six standard topographic manuscripts at the scale of 2 inches to 1 mile, eighty large-scale mapping plans at various scales, plus eight large plans at 20, 40, 50, and 100 feet to 1 inch of the Nanaimo Vocational School, Victoria University-Gordon Head area, and the Tranquille School. In addition, the plotting of the cadastral surveys on seventy Federal Government 1:50,000 manuscripts was completed.

The Federal Government now has fifty-six of our 1:50,000 scale manuscripts on hand for printing, which are in various stages of reproduction.

Copies of the multiplex large-scale mapping and the completed manuscripts as shown on the indexes following this report are available upon request.

One field party, using the M.V. " B.C. Surveyor " for transportation and accommodation, completed photo identification of existing Coastal triangulation for use as control for 16½ National Topographic Series map-sheets (*see* Fig. 1). In addition, strong ties were made between various Coast triangulation systems. During August, eighteen days were spent surveying the right-of-way of a forest-development road at the head of Kingcome Inlet, as well as a district lot in the same locality.

Another field party completed control for thirteen National Topographic Series map-sheets west of Davie Lake and north of Stuart and Babine Lakes (*see* Fig. 2). Use was made of a Bell G-2 helicopter, chartered from Vancouver Island Helicopters Ltd. for two months, as well as the Department's De Havilland Beaver. Organized as an all air-borne operation, it was difficult to substitute other methods of transportation when either aircraft was not available. This was particularly noticeable when the Beaver was late in arriving at the commencement of the survey, during

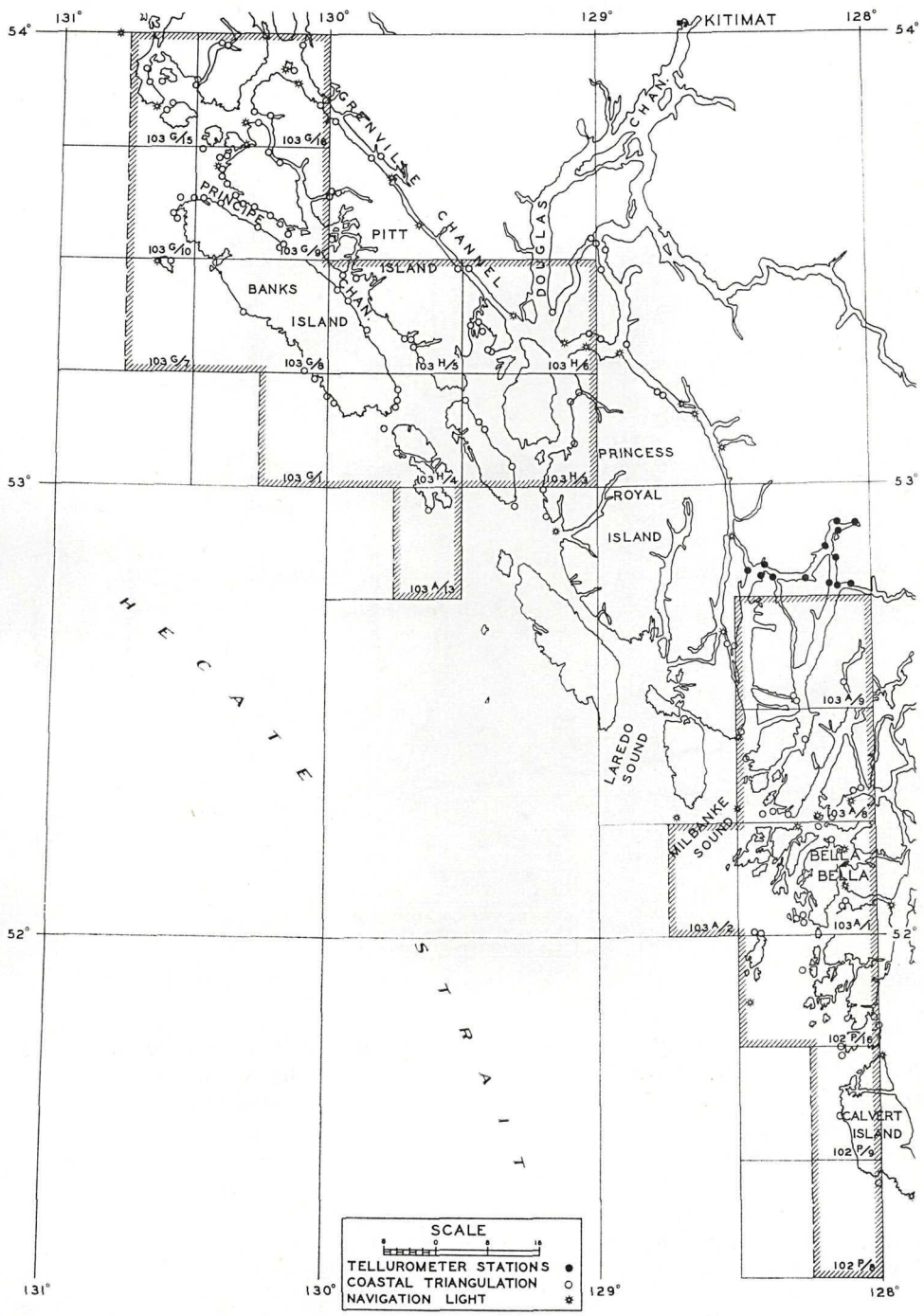

131°
130°
129°
128°
54°
53°
52°
KITIMAT
GRENVILLE CHANNEL
DOUGLAS CHAN.
PRINCE
PITT ISLAND
BANKS ISLAND
CHAN.
PRINCESS ROYAL ISLAND
HECATE STRAIT
LAREDO SOUND
MILBANKE SOUND
BELLA BELLA
CALVERT ISLAND
103 G/15
103 G/16
103 G/10
103 G/9
103 G/7
103 G/8
103 H/5
103 H/6
103 H/4
103 A/13
103 A/9
103 A/8
103 A/2
103 A/1
102 P/16
102 P/9
102 P/8
SCALE
TELLUROMETER STATIONS
COASTAL TRIANGULATION
NAVIGATION LIGHT

Fig. 1.

the operation when smoke conditions curtailed flying, and again when the helicopter was placed on forest fire duty. Tellurometers were used for distance measurement and proved excellent.

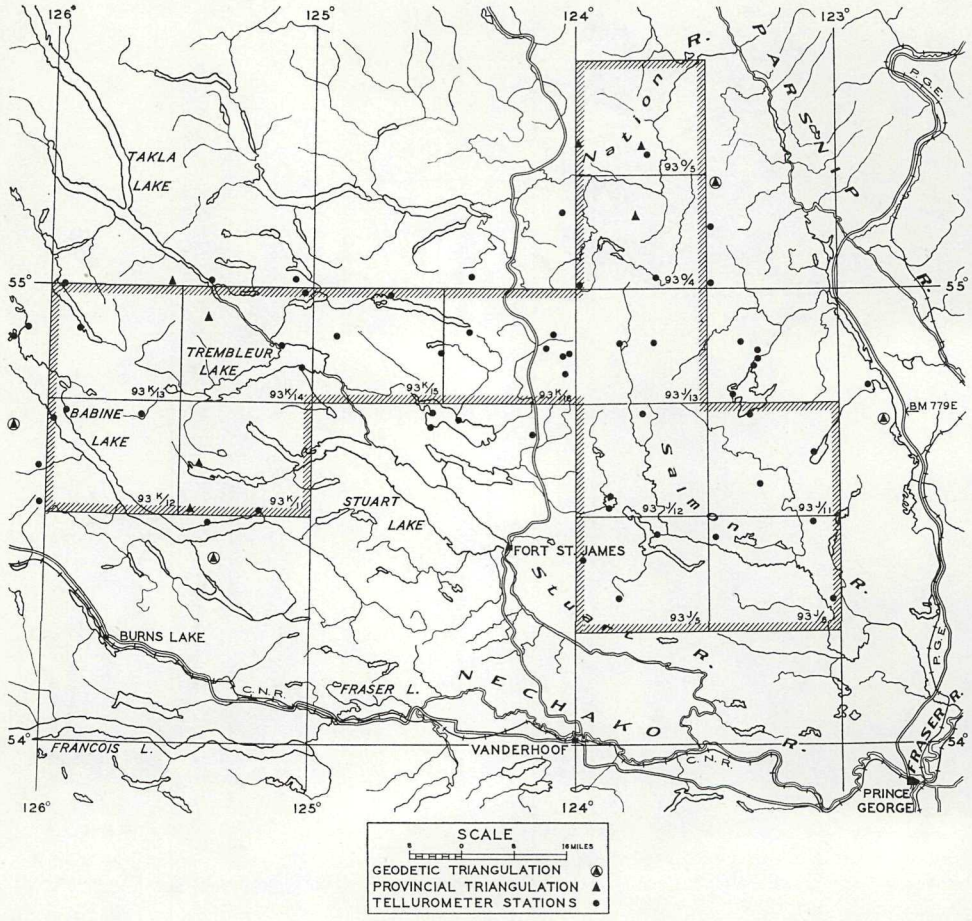


Fig. 2.

A third field party commenced operations in mid-May, and by the end of September had completed ten individual projects. In the McGregor River area, use was obtained of a Bell G-2 helicopter which was on charter to Noranda Mines Ltd. Noranda did not require the helicopter for a two-week period and allowed the Branch to charter this at an hourly rate. It would have taken a great deal longer to complete the work required in this rugged area without use of the helicopter. A normally poor weather section and a rocky canyon at the lower reaches of the river make this a difficult area in which to operate. An air-borne operation was, however, able to take full advantage of the good weather and low-water conditions.

A further field party obtained control for six relatively small areas for large-scale mapping at scales ranging from 40 to 500 feet to 1 inch. Three of these, the Victoria College, the University Endowment Lands, and the Cowichan Lake Diversion, were priority jobs that were completed and ready for compilation as soon as the field work on each one was finished.

A final party worked on four projects for the Fraser River Board on the Clearwater River and Hobson and Summit Lakes. The projects involved were either extensions of presently mapped areas or bedrock locations which had to be tied to existing surveys. The party co-operated with other Fraser River Board personnel in the area, and supplied data on the spot when requested by the resident engineer.

List of Large-scale Mapping

No.	Name	Available	Scale	Contour Interval	No. of Sheets	Date
X 1	Goldfields	No	1″=800′, 900′ 1,000′, 1,320′	100′	----	--------
S.P. 1	Richmond	Yes	1″=200′, 600′	Mosaic	----	--------
S.P. 2	Lower Fraser Valley	Yes	1″=1,000′	5′–50′ then 50′	18	1957
S.P. 3	Lower Fraser Valley	Yes	1″=1,000′	5′–50′ then 50′	20	1958
1	Squamish	Yes	1″=20 ch.	20′	(1)	1952
2	Aleza Lake	No	1″= 550′	20′	----	1951/52
3	Tamihi Creek	No	1″=10 ch.	100′	----	1950
4	Earle Creek	No	1″=10 ch.	50′	----	1951/52
5	Lawless Creek	Yes	1″=10 ch.	50′	13	1951
6	Kemano	No	1″=1,300′	50′	----	1952/53
7	Mount Farrow	Yes	1″=13 ch.	500′	1	1951
8	Moran Dam-site	Yes	1″= 100′	5′	1	1951/52
9	Salmo	Yes	1″=1,000′	50′	38	1952
10	Moran Pondage	Yes	1″= 500′	20′–40′	8	1952
11	University Lands	No	1″= 100′	5′	----	1952
13	Trout Lake	No	1″=1,000′	50′	----	1953
14	Fraser Pondage	Yes	1″= 500′	10′–20′	6	1951
15	Fraser Pondage	Yes	1″= 500′	20′–40′	13	1953
16	Gulf Islands	No	1″=1,320′	50′	----	1953
17	Agassiz	Yes	1″= 200′	5′	28	1953
18	Delta Municipality	Yes	1″= 200′	Spot heights	73	1953/54
19	Doukhobor Lands—					
	Grand Forks	Yes	1″= 400′	5′–10′–25′	2	1953/54
	Krestova-Raspberry, Brilliant, etc.	Yes	1″= 400′	5′–10′–20′	7	1953/54
20	Brooks Peninsula	No	1″=1,320′	100′	----	1953/54
21	Agassiz (Extension)	Yes	1″= 400′	20′–100′	(2)	1954
24	Moran Pondage	Yes	1″= 500′	20′–40′	11	--------
28	Clearwater	Yes	1″= 500′	20′–40′	12	--------
M 2	Morice Lake	Yes	1″=1,000′	50′	8	1954/55
M 3	Naver Creek	Yes	1″=1,320′	50′	6	1955
M 4	Chilcotin River	Yes	1″= 500′	20′–40′	6	1955
M 5	Gaspard Creek	Yes	1″= 500′	20′–40′	1	1955
M 6	Churn Creek	Yes	1″= 500′	20′–40′	1	1955
M 7	Willow River	Yes	1″=1,000′	50′	26	1955/56
M 8	Upper McGregor River	Yes	1″=1,000′	20′	3	1956
M 9	Sinclair Mills	Yes	1″= 500′	20′	39	1956
M 11	Hobson Lake	Yes	1″=1,000′	50′	8	1955
M 12	Moran-Lytton	Yes	1″= 500′	20′–40′	23	1955
M 13	Penticton-Osoyoos	Yes	1″= 500′	10′	11	1954
M 14	Kelowna	Yes	1″= 500′	10′	5	1954
M 15	Westbank	Yes	1″= 500′	10′	2	1954
M 16	Lower McGregor River	Yes	1″=1,000′	20′	7	1956
M 17	Creston	Yes	1″= 500′	5′–10′–15′	7	1954
M 21	Clearwater	Yes	1″= 500′	20′–40′	20	1955
M 24	San Jose	Yes	1″= 500′	10′	8	1956
M 26	Taghum	No	1″= 300′	5′–10′–20′	----	--------
M 27	Peace River Pondage	Yes	1″=1,000′	20′	11	1958
M 29	Naramata	Yes	1″= 400′	10′	2	1956
M 30	Goat River	Yes	1″= 200′	Planimetric	4	1956
M 34	Fruitvale	Yes	1″= 500′	10′–20′	2	1957
M 36	Moose River	Yes	1″=1,000′	20′–40′	4	1957
M 37	Mount Robson	Yes	1″=1,000′	20′–40′	5	1956/57
M 38	McLennan River	Yes	1″=1,000′	20′–40′	3	1956/57
M 39 (1957)	Dease River Dam-sites	Yes	1″= 500′	20′	9	1956/57
M 39 (1958)	Dease-Stikine Dam-sites	Yes	1″= 500′	10′	16	1959
M 39 (1960)	Dease-Stikine Dam-sites	Yes	1″= 500′	10′–20′	40	1960
M 40	Chilliwack River	Yes	1″= 600′	20′	7	1956

1 One (Map 5E). 2 *See* No. 17.

LIST OF LARGE-SCALE MAPPING—*Continued*

No.	Name	Available	Scale	Contour Interval	No. of Sheets	Date
M 41	*Summit Lake Diversion*	Yes	1″=1,000′	20′	3	1958
M 42	Peace River Dam-site	Yes	1″= 600′	20′	10	1957
M 43	Alert Bay	No	1″=1,320′	50′	----	1956
M 44	Prince George East	Yes	1″= 200′	5′	2	1958
M 45	Prince George West	Yes	1″= 200′	5′	8	1958
M 52	Kaslo	Yes	1″= 500′	50′	17	1959
M 54	Big Bar	Yes	1″=2,640′	100′	1	1957
M 56	Lac la Hache	Yes	1″= 500′	20′	10	1958
M 59	Eaglet Lake	Yes	1″=1,320′	20′	2	1958
M 62	Alberni	Yes	1″= 500′	10′	2	1958
M 63	Parsnip River Pondage	Yes	1″=1,320′	20′–2,600′ then 50′	61[3]	1958
M 63	Parsnip River Pondage	Yes	1″=1,320′	20′	10[4]	1961
M 66	Glen Lake	Yes	1″= 400′	10′	10	1958
M 67	Chemainus River	Yes	1″= 400′	10′	4	1958
M 68	Hansard Lake	Yes	1″=1,320′	20′	3	1958
M 70	Courtenay-Comox	Yes	1″=1,320′	25′	10	1958
M 73	North Okanagan	Yes	1″=1,000′	20′	48	1959
M 73	North Okanagan	Yes	1″= 500′	10′	5	1959
M 74	Glinz Lake	Yes	1″= 200′	10′	1	1959
M 75	Duncan	Yes	1″= 500′	10′–20′	25	1959
M 76	Nanaimo	Yes	1″= 500′	10′–20′	20	1960
M 77	Prince George	Yes	1″=1,000′	20′	17	1960
M 88	South Okanagan	------	1″=1,000′	20′	----	--------
M 89	North Thompson	Yes	1″= 300′	5′	5	1960
M 89	North Thompson	Yes	1″= 500′	20′	14	1960
M 90	Similkameen	Yes	1″= 500′	5′	15	1960
M 92	Skeena River	------	1″= 500′	20′	----	--------
M 98	Aberdeen-Haddo Lake	Yes	1″= 500′	10′	4	1960
M 107	Campbell River	Yes	1″=1,000′	20′	5	1961
M 108	Kootenay River	Yes	1″= 500′	Planimetry	12	1961
M 111	Clearwater River Dam-site	Yes	1″= 250′	5′	4	1961
M 113	Nanaimo	------	1″= 500′	5′–10′	----	--------
M 117	Liard River	------	1″=1,000′	20′	----	--------
M 117	Liard River Dam-site	------	1″= 500′	10′	----	--------
M 118	Nitinat	Yes	1″= 500′	10′–20′	4	1962
M 121	Winfield	Yes	1″= 500′	10′–20′	4	1961
M 122	Stuart Lake Pondage	Yes	1″=1,320′	20′	9	1962
M 125	Port Hardy	Yes	1″= 100′	2′	3	1962
M 126	Thompson River	------	1″= 200′	10′–20	3	--------
M 127	Parksville	------	1″= 500′	10′	----	--------
M 129	Aleza Lake	Yes	1″= 40′	2′	1	1962
------	Government House Grounds	No	1″= 20′	2′	2	1959
------	Victoria University Campus	No	1″= 20′	2′ and 5′	5	1960
M 84	Victoria University, Gordon Head	No	1″= 40′	2′	5	1960/61
M 83	Oakalla	No	1″= 40′	2′	4	1960
M 100	Essondale	No	1″= 50′	2′	4	1962
M 100	Essondale	No	1″= 100′	Spot heights	2	1962
M 114	Tranquille	No	1″= 50′	2′	2	1962
M 114	Tranquille	No	1″= 100′	2′	3	1962

[3] South area. [4] North area.

List of British Columbia Manuscripts Showing Date Surveyed

Sheet	Date
82 F/3	1951, 1960
82 F/4	1944, 1947
82 K/11, W.	1952
82 K/12	1952
82 L/7	1958
82 L/10	1958
82 M/13	1959
83 D/4	1959
83 D/5	1959
83 D/12	1959, 1960
83 D/13, W.	1960
92 B/5	1937, 1938, 1955
92 B/6, W.	1955
92 B/11, W.	1955
92 B/12	1938, 1955
92 B/13	1942, 1943, 1951
92 B/14	1951
92 C/8	1937, 1938
92 C/9	1937, 1938
92 C/10	1937, 1938
92 C/11	1938
92 C/13	1938
92 C/14	1938
92 C/15	1937, 1938
92 C/16	1937, 1938, 1942
92 E/1	1942
92 E/7	1946
92 E/8	1943, 1946
92 E/9	1938, 1946, 1947
92 E/10	1947
92 E/14	1948
92 E/16	1947
92 F/1	1942
92 F/2	1938, 1940, 1942
92 F/3	1938, 1940, 1941
92 F/4	1942
92 F/5	1937, 1938, 1943
92 F/6	1937, 1940, 1941, 1943
92 F/7	1942, 1943
92 F/8	1942, 1943, 1950
92 F/9	1950
92 F/10	1950, 1953
92 F/11	1934, 1935
92 F/12	1936, 1937, 1938
92 F/13	1935, 1936
92 F/14	1935
92 F/15, part	1950
92 F/16, part	1950
92 G/4	1942, 1943
92 G/5	1950, 1952
92 G/7, part	1940
92 G/10, part	1940
92 G/11	1952
92 G/12	1950, 1952
92 G/13	1950, 1952
92 G/14	1952
92 H/1	1920, 1923, 1949
92 H/2	1923, 1949
92 H/3	1924, 1931, 1948, 1949
92 H/4	1948, 1956
92 I/12	1958
92 I/13	1958
92 J/15	1948, 1949
92 J/16	1948, 1949
92 K/1, part	1950
92 K/2, W.	1961
92 K/3	1949
92 K/4	1949
92 K/5	1949
92 K/6	1949
92 K/7	1961
92 L/1	1932
92 L/2	1931, 1932
92 L/3	1948
92 L/4	1948
92 L/6	1931, 1934
92 L/7	1931
92 L/8	1931, 1932
92 L/10	1931, 1940, 1956
92 L/11	1940
92 L/12	1935, 1936
92 L/13	1936
92 M/3	1959
92 M/4	1959
92 M/5	1959
92 N/1	1958
92 N/7	1958
92 N/8	1958
92 N/9	1958
92 N/10	1958
92 N/15	1958
92 O/1	1950
92 O/2	1947
92 O/3	1958
92 O/4	1958
92 O/5	1958
92 O/6	1958
92 O/7	1950, 1958
92 O/8	1950
92 O/9	1951
92 O/10	1958
92 O/11	1958
92 O/12	1958
92 O/16	1951
92 P/2	1959
92 P/3	1959
92 P/4	1958
92 P/5	1958
92 P/6	1959
92 P/7	1959
92 P/10	1959
92 P/11	1959
92 P/12	1958
92 P/13	1958
92 P/14	1959
92 P/15	1959
92 P/16	1959
93 A/1	1959
93 A/2	1936, 1959, 1960
93 A/3	1959, 1960
93 A/4	1959
93 A/5	1935
93 A/6	1935
93 A/7	1936, 1959, 1960
93 A/8	1959
93 A/9	1959, 1960
93 A/10	1934, 1960
93 A/11	1933, 1934
93 A/12	1931, 1933, 1934
93 A/13	1934
93 A/14	1933, 1934
93 A/15	1934, 1960
93 A/16	1960
93 B/1	1951
93 B/8	1952
93 B/9	1950
93 B/16	1950
93 C/5	1959
93 D/7, E.	1958
93 D/8	1958, 1959
93 G/2	1933, 1960
93 G/3	1960
93 G/4	1960
93 G/5	1960
93 G/6	1960
93 G/7	1933, 1960
93 G/10	1960
93 G/11	1960
93 G/12	1960
93 G/14	1948
93 I/8	1956
93 I/9	1956
93 I/10	1956
93 I/11	1957
93 I/12	1957
93 I/13	1957

List of British Columbia Manuscripts Showing Date Surveyed—*Continued*

Sheet	Date
93 I/14	1957
93 I/15	1956
93 I/16	1956
93 J/2	1949
93 J/3	1949
93 J/5	1961
93 J/6	1961
93 J/11	1961
93 J/12	1961
93 J/13	1961
93 K/1	1946
93 K/2	1946
93 K/7	1960
93 K/8	1960
93 K/9	1960
93 K/10	1960
93 K/11	1961
93 K/12	1961
93 K/13	1961
93 K/14	1961
93 K/15	1961
93 K/16	1961
93 L/2	1951
93 L/7	1951
93 L/8	1951
93 L/9	1951
93 L/10	1950, 1951
93 L/11	1950
93 L/14	1950
93 M/5	1949
93 M/12	1949
93 O/1	1957
93 O/4	1961
93 O/5	1961
93 O/6	1957
93 O/8	1957
93 O/11	1957
93 O/12	1957
93 O/13	1957
93 O/14	1957
93 P/1	1956
93 P/2	1956
93 P/3	1957
93 P/4	1957
93 P/5	1957
93 P/6	1957
93 P/7	1956
93 P/8	1956
94 B/4	1939, 1957
94 C, part	1939
94 E, part	1939
94 F, part	1939
94 L, part	1940, 1941
94 M, part	1941
102 I/8	1935, 1937
102 I/9	1935, 1936, 1937
102 I/15	1937
102 I/16	1936, 1937
102 P/8, E.	1961
102 P/9, E.	1961
102 P/16	1961
103 A/1	1961
103 A/2, E.	1961
103 A/8	1961
103 A/9	1961
103 A/13, E.	1961
103 G/1, E.	1961
103 G/7, E.	1961
103 G/8	1961
103 G/9	1961
103 G/10, E.	1961
103 G/16, E.	1961
103 G/16	1961
103 H/3	1961
103 H/4	1961
103 H/5	1961
103 H/6	1961
103 I/2	1949
103 I/7	1948
103 I/10	1947
103 P/9	1949
103 P/10, E.	1950
103 P/14, E.	1950
103 P/15	1950
104 A/2, W.	1950
104 A/3	1950
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
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

GEOGRAPHIC DIVISION

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

The Geographic Division not only continued to maintain the usual flow of published maps and computations, but also introduced new techniques and assumed new responsibilities in 1961. Among the innovations was a new method of classifying roads on certain Provincial maps at 1-inch-to-2-miles and 1:250,000 scale, and checking well-site surveys made under the *Petroleum and Natural Gas Act*.

During 1961 there was no net increase or decrease in staff. However, one senior cartographer resigned to accept a posting with a United Nations technical assistance mission in Somalia, while one vacancy was filled at the junior cartographer level. As indicated in Table F of the statistical tables following this written report, the volume of correspondence handled increased by a wide margin (one-quarter) over the previous year.

On July 13, 1961, the Government of Canada, by Order in Council, established a new body in lieu of the Canadian Board on Geographical Names. While retaining many of the terms of reference of the former Board, the new group, designated the "Canadian Permanent Committee on Geographical Names," was to be somewhat broader in scope. Provision was made for creation of a research section, which, acting under the Committee's instructions, would be responsible for matters of research and investigation pertaining to place-names.

Later in the year the writer was honoured to be appointed by Provincial Order in Council as representative for British Columbia on the Canadian Permanent Committee on Geographical Names.

New regulations (Order in Council No. 2033/61) governing the survey of well-sites under the *Petroleum and Natural Gas Act* became effective in September, and it was arranged that the Geographic Division would receive and examine all well-site survey plans to see that they conformed to the standard of accuracy required by the regulations. In co-operation with the Legal Surveys Division, a system was devised for checking the accuracy of the field survey and the scale and format of the submitted plan. Checking, which is done by the Trigonometric Control Section, accounted for sixty-seven plans by the end of the year.

The above procedure adds considerably to the work of the Trigonometric Control Section. In many cases, well-site surveys are commenced from a point on a surveyed oil or gas pipe-line right-of-way, and before the survey check can proceed it is necessary to obtain the right-of-way survey plan in order to calculate an adjusted position for the point of commencement. One man has been employed full-time on examination of well-site plans, and occasionally one or even two more are necessary in order to facilitate prompt return of the plans to the Petroleum and Natural Gas Branch of the Department of Mines and Petroleum Resources. Besides this new responsibility, the Trigonometric Control Section maintained its usual task of determining least-scale triangulation adjustments and other types of computation (*see* Tables A and B).

The Research Assistant made minor revisions to two Land Series bulletins, Prince Rupert–Smithers Bulletin Area (No. 8) and Okanagan Bulletin Area (No. 2). Two new bulletins were distributed, Atlin Bulletin Area (No. 9) and The Acquisition of Crown Lands in British Columbia. In December, 1961, the manuscript of a completely revised and standardized Peace River Bulletin (No. 10) was submitted for printing in 1962. Since work on the new series of land bulletins

commenced in 1952, a total of 112,000 of these booklets has been printed for distribution.

Seven Provincial topographic manuscripts were checked for cultural detail and place-names and sent to Ottawa, where they were added to stocks on hand awaiting reproduction (*see* Table J).

Ottawa mapping agencies supplied lithographed stocks of eight new 1:50,000 scale sheets and six reprints compiled by the Provincial Surveys and Mapping Branch. These are listed in Table H. An additional seventy-one National Topographic maps of British Columbia at 1:50,000 scale were edited by Ottawa, of which nine were two-colour provisional sheets. Major stocks were received of twenty-four of the aforementioned maps. Three maps of the 1:250,000 scale National Topographic Series were also received from Ottawa. Stocks of a new series of large-scale (1:25,000) maps were produced by the Army Survey Establishment. During 1961 fifteen sheets were received covering parts of metropolitan Victoria and metropolitan Vancouver. This new series should be of particular interest to those engaged in planning and in regional studies of small areas.

Provincial mapping by Geographic Division continued apace. Seven new editions of maps appeared and five others were reprinted (*see* Table G). The fifth sheet of the popular 1-inch-to-10-miles regional series was released in three editions —planimetric, grey landforms, and special brown landforms. The area covered by this new map is North-eastern British Columbia. Other mapping accomplishments included two completely new land-status maps at 1:250,000 scale, these being Nootka Sound (92E) and Taseko Lakes (92O) and two land-status maps at 1-inch-to-2-miles scale—namely, Kaslo (82 F/NE) and Nakusp (82 K/SW). Continuing demands for maps showing land status necessitated the reprinting, with or without revision, of two maps at 1-inch-to-2-miles scale, one at 1-inch-to-3-miles scale, and one at 1:250,000 scale. Also reprinted was a planimetric edition of West Central British Columbia (Map 1F).

As the result of concentrating mainly on land-status editions at 1-inch-to-2-miles scale, the results of the ten-year interval since mapping began at 1:250,000 scale are now being felt. Ten of the latter sheets are due for replacement, all of which have either gone out of print or nearly so. Six of the replacement sheets are in hand (*see* Table I), and compilation of the remainder must soon be started. A good proportion of the restatusing has involved areas of South-western British Columbia, where the density of settlement is particularly high and, therefore, the extent of land alienated from the Crown is correspondingly large.

In order to facilitate identification of private access roads, a new code key was devised for use on maps at 1-inch-to-2-miles and 1:250,000 scale. This extra refinement is designed to aid the public when travelling off the network of main roads and also improves the legibility of the map.

Field work in the form of a culture check was performed in the East Kootenay area between Cranbrook and Harrogate. The results will be shown on four new 1-inch-to-2-miles sheets, 82 G/NW, 82 J/NW, 82 J/SW, and 82 K/NE, and on the east half of 82 K/SE. The new maps will replace portions of the old Degree Series sheets, 4C, 4D, 4E, 4F, and 4G.

Routine stock handling, map editing, and miscellaneous clerical and cartographic work all showed substantial increases over 1960. Seventy-four sheets and charts were checked for geographical names and cultural detail, while 360 new names were accumulated in the Gazetteer records. A total of 87,198 maps, valued at $32,936, was distributed to various Government departments and to the general public. Both the aforementioned figures represent all-time records for the Division.

In addition to assembling, publishing, and distributing of the Lands Service Annual Report, a total of twenty-two mapping jobs was completed for various Government departments and the general public, for a value of $1,452. Of special note was the production of an Air Facilities Map of British Columbia. This map, which is distributed through the offices of the British Columbia Aviation Council, used Provincial Map 1J (1-inch-to-30-miles scale) as a base with an overprint showing airports, airstrips, and other details of interest to pilots. The reverse side of the sheet contains a numerical index to the airports and airstrips shown on the map face, location of these by co-ordinates, length of runways, etc., and pertinent information relating to flying in British Columbia.

A statistical summary of the work completed by the Geographic Division may be found in Tables A to J below. For convenience, Indexes to Published Maps (Nos. 8 to 14), which list information concerning prices, dates of publication, and how to order maps, are contained in the envelope attached to the back cover of this Annual Report.

STATISTICAL COMPUTATIONS

Table A.—Least-square Triangulation Adjustments Completed

Net	Locality	Type of Bearings	Number of Triangles Involved
Provincial Main	Tie Triangulation, Alaska Highway	True	20
Provincial Main	Stuart Lake and vicinity	True	27
Provincial Main	Skeena River to Takla Lake (revision)	True	31
Canadian Hydrographic Service	Mathieson and Seaforth Channels	Grid	48
Canadian Hydrographic Service	Prince Rupert Harbour and approaches	Grid	56

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

Table B.—Computations

	1956	1957	1958	1959	1960	1961
Triangles adjusted by least squares	814	567	562	542	543	182
Stations calculated from rectangular co-ordinates	536	669	918	806	891	168
Stations fixed by tellurometer measurements	.....	.....	.....	.....	73	201
Ties to cadastral surveys	32	70	22	24	174	113
Elevation of stations determined	82	325	378	133	251	128
Index cards—						
New	1,093	1,637	1,173	1,563	1,419	1,930
Old (rewritten)	888	613	1,297	945	551	149
Total on file	24,652	26,289	27,462	29,025	30,444	32,374
Requests for control attended to	461	403	397	383	349	333

Table C.—Canadian Permanent Committee on Geographical Names

	1956	1957	1958	1959	1960	1961
Number of map-sheets or charts checked	61	54	49	51	41	74
Number of names checked	6,664	8,884	4,698	6,321	4,949	7,837
Number of new names recorded	247	306	278	372	322	360

Table D.—Map Stock and Distribution

	1956	1957	1958	1959	1960	1961
Maps issued to departments and public	59,290	55,167	62,544	78,074	68,518	87,198
Maps received into stock	129,901	181,412	117,729	92,374	175,495	126,502
Total value of maps issued	$20,523	$20,441	$21,911	$27,117	$24,378	$32,936

Table E.—Geographical Work for Other Departments and Public

	1956	1957	1958	1959	1960	1961
Total number of items	84	86	55	20	18	22
Total value of work	$2,687	$2,654	$1,447	$2,754	$1,370	$1,452

Table F.—Letters

	1956	1957	1958	1959	1960	1961
Letters received and attended to	5,419	5,516	6,545	6,865	6,929	8,670

Table G.—Maps Reproduced and Printed by the Geographic Division, Victoria, during 1961

Map. No.	Name	Scale	Remarks
1D	North-eastern British Columbia, planimetric	1 in. to 10 mi.	New edition.
1DL	North-eastern British Columbia, landforms	1 in. to 10 mi.	New edition.
1DLS	North-eastern British Columbia, landforms in brown	1 in. to 10 mi.	New edition.
1F	West Central British Columbia, planimetric	1 in. to 10 mi.	Reprint, minor revisions.
3G	Quesnel	1 in. to 3 mi.	Reprint, no revision.
92E	Nootka Sound (first status edition)	1:250,000	New, seven colours, contoured.
92O	Taseko Lakes (first status edition)	1:250,000	New, seven colours, contoured.
93D	Bella Coola (first status edition)	1:250,000	Reprint, no revision.
82 F/NE	Kaslo (first status edition)	1 in. to 2 mi.	New, seven colours, contoured.
82 K/SW	Nakusp (first status edition)	1 in. to 2 mi.	New, seven colours, contoured.
82 L/SW	Vernon (second edition)	1 in. to 2 mi.	Status overprint, no revision.
92 I/SE	Merritt (second status edition)	1 in. to 2 mi.	Complete revision.

Table H.—Provincial Government Topographic Manuscripts Reproduced and Printed at 1:50,000 Scale by the Canadian Government, Ottawa, during 1961

Map No.	Name	Map No.	Name
92 B/13, E. & W.	Duncan (second edition reprint).	92 O/1, E. & W.	Yalakom River (first edition).
92 C/16, E. & W.	Cowichan Lake (first edition reprint).	92 O/8, E. & W.	Empire Valley (first edition).
92 F/11, E. & W.	Forbidden Plateau (second edition reprint).	104 H/12, W.	Kluea Lake (first edition)
92 H/3, E. & W.	Skagit (second edition).	104 H/13, W.	Ealue Lake (first edition).

Table I.—Maps Being Reproduced by the Geographic Division, Victoria, during 1961

Map No.	Name	Scale	Remarks
1B	North-western British Columbia	1 in. to 10 mi.	In draughting.
92 B/C	Victoria (first status edition)	1:250,000	Draughting complete.
92F	Alberni (second status edition)	1:250,000	Draughting complete.
92G	Vancouver (second status edition)	1:250,000	In draughting.
92J	Pemberton (second status edition)	1:250,000	In compilation.
93D	Bella Coola (second status edition)	1:250,000	In draughting.
103 I/J	Prince Rupert (second status edition)	1:250,000	In compilation.
82 F/NW	Slocan (first status edition)	1 in. to 2 mi.	In draughting.
82 F/SE	Creston (first status edition)	1 in. to 2 mi.	In draughting.
82 G/NW–NE	Cranbrook (first status edition)	1 in. to 2 mi.	In compilation.
82 G/SE	Flathead (first status edition)	1 in. to 2 mi.	In compilation.
82 G/SW	Elko (first status edition)	1 in. to 2 mi.	In draughting.
82 K/SE	Lardeau (first status edition)	1 in. to 2 mi.	In compilation.

Table J.—Provincial Government Topographic Manuscripts Being Reproduced at 1:50,000 Scale by the Canadian Government, Ottawa, during 1961

Map No.	Name	Map No.	Name
82 F/3, E. & W.	Salmo (second edition).	93 P/2, E. & W.	Flatbed Creek (first edition).
82 K/11, W.	Trout Lake (first edition).	93 P/3, E. & W.	Bullmoose Creek (first edition).
82 K/12, E. & W.	Beaton (first edition).	93 P/4, E. & W.	Sukunka Creek (first edition).
92 J/15, E. & W.	Bralorne (first edition).	93 P/5, E. & W.	Burnt River (first edition).
92 J/16, E. & W.	Bridge River (first edition).	93 P/6, E. & W.	Gwillim Lake (first edition).
92 L/10, E. & W.	Alert Bay (first edition).	93 P/7, E. & W.	Sundown Creek (first edition).
92 M/3, E. & W.	Belize Inlet (first edition).	93 P/8, E. & W.	Tupper Creek (first edition).
92 M/4, E. & W.	Cape Caution (first edition).	104 A/2, W.	Kwinageese River (first edition).
92 M/5, E. & W.	Goose Bay (first edition).	104 A/5, W.	Bowser Lake (first edition).
92 O/9, E. & W.	Dog Creek (first edition).	104 A/6, E. & W.	Bell-Irving River (first edition).
93 C/5, E. & W.	Atnarko (first edition).	104 A/11, W.	Taft Creek (first edition).
93 D/7, E.	Bella Coola (first edition).	104 A/12, E. & W.	Delta Peak (first edition).
93 D/8, E. & W.	Stuie (first edition).	104 A/13, W.	Mount Alger (first edition).
93 I/8, E. & W.	Narraway River (first edition).	104 B/16, E. & W.	Bob Quinn Lake (first edition).
93 I/9, E. & W.	Belcourt Creek (first edition).	104 K/16, E.	Nahlin River (first edition).
93 I/10, E. & W.	Wapiti Lake (first edition).	104 N/2, E. & W.	Nakina (first edition).
93 I/15, E. & W.	Kinuseo Creek (first edition).	104 N/1, E. & W.	Nakina Lake (first edition).
93 I/16, E. & W.	Redwillow River (first edition).	104 N/3, E.	Sloko River (first edition).
93 P/1, E. & W.	Kiskatinaw River (first edition).		

AIR DIVISION

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

The work of the Air Division for the year 1961 continued in much the same pattern as established in 1960.

The air-photography operations carried out during the summer months totalled 12,357 square miles of photography for various mapping projects and 2,762 lineal miles of photography for various purposes, including map revision for the Geographic Division, road reconnaissance for Forest Engineering, and cross flights to be used by the Topographic Division for bridging or air triangulation.

The Mapping and Compilation Sections produced 20,000 square miles of slotted templet lay-downs and 14,600 square miles of detail plotting of cadastral, highway, railway, transmission, and pipe-line surveys. This plotting is done at the scale of 1 inch to 20 chains for the Forest Surveys and Inventory Division current programme of producing surveys of the public working circle areas established throughout the Province.

The Processing Laboratory maintained its normal production of nearly 150,000 standard 9- by 9-inch prints and 2,000 other types, including enlargements. Because of the increased demand for reprints and the necessity of maintaining a complete stock of prints available in the Air Photo Library, a backlog of 40,000 requests for reprints existed at the end of the year. Inasmuch as the amount of new photography obtained during the 1961 summer season was below average, it is hoped that this backlog can be substantially reduced during 1962.

The Air Photo Library continued to be most active, and the loan traffic to the general public was above that of 1960, a total of 13,399 prints being sent out on loan during the year as against 11,840 during 1960. This was partially offset by a decrease in the number of reprints supplied to the general public, which decreased from a total of 49,627 prints in 1960 to a total of 34,659 prints supplied in 1961.

The total traffic handled through the Air Photo Library amounted to 149,820 reprints and 34,466 prints on loan.

In the report of this Division for last year, it was mentioned that the possibility of having to obtain replacements for the two Anson V aircraft was being given serious consideration.

It developed during the annual inspection routinely conducted during the winter that such replacements were more urgent than had been suspected, inasmuch as the inspection revealed that aircraft CF-EZN had developed extensive rot in the wood forming the structure of the centre section of the fuselage. While it would have been possible to rebuild the section, such a project would have been a major undertaking and no guarantee could be given that similar deterioration would not recur.

It was decided, therefore, to purchase two Beechcraft D18S (Expeditor) aircraft which had been declared surplus by the Royal Canadian Air Force and carry out the necessary modifications on one of them to replace Anson V CF-EZN for the summer operations of 1961.

This was done at the Government hangar at the Victoria International Airport, and although the work of modifying the aircraft for air photography took much longer than anticipated, the aircraft was put into operational use toward the end of the season and proved to be most successful for the type of work required.

Another item of interest was the acquisition of two O.S.C. air cameras on loan from the Royal Canadian Air Force. These were obtained on a trial basis and

proved to be most suitable for forest inventory and general reconnaissance purposes. They are subject to a minimum of mechanical trouble, and the negatives obtained by them are of excellent quality. It is hoped these cameras can be retained on a permanent basis in the future.

Details of the Air Division's activities and accomplishments during the year are given in the following reports, tables, and maps.

AIR OPERATIONS

The highlights of the year were the obtaining of two aircraft to replace the Anson V types that have been in constant service with the Air Division since 1947, and two air cameras to replace the F-24 cameras which had been modified in the Air Division Instrument-shop for use on the forest inventory programme.

The obsolescence of the two Anson V aircraft has been anticipated for some time, and many types of aircraft were investigated as possible replacements. These investigations indicated that the Beechcraft D18S (Expeditor) aircraft would, with suitable modification, have the necessary performance for the type of work required.

The first Beechcraft D18S, CF-BCE, was overhauled and modified at the Provincial Government hangar at the Victoria International Airport, and, after some delays, was put into operation early in September. Subsequently a total of sixty-nine hours was flown by this aircraft, forty-four of which were on air photography, and its performance has been most gratifying. While it is not as roomy nor as stable as the Anson, it has a faster rate of climb and a 20-per-cent higher cruising speed, and there is every indication that it will be most suitable for the work required.

In order to meet the need for better-quality photos for the Forest Surveys, as mentioned in last year's report, two O.S.C. cameras were obtained on loan from the Royal Canadian Air Force and put into service during the summer. This camera is fitted with Ross Xpres 12-inch focal length f. 5.6 lens and a Williamson Kinetric sector shutter and is completely automatic. Over 7,000 exposures were made with these two cameras, and the results were excellent. The cameras gave a minimum of trouble mechanically and produced negatives of superlative quality.

Despite the fact that only one aircraft was operational for the greater part of the season, 426 hours of flying were obtained, and 17,116 photographs covering over eighty different projects were taken.

A total of 10,745 square miles of 1-inch-to-20 chains scale coverage was obtained for Forest Surveys, 1,460 square miles of which were done on contract by a commercial company; 841 lineal miles of reconnaissance photography for Forest Engineering were flown, mainly for road-location and bridge-site study purposes; 2,766 square miles of block cover for mapping and 328 lineal miles of tie strips for bridging, using the Wild A-7 plotter, were flown for the Topographic Division; 306 square miles of 1-inch-to-20-chains photography, covering four large areas damaged by forest fires, were flown for the Forest Service district offices; and 1,457 lineal miles were flown and photographed in connection with map revision. For details of air operations, *see* table on pages 64 to 66, inclusive.

MAP COMPILATION

The main effort of the mapping sections continued to be concentrated on the production of air-photo and base-map compilations at a scale of 1 inch to 20 chains for use by the Forest Surveys and Inventory Division.

Over 20,000 photographs, covering 20,000 square miles, were plotted by the slotted templet method, and 14,600 square miles of ground surveys were compiled

during the year. In addition to this, some 1,550 square miles covering thirty-three sheets of final tracings were produced.

It will be noted that the area for which ground surveys were compiled during the year amounted to 14,600 square miles, as compared to 6,130 square miles completed during 1960. The increase in area completed in 1961 was partially due to the limited amount of cadastral surveys existing in much of the area of interest. In the area south-west of Prince George, for example, the compilation of base sheets can be completed in a quarter of the time required to compile a similar size area in the Trail-Rossland district. The filling of staff vacancies, which had existed in the early part of 1960, also contributed to the larger area completed during 1961.

AIR PHOTO LIBRARY

The Air Photo Library again reports a busy year in serving the public as well as other Government departments. The total reprints handled was some 5,000 less than in 1960, but an increase of over 6,000 prints was noted in the traffic of the loan service. Nearly 150,000 reprints were handled and some 34,000 prints were loaned during the year.

A decrease of some 15,000 reprints sold to the public, mostly to the forest industries and the oil and natural-gas industries, was partially offset by an increase of some 10,000 reprints supplied to Government departments. The Federal Government, for example, purchased over 4,000 reprints, as compared to 1,845 in 1960.

Toward the end of the year the prices of reprints and enlargements were increased and are now at the same rate as the prices charged by the National Air Photo Library in Ottawa.

With the new 1-inch-to-20-chains photography it became necessary to use a larger-scale index map. While the 1-inch-to-4-miles sheets for the 40-chain photography are still in use, 145 1-inch-to-2-miles sheets have been required to properly index this new photography. A total of some 350 index maps is now in use, and 3,465 Ozalid copies were distributed during the year.

PROCESSING LABORATORY

Since this Division was first established, the greater amount of reprints produced were made from 5- by 5-inch negatives enlarged to 9- by 9-inch prints. This year, with the new O.S.C. camera and the R.C. 8 camera, both using a 9- by 9-inch negative, the production of contact prints has greatly increased. Nearly 23,000 contact prints were made this year, as compared to about 6,000 in 1960. Considering the out-of-date equipment used for film development and contact printing, the laboratory staff did an excellent job. However, new and up-to-date equipment will be available for this coming summer's work, when we anticipate a further increase in the production of contact prints.

INSTRUMENT-SHOP

Considerable effort was expended by the shop personnel on designing and building a camera hatch in the new Beech aircraft. A new camera mount which could handle both the R.C. 8 and O.S.C. cameras was built and installed in the aircraft. A new intervalometer and control system for the cameras is being designed at present, and we expect to have this in operation for the 1962 flying season.

Development work on a new precision printer, designed to utilize the older 5-inch negatives, is continuing. Due to other more urgent work, very little progress

can be reported on the new Logetron printer, but it is hoped that work will again be started on this equipment during the coming year.

Co-operation with and assistance to other departments can again be reported from our shop. Modifying snow measuring tubes for the Water Rights Branch, construction of weather recording instruments for the Forest Service, and calibrating cruising prisms for the Forest Surveys and Inventory Division are just a few of the many outside projects taken on by our Instrument-shop.

STATISTICAL TABLES

ORDERS FOR STANDARD PRINTS (9 BY 9 INCHES) FROM BRITISH COLUMBIA NEGATIVES, 1961

	Reprints		Loans	
	Requisitions	Number	Requisitions	Number
Public—				
Individuals	779	4,999	409	5,785
Companies and organizations	41	266	26	429
Mining	134	10,966	68	2,672
Oil and natural gas	19	4,228	3	79
Schools and universities	52	1,399	22	1,611
Towns and cities	10	192	4	28
Commercial air survey	85	7,246	43	1,119
Forest industries	321	5,228	129	1,477
Real estate	33	135	41	199
Totals	1,474	34,659	745	13,399
Federal Government—				
Department of Mines and Technical Surveys	18	3,208	3	33
Department of National Defence	----	----	----	----
Department of Agriculture	31	344	1	50
Department of Fisheries	2	319	6	44
Miscellaneous	40	626	14	111
Totals	91	4,497	24	238
Provincial Government—				
Surveys and Mapping Branch	238	22,885	478	7,284
Land Inspectors	37	2,289	14	214
Water Rights Branch	63	3,155	77	1,002
Lands Branch (miscellaneous)	15	63	13	163
Department of Highways	82	1,023	158	2,128
Forest Surveys	186	77,398	200	3,489
Department of Finance	16	180	14	194
Department of Agriculture	20	1,560	5	42
Department of Mines	23	455	103	3,031
British Columbia Power Commission	20	1,052	34	939
Regional Planning	2	74	27	246
Department of Recreation and Conservation	34	530	203	2,097
Pacific Great Eastern Railway	----	----	----	----
Totals	736	110,664	1,326	20,829
Grand totals	2,301	149,820[1]	2,095	34,466

[1] Includes 9½- by 9½-inch contact prints from R.C. 8 and O.S.C. photography.

PRODUCTION RECORD, 1961, AIR PHOTO PROCESSING LABORATORY

	1946–55	1956–60	1961	Grand Total
Processing completed—				
Air films (averaging 117 exposures)	1,855	854	72	2,781
Air films (averaging 220 exposures)	.....	24	57	81
Air films (obliques averaging 40 exposures)	33	38	.....	71
Air films (70-mm. helicopter)	.....	1,230	4	1,234
Air films (test rolls)	.....	21	.....	21
Air films (color, Forest Service fires)	.....	3	1½	4½
Mountain station films (6 exposures each)	2,510	1,263	30	3,803
Printing completed—				
Standard prints (5 by 5 inches enlarged to 9 by 9 inches)	942,098	710,872	127,043	1,780,013
Contact prints (5 by 5 inches)	42,829	3,188	30	46,047
Contact prints (9½ by 9½ inches)	.....	8,066	22,777	30,843
Contact prints (20 by 24 inches)	1,271	1,973	133	3,377
Enlargements up to 40 by 60 inches	11,107	10,082	1,345	22,534
Mountain station enlargements (11 by 14 inches)	13,627	7,801	410	21,838
Kelsh and A-7 plates	.....	265	352	617
Lantern slides (2 by 2 inches)	346	26	.....	372
Autopositive films (various sizes to 30 by 40 inches)	4,123	2,870	635	7,628
Miscellaneous photographs, copies, etc.	1,102	1,314	16	2,432
Requisitions completed	11,914	11,712	2,627	26,253

PUBLIC LOANS AND REPRINTS

	1957	1958	1959	1960	1961
Loans	11,059	8,646	13,981	11,840	13,399
Reprints	62,843	32,131	45,644	49,627	34,659
Totals	73,902	40,777	59,625	61,467	48,058

1961 AIR OPERATIONS COST SUMMARY BY PROJECTS

	Aircraft-hours	Number of Photographs	Accomplishment			Flying Costs	Photographic Costs	Total Costs
			Square Miles	Lineal Miles	Stations			
	Hr. Min.							
A. Basic vertical cover—Queen Charlotte Islands	7 50	.....	.....	.....	.....	$1,393.95	.....	$1,393.95
B. Basic tricamera cover	.....	.....	.....	.....	.....	.....	.....	.....
C. Triangulation control identification—Gulf Islands	3 10	150	.....	.....	45	563.51	345.22	908.73
Average cost per square/lineal mile/station	.....	.....	.....	.....	$20.19	.....	.....	.....
D. Forest inventory cover (approximately 20 chains to 1 inch)—								
1. New cover—								
Arrowhead	21 05	1,130	860	.....	.....	$3,751.80	$2,600.62	$6,352.42
Big Bar	16 35	1,340	1,190	.....	.....	2,951.02	3,083.93	6,034.95
Dean	20 05	915	850	.....	.....	3,573.85	2,105.81	5,679.66
Harrison	3 00	175	170	.....	.....	533.85	402.75	936.60
Nechako	47 15	4,025	4,160	.....	.....	8,408.20	9,263.27	17,671.47
Salmo	12 15	845	770	.....	.....	2,179.90	1,944.71	4,124.61
Salmon Arm	10 55	510	540	.....	.....	1,942.63	1,173.73	3,116.36
Shuswap	2 30	135	105	.....	.....	444.88	310.70	755.58
Yale	16 25	990	640	.....	.....	2,921.36	2,278.42	5,199.78
Yale commercial contract flying	.....	1,210	1,460	.....	.....	2,968.68	3,592.92	6,561.60
Sub-totals	150 05	11,275	10,745	.....	.....	$29,676.17	$26,756.86	$56,433.03
2. Improvement flying, all districts	6 00	220	.....	.....	.....	1,067.71	506.32	1,574.03
Totals	156 05	11,495	10,745	.....	.....	$30,743.88	$27,263.18	$58,007.06
Average cost per square mile	.....	.....	$5.40	.....	.....	.....	.....	.....

1961 Air Operations Cost Summary by Projects—*Continued*

	Aircraft-hours	Number of Photographs	Accomplishment			Flying Costs	Photographic Costs	Total Costs
			Square Miles	Lineal Miles	Stations			
	Hr. Min.							
E. Forest Engineering—								
Aleza Lake Ranger Station	55	4			1	$163.12	$9.21	$172.33
Barriere Lakes Forest-development Road	1 45	82		70		311.42	188.72	500.14
Hendrix Creek Forest-development Road	1 20	50		32		237.26	115.07	352.33
Kettle River Forest-development Road	3 15	95		80		578.35	218.64	796.99
Kingcome Inlet Forest-development Road	3 00	20		25		533.85	46.03	579.88
Naver-Ahbau Forest-development Road	1 15	35		25		222.45	80.55	303.00
Nicoamen Forest-development Road	2 00	40		23		355.90	92.06	447.96
Parsnip River Forest-development Road	5 05	360		350		904.58	828.52	1,733.10
Prince George administration buildings	45	3		1		133.46	6.90	140.36
Summit Lake Ranger Station	55	3			1	163.12	6.90	170.02
Swift River Forest-development Road	1 15	38		25		222.45	87.45	309.90
Upper Bowron Forest-development Road	3 40	147		100		652.48	338.31	990.79
Wapiti River Forest-development Road	5 55	180		135		1,052.87	414.26	1,467.13
Willow River Forest-development Road	1 15	27		20		222.45	62.14	284.59
Ranger stations	8 50	100			22	1,571.90	230.14	1,802.04
Timber sales, Adams Lake	4 00					711.80		711.80
Totals	45 10	1,184		886	24	$8,037.46	$2,724.90	$10,762.36
Average cost per square/lineal mile/station				$9.73	$89.35			
F. Precision Mapping Projects—								
Cross flights	3 50	105		225		$682.15	$241.65	$923.80
Duck Islands	1 25	23	15			252.10	52.93	305.03
Kamloops Provincial buildings	1 00	2	1			177.95	4.60	182.55
McGregor River	2 30	95		100		444.88	218.64	663.52
Port Hardy	2 40	3		3		474.54	6.90	481.44
Stuart Lake	23 50	642	2,750			4,241.16	1,477.53	5,718.69
Totals	35 15	870	2,766	328		$6,272.78	$2,002.25	$8,275.03
Average cost per square/lineal mile			$2.24	$6.31				
G. Special projects—								
Water Rights Branch—								
Abbotsford	45	16		12		$133.46	$36.82	$170.28
Columbia Arrow Lakes flooding	7 00	215		85		1,245.67	494.81	1,740.48
Cowichan–Nitinat	1 20	18		20		237.27	41.43	278.70
Fraser River flooding	3 40	110		45		652.48	253.16	905.64
Fraser River low water	6 05	65		105		1,082.55	149.59	1,232.14
Fraser Valley dyked area	8 35	360		300		1,527.42	828.52	2,355.94
Kamloops Lake	4 25	163		90		785.95	375.13	1,161.08
Kamloops Lake revision	2 50	83		85		504.20	191.02	695.22
Kootenay River	3 10	80		75		563.51	184.11	747.62
Kootenay River flooding	1 35	35		20		281.75	80.55	362.30
Lillooet River	1 00	12		15		177.95	27.62	205.57
Luxton flooding	1 10	32		10		207.61	73.65	281.26
Nanaimo	1 20	18		22		237.27	41.43	278.70
Parksville	1 25	16		10		252.10	36.82	288.92
Prince George	20	24		11		59.31	55.23	114.54
Quesnel	1 40	18		20		296.58	41.43	338.01
Salmon River channel	40	8		4		118.63	18.41	137.04
Sproat Lake outlet	2 10	10		3		385.56	23.01	408.57
University Lands	1 30	21		10		266.93	48.33	315.26
Legal Surveys—								
Malakwa–Clanwilliam Highway	1 45	55		40		311.41	126.58	437.99
Revelstoke–Glacier Highway	1 45	65		45		311.41	149.59	461.00

1961 Air Operations Cost Summary by Projects—*Continued*

	Aircraft-hours	Number of Photographs	Accomplishment			Flying Costs	Photographic Costs	Total Costs
			Square Miles	Lineal Miles	Stations			
G. Special projects—*Continued*	Hr. Min.							
Geographic Division — Columbia–Kootenay map revision	4 45	240		350		845.27	552.34	1,397.61
Forest Surveys—Cranbrook vicinity	1 00	45		20		177.95	103.56	281.51
Department of Highways—								
Beaver Point–Ganges	40	50		15		118.63	115.07	233.70
Saddle Rock slide	2 10	6		6		385.56	13.81	399.37
Squamish River	1 00	17		10		177.95	39.12	217.07
Public Works—Brannen Lake	30	2		1		88.97	4.60	93.57
Experimental Station—Mesachie Lake	30	2		1		88.97	4.60	93.57
Capital Region Planning Board—Marine Drive	45	29		10		133.46	66.74	200.20
Ranger School—Central Park, Burnaby	1 25	25		5		252.10	57.54	309.64
Forest district burns—								
Prince George—Tsus and Grove	5 45	230	250			1,023.22	529.33	1,552.55
Prince Rupert—Paul, Otto, and Pope	2 15	75	56			400.40	172.61	573.01
Kamloops—Cat, Lan, and Rage	3 15	46		12		578.34	105.87	684.21
Totals	78 10	2,191	306	1,457		$13,909.84	$5,042.43	$18,952.27
Average cost per square/lineal mile			$6.95	$11.55				
H. Miscellaneous flying—								
Water Rights Branch—Fraser River flood recce.	3 00	60		45		$533.85	$138.09	$671.94
Department of Highways—administration flying	3 45					667.32		667.32
Taxation—Cowichan obliques	2 30	8				444.88	18.41	463.29
Department of Mines—Indian River fault	30	3				88.98	6.90	95.88
Internal—								
Balloon target test photo	1 25	9		2		252.09	20.71	272.80
Beacon Hill Park	50	1		1		148.30	2.30	150.60
Burnaby Vocational School	40	2		1		118.63	4.60	123.23
Exposure comparison test	1 25	35		8		252.09	80.55	332.64
Gulf Islands obliques	45	30				133.46	69.04	202.50
Ilford film test	1 30	60		8		266.93	138.10	405.03
Shawnigan test photo	1 25	20		5		252.10	46.03	298.13
Sooke Lake watershed	2 50	119		50		504.20	273.87	778.07
Tacheeda Lake Road	55	9		6		163.12	20.71	183.83
Colour test photo	5 35	54		2		993.56	124.28	1,117.84
Training[1]	45 30							
Camera maintenance[1]	16 30	45		8				
Aircraft maintenance[1]	32 40							
Administration flying	4 10					741.46		741.46
Totals	125 55	455		136		$5,560.97	$943.59	$6,504.56
Average cost per square/lineal mile				$47.83				
Grand totals	451 35	16,345	13,817	2,807	69	$66,482.39	$38,321.57	[2]$104,803.96

[1] Cost of maintenance and training charged to all projects.
[2] Includes cost of contract flying, $5,354.75.

WATER RIGHTS BRANCH

Note 3 THE WATER RIGHTS BRANCH

The Water Rights Branch is the agency of the Provincial Government which administers the control and use of surface water under the authority of the *Water Act*.

The main principles of the *Water Act* regarding the use of water are:—

(1) The property in and the right to the use and flow of all the water at any time in any stream in the Province are for all purposes vested in the Crown in right of the Province. The common-law principle of riparian water right has been abolished.

(2) Licence-holders have a right to the use of water under the terms and conditions of the water licence issued by the Comptroller of Water Rights. Earlier licences have priority over licences issued later.

(3) Retention of a water licence is dependent upon the beneficial use of the water, payment of the water-licence rentals, and observance of the regulations of the *Water Act*.

(4) A water licence is generally made appurtenant to a parcel of land, mine, or undertaking, and it will pass with any conveyance or other disposition thereof.

(5) If it is necessary that a water licensee construct works on another person's land, he can expropriate the land reasonably required if an amenable agreement cannot be reached. If the works will be on Crown land, the water licensee may acquire a permit to occupy Crown land for such purpose.

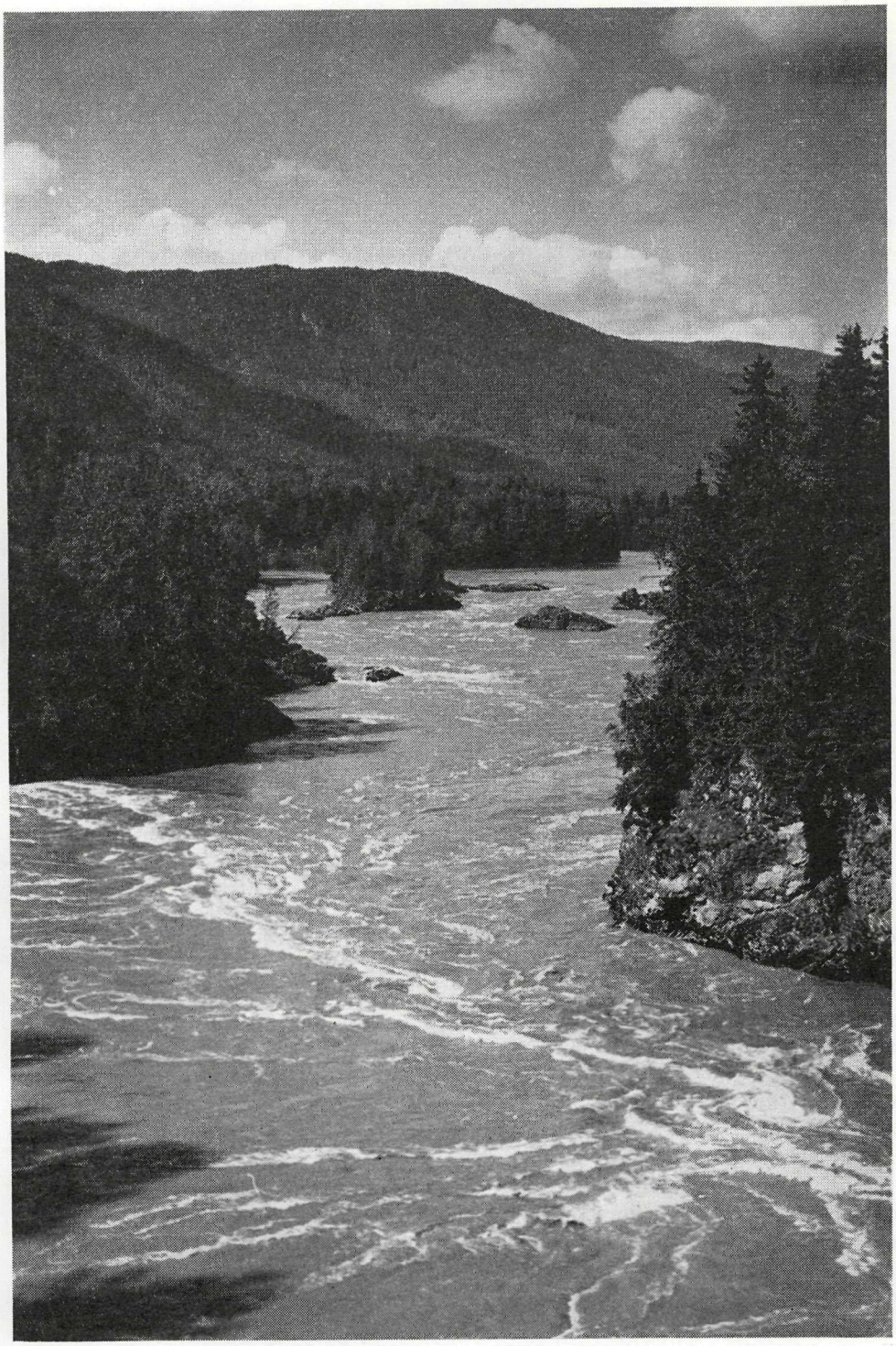
The second major function of the Water Rights Branch is to generally supervise and assist the administration of the improvement districts which have been incorporated under the *Water Act* for irrigation, waterworks, drainage, dyking, street-lighting, providing financial aid to hospitals, fire protection, and several other purposes. An improvement district is a self-governing public corporate body administered by elected Trustees. The undertakings of an improvement district can be financed by Provincially guaranteed debenture issues.

The third dominant function of the Water Rights Branch is to carry out water-resource surveys. Basic data are gathered to encourage and guide the future use and conservation of our water resources, and engineering investigations are carried out pertaining to irrigation- and domestic-water supply, stream erosion, flooding, and other water problems.

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

Water is a natural resource which often has a controlling influence on economic development of other resources and, therefore, is in competitive demand by the utilizers of other resources. Much of the vast industrial expansion presently occurring in this Province is associated with the use of British Columbia water. A large number of communities have been incorporated into improvement districts to operate community projects and provide essential amenities.

The Water Rights Branch, therefore, has engineering as well as administrative functions and is called upon by the Government and the public to carry out many and varied investigations and to assist and direct this expansion in the public interest. The members of the Branch take an active part in a number of important committees and boards dealing with the disposition of the Province's water resources.



Skeena River—head of Kitselas Canyon.

WATER RIGHTS BRANCH

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

Increasing activities of the Branch produced new high points again in 1961. Applications for new water licences totalled 1,102, the highest on record, and the number of active water licences is now nearly 18,000. The general problem of diminishing water-supplies that could be utilized at a reasonable cost and increased competition for these supplies were strongly accentuated by the dry summer experienced in the Southern Interior of the Province. Heavy storms at the beginning of the year in the coastal areas and high snow-melt run-off in some Interior streams further increased the work of the Branch.

The growing pressure on the man-power of the Branch was temporarily relieved by the creation of seven additional positions in the establishment. A new district office for the Lower Mainland at Mission City was opened. Several staff transfers within the Branch were also involved, as well as new recruitments Concerning senior positions, Mr. H. D. DeBeck, Kamloops District Engineer, was transferred to Victoria to replace Mr. G. A. J. Kidd, Project Engineer, who resigned. Mr. P. G. Odynsky became Kamloops District Engineer. Mr. E. G. Harrison, who was in charge of the Prince George office, was transferred to the new district office at Mission City, and Mr. C. K. Harman was recruited to fill the vacancy at Prince George. Mr. E. Livingston, geological engineer, joined the staff to form the nucleus of a new section which in time will be dealing with ground-water licensing as foreseen in the 1960 amendments of the *Water Act*.

Similarly increased activities also prevailed in the section dealing with community water-supply projects, under the direction of Mr. P. J. Leslie, assisted by Mr. J. W. Webber, which projects are closely related to our general supervision over the improvement districts, co-ordinated by the solicitor, Mr. A. K. Sutherland. During the year a record number of nineteen new improvement districts were incorporated, bringing the total at the end of 1961 to 270.

With reference to planning and surveys for major rivers, the Branch continued its co-operation with the Fraser River Board and also continued surveys of the northern streams. In the Columbia River basin, the three storage projects envisaged in the Columbia River Treaty are under active study by the British Columbia Power Commission. Water applications were received for storage dams on the Columbia River at the Mica Creek site and at the outlet of Lower Arrow Lake and at the outlet of Duncan Lake in the Kootenay watershed. These applications necessitated the holding of a number of public hearings by the Comptroller of Water Rights in the areas affected by the proposed projects.

The recently constituted Crown corporation, the British Columbia Electric Company, took over the undertaking of the Peace River Development Company, and at the year's end was actively engaged in the further exploration toward the planned development of this project.

There was no lessening in the activities in connection with a number of boards, committees, or organizations dealing with water problems and related matters and on which the Comptroller or senior staff members participate. Among these activities are such as the work of the electric load forecast committee of the British Columbia Energy Board and several other working groups of other committees. A list of organizations in which the Branch participated includes the following: Fraser River Board, International Kootenay Lake Board of Control, British Columbia Energy Board, Pollution-control Board, Interdepartmental Committee on Flooding and Erosion, Federal-Provincial Resources for To-morrow Conference,

British Columbia Natural Resources Conference, Hydrology Sub-committee of the National Research Council, Western Snow Conference, and Cowichan River Erosion and Flooding Committee.

IMPROVEMENT DISTRICTS

There are 270 improvement districts under the supervision of the Water Rights Branch. These districts are incorporated for various purposes, among which are to extend financial aid to hospitals; to provide hospitals, irrigation, waterworks, fire protection, street-lighting, sewage-disposal, garbage collection and disposal, land protection, dyking, drainage, community halls, ambulance services; the operation and maintenance of cemeteries; and the provision and maintenance of parks and playgrounds. Nineteen improvement districts were incorporated this year, as follows: Independent Waterworks District, King Improvement District, Kye Bay Improvement District, Metchosin Fire Protection District, Nicola Valley Hospital Improvement District No. 30, Okanagan Mission Waterworks District, Oliver Fire Protection District, Omineca and Nechako Valley Hospital Improvement District No. 32, 100 Mile House Fire Protection District, Osoyoos Rural Fire Protection District, Quinsam Heights Waterworks District, Seagirt Waterworks District, Selma Park Improvement District, Sicamous Waterworks District, Somerset Waterworks District, Sunshine Coast Hospital Improvement District No. 31, West Sechelt Waterworks District, Windermere Improvement District, and Mamquam Sewerage District.

Pursuant to section 62 of the *Water Act,* $389,939 was advanced to improvement districts by the Province of British Columbia for 1961 requirements to provide fire protection, financial aid to hospitals, ambulance services, 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 upon the capability of the area to repay. The tax levy for 1961 to take care of the aforementioned advances and those of previous years was $961,968.

Pursuant to the *Improvement Districts Assistance Loan Act,* chapter 38 of the Statutes of British Columbia, 1945, and amendments thereto, the Province of British Columbia guaranteed debentures with respect to both principal and interest in the amount of $686,000. In addition, temporary borrowings with respect to both principal and interest in the amount of $1,001,785 were guaranteed by the Province of British Columbia. This Branch recommends the feasibility of the projects before the Province guarantees temporary borrowings and debentures with respect thereto, and, further, that the areas can liquidate the debentures as they become due. Of the total net amount guaranteed as aforesaid, $14,500 was used for rehabilitating irrigation systems, $237,285 was used for rehabilitating and constructing waterworks systems and sewers, $715,000 was used for constructing new hospitals, and $35,000 was used for constructing a new fire-hall.

WATER-USERS' COMMUNITIES

There are sixty-two water-users' communities in the Province at the present time. They are incorporated under the *Water Act* by certificate of incorporation issued by the Comptroller of Water Rights and are usually small corporate bodies of six or more persons holding water licences. A community can install and operate a water-supply system for its members. Their powers are more restricted than those of an improvement district, and the administration is carried out by a manager under the supervision of the Comptroller of Water Rights. Four water-users' communities were incorporated during 1961.

INTERNATIONAL WATERS—COLUMBIA BASIN

On January 17, 1961, the Columbia River Treaty between the United States and Canada was signed by President Eisenhower and Prime Minister Diefenbaker. This was the culmination of sixteen years of investigation and study by the International Joint Commission into the possibilities of a co-operative water-resource development between the two countries, followed by a year of intensive negotiation by negotiating teams appointed by the two Governments. The treaty was subsequently ratified by the United States, and will take effect from the date of its ratification by Canada.

The treaty provides for the building in British Columbia of three major water-storage projects, which are to be operated so as to achieve optimum generation of hydro-electric energy in the United States at plants on the Columbia River and its tributaries. In return for storage in Canada, the United States will deliver to Canada free of charge a half share of the additional power that results in the United States from the improved flow regulation provided by the Canadian storage projects. The United States also undertakes to pay Canada a total sum of $64,000,000 in consideration of flood damages that will be prevented by these projects.

Another provision in the treaty allows the United States to build a dam on the Kootenai River near Libby, Montana. This project will provide substantial benefits in both countries. Canada's financial commitment in this case is the preparation of the portion of the reservoir which extends north across the International Boundary. In return for this, Canada gains valuable flood-control at Creston and an estimated potential of 200,000 kilowatts of power on the Kootenay River in British Columbia.

Details of the Canadian storage projects are as follows:—

(*a*) A dam on the Columbia River near Mica Creek, British Columbia, with approximately 7,000,000 acre-feet of storage.

(*b*) A dam near the outlet of Arrow Lakes, British Columbia, with approximately 7,100,000 acre-feet of storage.

(*c*) A dam or dams on one or more tributaries of the Kootenay River in British Columbia down-stream from the Canada–United States Boundary with storage equivalent in effect to approximately 1,400,000 acre-feet of storage near Duncan Lake, British Columbia.

Item (*a*) above is to be completed within nine years of the ratification date and items (*b*) and (*c*) within five years.

It is noted that while the treaty provides for the benefits to accrue to Canada, the benefits will in actuality accrue to the agency of the Province of British Columbia that constructs and operates the projects.

The determination of the down-stream power benefits, which the United States is required to share with Canada, is based on the increased outputs that will occur at the plants of the "base system" in the United States when the aforementioned Canadian storage projects become operative. The "base system" consists of the following hydro-electric projects: Hungry Horse, Kerr, Thompson Falls, Noxon Rapids, Cabinet Gorge, Albeni Falls, Box Canyon, Grand Coulee, Chief Joseph, Wells (not under construction at present), Rocky Reach, Chelan Lake, Rock Island, Wanapum, Priest Rapids, Brownlee, Oxbow, Ice Harbour, McNary, John Day, The Dalles, Bonneville, Coeur d'Alene Lake, and Kootenay Lake.

Present estimates of the power to be received initially by Canada as a half share of the down-stream benefits are as follows:—

	Average MW	Peak MW
Arrow Lakes	484	785
Duncan	75	110
Mica	204	415
Totals	763	1,310

Although these benefits which Canada will receive under the treaty are substantial, they are a relatively small part of the total benefits which will eventually result in Canada. In addition to the production of down-stream benefits, the construction of the storage-works will make it economically feasible to develop the vast hydro-power potential of the Columbia River and its tributaries in Canada.

The British Columbia Power Commission has been designated by the Government of the Province to pursue the development of the treaty projects on behalf of the Province. A considerable amount of investigation has been carried out during 1961 by consultants for the Power Commission on design for the three Canadian storage dams, and applications for water licences for the three dams were made by the Power Commission in June.

FRASER RIVER BASIN

During the year the Branch continued its active participation in the studies and field investigations for the Fraser River Board. This Board, of which the Comptroller of Water Rights is a member, is engaged in an analysis of flood regulation and hydro-electric development in the headwater streams of the Fraser system. The major area annually threatened is the Lower Fraser Valley, and it is in this region that Water Rights Branch field parties were employed throughout the year. Surveys, commenced in 1960, on the drainage and dyking systems of the valley between Chilliwack and New Westminster were completed during 1961. Additional work of the same order was carried out on the estuary islands in the latter part of the season. The information obtained from this field work is being used in the analysis of storm flooding throughout the valley and in the evaluation of potential damage from major spring floods.

The Fraser River Board, in its current analysis, is giving consideration to the results of flood storage in the Upper Thompson system and the possible effect upon flood levels in the Kamloops region. This area was also surveyed by Branch field parties, and, in addition, soundings were completed at the outlet of Kamloops Lake and west along the Thompson River for several miles in order to ascertain the river gradient in that area. These field data were obtained to provide the basis for an assessment of the natural storage created by Kamloops Lake and its effect on the levels in the region of Kamloops itself.

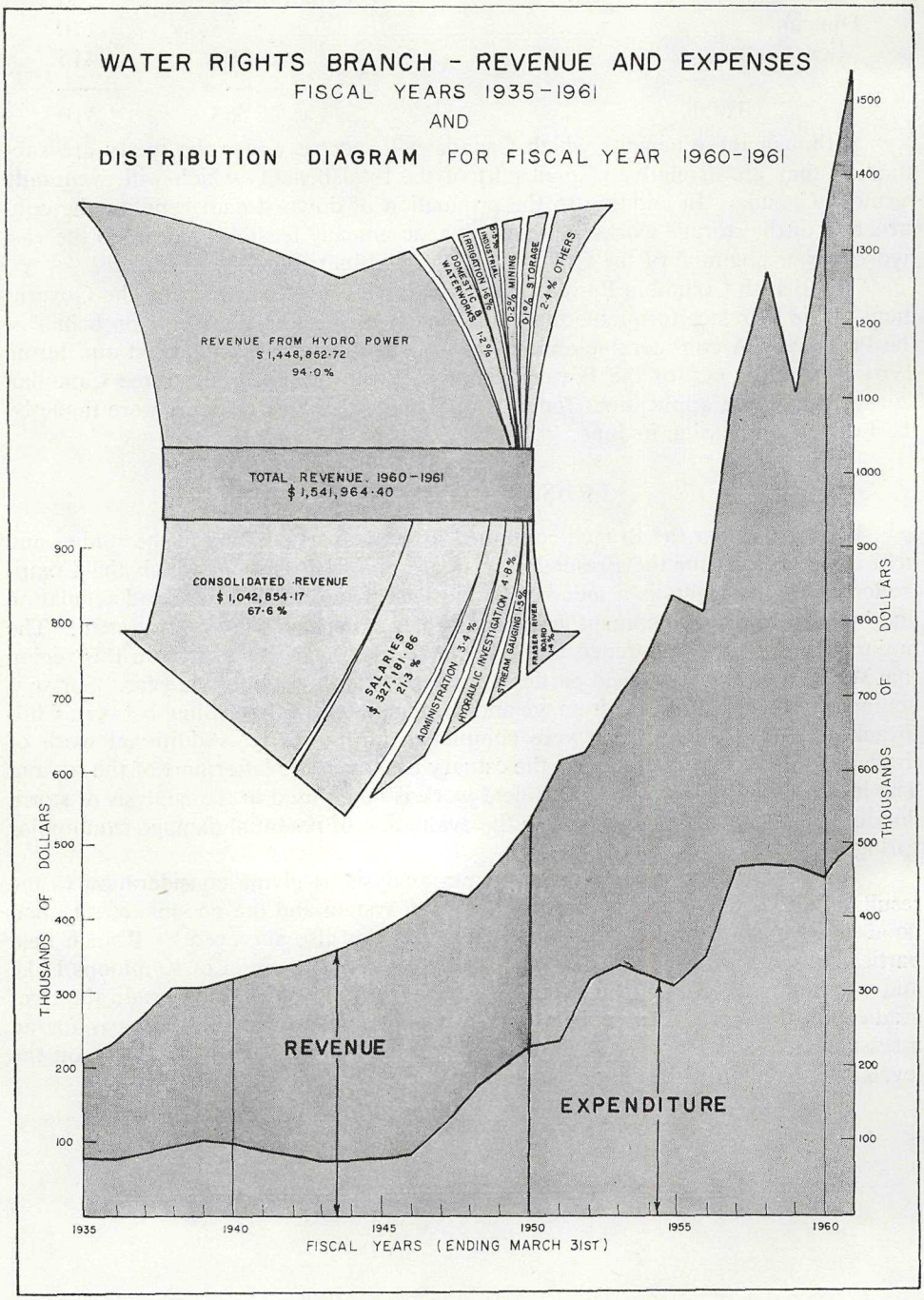

WATER RIGHTS BRANCH - REVENUE AND EXPENSES
FISCAL YEARS 1935-1961
AND
DISTRIBUTION DIAGRAM FOR FISCAL YEAR 1960-1961
REVENUE FROM HYDRO POWER
$ 1,448,852·72
94·0 %
TOTAL REVENUE, 1960-1961
$ 1,541,964·40
CONSOLIDATED REVENUE
$ 1,042,854·17
67·6 %
SALARIES
$ 327,181·86
21·3 %
ADMINISTRATION 3·4 %
HYDRAULIC INVESTIGATION 4·8 %
STREAM GAUGING 1·3 %
FRASER RIVER BOARD 0·4 %
DOMESTIC & WATERWORKS 12·9 %
IRRIGATION 1·8 %
INDUSTRIAL 0·3 %
0·2% MINING
0·6% STORAGE
2·4 % OTHERS
REVENUE
EXPENDITURE
THOUSANDS OF DOLLARS
FISCAL YEARS (ENDING MARCH 31ST)
1935
1940
1945
1950
1955
1960

Plate 1.

OPERATIONS DIVISION

M. L. ZIRUL, P.ENG., CHIEF, OPERATIONS DIVISION

Under the *Water Act* the Comptroller of Water Rights is charged with the administration of the water resources of the Province. The duties arising out of processing and investigating applications and supervising and regulating the diversion and use of water under water licences fall to the Operations Division.

The Chief, Operations Division, is responsible to the Comptroller and Deputy Comptroller for the enactment and completion of these duties and is assisted by the following organization:—

(1) General office, under the supervision of Chief Clerk.

(2) Administrative draughting office, under the supervision of Chief Draughtsman.

(3) Six district offices located at Victoria, Mission City, Kamloops, Kelowna, Nelson, and Prince George, each in the charge of a District Engineer. Mission City office was opened in 1961.

An applicant for a water licence must fulfil the statutory requirements for application set out in the *Water Act* and the regulations thereto. An application is "cleared" by the administrative draughting-room with reference to other water licences, reserves, and lands affected. The general office sees that the statutory requirements are carried out, including posting of the application, notification of the holders of other licences and owners of lands affected, and the payment of fees. The application will then be investigated by the respective district office, after which the issuance of a water licence will be considered.

Because of the fact that the most easily developed sources within economical reach of areas requiring water are becoming fully licensed, applications for new licences on these sources require very careful study and existing water licences require increasingly more administrative attention. District offices have commenced studies concerning possibilities of augmentation of depleted water-supplies in water-short areas. Applications for water licences for the year under review totalled 1,102, an increase of 17.4 per cent over the number received during the preceding year.

The latter part of the summer was very dry in some parts of the Province and water shortages occurred in many areas, particularly in those districts administered by the Kamloops and Kelowna offices. This resulted in much of the time of the District Engineers and staff of these offices being spent on the allocation of available water-supplies in accordance with the priorities of licences and in adjudicating disputes arising over entitlement to water.

In 1961 a geological engineer was added to the staff in connection with anticipated ground-water licensing in the future. Available information on ground-water potential and its existing use is being compiled and preparations are being made for establishment of a ground-water observation network.

The reports of both the Chief Clerk and the Chief Draughtsman show increases in the volume of work handled by their respective offices during the year.

The separate reports of the general office, administrative draughting office, and district offices follow.

GENERAL OFFICE

(Period November 1, 1960, to October 31, 1961.)

	1957	1958	1959	1960	1961
Applications for licences	687	977	1,038	939	1,102
Applications for apportionments	32	16	42	36	25
Applications for change of appurtenancy	16	25	23	31	31
Application for change of works	45	54	75	115	175
Applications for extension of time	590	298	69	84	67
Change of ownership, address, etc.	1,902	2,299	2,364	2,293	2,669
Cancellations and abandonments	211	257	190	222	384
Right-of-way over Crown lands	125	131	109	160	184
Totals	3,608	4,057	3,910	3,880	4,637
Conditional licences issued	570	562	850	718	810
Final licences issued	364	275	274	228	220
Total licences issued	934	837	1,124	946	1,030

DRAUGHTING OFFICE

	1960	1961
Water applications cleared and plotted on maps	939	1,013
Final- and conditional-licence plats compiled and traced	1,194	932
New water-rights maps compiled and traced	11	30
Water-rights maps revised	4	42
New improvement districts described and plans prepared	9	19
Improvement districts' descriptions and plans amended	25	37
Reference maps renewed	20	16
Water clearances (change of ownership, apportionments, cancellations, etc.)	2,515	3,109
Land clearances (purchases, Crown grants, leases, etc.)	5,345	6,232
Land clearances (cancellations)	1,745	1,517
Rights-of-way over Crown land	183	185

During the year many inquiries by the public and other departments were taken care of. The usual requests for maps and other information by 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 DISTRICTS ENGINEERING SECTION

The bulk of the work undertaken consisted of the preparation of feasibility reports for proposed waterworks and irrigation schemes, the review of engineering reports and plans submitted by improvement districts, and the dispensation of engineering advice. A summary of major reports and investigations during the year follows.

East Osoyoos Irrigation District

Pumping-main renewal was carried out in the spring, and because of the financial difficulties of the district, the complete engineering for the project was carried out. The system is now operating satisfactorily.

Garden Bay Waterworks District

The community of Garden Bay has for some time obtained its water-supply from Garden Bay Lake through a pipe-line which was installed over thirty years ago by the Columbia Coast Mission, and is in an unreliable condition. A survey of the district was therefore carried out and a report subsequently prepared outlining a new and more comprehensive system to replace the existing one.

Riverview Area near Creston

A study was made of the feasibility of providing a domestic water-supply or, alternatively, a combined irrigation and domestic water-supply for the Riverview area near Creston. Consideration was given to pumping from either Floyd Creek or the Goat River, but the cost of both schemes proved to be high.

Ruckles Addition near Grand Forks

The area known as the Ruckles Addition lies to the immediate south of the City of Grand Forks. The existing water-supplies, which are obtained from shallow wells, are in many cases contaminated. A survey of the area was therefore made to determine the cost of installing a domestic water-supply system, and a report on this scheme will be issued shortly.

Barkerville Restoration Project

The Parks Branch of the Department of Recreation and Conservation is at present engaged in the restoration of the historic site of Barkerville. The advice of the Water Rights Branch was requested regarding the selection of a course of water-supply to provide fire protection for the museum and buildings at the site. Accordingly, a visit was made to Barkerville in the spring, and a memorandum was prepared giving the findings of the investigation.

Cumberland Village

The Village of Cumberland has experienced shortages of water, and at its request an investigation was made to determine whether the yield of Allen Lake, from which the village draws part of its supply, could be increased. It was recommended that the storage capacity of the dam be increased.

Jingle Pot Road Area

An investigation was carried out to determine the feasibility of a domestic water-supply system for the Jingle Pot Road area, immediately to the west of Nanaimo. The source of supply assumed for the proposed scheme was from the Greater Nanaimo Water District. A study of the economics of operating the system indicated rather high annual costs, an inevitable reflection of the widely scattered pattern of development in the area.

Black Mountain Irrigation District

A comprehensive report on the Black Mountain Irrigation District was presented to the Trustees. The report was very favourably received, and the district has requested further guidance in establishing a master plan upon which to base future system-renewal policy.

Winfield and Okanagan Centre Irrigation District

Detailed mapping and site surveys have been completed in preparation for a study of the system serving the Winfield and Okanagan Centre Irrigation District. The proposed report will contain a system appraisal and recommendations regarding future system-renewal policy.

Westbank Waterworks District

In response to a request from the Trustees, the Branch prepared a report containing tentative estimates and designs for developing a supplementary source of supply from Powers Creek and augmenting the existing distribution system. These proposals are estimated to cost approximately $48,000.

West Bench Irrigation District

The Trustees of the West Bench Irrigation District requested the guidance of the Water Rights Branch regarding a proposed bulk supply of water to the Baumann Subdivision, a concentrated housing development bordering the district. In response, the Water Rights Branch prepared a report which also included specific recommendations to safeguard the district's interests. Another study and report were made to determine the ability of the existing works to supply irrigation-water to additional lands, the owners of which had petitioned for inclusion in the district.

Chetwynd Waterworks District

Following previous Water Rights Branch reports on the proposed methods of securing a domestic water-supply for the Chetwynd Waterworks District, further field investigations were made regarding the storage possibilities on Windrem Creek. These surveys confirmed that the Pine River offered the only feasible source of supply, and the district is currently installing works designed for the future use of Pine River.

North Saanich Water-supply

The residents of North Saanich have, for many years, been inconvenienced by the inadequacy and doubtful quality of water obtained from individual wells and springs. At the request of the Sidney and North Saanich Chamber of Commerce, a comprehensive study of existing water-supply sources was made.

It was determined that Elk Lake offered a feasible source of water-supply for North Saanich. As this source is currently used by the Municipality of Central Saanich, the Branch report recommended that negotiations be entered into with this authority to supply water in bulk to the North Saanich area. The report included tentative design layouts and cost estimates for the works required to serve the area, and also outlines the organizational steps necessary to develop the over-all system described.

Miscellany

A number of schemes of a minor nature were also investigated and reported on by the section during the year. These included proposed water-supply schemes for the Minto area near Cumberland, and West Sechelt, together with rehabilitation of the Walhachin Waterworks, and study of the flooding problems at Western Lake, Saltspring Island.

VICTORIA DISTRICT OFFICE

C. Errington, P.Eng., District Engineer

The area under the administration of the Victoria District Office was considerably reduced with the establishment of a new district office at Mission City. The Victoria District Office now administers the Alberni, Nanaimo, and Victoria Water Districts, which comprise most of Vancouver Island and include the Gulf Islands and other islands adjacent to Vancouver Island. The office now operates without an Assistant District Engineer.

Although precipitation records show that, except for the Victoria area, rainfall during the months of June to September was below the long-term average, our water-supply problems were normal.

During the period under review, November 1, 1960, to October 31, 1961, some seventeen special investigations, studies, or reports were made.

SUMMARY OF YEAR'S WORK

Total applications received	283
Conditional licences issued	303
Final licences issued	73
Applications refused	11
Licences abandoned or cancelled	108

KELOWNA DISTRICT OFFICE

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

The Kelowna District Office administers an area of approximately 15,000 square miles, comprising the Kettle, Similkameen, and Okanagan drainage-basins, 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.

In 1961 an extremely dry season was experienced. With minimum flows occurring in many of the streams, it was necessary to spend a great deal of time on the regulation of licensed diversions.

The general water shortage has resulted in a renewed interest in the development of additional storage. During the past year three new dams were constructed and extensive improvements carried out to several existing dams.

Engineering investigations in the field of domestic water-supply are becoming an important part of the district office work. This has resulted from continued urban development and a demand for improved water-supply.

As in previous years, there was a noticeable increase in the routine administration work, particularly in the number of water applications requiring attention. As the water-supply of many of the streams is already fully recorded, an appreciable number of applications for new water licences must be refused. At the present time approximately 250 streams are fully licensed.

SUMMARY OF YEAR'S WORK

Applications on hand and received	279
Applications investigated and reported on	146
Applications abandoned or cancelled	13
Final-licence survey reports	65

Miscellaneous surveys	24
Dam inspections	39
Site inspection, proposed dams	9
Engineering investigations for irrigation and domestic water-supply	67
Investigations for flooding, drainage, river-bank erosion, and miscellaneous problems	118
Meetings with improvement districts and others	55

Engineering Investigations

Engineering investigations of a major nature, requiring preparation of engineering reports including design, cost estimates, financial study, and recommendations, were as follows:—

(1) Okanagan Falls Irrigation District—report on replacement of laterals.
(2) Covert Irrigation District—field work completed preliminary to preparing a feasibility report on system replacement.
(3) Rutland Waterworks District—field work completed and report under preparation on intake rehabilitation necessitated by flood damage.
(4) Bridesville Waterworks District — report on system replacement under preparation.

Further investigations involving engineering study and giving of engineering advice to the parties concerned were carried out with respect to the following: Shuttleworth Creek Irrigation District (study of storage possibilities), Similkameen River (report on bank erosion), Southern Okanagan Lands Project (flooding of lands from Lateral 6 spillway), Big Eddy Waterworks District (rehabilitation of intake works affected by silt), Grandview Waterworks District (study of storage possibilities), Municipality of Spallumcheen (preparation of plan of existing waterworks system).

In addition to the above, schemes to augment water-supply in deficient areas are being studied.

KAMLOOPS DISTRICT OFFICE

P. G. Odynsky, P.Eng., District Engineer

The Kamloops District Office administers the central section of the Fraser River drainage-basin, extending from Spuzzum to a point 20 miles north of Quesnel, containing approximately 57,000 square miles.

Water-supplies were again inadequate in the Dry Belt water districts of Ashcroft, Kamloops, and Nicola. Many disputes arose among water-users who had not experienced such critical water shortages before, and much of the irrigation season was spent in resolving such conflicts.

The diminishing supply of unrecorded water in the more settled areas of the seven water districts is demanding more time and study in the investigation and processing of water applications. To deal with the increasing number of applications, other administrative matters have had to be deferred, thereby creating a substantial backlog of work for this office.

There are 4,690 active licences under the administration of the Kamloops Office, of which 133 conditional licences and thirty-one final licences were added to our files during the year of review.

Summary of Year's Work

Applications received	237
Applications inspected and reported on	95

Final-licence survey reports	29
Dam inspections	56
Miscellaneous field investigations and surveys	145
Meetings with improvement districts and others	12

A study was made and report prepared on a proposed system renewal for the Walhachin Waterworks District.

NELSON DISTRICT OFFICE

J. P. Riley, P.Eng., District Engineer

The Nelson District Office administers Water Rights Branch matters over some 25,000 square miles in the south-eastern part of British Columbia.

The water-supply during the past irrigation season was generally good, with most streams maintaining a sufficient flow to satisfy licences. The increasing public interest in water matters was again indicated by the continuing upward trend in the number of inquiries and calls at our office. In addition, several improvement districts and water-users' communities took action toward the renewal and expansion of their systems.

There are more than 4,200 active licences in the Nelson District. During the year 147 conditional licences and seventy-nine final licences were added to our files.

Summary of Year's Work

New applications received	165
New applications investigated and reported	155
New applications abandoned and cancelled	37
Final-licence and licence-amendment surveys	103
Pollution investigations	6
Flooding investigations	25
Water-use investigations	15
Meetings with improvement districts and water-users' communities	20
Miscellaneous meetings and investigations of non-routine nature	24
Routine calls and problems	1,639
Sampling of snow courses	15
Dam inspections	4

Engineering Investigations and Studies

(1) Water-supply for Balfour community.
(2) Water-supply for Wilmer.
(3) Water-supply for King Improvement District at Cranbrook.
(4) Office study of areas with limited water-supplies.
(5) Flooding of Crawford Creek at Crawford Bay.
(6) Flooding of Elk River at Natal.
(7) Flooding of Goat River at Creston.
(8) Flooding of small streams in Creston, Thrums, and other areas.

PRINCE GEORGE DISTRICT OFFICE

C. K. Harman, P.Eng., District Engineer

The area administered from the Prince George District Office includes the Skeena River drainage, the Peace River drainage within British Columbia, and the Fraser River drainage up-stream from a point 20 miles north of Quesnel.

An unusually hot and dry July resulted in renewed interest in irrigation, particularly in the Vanderhoof area. Irrigation, however, is still thought to be uneconomic in this area, except in cases where the cost of delivering water to the farm is low and where high-value crops are grown.

New applications received in 1961 totalled sixty-five, which is an increase of 55 per cent over 1960. The increase occurred mainly in the Fort Fraser and Peace River Water Districts. Forty-eight new conditional water licences were issued.

Investigations were completed or were under way during 1961 in connection with water-supply for proposed improvement districts, for the communities of Port Edward, Rolla, Fort Fraser, and an area on the John Hart Highway just north of Prince George.

MISSION CITY DISTRICT OFFICE

E. G. Harrison, P.Eng., District Engineer

The Mission City District Office, which was established in the new B.C. Government Building in June, 1961, administers water-rights matters in the Vancouver and New Westminster water districts, both of which were formerly within the administrative area of the Victoria office.

In the six months that this office has been open, there have been 144 applications for water licences received, and thirty-five examined and reported on. Several miscellaneous jobs were carried out, such as the investigation into the use and control of water in various municipalities and the settling of disputes over water use.

HYDRAULIC INVESTIGATIONS DIVISION

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

The problems investigated and reported upon by the Hydraulic Investigations Division have been grouped under the following sections:—

(1) Flooding, Erosion, and Drainage.
(2) Irrigation, Water-supply, and Sewerage.
(3) Hydro-electric Power Surveys.
(4) Snow Surveys.

The two heavy rain-storms early in January, 1961, resulted in flooding at many of the Coastal points, and the Water Rights Branch was requested to investigate possibilities for flood protection. At the same time a continuing programme of investigational work was carried out for the Fraser River Board to assist it in determining the value of flood-control through up-stream storage.

This year also saw the completion of the North Okanagan water-supply investigation. The report selected three areas totalling some 16,000 acres—namely, north of Vernon, at Lumby, and at Cherryville—as illustrative examples of what might be developed in the irrigation of new lands in that region. A major domestic water-supply problem to receive attention on Vancouver Island was in the Campbell River area, where the village, and waterworks districts of Willow Point and Quinsam Heights have been considering the formation of a greater water board. A preliminary report was prepared for them, and they are now discussing the legal requirements for incorporation.

Hydro-electric power, in so far as field work is concerned, has been concentrated in completing the mapping of several of our northern rivers, including the Dease, Stikine, and Liard Rivers. New photography for these areas was obtained.

Snow surveys have continued to play an increasingly important role in providing the expected total volume run-off from our major rivers during the summer months. The importance of the background data already obtained will prove valuable in the years to come, particularly in connection with flood-control and hydro-electric power on our major rivers. The use of the Department of Finance's IBM 650 electronic computer has allowed the Snow Survey Section to select the variables, such as temperature, snow moisture content, etc., which provide the best run-off correlation for any particular region.

Most of the hydraulic investigations which are described below are covered in reports, of which there are now over 900 in the Water Rights Branch library. This total is being added to at the rate of fifty per year, and these are available to the public at a nominal charge for assembling only. During the year there were some 245 requests for such information, not including visitors to the Branch or interdepartmental inquiries.

FLOODING, EROSION, AND DRAINAGE

There has been a steady increase in the number of water-damage problems which have been brought to the attention of the Branch in the last year. In many instances, as will be noted below, reports have been prepared containing proposals for the solution of these hazardous conditions, but generally the costs of such improvements have been considered by those affected to be beyond their financial capabilities.

Two separate storms occurring around January 10 and 15, 1961, invaded Vancouver Island and the Lower Mainland areas. The first storm was felt mostly

in the lower coastal region around Vancouver and the adjacent north side, while the second storm penetrated the Seymour, Coquitlam, and Alouette watersheds, extending easterly to Boston Bar. At the same time, southern Vancouver Island experienced its heaviest rainfall of the season on January 14th. Snow melt also produced record high flows in June in the Kootenay River basin and on the lower Columbia River.

Capilano and Seymour Rivers

Maximum discharge through the Cleveland Dam on the Capilano River for the month of January, 1961, occurred at noon on the fifteenth, when 17,700 cubic feet per second was measured. The reservoir rose some 8.7 feet during the day, indicating a maximum inflow of about 20,000 cubic feet per second or about 260 cubic feet per second per square mile of watershed. This is well below the maximum recorded inflow.

On January 15, 1961, a peak discharge of 11,600 cubic feet per second occurred at the Seymour Falls dam. Within the twenty-four-hour period immediately preceding, almost 14 inches of rainfall were recorded, with the maximum rate reaching 1 inch per hour at the height of the storm.

Coquitlam River Flooding

In the same period heavy flooding occurred in the lower Coquitlam River, threatening the Lougheed Highway bridge at Port Coquitlam, the Canadian Pacific Railway bridge, and in particular the " Red " bridge on Pitt River Road.

Following a request from the City of Port Coquitlam, the Water Rights Branch undertook to prepare a preliminary report on possible methods of flood-control for the region. An interim report on channel improvement in the lower reaches of the river was completed during the summer, and another report on control of inflow into Coquitlam Lake will follow.

Alouette River Flooding

The average two-hour inflow for the twenty-four-hour period ending at midnight on January 15, 1961, at the Alouette Dam of 17,135 cubic feet per second was the second highest recorded and only exceeded by the November 3, 1955, inflow of 19,335 cubic feet per second. The latter represents about 240 cubic feet per second per square mile.

Cowichan River Flooding

The storm pattern over the Cowichan River watershed as measured by precipitation at Cowichan Lake showed a concentration of over 8 inches in the period of January 8 to 10, 1961, and a similar total amount in the period January 14th to 16th.

In the first instance, Cowichan Lake was relatively low (gauge reading of 8.0 feet) and about one-quarter of the maximum daily inflow of 19,060 cubic feet per second was discharged.

Maximum inflow in the second storm was slightly less at 17,580 cubic feet per second on January 15th, while outflow on the following day reached 10,900 cubic feet per second. The lake rose to a maximum recorded level of 14.04 feet, resulting in a portion of the discharge being by-passed around the highway bridge and through the village. This portion of the flow was unrecorded, so that the discharge quoted above is low.

Inundation of the low-lying areas down-stream of the Cowichan Lake highway bridge also occurred. In addition, tributary inflow down-stream increased the maximum recorded river flow at the White Bridge at Duncan to 25,400 cubic feet per second on January 15th.

The nearest tidal gauge at Fulford Harbour recorded between 4.6 feet (4.55 a.m.) and 5.0 feet (2.20 p.m.), which was the highest level for the last nine years.

These high tides, coupled with heavy run-off, not only carried extensive flooding within the Cowichan River valley itself, but also impeded the outflow of Somenos Lake and Creek, which in turn inundated a new subdivision in the north-eastern section of Duncan.

A Water Rights Branch investigation was started immediately, and it was possible through field surveys to obtain the maximum high-water marks throughout the area.

Since then several meetings have been held with the Cowichan-Koksilah River Control Committee. This organization, consisting of representatives from the local municipal governments as well as the Federal Department of Fisheries, has already obtained a preliminary report from its consulting engineers with respect to local dyke protection in and around Duncan.

The Water Rights Branch has assisted by supplying basic data to the Committee and arranging for the setting-up of several hydrometric stations on tributary streams. At the same time, it is continuing its studies with respect to the possibilities of up-stream regulation, which, if feasible, would benefit the whole watershed.

Pemberton Valley Dyking District

In response to a request from the district, a brief survey and inspection were carried out with respect to the dyking of about 3 miles of Lillooet River along the MacKenzie Cut-off. Minimum cost, which would provide protection against all but a record flood, would run to about $58,000. In order to retain the river against the maximum recorded flood, a dyke twice as high and costing three times as much would be required.

Fraser River Basin

The Water Rights Branch is continuing studies for the Fraser River Board. The Branch has agreed to value flood protection for populated areas, and this has required an evaluation of existing developments within the valley which would be inundated should the design flood occur. Through the use of up-to-date enlarged photographs on which have been plotted spot elevations, it has been possible to prepare elevation-damage curves. Such data, of course, only provide the direct damage resulting from such a flood at the present time. Indirect damage, such as severance of transportation lines, disruption of industry, etc., is still to be computed. The total value of this flood-control, projected some time into the future, will provide a measure of the contribution that might be credited to up-stream storage for this purpose.

At the same time, the existing dyking and drainage districts in the Lower Fraser Valley were examined. These areas are affected not only by the Fraser River high water, but also by the inflow from the surrounding hills caused by the fall and winter rains.

Certain up-stream areas, including Prince George, Quesnel, and Kamloops, are also under examination and study with respect to the benefits to be derived by flood-control. Kamloops in particular has suffered from previous extreme floods. Studies were made to determine whether the outlet conditions at Kamloops Lake could be improved, which in turn would reduce maximum water levels.

Maximum Stream Discharge Estimates

A brief study was made for the Department of Highways on Lynn Creek near Vancouver to indicate the probable maximum flood level at the existing bridge. Also, an estimate was prepared on the backwater effect caused by the present Peace Arch Highway bridge and the proposed Deas Tunnel Throughway bridge which will span the Nicomekl River.

Salmon River and Shuswap Lake

Complaints were received from the Salmon Arm and District Chamber of Commerce and the Salmon Arm Boat Club regarding silting-up of the access channel to the wharf due to the Salmon River sedimentation.

An investigation was undertaken to determine (*a*) the effect of dredging at the outlet of Shuswap Lake on the lake-levels and (*b*) the effect and practicability of relocating the mouth of Salmon River. Through the use of air photographs and soundings, it was possible to draw some tentative conclusion as to modifications in the existing estuary which should reduce silting around the wharf.

Columbia River Flooding at Athalmer

The inhabitants of Athalmer and those living around Lake Windermere experienced the highest water-levels on record in early June, 1961, although the 1948 and 1956 marks were only a few tenths of a foot lower.

In September, a Water Rights Branch party carried out some limited soundings in the channel from Windermere Lake down-stream for some 20 miles. Certain proposals for improvements to the river channel have been studied, and a report is in preparation.

Miscellany

Minor investigations have been carried out concerning the following:—

(*a*) Parksville Village drainage into Englishman River.
(*b*) A drainage problem on Gabriola Island.
(*c*) Mamquam River control in the Village of Squamish.

Liard River Suspended-sediment Measurements

A brief silt-sampling programme was carried out during the latter part of June and early July within the watershed. In most instances sampling was done well above average discharge. Some eighty-six samples were collected, using a P-46 sampler. Samples are being analysed by the British Columbia Research Council, and information to date shows the following results (the samples on the Sikanni Chief and Muskwa Rivers near Fort Nelson were taken on the rising stage and represent near maximum conditions):—

River	Total Suspended Sediments (Parts per Million)	Size Distribution (per Cent of Total)			
		Sand	Silt 1	Silt 2	Clay
Sikanni Chief	1,082	31	30	21	18
Muskwa	3,772	27	30	18	25
Racing	251	44	26	29	1
Toad	81	----	----	----	----

Note.—Sand particles greater than 0.0625 millimeter; Silt 1—0.0625 to 0.0156 millimeter; Silt 2—0.0156 to 0.0039 millimeter; clay particles less than 0.0039 millimeter.

IRRIGATION, WATER-SUPPLY, AND SEWERAGE

North Okanagan Water-supply

An investigational programme conducted during the years 1959 and 1960 was concluded with the publication of a report in two volumes on "North Okanagan Irrigation and Domestic Water Supplies." Volume 1 deals with the question of domestic water-supply, whilst Volume 2 is concerned with irrigation water-supply. The primary object of the report was to assess the present and future water-supply position, with a view to establishing whether there is a need for a metropolitan type of water system to serve the North Okanagan communities, and also the possibilities for new irrigation in the area.

The areas investigated extend 36 miles north and 44 miles east of the City of Vernon and include the main Okanagan Valley, the Coldstream, Creighton, Blue Springs, and White Valleys, and the Hilton-Cherryville area. The Department of Agriculture soil surveys and land-classification data covered 148,000 acres of land in these areas. No economic studies were attempted, and the desirability of irrigating these new lands has not been determined.

The studies have demonstrated that no single source of water-supply can be developed to satisfy the potential irrigation requirements of the area, and that irrigation proposals in the future will be limited by practical considerations to the larger areas where a substantial acreage can be developed and local water-supplies exist. Capital costs are estimated in the region of $600 per acre developed, and total annual charges are expected to lie between $50 and $70 per acre, exclusive of farm development.

Domestic and industrial water-supply sources for the North Okanagan population centres are generally adequate in that the presently developed watersheds are capable of meeting existing demands and readily available sources can be developed for future need over a forty-year forecast period. The prospect of supplying future municipal water needs from projected irrigation schemes is unlikely to be of practical importance during the forecast period, and attention is directed to the proper development of existing and potential local sources of water.

Campbell River Area Water-supply

The Village of Campbell River and Willow Point Waterworks District have requested engineering assistance in connection with a proposed greater water board for the area. The investigation included the Village of Campbell River and Willow Point, North Campbell River, and the proposed Quinsam Heights Waterworks Districts.

Three alternative joint supply schemes were considered in the report, and in all cases the estimated cost of installing a joint project to serve the three areas is less than the combined cost of individual schemes for each area.

Quinsam Heights Area Water-supply

The proposed Quinsam Heights Waterworks District was included in the plan for a joint water-supply system to serve the area south of Campbell River. A report was prepared outlining a distribution system to serve the region based on the assumption that the supply would be obtained from a greater water board scheme. Since the new gravity supply from the power-plant penstocks appeared to be favoured by the Village of Campbell River and the District of Willow Point, this layout was chosen in the design of the Quinsam Heights distribution system.

Alert Bay Water-supply

A brief office study was made of the possibility of supplying water to the Village of Alert Bay on Cormorant Island from streams on adjacent Vancouver Island. It was found that Thiemer Creek, east of the Nimpkish River, would probably be an adequate source, although a 7,000-foot underwater crossing of Broughton Strait and a 9,000-foot conduit on shore could make this an expensive project.

Ashcroft Area Irrigation

In response to a request from the Ashcroft and District Board of Trade, a brief reconnaissance of the region was made with respect to potential irrigable land. The total area involved, along the north side of the Thompson River between Ashcroft and Savona, amounts to about 11,000 acres and includes some land which is presently under irrigation, as well as a considerable area which has, in the past, been irrigated.

Miscellany

Limited studies have been made as follows:—

(*a*) Brannen Lake irrigation storage possibilities, in Millstone Creek watershed, near Nanaimo.

(*b*) Departure Bay Waterworks District's proposed sewage-disposal.

HYDRO-ELECTRIC POWER

In the past few years, most of the hydro-electric power investigations have been carried out in the northern half of the Province, where very little large-scale photography or mapping exists. For these reasons, it has been necessary to carry out some extensive topographic surveys. New maps are just becoming available, and this, together with recent hydrometric information, will provide the basis for engineering reports.

Dease-Stikine Hydro-power Investigation

Investigation of the power potential of the Dease-Stikine area was carried a step further with the completion of 1-inch-to-1,000-feet mapping of much of the main stem. Storage-capacity curves have been prepared, and with recent photography obtained this year it will be possible to carry this study to completion.

Bowron-Willow Hydro-power Investigation

A previous incomplete study on this project was carried through to report stage for the Fraser River Board. Four sites were selected on the Bowron River, the upper site providing the main storage of some 345,000 acre-feet, while the lower sites were designed as run-of-the-river power-dams.

Similarly on the Willow River two power-dams were located on the lower reaches, with some tributary storage being obtained at Narrow and Stony Lakes. Diversions were also given some consideration, but lack of topographic data allow only tentative conclusions.

Tentatively, the following power potential has been computed:—

Scheme	Prime Power (MW)	Installed (MW)	Average Annual Output (Million Kwh.)
Bowron	21.4	39.0	227
Willow	9.6	18.3	108
Bowron and diversion of Willow into Bowron	27.0	49.0	287
Willow and diversion of Bowron into Willow and diversion to Giscome	40.5	73.7	432

Liard River Hydro-power Investigation

Mapping is being completed for the main stem and several tributaries as the result of last year's field work. This consists of pondage maps at a scale of 1 inch to 1,000 feet, and dam-site plans at 1 inch to 500 feet.

SNOW SURVEYS

In British Columbia, precipitation falls mostly as snow. Thus nature provides in mountain snow a water-storage facility greater than any man-made storage ever conceived. Foreknowledge of this snow-melt water-supply greatly aids the economy through better management of water-supplies. To provide this forecast service, the Water Rights Branch, since 1935, has steadily increased its network of snow courses, and in the coming sampling season will have 112 courses in active operation. Of these, sixty-two will be measured free of charge by those co-operating agencies with a direct interest in the problem of water-supply. All data are processed and inserted in one of six bulletins published during the snow-accumulation and snow-melt periods.

During the winter of 1961 nineteen snow courses were visited by our field representative and sampling instruction provided to the responsible snow surveyors. During the summer inspection trips, repairs were made to twenty-eight courses. Also, a reconnaissance trip was made into the Columbia Basin for the purpose of investigating locations for new snow-course installations in anticipation of the proposed power development of the Columbia River. With Water Rights Branch co-operation and participation, the Federal Meteorological Service has embarked on a snow-survey programme with establishment of low-level snow courses at all first-order meteorological stations. Data from these sites will be published in the British Columbia snow bulletins.

Work has progressed with derivation of new multiple correlation forecast procedures by making use of the IBM 650 electronic computer. This involves tabulation of basic data in convenient form prior to card-punching, and then selection and elimination of variables in order to produce the final forecast equations. In addition to the usual April 1st forecasts, it is hoped that revised May 1st forecasts will be issued for the first time in 1962.

The Water Rights Branch has co-operated with the United States Soil Conservation Service in the development of common forecast procedures for three international gauging-sites; namely, the Columbia at Birchbank, the Kootenay at Porthill, and the Similkameen at Nighthawk. As a result of this co-operation, the United States and British Columbia will provide water-users with the forecasts for these gauging-sites.

Developed and Undeveloped Water Power (as of December 31, 1960)

Records of hydro-power installations during 1960 and preceding years are shown graphically on Plates 2 and 3. Plate 2 shows the total of all peak loads, the average load, and the total installed capacity for the Province in each year. Plate 3 illustrates the breakdown of these figures between the major power-producers.

During 1960 the total amount of electrical energy generated by hydro-electric plants in British Columbia amounted to 12,638,500,000 kilowatt-hours. This is 7.57 per cent greater than the corresponding use for 1959 and indicates that the annual use of water for the production of electricity, which in 1959 dropped to 4.75 per cent, is returning to a more healthy position. Much of the increase is due to a greater output at the Aluminum Company of Canada Limited's smelter at Kitimat. This is the single largest power-user in British Columbia, and the recent ups and downs of the aluminum industry reflect strongly on the Provincial power usage.

Over the last ten years (1950 to 1960) the total annual generation from all sources in the Province has risen from 4,866 million kilowatt-hours to about 13,600 million kilowatt-hours, an average increase of 10.8 per cent per annum compounded. Slightly over half of the total generation is provided by industries for their own use, and out of this the Aluminum Company of Canada Limited alone contributes a half share, or a quarter of the Provincial total.

Installed operating hydro-electric capacities at the end of 1960 totalled 2,528,000 kilowatts, as compared with 2,370,000 kilowatts in 1959. The principal addition during the year was 124,000 kilowatts at the British Columbia Electric Company's plant at Bridge River. Other additions were made at the Walter Hardman plant, owned by the City of Revelstoke, and at the Big Falls plant, owned by the Northern B.C. Power Corporation, with added installations of 4,000 kilowatts and 3,900 kilowatts respectively. As the remaining difference between the total installed capacity figures for 1960 and 1959 is due to revisions, the total increase for the year was approximately 132,000 kilowatts or 5.57 per cent.

In the thermal field there were no significant additions to the electrical generating capacity of the Province during 1960. The British Columbia Electric Company is continuing with construction of its plant on Burrard Inlet at Ioco, and installation of the first unit of 157,500 kilowatts is now planned for the early part of 1962.

Apart from planning for the Columbia and Fraser Rivers, which are dealt with elsewhere, other studies are being made of undeveloped hydro resources. The latest estimate of the total undeveloped power available is 22,100,000 kilowatts, as was reported last year.

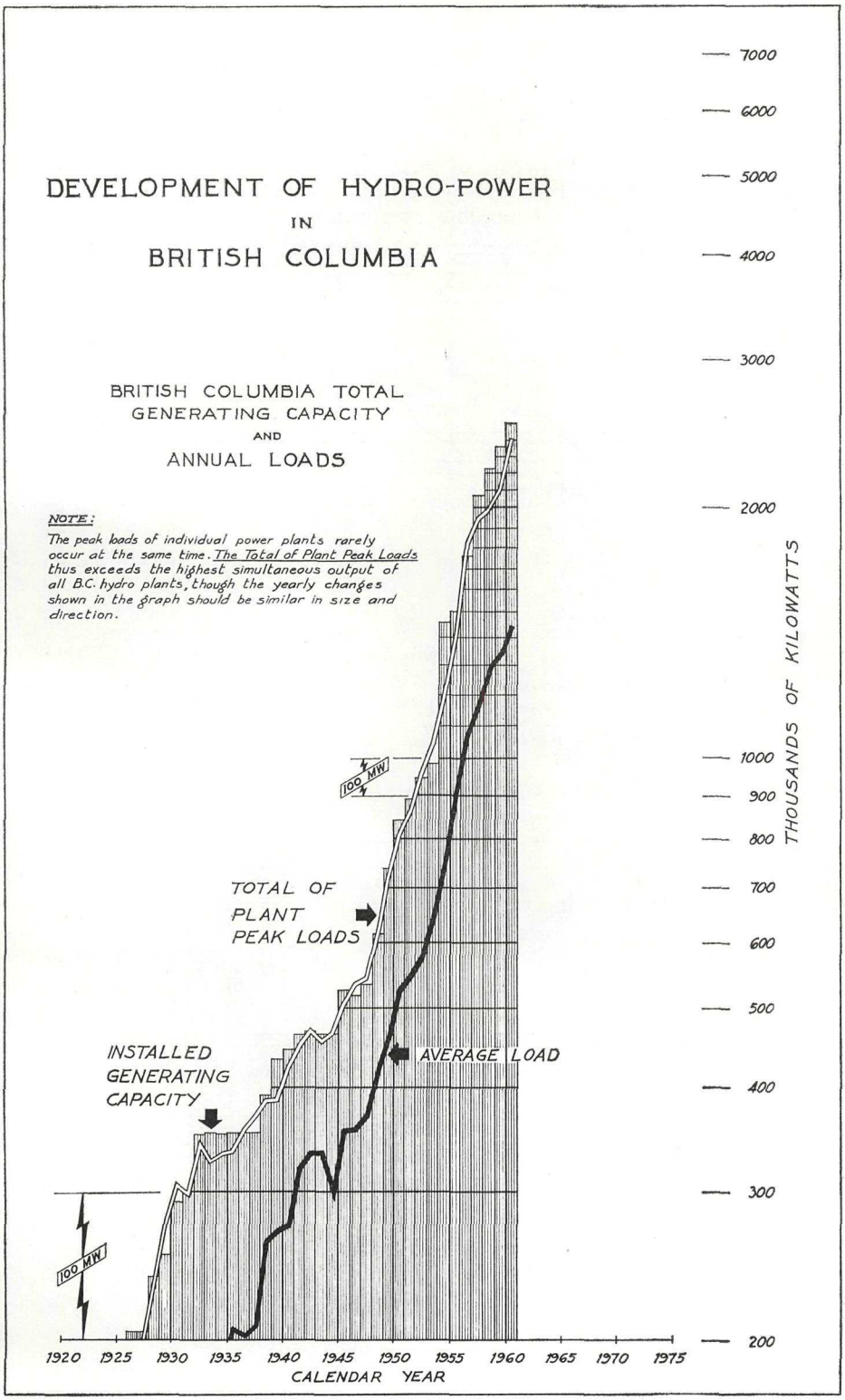
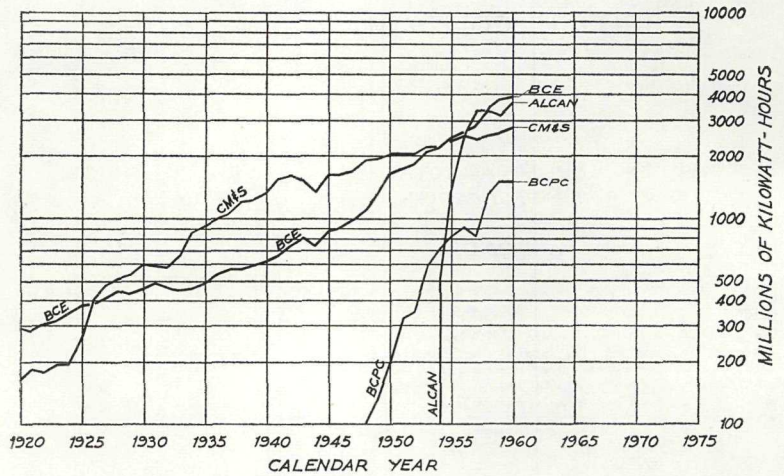

DEVELOPMENT OF HYDRO-POWER
IN
BRITISH COLUMBIA
BRITISH COLUMBIA TOTAL
GENERATING CAPACITY
AND
ANNUAL LOADS
NOTE:
The peak loads of individual power plants rarely occur at the same time. The Total of Plant Peak Loads thus exceeds the highest simultaneous output of all B.C. hydro plants, though the yearly changes shown in the graph should be similar in size and direction.
100 MW
TOTAL OF PLANT PEAK LOADS
INSTALLED GENERATING CAPACITY
AVERAGE LOAD
100 MW
7000
6000
5000
4000
3000
2000
1000
900
800
700
600
500
400
300
200
THOUSANDS OF KILOWATTS
1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975
CALENDAR YEAR

Plate 2.

DEVELOPMENT OF HYDRO-POWER IN BRITISH COLUMBIA

ANNUAL PRODUCTION OF HYDRO-ELECTRIC ENERGY BY MAJOR PRODUCERS



ALCAN	Aluminum Company of Canada.
BCE	British Columbia Electric Company & Associated Companies.
BCPC	British Columbia Power Commission.
CM&S	Consolidated Mining & Smelting Company & West Kootenay Power & Light Company.

INSTALLED GENERATING CAPACITIES OF MAJOR PRODUCERS

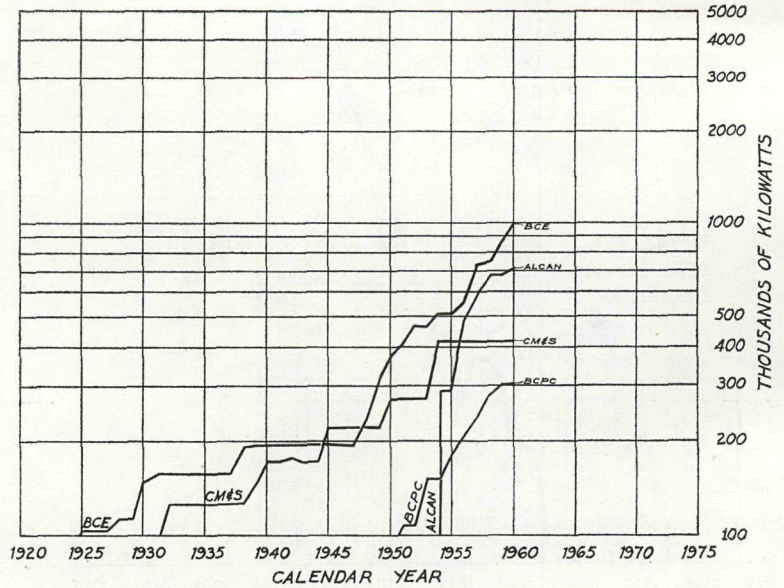


Plate 3.

UNIVERSITY ENDOWMENT LANDS

UNIVERSITY ENDOWMENT LANDS

M. E. FERGUSON, PROJECT MANAGER

The general administration of the University Endowment Lands during 1961 was, in the main, similar to average-type municipal management.

With no lots available, there was no activity in residential or apartment property sales. The only activity relative to land was the disposal, on a basis of sale or lease to be determined when future property is developed, of the balance of the lots set aside for fraternities and the church-site for the United Church which had been promised some time earlier.

From a maintenance view-point, it was clearly shown that the annual programme of dragging the sewers is proving very effective, since the year was completed with no sur-charging or other flood effects in spite of record rainfall. At times several adjoining municipalities encountered rather extensive difficulties.

During the past summer, which was one of the driest in many years, the administration was able to maintain a fairly good supply of water with the installation of a new pump by the Greater Vancouver and District Water Board. While pressures did drop during peak periods, it was better than has been experienced in previous years. There is still a problem to be solved to ensure an adequate supply to meet the needs of a growing university campus and at the same time provide ample reserve for potential fire-fighting needs. These problems have been presented to the Greater Vancouver and District Water Board, and it is currently studying the situation.

Taxes are always of interest to property-owners, and in this regard it may be worthy of note that while our general tax rate increased seven-tenths of a mill for 1961, it was still below the rate set for 1959. In essence this means that the 1-mill reduction for 1960 has, to a fairly large extent, been maintained for the second year.

Several new ideas were incorporated in general maintenance work, such as the reconditioning of all water-main valves in Unit 2. These valves have been in use for some thirty-five years, and considerable difficulty was being encountered when lines had to be shut down. From the results obtained in this year's operation, there would appear to be every reason to anticipate that this programme will be expanded to other sections in the near future.

The Fire Department again operated under a special arrangement whereby assistance of the City of Vancouver was available on a prearranged hourly-cost basis. A major problem of the Fire Department was greatly improved through the banning of parking on certain streets and near many buildings.

NUMBER AND VALUE OF BUILDING PERMITS ISSUED DURING THE YEARS ENDED DECEMBER 31, 1959, 1960, AND 1961

	1959		1960		1961	
	Number	Value	Number	Value	Number	Value
Churches	----	----------	----	----------	1	$150,000.00
Swimming-pools	3	$17,265.00	4	$19,800.00	1	13,000.00
New houses	----	----------	----	----------	1	20,000.00
New fraternities	----	----------	2	100,530.00	1	50,000.00
Alterations	25	41,650.00	12	55,831.00	10	44,450.00
Garages, etc.	3	1,550.00	4	4,200.00	9	8,400.00
Totals	31	$60,465.00	22	$180,361.00	23	$285,850.00

SUMMARY OF REVENUE RECEIVED DURING THE PAST TEN YEARS TO DECEBER 31, 1961

Year	Sale of Repossessed Property		Local Improvement Taxes		Loans		Land Sales		99-Year Lease Rentals	Water Account	Sundry Rents and Leases	Miscellaneous and Permits	Total
	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest					
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	87,745.41
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
1958			8,832.53	17.97	11,067.28	544.28	2,000.00	92.50	146.10	67,388.26	13,768.93	2,223.97	106,081.82
1959			6,758.89	6.24	5,051.43	245.03			146.10	70,867.86	6,536.23	1,894.11	91,505.89
1960			7,352.79	20.91	3,123.88	166.07			146.10	82,346.14	16,022.63	3,337.84	112,516.36
1961			12,427.09	31.35	537.87	12.56			146.10	84,435.63	11,622.23	10,333.27	119,546.10
Totals	$2,868.73	$306.10	$90,018.38	$521.11	$77,313.17	$16,679.99	$146,884.42	$3,939.44	$5,218.99	$560,474.31	$103,648.71	$214,417.32	$1,222,290.67

PERSONNEL OFFICE

PERSONNEL OFFICE

J. H. PALMER, B.A., B.COM., PERSONNEL OFFICER

ESTABLISHMENT AND ORGANIZATION

Consequent upon an amendment to the *Water Act* in 1960 which provided for the control of ground-water supplies, a significant expansion of the Department's establishment occurred in 1961 with the addition of seven permanent positions to the Water Rights Branch. This permitted the creation of a Ground-water Section consisting of a geological engineer, a senior clerk, and a draughtsman; the opening of a district office in Mission City with a District Engineer and stenographer (and an Assistant District Engineer whose position was transferred from the Victoria office); and a reorganization of the clerical work in the Operations Division where, by the addition of a Clerk 3, it is now the practice to route incoming work to sections dealing with new licences, ground-water, and licence amendments. An Inspector of Improvement Districts was added to the Improvement Districts Section to assist with incorporation procedures and administration.

In the Lands Branch three additional casual positions were approved; two of these, a Clerk 1 and a Clerk-Typist 1, are employed in the general office, and a Clerk 2 is employed in the Land Inspection Division to relieve professional employees of clerical functions.

In the Topographic Division of the Surveys and Mapping Branch, the introduction of the tellurometer, an electronic distance-measuring device, permitted a reduction in the number of field positions in favour of office draughting and mapping assistant positions which were required in order to offset the bottleneck in plotting. The policy of converting field positions to office ones resulted in greater production without increasing the total of staff employed.

TURNOVER

Separations from the Department in 1961 reached forty-two, compared with twenty-four in the previous year. Turnover was heaviest in the stenographic field. There was one retirement—Mr. J. G. Evans, Clerk 1, File Vault. Thirty-eight new appointments were made and twelve promotions took place within the Department during the year. Twenty-two reclassifications were implemented.

TRAINING

Messrs. A. Lukinuk, G. S. Smith, and J. Tomczak, of the Air Division, and Mr. E. S. W. Andrews, of the Topographic Division, received diplomas in public administration following the completion of the three-year course sponsored by the Civil Service Commission. This brings to twelve the total number of graduates in this course from this Department. Two employees entered the second year of this course and four began the first year.

Mr. A. Paulsen, the Land Inspector in Kelowna, completed the requirements for registration as an Accredited Appraiser, Canadian Institute (A.A.C.I.).

UNIVERSITY ENDOWMENT LANDS

The Minister's Salary Advisory Committee for the University Endowment Lands, consisting of the Deputy Minister of Lands, the Chief Personnel Officer of the Civil Service Commission, and the Lands Service Personnel Officer, was estab-

lished to advise the Minister regarding wages and working conditions for the University Endowment Lands. This Committee carried on negotiations with the B.C. Government Employees Association, which represented the outside staff, and with the International Association of Fire Fighters, which represented Fire Department personnel up to and including the rank of captain. Some minor changes in working conditions were implemented, and an upward revision of salaries was approved by the Government for nearly all classifications in this division of the Department.

MAIL AND FILE ROOM

MAIL AND FILE ROOM

JOHN A. GRANT

Letters received in the Department during 1961 amounted to 237,317, compared to 239,406 in 1960, a decrease of 0.9 per cent. This is the first decrease recorded since 1954.

There were 9,635 new files created during the year. It is noted that over 96,000 files have been made since 1951, and it can be expected that another 100,000 will be in existence ten years from now. This, of course, brings up the question of storage. The problem has been solved temporarily by storing closed sections of files, and other inactive files, in the Topaz Avenue vaults. It is estimated, however, that within a very few years another microfilming programme will be necessary.

Increased reference to microfilmed files necessitated the acquisition of a third reader in the File Room during the year.

LETTERS INWARD

Branch	1960	1961	10-year Average 1952–61
Lands	42,355	44,552	37,055
Forests	153,503	148,863	110,052
Water Rights	24,382	24,169	20,805
Surveys and Mapping	19,166	19,733	16,613
Totals	239,406	237,317	184,525

LETTERS OUTWARD (RECORDED)

Branch	1960	1961	10-year Average 1952–61
Lands	15,871	16,674	12,285
Forests	2,612	2,296	4,979
Water Rights	2,319	2,381	1,864
Surveys and Mapping	.....	.....	.....
Totals	20,802	21,351	19,128

MISCELLANEOUS REPORTS

Designation	1960	1961	10-year Average 1952–61
Forest-fire reports	8,288	9,184	4,958
Slash-disposal reports	560	532	460
Logging-inspection reports	16,336	14,792	15,767
Land-classification reports	3,585	4,075	2,792
Stumpage-adjustment notices	3,465	4,372	.....
Totals	32,234	32,955	23,977

New Files Created

Designation	1960	1961	10-year Average 1952–61
"0" files	5,412	5,767	4,793
Timber-mark files	1,320	1,208	1,404
Timber-sale files	2,845	2,660	3,437
Totals	9,577	9,635	9,634

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1962

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