PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES

HON. R. G. WILLISTON, *Minister* R. TORRANCE, *Deputy Minister of Lands*

REPORT

of the

LANDS SERVICE

YEAR ENDED DECEMBER 31

1967

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in right of the Province of British Columbia.
1968

VICTORIA, B.C., March 13, 1968.

To Major-General the Honourable GEORGE RANDOLPH PEARKES,
V.C., P.C., C.C., C.B., D.S.O., M.C., C.D.,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Annual Report of the British Columbia Lands Service of the Department of Lands, Forests, and Water Resources for the year ended December 31, 1967.

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

VICTORIA, B.C., March 13, 1968.

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

SIR,—I have the honour to submit the Annual Report of the British Columbia Lands Service of the Department of Lands, Forests, and Water Resources for the 12 months ended December 31, 1967.

R. TORRANCE,
Deputy Minister of Lands.

Headwaters of Bowser River, west of Bowser Lake, looking south-west.

CONTENTS

	PAGE
Introduction by the Deputy Minister of Lands	9
Accounting Division	15
Lands Branch—	
Director of Lands	23
Land Inspection Division	31
Surveys and Mapping Branch—	
Surveyor-General	45
Legal Surveys Division	54
Topographic Division	60
Geographic Division	73
Air Division	79
University Endowment Lands	91
Land Settlement Board	95
Personnel Office	99
Mail and File Room	103

COVER PHOTO

Tide Lake tunnel camp, Granduc project. Toe of Berendon Glacier showing medial moraine in background.

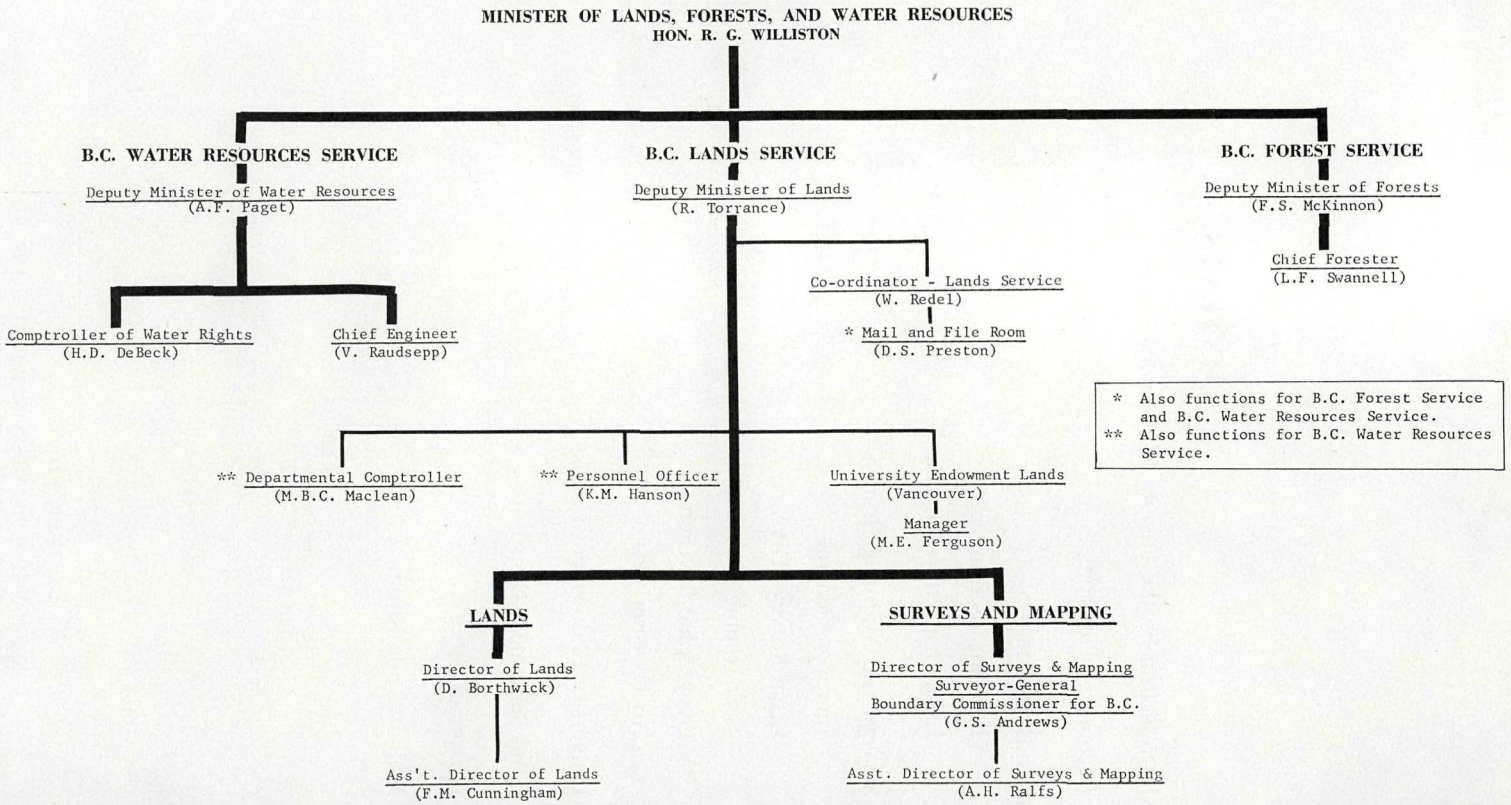
ORGANIZATION

BRITISH COLUMBIA LANDS SERVICE

DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES

Victoria, B.C.

Year ending December 31, 1967



Report of the British Columbia Lands Service

R. Torrance, Deputy Minister of Lands

The large-scale development which British Columbia is experiencing is, of course, affecting the activities of all departments of our governmental structure. However, in this development the Lands Service occupies a unique position. With the continuous expansion of the economy of the Province, the demand for Crown land has become more and more intense and, consequently, important decisions must be made daily in allocating the Crown land resource to its best use in the interests of all of the people.

The Lands Service is also charged with providing the framework of maps and surveys so necessary for the orderly development and settlement of British Columbia. Involved is a great variety of techniques and equipment which must support our complex surveying and mapping organization. In many ways the science of surveying and mapping serves the people by keeping pace with development through the application of modern technological advances.

A large part of the work load of the Lands Service is involved in providing services to other governmental agencies, such as by way of maps, air photography, various types of surveys, ground examination reports, etc. To an extent not generally realized, the Lands and Surveys and Mapping Branches are "service" organizations.

Several administrative changes involving senior Lands Service personnel took place during 1967. After a distinguished career in the public service, first in the Forest Service and since 1954 as Deputy Minister of Lands, Mr. E. W. Bassett retired on July 31, 1967.

In the latter months of the year the administrative lines of the Department were reorganized, with the offices of the Director of Lands and Assistant Director of Lands superseding those of the Superintendent of Lands and Assistant Superintendent of Lands. A new position of Departmental Co-ordinator was also created. The organization chart on the page preceding this introduction illustrates the major personnel structure of the Lands Service.

Lands Service net revenue collections of $2,985,996 in 1967 were below those of the previous year, mainly as the result of a decline in revenue from land sales. On the other hand, proceeds from leases, miscellaneous rentals, and fees rose by more than $400,000 over 1966, to a new high record of $1,917,435. Revenue from the sale of maps and aerial photographs also increased substantially in 1967.

As tabulated in the report of the Land Inspection Division, the number of completed land examinations reflected a mixed trend compared with 1966, being lower in nine land inspection districts and higher in eight others. However, the total number of requests for inspections was 3 per cent higher.

Since the lease-develop-purchase policy of agricultural land alienation was first adopted in 1962, a growing number of inspections under the *Land Act* have been in connection with leases. As recently as 1960, only one-third of all inspections were for leases, whereas by 1967 the proportion had doubled to two-thirds. On the other hand, examinations for purchase fell from 36 per cent of the total in 1960 to 10 per cent in 1967. It is expected, however, that as improvements on lands under lease are completed and purchase options exercised, the disparity will diminish.

Pre-emption records issued by the Lands Branch were only one-third of the 1958–67 average of 78, thus continuing pre-emption's steady decline as a method of Crown land alienation. Certificates of purchase, which numbered 503 in 1967, were also considerably below the 10-year average of 963. This can be attributed to the greater emphasis now being placed by the Department on lease-hold alienation. Leases increased from 1,245 in 1966 to 2,401 this year and were well above the 10-year average of 1,122. The acreage leased was also much higher, 579,092 acres, compared with 220,802 acres annually for the 1958–67 decade.

The Lands Branch continued its policy of subdividing and providing road access to lots in areas having a usually high public demand for Crown land. A total of 403 lots was serviced at nine locations throughout the Province, mostly for home-sites or summer cottages. The Green Lake subdivision north-east of 70 Mile House attracted more than 300 people to the Land Commissioner's office in Clinton, where, early in the summer, 109 lots were offered for lease by public auction. During 1967 a total of 430 lots was leased by auction throughout the Province, and 55 were leased by tender. Only one parcel was offered for sale by tender, and 21 for sale by auction.

The Legal Surveys, Topographic, Geographic, and Air Divisions of the Surveys and Mapping Branch experienced a busy year.

In 1967 the Legal Surveys Division surveyed a total of 307 waterfront lease lots on Stave Lake, Hannah Lake near North Bend, Cluculz Lake, Fraser Lake, Babine Lake, Rail Lake near Lac la Hache, and Sandspit. Sixty roadside lots were created on the Cariboo Road near Williams Lake, 22 lots on the Blackwater Road south-west of Prince George, one at Chilliwack Lake, and one near Lillooet. Other cadastral surveys included such diverse jobs as a vocational-school property at Kamloops, a cemetery at Hazelton, Government parking-lots in Victoria, and a historical site at Seton Lake.

A total of 60.3 miles of Provincial highway right-of-way was surveyed in three projects. These were a section of Route No. 95 between Spillimacheen and McMurdo, Tabor Lake to Purden Lake east of Prince George, and Nicola Lake to Stump Lake north of Merritt.

The far-flung tasks of the Topographic Division took field survey crews into distant parts of British Columbia. One of the largest field parties in recent years, some 45 men, worked on triangulation and levelling surveys in the north-eastern corner of the Province. The results should be immediately beneficial to the petroleum and natural-gas industry for determining the location and elevation of drilling-sites. The Air Division workshop made special modifications to the instrument tripods for use in muskeg.

Survey control for topographic mapping was concentrated in National Topographic Blocks 104A and 104B north and east of Stewart. Through extensive use of a helicopter and fixed-wing aircraft, control was laid down for 17 National Topographic manuscripts.

Cadastral survey control monumentation was continued in a dozen municipalities, and Integrated Survey Area No. 1, covering part of Surrey Municipality, was declared by Order in Council in June, 1967. In the West Kootenay a co-operative project with the Geodetic Survey of Canada saw the designation of a triangulation network between Trail and Creston and north along Kootenay Lake and the Arrow Lakes to Revelstoke.

Photogrammetric compilation was finished for 8½ National Topographic map-sheets and parts of two others, while 28 standard topographic manuscripts at 2-inches-to-1-mile scale were draughted in full detail for reproduction in Ottawa as National Topographic maps at 1:50,000 scale.

The Geographic Division lithographed 15 maps, of which seven were entirely new. Included in the latter was Map SGS-1, a 10-colour print of Vancouver Island at 1-inch-to-6-miles scale. The combination of shaded relief and elevation tinting resulted in a particularly attractive map which has proven to be very popular.

The total number of maps distributed to Government departments and the general public continued its upward trend, reaching 114,723, some 19,183 higher than in 1966 and more than double the total a decade ago. The value of maps sold and distributed also rose to an all-time high record of $73,550.

The Air Division's two aerial photographic detachments logged 706½ hours on 83 projects and exposed 34,540 negatives. Both figures represent new records. As indicated by the number of hours flown and negatives exposed, the projects varied widely in flying-time and number of photographs recorded. For example, a major project for the Department of Agriculture in the Cariboo-Chilcotin region produced 4,515 photos in 144:45 hours. On the other hand, only 15 minutes were needed to obtain five photos of The Woodlands School at the request of the Department of Public Works.

During 1967, orders were received for more than 290,000 aerial photographs on loan or reprint. Though this is slightly below last year's total, it is well above the 10-year average of 222,000.

A noteworthy ceremony which was arranged in the past year by the Surveys and Mapping Branch was the dedication on the summer solstice, being June 21st, of the site of British Columbia's Centennial survey monument. This was especially interesting because on that day similar ceremonies took place at Ottawa and in each of the Provincial capitals across Canada as well as at Whitehorse, Yukon Territory. The simultaneous ceremonies were inspired by the Advisory Council on Cadastral Surveys, comprised of the Surveyors-General and Directors of Survey of Ottawa and the Provinces. The site chosen here was one in the new Museum-Archives precinct, and the Honourable R. W. Bonner, Attorney-General, gave the dedication address and unveiled the monument. The monument itself, as well as being precisely located with respect to those in the other parts of Canada, commemorates the establishment in the century 1867–1967 of the North American Survey Datum across the continent from ocean to ocean, a network of thousands of points, precisely located, interconnected and permanently marked in which all surveys may be integrated. A testimony to the many surveyors and engineers for their contribution in this field, the Centennial monument, now being constructed, will be artistic and worthy of the site chosen for it.

For a full description of the achievements during 1967 of the British Columbia Lands Service (including the University Endowment Lands administration and the Land Settlement Board), the reader is commended to the main body of this Annual Report, which follows.

ACCOUNTING DIVISION

ACCOUNTING DIVISION

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

This Division carries out the accounting function for both Lands Service and Water Resources Service, and in all phases of its function—that is, payroll, expenditure, and revenue—the Division has experienced another busy year. During the summer of 1967 the operations of the Surveys and Mapping Branch were by far the most extensive in recent years. While there was no increase in permanent establishment during the year, temporary assistance and temporary field personnel required to carry out the 1967 summer field programme were considerably larger than in previous years and placed a heavy strain on our payroll section. The number of vouchers processed during the year was also considerably higher than normal.

The revenue section of the Division has been taxed almost to the limit of its capability despite the fact that as many short cuts as possible have been implemented without jeopardizing control. New leases, assignments, reviews, and expiries have been at an all-time high record during 1967, and, in addition to this, over 24,400 pieces of money mail were processed.

In respect of revenue, lease accounts again increased substantially, from 8,861 at January 1, 1967, to 10,440 at December 31, 1967, an increase of 17.8 per cent. Land sales accounts, on the other hand, declined from 1,227 at January 1, 1967, to 875 at December 31, 1967.

As a result of the continued leasing policy in regard to applications for agricultural lands, lease revenues have continued to rise. While a number of these leases have been converted to purchases, that number has not yet been sufficiently large to overcome the net decline in purchase accounts. Purchase revenue during 1967 shows a decrease of some $770,000, which is explained as follows: Firstly, 1966 revenue included sales of lands to the City of Prince George totalling over $700,000, while in 1967 sales to the same city amounted to only slightly over $100,000, and, secondly, the steady decline in the number of purchase accounts due to the leasing policy.

STATISTICAL TABLES

Table 1.—Summary of Lands Service Net Revenue Collections for the Year Ended December 31, 1967

Land leases, rentals, fees, etc.	$1,917,435.31
Land sales	916,098.98
Sale of maps and air photos	152,462.32
Net revenue collections	$2,985,996.61

Table 2.—Comparison of Revenue Collections for 10-year Period 1957–67, Inclusive

1958	$1,340,045.76
1959	1,323,877.29
1960	1,714,220.41
1961	1,765,207.54
1962	1,847,457.83
1963	2,034,841.80
1964	2,587,110.34
1965	2,594,341.32[1]
1966	3,343,672.46[1]
1967	2,985,996.61[1]

[1] Net revenue.

Table 3.—Classification of Revenue Collections for the Year Ended December 31, 1967

Land sales—			
Country lands		$668,949.89	
Town lots		244,075.72	
Surface rights, mineral claims		6,293.85	
			$919,319.46
Land leases, rentals, fees, etc.—			
Foreshore leases—			
Booming and log storage	$302,745.18		
Commercial (marinas, etc.)	518,409.66		
Oyster	11,668.89		
Miscellaneous (foreshore protection, etc.)	825.00		
		$833,648.73	
Land leases—			
Grazing and (or) agriculture	$259,970.90		
Quarrying (limestone, sand and gravel)	44,859.67		
Camp-site (lodge, fishing)	9,389.09		
Home-site	1,464.18		
Residential	156,122.55		
Miscellaneous	157,217.18		
		629,023.57	
Land-use permits		3,555.10	
Licences of occupation		29,922.62	
Royalty collections		162,895.18	
Bonus bids (lease tenders and auctions)		64,064.94	
Easement collections—			
Annual rentals	$3,079.77		
Outright considerations	53,369.48		
		56,449.25	
Fees—			
Crown grant	$8,360.00		
Assignment	3,615.00		
Miscellaneous (lease, search, etc.)	12,096.00		
		24,071.00	
Sundry collections (occupational rental, survey charges, etc.)		116,607.19	
			$1,920,237.58

Sale of maps and air photos—		
Legal Division	$37,759.92	
Geographic Division	56,328.06	
Air Division	72,871.72	
		$166,959.70
Gross revenue for year		$3,006,516.74
Less refunds and taxes		20,520.13
Net revenue for year		$2,985,996.61

Table 4.—Comparison of Land Leases, Rentals, Fees, Etc., Revenue for 10-year Period 1958–67, Inclusive

1958	$605,229.73
1959	668,367.70
1960	842,413.17
1961	1,001,071.13
1962	933,607.66
1963	1,149,650.45
1964	1,485,539.13
1965	1,462,024.93[1]
1966	1,514,749.69[1]
1967	1,917,435.31[1]

[1] Net revenue.

Table 5.—Comparison of Land Sales Revenue for 10-year Period 1958–67, Inclusive

1958	$677,036.15
1959	589,975.24
1960	806,723.54
1961	703,705.71
1962	836,270.32
1963	787,184.11
1964	982,137.88
1965	1,017,893.16[1]
1966	1,692,861.14[1] [2]
1967	916,098.98[1] [2]

[1] Net revenue.
[2] Includes sales to City of Prince George: 1966, $718,733; 1967, $107,200.

LANDS BRANCH

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. Today the Department of Lands, Forests, and Water Resources 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 today? 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 Director 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* and the *Mineral 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 Water Resources Service, the Surveys and Mapping Branch within the British Columbia Lands Service, and all the departments in the Government of the Province, notably Highways, Education, Attorney-General, and 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.

Summer cabin on Crown lakeshore lease.

December 31, 1968.

LANDS BRANCH

DIRECTOR OF LANDS
(D. Borthwick)

ASSISTANT DIRECTOR OF LANDS
(F.M. Cunningham)

ADJUDICATION OFFICER
(R. Rutherford)

ADMINISTRATIVE OFFICER
(G.H. Wilson)

LAND ADMINISTRATION DIVISION

Administrative Officer
(W.J. Long)

SECTIONS

Purchases
(H.K. Kidd)

Leases
(W.C. Fry)

Crown Grants
(R. Wingfield-Digby)

Easements
(N.D. Smith)

Pre-emptions & Reserves
(C.W. House)

Registers
(D. Conway)

Stenographer Pool
(Mrs. B. Lawson)

LAND INSPECTION DIVISION

CHIEF LAND INSPECTOR
(L.D. Fraser)

ASST. CHIEF LAND INSPECTOR
(A.F. Smith)

Land Inspection Districts

Burns Lake	-	L.R. Paynton
Clinton	-	F.G. Edgell
Courtenay	-	D.E. Goodwin
Fort St. John	-	A.G. Anderson
Kamloops	-	D.I. Snider
Kelowna	-	R.F. Gilmour
Nelson	-	H.K. Boas
New Westminster	-	A. Paulsen
Prince George	-	D.M. Thom
Prince Rupert	-	L.M. Warner
Pouce Coupe	-	R.W. Brown
Quesnel	-	G. Huva
Smithers	-	R.N. Bose
Vancouver	-	G.A. Rhoades
Vanderhoof	-	J.R. Nijhoff
Victoria	-	G.H. Wilson
Williams Lake	-	J.A. Esler

LANDS BRANCH

D. Borthwick, B.S.A., B.Ed., A.A.C.I., Director of Lands

During 1967 there was a drop of 10 per cent in the number of land applications filed with the Department. However, the trend toward increasing revenue is continuing, resulting in a total revenue for 1967 of $2,833,534. Fewer direct sales of land are being made due to the Department's policy requiring lease tenure, which leads to sale upon completion of improvements to the property. This policy has resulted in a constantly increasing number of lease applications with a correspondingly larger percentage of total revenue attributable to lease rentals rather than to sale values.

As in past years, the Lands Branch has co-operated closely with municipalities throughout the Province by providing lands where available for public use. Assistance has also been given to replotting schemes which have been initiated at the local government level. The purpose of the replotting schemes is to cancel obsolete subdivisions and resurvey to maximize the utility of the land. During the past year such schemes were initiated in North Vancouver, Port Edward, and Fraser Lake.

The bulk of applications for Crown land has been filed in the Peace River District, and it is anticipated that this trend will continue. A large reserve was established in this district to curtail applications for Crown land which were far removed from the rail-head or otherwise uneconomical to develop. At the same time, adequate areas were left for alienation, and in addition some 385,000 acres were released from a previous reserve.

The interest shown during the past few years in the acquisition and development of Crown lands for ski-resort purposes is still active. During the past year the Lands Branch has processed many inquiries for this purpose, and the development of ski-ing facilities is now proceeding in virtually all parts of the Province. Such developments, when coupled with the continuing policy of etablishing reserves over suitable Crown lands for the use, recreation, and enjoyment of the public, will ensure present and future generations of access to adequate and enjoyable recreational pursuits.

The year 1967 was an active one from the standpoint of subdivision work undertaken by the Crown. Nine Crown subdivisions, comprising some 403 lots, were serviced by road over the past year. The subdivisions on Wasa and Bednesti Lakes will be surveyed in 1968 as the roads were not completed until late in 1967. The remaining subdivisions on Fraser Lake, Clucultz Lake, Seymour Lake, Green Lake and north of Williams Lake, south of Prince George, and on the Blackwater Road have all been surveyed, and with the exception of Green Lake will be offered for disposition on a leasehold basis by public competition in 1968. The subdivision on Green Lake, which comprised approximately 109 lots, was offered to the public during the latter part of June. The auction, which was held by the Land Commissioner at Clinton, was attended by well over 300 interested applicants and is believed to be one of the best-attended auctions held by the Department in recent years.

Over the past few years it has been very apparent that road-development costs to service these subdivisions have been increasing steadily. This is partially due to increased labour and equipment costs and partially due to the fact that the more accessible Crown lands have already been subdivided, and hence to gain entry to the more remote Crown lands it is sometimes necessary to underwrite the cost of building a considerable amount of access road from the existing public road to the site of the proposed Crown subdivision.

During the past year, with the co-operation of the Department of Highways, the Lands Service underwrote the cost of providing a car-parking lot on Crown land at Whistler Mountain for ski club lessees situated within Lot 7179, Group 1, New Westminster District. This facility will be maintained by the Department of Highways in order that the ski club members leasing the Crown lands can park their cars off the Squamish–Garibaldi Highway.

A full work load is again being considered for 1968, and arrangements are now under way to select appropriate sites for development where public demand and the economics of the development indicate a subdivision is warranted.

A brief summary of the activities of the various sections of the Administration Division of the Lands Branch is set out hereunder:—

Lease Section.—The policy of disposing of most lands on a lease-develop-purchase basis has resulted in a continued increase in the number of lease applications. This year 2,768 applications were received as compared to 2,690 last year. This continuing increase is largely a reflection of the interest in acquiring agricultural lands, particularly in the Peace River District.

Purchase Section.—During 1967 there was a sharp decrease in the number of purchase applications filed with the Branch. However, this was anticipated in view of the emphasis being placed on acquiring Crown land initially on a leasehold basis. The workload of this Section will increase in the next few years as the purchase options on existing leases are exercised.

Crown Grants.—The volume of work in the Crown Grant Section decreased from 1,020 in 1966 to 980 in 1967. This was mainly due to the change in Departmental policy requiring lands held under leasehold tenure to be developed before the lessee could exercise his option to purchase. It is anticipated that as lessees meet Departmental requirements in respect to development of the land and exercise their purchase options, the work of this Section will increase.

Pre-emption and Reserve Section.—The number of applications processed by this Section remained about constant when related to 1966, with 564 applications received. The importance of the pre-emption as a means of acquiring land has been gradually diminishing over the years, and the number of pre-emption records issued was only 26 as compared to 42 in 1966.

Status Section.—The number of statuses completed decreased slightly from 21,856 in 1966 to 21,115 in 1967. The decrease was the result of more interest shown in acreage parcels of Crown land rather than town lot parcels.

Easement Section.—During 1967, 146 easements were granted, which was about the same as for the preceding year. The majority of the easements issued are for power-line purposes.

GENERAL ACTIVITY

During 1967 a total of 55 parcels was tendered for lease, and 39 parcels, comprising 6,732 acres, were acquired by this means. In addition, 430 lots were offered for lease by public auction and 274 were leased at the time of auction. Of the 430 lots, 301 were waterfront parcels.

Only one parcel was tendered for sale in 1967, but 21 parcels were offered for sale by public auction. Of this number, only 14 sold, bringing in a revenue of $104,360.

During the past year, 390 town lots were sold, realizing the sum of $238,610.

The following tables indicate in detail the work carried out by the various sections of the Lands Service in 1967.

Table 1.—Country Land Sales, 1967

	Acres
Unsurveyed	435.535
Surveyed	8,624.851
Total	9,060.386

Table 2.—Certificates of Purchase, 1967

Land Recording District	Total
Alberni	9
Atlin	1
Cranbrook	16
Fernie	8
Fort Fraser	27
Fort George	36
Fort St. John	71
Golden	15
Kamloops	16
Kaslo	3
Lillooet	20
Nanaimo	13
Nelson	6
New Westminster	38
Osoyoos	3
Pouce Coupe	57
Prince Rupert	22
Quesnel	20
Revelstoke	7
Similkameen	44
Smithers	12
Vancouver	30
Victoria	2
Williams Lake	27
Total	503

Table 3.—New Leases Issued, 1967

	Number	Acreage
Land—		
Agriculture	854	446,579.44
Hay and grazing (pasture and hay-cutting)	413	136,413.87
Quarrying (sand, gravel, limestone, etc.)	21	2,042.03
Home-site (section 78, *Land Act*)	5	31.90
Residential	684	1,128.61
Miscellaneous (resorts, service-stations, camp-sites, mill-sites, etc.)	145	5,676.48
Foreshore—		
Booming, log storage, log-dumping, etc.	119	2,860.07
Oyster and shellfish	49	795.49
Industrial (canneries, mill-sites, wharves, etc.)	29	304.69
Quarrying (sand, gravel from river-beds)	9	420.12
Commercial (boat rentals, marinas, marine service-stations, etc.)	33	64.13
Miscellaneous (private wharves and boat-houses, etc.)	40	775.43
Total	2,401	597,092.26

Table 4.—Temporary Tenure Leases Renewed, 1967

Number	485
Acreage	161,141.69

Table 5.—Land-use Permits Issued, 1967

Number	43
Acreage	99.98

Table 6.—Licences to Occupy Issued, 1967

Number	22
Acreage	37,459.78

Table 7.—Assignments Approved, 1967

Leases, land-use permits, licences of occupation	718

Table 8.—Easements Granted, 1697

	Number	Miles	Acres
Foreshore			
Submarine power cables	6	2.597	19.072
Submarine telephone cables	7	26.428	297.760
Overhead power-lines	7	1.014	9.700
Overhead telephone cables	7	0.734	3.860
Telephone ground terminal line	1	0.027	0.017
Water pipe-line	1	1.039	2.520
Sewer outfalls and pipe-lines	2	0.140	0.250
Totals	31	31.979	333.179
Land			
Oil and gas pipe-lines	9	29.248	132.654
Well-sites and pipe-lines	12	11.880	68.660
Water and gas pipe-line, power-line, and water-well site	1	0.610	3.120
Well-sites and power-lines	2	.....	7.340
Cathodic sites	2	0.109	0.750
Power-lines	67	200.015	11,133.745
Telephone-lines	7	2.326	7.770
Underground telephone cables	3	2.550	5.590
Television antenna sites and power-lines	9	5.305	24.798
Television rebroadcasting stations and power-lines	2	0.090	0.691
Radio sites and power-lines	11	1.143	14.556
Microwave sites	8	1.850	35.419
Microwave sites and roads	2	9.930	85.170
Reducing-valve chamber site	1	.....	0.041
Effluent pipe-line	1	7.870	8.617
Water pipe-line	3	7.659	36.160
Water and sewer pipe-lines	1	0.090	0.340
Sewerage pipe-line	1	0.020	0.030
Drainage ditch	1	0.150	3.697
Gravity tram-line	1	0.880	4.285
Ski lift	1	0.390	6.250
Access roads	2	0.839	5.215
Totals	147	282.954	11,584.898
Licences of Occupation			
Radio site	1	.....	2.410
Electric distribution-line	1	0.097	.....
Totals	2	0.097	2.410
Southern Okanagan Lands Project			
Water pipe-line	1	0.104	0.390
Sewer pipe-line	1	0.315	1.010
Telephone-line	1	0.520	1.280
Totals	3	0.939	2.680
Grand totals	183	315.969	11,923.167

In line with current Departmental policy, 68 letters of consent for the construction of access roads were issued during the year.

Table 9.—Crown Grants Issued, 1967

Purchases (country lands)	697
Purchases (town lots)	162
Pre-emptions	47
Surface rights (*Mineral Act*)	14
Public Schools Act	14
Veterans' Land Settlement Act	4
Home-site leases	3
Pacific Great Eastern Railway Company	9
Miscellaneous	30
Total	980
Certified copies of Crown grants issued	*Nil*

Table 10.—Crown Grants Issued for Past 10 Years

1958	1,043
1959	1,471
1960	1,399
1961	1,074
1962	1,081
1963	1,042
1964	1,163
1965	1,087
1966	1,020
1967	980
Total	11,360

Ten-year average, 1,136.

Table 11.—Total Area Deeded by Crown Grant, 1967

	Acres
Purchases (country lands)	105,539.48
Pre-emptions	7,383.00
Surface rights (*Mineral Act*)	349.02
Public Schools Act	38.36
Veterans' Land Settlement Act	350.90
Home-site leases	51.00
Pacific Great Eastern Railway Company	3,528.34
Miscellaneous	432.45
Total	117,672.55

Table 12.—Pre-emption Records, 1967

	Pre-emptions			Certificates of Improvement Issued
	Applications Received	Applications Allowed	Cancelled	
Alberni	---	---	---	---
Atlin	---	---	1	---
Cranbrook	---	---	---	---
Fernie	---	---	---	---
Fort Fraser (Burns Lake)	6	2	---	2
Fort George (Prince George)	7	1	2	4
Fort St. John	9	9	7	15
Golden	---	---	---	---
Kamloops	2	---	---	1
Kaslo	---	---	---	---
Lillooet (Clinton)	1	---	---	---
Nanaimo	---	---	---	---
Nelson	---	---	---	---
New Westminster	---	---	---	---
Osoyoos (Vernon)	---	---	---	---
Pouce Coupe	25	12	10	22
Prince Rupert	---	---	---	---
Quesnel	---	---	2	6
Revelstoke	---	---	---	---
Similkameen (Penticton)	---	---	---	---
Smithers	1	1	---	---
Telegraph Creek (Prince Rupert)	---	---	---	---
Vancouver	---	---	---	---
Victoria	---	---	---	---
Williams Lake	---	1	---	---
Totals	51	26	22	50

Table 13.—Reserves, 1967

	Applications Received	Reserves Completed
Use, recreation, and enjoyment of the public	122	143
British Columbia Department of Highways (rights-of-way, gravel pits, bridge-sites, etc.)	131	110
Federal Government (defence purposes, wharf-sites, etc.)	35	21
British Columbia Forest Service (Ranger stations, grazing, radio sites, reforestation, etc.)	120	96
Miscellaneous (Fish and Wildlife Branch, water-power projects, garbage dumps, school-sites, cemeteries, etc.)	105	88
Totals	513	458

General Summary

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	10-year Average
Pre-emption records issued	99	53	77	147	127	79	83	50	42	26	78
Certificates of improvements issued	67	39	27	18	22	32	29	43	48	50	38
Certificates of purchase issued	1,151	1,114	1,248	944	1,106	934	1,118	819	694	503	963
Crown grants issued	1,043	1,471	1,399	1,074	1,081	1,042	1,163	1,087	1,020	980	1,136
Total acreage deeded by Crown grants	58,798	91,294	79,766	75,486	67,989	77,354	93,579	86,166	115,917	117,672	86,402
New land sales—											
Number	1,151	1,114	1,248	944	1,106	934	1,118	819	694	503	963
Value	$676,627.48	$669,899.78	$857,060.67	$673,655.53	$779,746.36	$658,950.00	$971,244.00	$966,020.00	$742,472.00	$681,850.00	$767,753.00
Leases under *Land Act*	479	513	802	1,013	1,094	1,051	1,474	1,144	1,245	2,401	1,122
Acreage leases, *Land Act*	77,912	51,777	107,474	104,029	186,806	341,770	271,518	235,220	234,420	597,092	220,802
Temporary tenure leases renewed	66	88	103	100	93	125	317	223	376	485	198
Land-use permits	9	8	21	13	21	15	46	18	26	43	22
Licences of occupation, easements, etc.	46	27	35	7	18	13	18	12	8	22	21
Clearances of reverted mineral claims	245	291	303	282	458	418	429	456	840	889	461
Reservations for use and enjoyment of public and other purposes	454	640	550	581	547	528	397	370	304	458	483
Land Act collections	$1,282,265.85	$1,258,342.94	$1,649,136.71	$1,704,776.84	$1,769,877.98	$1,936,834.00	$2,452,891.00	$2,479,918.00	$3,207,611.00	$2,833,534.00	$2,057,519.00

LAND INSPECTION DIVISION

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

During recent years there has been an increasing volume of work processed by this Division; this trend continued through 1967. As indicated by the footnote to Table 3, the average change over the whole Province this year was an increase of 3 per cent over 1966; the average change from 1963 to 1967 was 24 per cent.

As shown in Table 2 the number of inspections completed during 1967 was 5,920, a decrease of 4 per cent from the 1966 figure. At the same time, however, it is noteworthy that in spite of staff difficulties the outstanding inspection total at the year-end numbers 781, a 7-per-cent decrease. On the basis of a full complement this means that 24 applications per man are awaiting examination, an acceptable year-end figure.

The change to a lease-develop-purchase policy initiated by the Department in 1965 is continuing to have a decided effect upon the type of inspection and work volume relative to lease applications and renewals. This year 3,328 inspections dealt with new land lease applications or lease reviews. This was 56 per cent of the total 5,920 inspections completed. This figure may be compared with 53 per cent last year, 44 per cent in 1965, and 38 per cent for the same type of work at the end of 1964. It is anticipated that 1968 will be a busy year as the full effect of the 1965 policy will be felt with an increase in lease review requests following the initial three-year leasehold tenure period.

The Inspection Division again examined, appraised, and submitted reports to other Government departments and agencies — Pacific Great Eastern Railway, Southern Okanagan Lands Project, Land Settlement Board, Veterans' Land Act, Department of Social Welfare, British Columbia Forest Service, Provincial Secretary's Department, Department of Recreation and Conservation, and British Columbia Hydro and Power Authority.

Agricultural applications to lease and lease reviews constitute the bulk of the work in the Fort St. John Land Inspection District. When annual pre-emption inspections are included, this means over 71 per cent of the work load. New applications covered a land area of 137,000 acres this year. Almost 50 per cent of the applications received were from local people, 15 per cent from other Canadian residents, and the remaining 35 per cent from outside of Canada.

In the North Peace River area many of the present agricultural applications are a considerable distance from railroad and markets, and have poor access. Partially offsetting these factors, however, is the trend to larger parcels. This pattern follows the trend in the now established agricultural sections where owners are increasing the size of their farms to create economic units.

The area south of the Peace River covered by the Pouce Coupe Land Inspection District had an active year, very similar to 1966. The interest in land applications in this area has been fairly evenly distributed over the whole district. Most large remaining blocks of Crown land which are economically suitable for agriculture are now under application. Future applicants will be removed from established services and may expect to be faced with access problems. Lands having a homesite potential are in demand, and a number of applications have been made in the Portage Mountain area. It is noted that about 75 per cent of all applications made in this district in 1967 were by local or British Columbia residents.

A number of conflicts have recently come to light involving forestry, agriculture, grazing, and recreational use in this inspection district; for instance, there is

competition between recreation and other resource uses in the Sukunka and Upper Moberly River areas. This is not too surprising, of course, since the Peace River region as a whole, compared to the rest of the Province, is lacking in available natural local recreational facilities such as lakes and rivers suitable for swimming and fishing near established population centres. Attention is being given to recreational needs in the district, and wherever possible suitable areas for public use are being recommended for reserve.

In the Prince George Land Inspection District there was a 12-per-cent reduction in inspections requested during 1967. Completed examinations increased by 2.5 per cent, and the year ended with a very low backlog of outstanding work. The types of inspection requested varied little from 1966, the major change being a threefold increase in rental review requests. The workload distribution this year was fairly similar to 1966: 11 per cent of the total was in Community Planning Area Number 7, 20 per cent in Ranger District No. 4, and 25 per cent in Ranger District No. 14 adjoining the community planning area to the north-west and south-west. Activity east of Prince George is very limited and no substantial increase is foreseen, in spite of the new Highway No. 16 east to McBride and Jasper, since agricultural potential along the route is extremely limited. It is felt that there will be some future demand for commercial and residential use in subdivisions adjacent to the new highway. At the present time there is little application activity at Mackenzie; this is in part accounted for by a sizeable area here being under municipal control.

There is still a very active demand for lake-frontage property, and in this connection two Crown subdivisions offered in 1967 met with complete acceptance and over 120 lots were disposed of by public competition. It is anticipated that further Crown subdivisions will be considered in this district in order to keep pace with the public demand for property suitable for summer-camp site use.

In the Vanderhoof Land Inspection District the number of new requests was down 4 per cent from 1966, but at the same time the number of examinations completed was up from a year ago. Agricultural applications were down slightly from last year, and this trend is expected to continue in the future as the more readily accessible and potentially arable areas are applied for and developed. During 1967 a number of applications were made in the area lying between Stuart and Pinchi Lakes. Since the Pacific Great Eastern Railway now has a line into Fort St. James and as there is an access road running north to Tachie Village at the mouth of Tachie River, it is anticipated that there will be a demand for this land between the two lakes mentioned. The construction of the railway and new access roads in this area have also stimulated interest in Crown lands between Stuart and Necoslie Rivers. As access roads open up the area, applications are sure to follow for land which is economically suitable for agricultural development in this vicinity.

The reopening of Pinchi Mines on Pinchi Lake has stimulated growth at Fort St. James. It has been noticeable during the past year that other mining activity in the district has promoted growth of nearby towns, and in this connection the townsites of Fraser Lake and Endako should be mentioned in particular. Generally speaking, the area development and population growth over the year have been moderate in this district.

During the past year 180 new requests went out to Burns Lake Inspection District, and in total there were 173 inspections completed. Like the Vanderhoof District, this one also contains numerous lakes which influence the district and affect its residents to a considerable degree. During the year there was a continuing and growing interest in the Babine Lake area, and it is expected that there will be great interest in the large residential lot subdivision in the vicinity of Topley

Landing which the Department is expecting to auction shortly. Much of the interest in this area has been encouraged by Granisle Copper activities here and the possibility that Noranda and other mines may consider carrying out development work in this vicinity.

The number of inspection requests forwarded to the Smithers Land Inspection District increased during 1967 by 18 per cent. Examinations completed totalled 212, covering an area of approximately 60,000 acres, and 54 per cent of this total dealt with applications for agricultural use. It is considered that local residents were involved in 89 per cent of the applications.

Mine exploration activity is continuing to be a beneficial factor in the local economy, and during the year a number of applications dealt with the land needs of the mining industry.

During the year it was noted that a number of ranchers were showing an interest in acquiring arable portions of their grazing leases, and applications were made to convert grazing leases to agricultural leases where it was found to be economically feasible and possible to do so.

The number of inspection requests sent out during 1967 to the Prince Rupert Land Inspection District increased by 29 per cent over 1966. With the exception of the Terrace-Kitimat area and a very limited small settlement on the Nass River, this is a coastal district and, as would be expected, much of the work, 40 per cent in 1967, involves the use of Crown foreshore.

Industrial and labour trouble at the Columbia Cellulose plant in Port Edward and the fish-packing plants in Prince Rupert slowed the city economy. On the Queen Charlotte Islands, however, the cannery at Masset had a better than average season, the Bering Industries peat plant between Masset and Port Clements was in operation, new tourist and business facilities added activity to the local economy, whilst on the isolated west coast Wesfrob Mines Limited officially opened an iron mine. Mining activity also was of benefit to other areas in the Prince Rupert Inspection District, notably Stewart and Alice Arm.

Many of the agricultural and agricultural lease review requests in this district are found in the Terrace area. These were down in number from a year ago. There is an increasing interest in this part of the district in leases for home-site purposes both for permanent and summer-camp site residence. Lots in a small Crown subdivision on the very popular Lakelse Lake were auctioned in November; there is now virtually no potential subdivision frontage left in the name of the Crown on this lake.

During the year the Port Edward-Inverness Slough settlements became incorporated as the Village of Port Edward.

Land applications were up in the Quesnel Inspection District by 29 per cent and inspections were also up, a total of 241 being completed. It is anticipated that the work load for various types of inspections will maintain the same rate of growth in the next few years as has been the case in the last three. Normal population growths, the provision of access and the opening of new lands by loggers, miners, pioneers, etc., and the possibility of a new pulp-mill in Quesnel should all sustain this expected growth.

In this district as in others the implementation of the lease-develop-purchase policy will also ensure an increasing work load with reviews of leases being carried out initially on a three-year basis. As well, it is anticipated that the Cottonwood Provincial Forest will be converted to a pulp harvesting forest before long, and then practically all special-use permits now administered by the Forest Service will be handled by the Lands Service.

In the Williams Lake District the number of new application requests was up 25 per cent in 1967; work output was also up by 19 per cent, resulting in 492 completed inspections.

The ranching industry is the prime user of Crown land in the Cariboo, and therefore applications to lease for ranching purposes form the major part of the district work load. It is noted that the number of applications of a speculative nature have been greatly reduced by Departmental policy, wherein agricultural leasehold tenure requires cultivation plus, in the case of grazing leases, insistence that the fencing provision in the lease indenture be complied with. As stock numbers increase and the Crown ranges are used to greater capacity, it is becoming increasingly important to have a thorough knowledge of grazing patterns and use throughout the entire range in order to arrive at reasoned recommendations.

Cattle sales during 1967 in the Williams Lake District increased to 38,000 head from 25,000 head in 1966. The average price per head increased during the same period from $138 to $147 in 1967.

Once again inspection returns indicated that the lakes of the Cariboo are very popular by local people, tourists, and residents of other parts of the Province for summer-camp site use. This is borne out by the increase in summer-home site applications, the number increasing from 49 in 1966 to 80 in 1967.

Requests sent out to the Clinton Land Inspection District were up 26 per cent during the year; work accomplished increased by 18 per cent to 266 inspections completed. Examinations relating to ranching and tourism continued to dominate the inspection activity in this district. With the exception of grazing leases, the increase in the number of applications during 1967 was distributed through all sectors. It is early to attempt to explain the reduction in grazing lease applications, but it is felt this may be attributable to availability and to some extent to the enforcement of fencing requirements over existing grazing leases. The latter point has been received with mixed response by the ranching community, but for the most part there has been a general improvement in adherence to fencing requirements.

Again this year there was a continuing interest throughout the district in residential lots having lake-frontage. In June of this year the Department auctioned 95 residential lots on the south shore of Green Lake. All lots were disposed of at the initial auction with bonus bids received totalling more than $38,000, reflecting a strong demand for this type of development. All but 14 of the successful bidders were from the Lower Mainland. The market for permanent home-sites in the 100 Mile House area remains firm, and this is expected to be the pattern during the forthcoming year as well.

In the Kamloops Land Inspection District new requests were down 24 per cent from last year; work output totalled 423 inspections completed. There was a reduction in rental reviews during the year, but as this category involves summer homes and grazing lease reviews together, this would appear to be a temporary situation and one which could fluctuate greatly from year to year, depending upon the renewal dates of the leases. On the average this district should expect to have approximately 200 rental reviews of all types for each year. In 1967 new applications to lease summer-home sites on lakes were up from 24 to 68 compared to 1966, but all other types of inspections remained relatively constant.

The number of inspections requested from the Kelowna Land Inspection District was up by 38 per cent compared to last year, and the work output was also up 17 per cent to 216 examinations completed. The work load this year was above the five-year average.

There is a continuing demand in this district for residential leases having lake-frontage. In this regard a large number of rental reviews dealing with this type of leasehold were carried out in the district this year, the majority being on Christina Lake with a lesser number on Mabel Lake and along the Similkameen River.

Projects which were of particular interest during the year involved the appraisal of 50 parcels of land which were located along the Okanagan Flood Control Channel and administered by the Southern Okanagan Lands Project. Further types of examinations which were of special interest involved the exchange of land in the Mabel Lake area and the valuation of several parcels within the City of Vernon for the Public Works Department. In addition, this office inspected and reported upon a number of applications being made under section 102 (2) of the *Land Registry Act.*

Land-inspection requests in the Nelson District decreased by 8 per cent during 1967; the work accomplished totalled 250 examinations completed. It is anticipated that there will be a continuing interest in and demand for Crown land in the Nelson Land Inspection District owing to construction of the Libby and Mica Dams, construction and completion of the High Arrow Dam, completion of the Duncan Dam, construction of a new pulp-mill at Skookumchuck, construction of a recreational centre at Crawford Bay on Kootenay Lake, development of four new ski resorts in the area, and the proposed relocation of the towns of Natal and Michel.

The work load of the Vancouver Land Inspection District during 1967 decreased by 10 per cent; work accomplished increased to a total of 259 examinations completed. The types of examination, Table 1, for the district does not indicate any particular trend or development during the year; once again applications for foreshore lots constituted a major portion of the work load. The foreshore applications were for many purposes, including new booming and log-storage leases, marinas, oyster-growing purposes, etc.

During 1967 there was a decrease of 2 per cent in the New Westminster Land Inspection District work load; work accomplished was 245 examinations completed.

Projects of especial interest this year included the appraisal of properties for the British Columbia Forest Service and the Attorney-General's Department, a large sand and gravel operation, an industrial property having frontage on the Fraser River, and a ski-cabin subdivision development appraisal in the Alta Lake area.

Courtenay Land Inspection District also had a minor change in the number of inspections requested, up 3 per cent from 1966; work completed totalled 274 examinations.

As in previous years, foreshore inspections continued to be the predominant type of examination. The number of inspections for permanent home-sites also continued at a high rate.

Tahsis Company Limited completed the construction of its new pulp-mill at Gold River and commenced production in the summer of 1967.

In the Victoria Land Inspection District the number of inspections requested during 1967 decreased by 14 per cent; work accomplished increased for a total of 189 examinations completed. As has been experienced in previous years, foreshore inspections continued to be the predominant type of examination. Greater competition for the use of foreshore areas is inevitable with increased population since the more favourable locations are now held under lease.

STAFF CHANGES

During the year several changes were made in the location and employment of staff. On September 1, 1967, Mr. F. M. Cunningham was appointed Assistant

Director of Lands and was replaced as Assistant Chief Land Inspector by Mr. A. F. Smith on October 16, 1967.

Mr. J. S. D. Smith, Land Inspector at Nelson, passed away March 28, 1967, following a lengthy illness.

This year the following Land Inspectors resigned on the following dates and for the reasons noted: W. V. Lowry, April 17, 1967 (employment with Federal Government, Ottawa); M. G. McConnell, June 23, 1967 (returned to University of British Columbia); J. R. Prosser, October 31, 1967 (employment with ARDA, Winnipeg). Also the following Deputy Land Inspectors resigned: M. K. Wilson, August 22, 1967 (travelled to New Zealand), and R. L. Lussier, September 15, 1967 (transferred to British Columbia Forest Service).

These vacancies required the following transfers of Land Inspectors: F. G. Edgell from Prince George to Clinton, in charge, May 23, 1967; H. K. Boas from Smithers to Nelson, in charge, June 5, 1967; R. N. Bose from Clinton to Smithers, in charge, June 15, 1967. Also the following Deputy Land Inspectors: P. H. Downs from Fort St. John to Williams Lake, October 30, 1967, and J. E. Perdue from Williams Lake to Nelson, November 7, 1967.

As a result of the above resignations the following personnel were taken on staff on the dates noted and assigned to the following offices:—

Land Inspectors: J. P. Egan, June 12, 1967, Fort St. John; T. J. Todd, October 1, 1967, Prince George; J. R. Nijhoff, December 1, 1967, Vanderhoof; R. A. Cullis, August 16, 1967, Williams Lake.

Deputy Land Inspectors (two filled vacancies existing December 31, 1966): J. A. Little, June 1, 1967, Fort St. John; D. E. Jaffray, September 21, 1967, Fort St. John; E. S. Gowman, October 1, 1967, Fort St. John; H. Patzelt, January 1, 1967, Pouce Coupe.

TRAINING

Eight Land Inspectors together with the Chief and Assistant Chief Land Inspector are now accredited as appraisers with the Appraisal Institute of Canada.

Eight Land Inspectors and nine Deputy Land Inspectors have successfully completed Parts 1 and 2 of the Appraisal Course and are now studying Part 3. One Land Inspector is studying Part 2 on his own with a view to writing this examination in the spring. Three Land Inspectors and three Deputy Land Inspectors are studying Part 1 of the Appraisal Course.

Two Land Inspectors have completed the Public Administration Course, and at the present time one Land Inspector is in his third year and the Assistant Chief Land Inspector is in his second year of this course.

In March two zone meetings were held—one at Kamloops and one at Prince George.

STATISTICS

Table 1 represents a summary of the number and type of inspections completed in the Province by this Division during 1967. Table 2 represents a comparison, on a year-to-year basis, of the volume of field work completed and requests outstanding at the end of each year for the period 1963 to 1967, inclusive.

Table 3 represents an analysis of requests for inspections processed by this Division for the years 1963 to 1967, inclusive.

Table 1.—Types of Inspections, 1967

Purchases—	
Agriculture (other than grazing)	201
Access (roads, etc.)	2
Commercial (resorts, service-stations, hotels, airfields, etc.)	36
Community (cemeteries, church-sites, parking areas, etc.)	21
Grazing (pasture, range)	22
Home-sites (permanent)	218
Industrial (mill-sites, power-sites, manufacturing plants, etc.)	35
Summer home or camp-site	65
Wood-lots or tree-farms	2
Others	2
Leases—	
Land—	
Agriculture (other than grazing)	917
Commercial (resorts, service-stations, hotels, airfields, etc.)	67
Community (parks, cemeteries, dump-sites, etc.)	31
Fur-farming	1
Grazing (pasture, range, hay-cutting, etc.)	375
Home-sites (section 78 of the *Land Act*)	14
Home-sites (permanent, other than section 78 of the *Land Act*)	192
Industrial (mill-sites, power-sites, manufacturing plants, etc.)	40
Summer home or camp-site	382
Quarrying (sand, gravel, limestone, diatomaceous earth, etc.)	63
Reviews (rental and (or) diligent use)	1,243
Others	3
Foreshore—	
Booming and log storage or log-dumping	171
Commercial (boat rentals, marine service-station, wharves, etc.)	81
Industrial (mill-sites, canneries, factory-sites, wharves, etc.)	11
Quarrying (sand and gravel from river-beds)	2
Oyster and shellfish	15
Private (floats, boathouses)	24
Reviews (rentals and (or) diligent use)	250
Others	4
Land-use permits	51
Licence of occupation	17
Easements and (or) rights-of-way	14
Pre-emptions—	
Applications	22
Annual inspections (including applications for Crown grant)	232

Table 1.—Types of Inspections, 1967—Continued

Subdivisions—	
Valuations	19
Survey inspection	1
Plans cancellation	3
Proposals (lake-shore, residential, etc.)	27
Others	2
Reserves—	
Grazing	3
Gravel pits	1
Recreational	29
Others	6
Veterans' Land Act	1
Land Settlement Board—	
Classification	6
Valuations	5
Doukhobor lands	5
Southern Okanagan Lands Project	9
Pacific Great Eastern Railway	6
Department of Social Welfare	3
Other agencies (British Columbia Hydro and Power Authority, British Columbia Forest Service, Provincial Secretary's Department, and Department of Recreation and Conservation)	31
Miscellaneous inspections—	
Assignments	47
Delinquent accounts	9
Escheats Act	1
Lake reconnaissance	30
Land-use surveys	15
Land revaluations of special nature	82
Protests	107
Section 53 (2), *Land Act* (verifying improvements)	400
Section 65, *Land Act* (free grants)	------
Section 78, *Land Act* (*re* compliance with provisions of)	23
Section 130, *Land Act* (lands vested in Crown under *Taxation Act*)	------
Section 131B, *Land Act* (cases of doubt regarding inclusion of body of water in Crown grant)	5
Trespass (land)	25
Trespass (water)	106
Quieting Titles Act	5
Section 102 (2), *Land Registry Act*	24
Others	58
Total	5,920

Table 2.—Analysis of Inspections Completed and Inspections Outstanding at Year-end for the Years 1963 to 1967, Inclusive

Land Inspection District	Examinations Made during—					Outstanding at End of—				
	1963	1964	1965	1966	1967	1963	1964	1965	1966	1967
Burns Lake	-----	-----	136	318	173	-----	-----	151	27	32
Clinton	139	269	235	226	266	48	29	35	40	64
Courtenay	212	283	293	303	274	30	33	32	15	36
Fort St. John	593	853	582	1,129	1,066	156	104	230	146	180
Kamloops	329	460	482	515	423	78	75	50	72	52
Kelowna	166	202	201	185	216	28	36	26	15	39
Nelson	252	249	278	307	250	43	38	63	37	45
New Westminster	110	87	242	274	245	7	36	61	34	7
Pouce Coupe	513	450	454	609	610	87	81	121	92	45
Prince George	480	668	551	423	433	183	262	52	68	27
Prince Rupert	-----	-----	67	194	180	-----	-----	85	34	38
Quesnel	213	282	173	191	241	58	56	51	38	33
Smithers	279	401	317	351	212	279	418	178	14	23
Vancouver	240	245	250	233	259	9	46	30	57	31
Vanderhoof	-----	-----	236	330	327	-----	-----	35	49	40
Victoria	216	172	156	156	189	17	18	32	46	4
Williams Lake	421	438	530	415	492	61	58	33	38	74
Headquarters	-----	19	13	13	28	-----	-----	-----	-----	-----
B.C. Forest Service and others	72	96	70	20	36	33	29	16	14	11
Totals	4,235	5,174	5,266	6,192	5,920	1,117	1,319	1,281	836	781

NOTE.—These figures include pre-emptions.

Table 3.—Analysis of Requests for Inspection Processed by Land Inspection Division for Years 1963 to 1967, Inclusive

District	New Requests Received during—					Per Cent Change, 1967 over 1966	Per Cent Change, 1967 over 1963
	1963	1964	1965	1966	1967		
Burns Lake	-----	-----	287	194	180	−8	0
Clinton	170	249	241	230	290	+26	+71
Courtenay	209	286	292	286	295	+3	+41
Fort St. John	629	761	708	929	986	+6	+57
Kamloops	380	452	457	532	402	−24	+6
Kelowna	179	209	190	173	239	+38	+34
Nelson	253	244	312	281	258	−8	+2
New Westminster	104	116	267	246	241	−2	+132
Pouce Coupe	466	398	450	506	508	+4	+9
Prince George	570	730	457	426	375	−12	−34
Prince Rupert	-----	-----	108	143	184	+29	0
Quesnel	214	263	162	172	222	+29	+4
Smithers	442	540	366	187	221	+18	−50
Vancouver	230	282	256	260	233	−10	+1
Vanderhoof	-----	-----	168	320	307	−4	0
Victoria	212	176	172	170	147	−14	−31
Williams Lake	430	433	503	420	524	+25	+22
Headquarters	-----	19	13	13	28	0	0
B.C. Forest Service and others	98	105	57	27	36	+33	−63
Totals	4,586	5,263	5,466	5,515	5,676	------	------

Average change for 1967 over 1966 for Province is +3 per cent.
Average change for 1967 over 1963 for Province is +24 per cent.

SURVEYS AND MAPPING BRANCH

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 today 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 principal 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:—

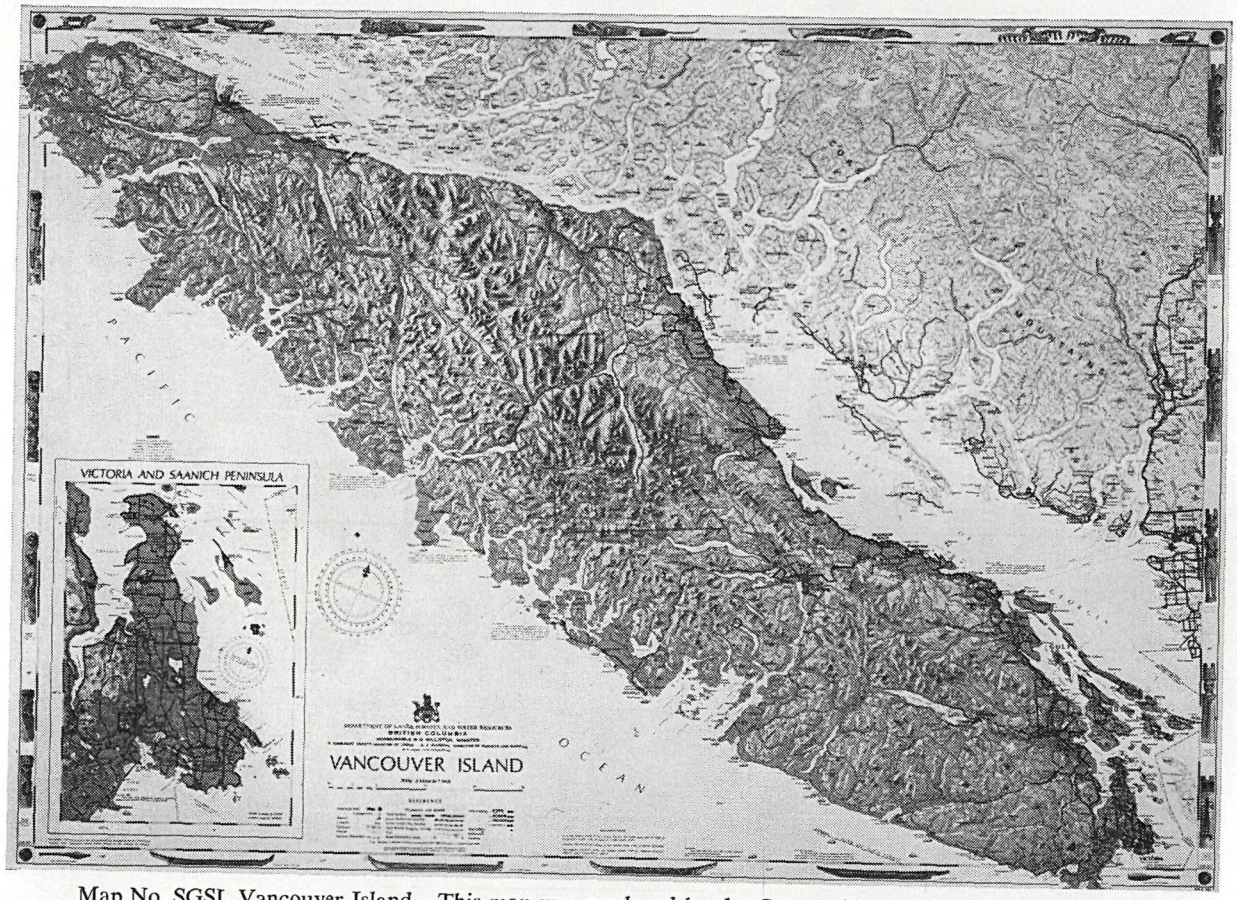
I. Administration.—General co-ordination of the four divisions of the Branch, being Legal Surveys, Geographic, Topographic, and Air; delineation and maintenance of boundaries under the Provincial Boundary Commissioner—namely, (*a*) Alberta-British Columbia Boundary and (*b*) British Columbia-Yukon-Northwest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

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 Otter float-plane; 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.

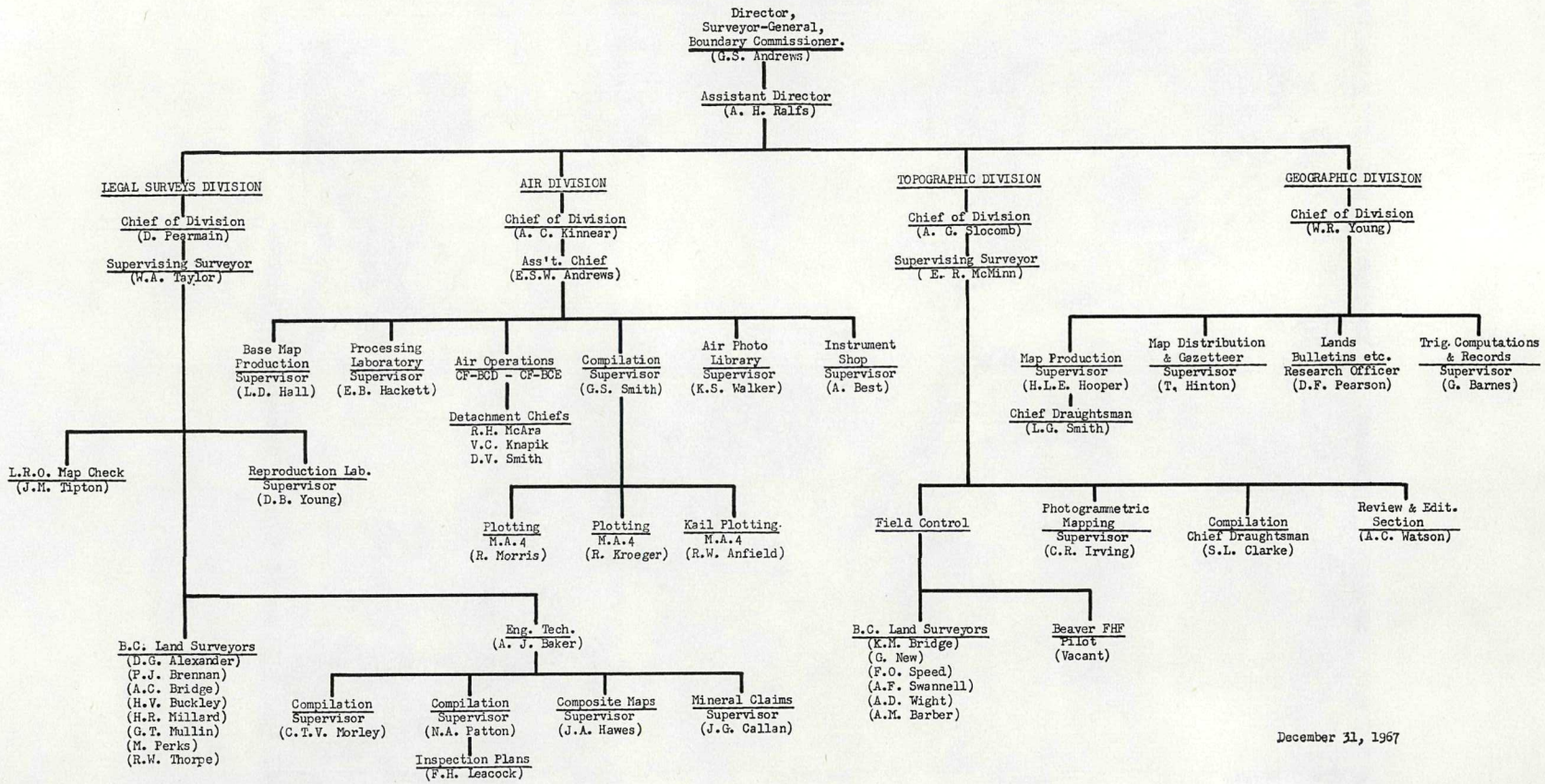
V. Air Division.—Aerial photographic operations involving maintenance and operation of two aircraft; photographic processing, air-photo distribution, and Provincial air-photo library; compilation of interim base maps, primarily for the forest inventory; air-photo control propagation; instrument-shop for the repair, maintenance, and development of technical equipment.



Map No. SGSI, Vancouver Island. This map was produced by the Geographic Division, Surveys and Mapping Branch, Department of Lands, Forests, and Water Resources, and printed by the Government Printing Bureau, September, 1967, on scale 1 inch to 6 miles. Ten colours were used for the base and for the portrayal of the shaded relief features on contours, 500-foot interval. The border illustrations were specially prepared for the map by the British Columbia Provincial Museum from Vancouver Island Indian objects.

ORGANIZATION CHART

SURVEYS AND MAPPING BRANCH
DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES



December 31, 1967

SURVEYS AND MAPPING BRANCH

G. S. ANDREWS, M.B.E., DIRECTOR, SURVEYOR-GENERAL,
AND BOUNDARIES COMMISSIONER

Each year, completed and up for review, is like the youngest child added to a large family, all of whom show common characteristics, but interesting variations are also evident among them, according to how the chromosomes got stirred up in each mix. While gratifying to " Pa " that the children are all like him in one way or another, the old saying goes, " Mother knows best." So it is with this Branch's family of years, on no less than 17 of which (since 1951) it has been the writer's privilege to report. Characteristic trends through these years include authorized annual expenditure, staff establishment, accommodation, policy, the nature of work, technology, equipment, methods, and accomplishment.

Authorized annual expenditure on surveys and mapping covering payroll, equipment, and operations has shown a gradual climb from some $830,000 in 1951/52 to $1,790,000 for the current year. To be realistic, the increase must be discounted somewhat for the inflationary spiral. These expenditures, in proportion to the total Provincial budget have, however, declined steadily from 0.94 per cent in 1951/52 to 0.25 per cent now, reflecting the growing complexity and responsibility demanded of government. Nevertheless, one must ask, if the relative importance of surveys and mapping, which provide the very basis for economic growth, should not maintain its former proportion of the total budget.

Authorized staff establishment of the Branch has been monotonously static through the past 17 years. The figure for 1951/52 was 183, the current total is 186. The highest was 192 in 1952/53 and the lowest, 175, in 1958/59, the 17-year mean being just under 182. Temporary field staff has augmented these totals in summer months by 15 to 20 per cent. The housing of the Branch's activities reflects the stability in personnel, by having changed little, area-wise, but in quality it has improved in some respects, such as ventilation in the photo-processing laboratory. In spite of some consolidation, the accommodation is still sporadically fragmented, with the penalty in restricted co-ordination of the various branch segments. My comment for the year 1951 could be repeated for 1967: " Our present sporadic distribution of offices in four different buildings, diluted among unrelated units of other departments, is to some extent chaotic and wasteful."

Features of conspicuous but progressive change during this period are technological, covering equipment and methods, happily with a corresponding increase in the quantity and quality of work output. In this sense the later years of the period are like later additions to the family, which enjoy the benefits not afforded to the earlier children, due to enhanced economic status and maturity of the family unit. The technological features mentioned include improved photo aircraft, the cameras and the navigational aids used in them, together with processing facilities. Revolutionary procedures for distance measurement in field surveying became available in the late 1950's in the form of the tellurometer and the geodometer, as did first-order photogrammetric plotting equipment in the form of the Wild A7 autograph. Complementary with these, the revolution in computations and data processing by electronic systems was propitiously and progressively used, such that almost immediate advantage of the improved field measurements in the form of sophisticated adjustments has made practical reality of what was formerly theoretic and wishful thinking. Improvements in cartography, lithography, and in drawing and reproduction materials, particularly in respect to dimensional and chemical stability, have

been significant. It has only been by persistent and aggressive adaptation to these new advantages that the static staff potential has been able to cope with the compounding increase in volume, variety, and complexity of demand.

A few features of the current year as given in detail by the division reports following are worthy of special remark. An all-time record for air-photo flying was achieved by the Air Division. Again the commendable vigilance and efficiency of the aircraft personnel in fully exploiting any incidence of photo weather whenever and wherever was a major contributing factor in this accomplishment. The acquisition of two Zeiss RMK 30/23 12-inch focal-length cameras now provides each of the two air-photo detachments with full complement of modern first-order air survey cameras for either the 6- or 12-inch photography, according to opportunity, thus providing full flexibility of operation. This was a contributing factor to the high record of accomplishment in 1967. Increasing incidence of breakdowns with the old worn-out 12-inch O.S.C. cameras formerly used implied a significant loss of photo-weather opportunity in past years. Complementary to the increased potential for taking air photos, the operation of a second Cintel electronic printing unit in the processing laboratory has reduced a long-time bottleneck in that section. The aggregate holding of prints in the Air Photo Library now approximates 700,000. This is an impressive total for a Provincial service. The National Air Photo Library in Ottawa, covering all of Canada, some 10 times the area of British Columbia, had a total in excess of three million photographs in 1965, and probably approaches four million now. The perennial deficiency of staff in the Air Division to fully complete the air-photo interim map series, one of our best sellers, is regrettable. The remedy is obvious.

In connection with the work of the Geographic Division, the appearance of the long-awaited 1966 edition of the Geographical Gazetteer of British Columbia was a welcome event. The previous 1953 edition had been both out of print and obsolescent for some time. The new edition includes over 35,000 names, some 8,000 more than the previous edition. From data given in the Division report, it would appear that there are already over 700 new approved names to supplement those presented in the 1966 Gazetteer. Among seven completely new maps produced by the Division in 1967, the special one-sheet map of Vancouver Island (SGS 1) at 6-miles-per-inch scale is noteworthy and an example of cartographic excellence, produced entirely in the Province. Compilation, colour separation, and editing were done by the Division, and the map was excellently photographed and lithographed by the Government Printing Bureau.

Utilizing improved facilities for electronic computations and mathematical adjustment described in the Legal Surveys Division's report, a large amount of survey control adjustment was accomplished by the Computing Section, as shown in Table A of the Geographic Division report. There is now record of over 39,000 monumented survey points duly co-ordinated on the North American Geodetic Datum within the Province.

A comparative statistical tabulation of many routine office operations of the Legal Surveys Division for 1966 and 1967 indicates more increases than decreases. Among the increases are diazo prints, up some 50,000 items (16 per cent); offset prints, up 273,000 (62½ per cent); applications for lease cleared, up over 1,000 (22 per cent); photostats dropped by 73,000 (45 per cent). The plan-checking programme for Land Registry Offices has been widened to serve all districts except that of New Westminster, which, toward the end of the year, expressed a need for this service due to an unprecedented land subdivision activity in that district. Its inclusion would, however, require additional staff due to current capacity load in this section. The success of the drivable pipe posts innovated by the Legal Surveys Division

several years ago is reflected in the total issue of some 4,500 of this type as against 715 of the older standard pipe post.

Gratifying progress continues in the field of electronic computations, especially in converting programmes in various ways. Conversion from the I.B.M. 1620-II to the I.B.M. System/360 installed during the year is under way, and the benefits of the new system are both significant and appreciated.

The Topographic Division had a record year in respect to the magnitude of its field operations and the budget to finance them. This situation arose largely from a crash programme to improve the quality and density of horizontal and vertical control in North-east British Columbia in response to representations from the Canadian Petroleum Association, and was approved on our recommendation that it would be more economical to get most of it done in one season by an enlarged operation than to do it piecemeal over a number of years. In spite of propitious weather which favoured the general operation and also permitted the obtaining of the essential new 40-chain air-photo cover early in the season, the accomplishment fell somewhat short of expectations. This was due mainly to two factors: one was the unexpected density and height of new growth along the seismic lines used for routing the levelling and traverse loops. In many places this necessitated shorter courses between a larger number of occupied traverse stations and turning points, and brush-cutting, both of which significantly impeded progress. The other factor was the necessity to close down the operation two weeks prematurely due to a precipitant clamp-down on release of funds in conformity with an austerity blitz and because an over-expenditure of some $20,000 previously authorized for extra work done on another project did not materialize. With such a large field force, some 50 men, two helicopters, and an Otter support aircraft, this restriction reduced the effective accomplishment in proportion to the basic cost of deployment in such a remote area. These two weeks' field opportunity lost due to a freeze on funds were, unfortunately, the most effective weeks of the whole season, with crews all high-balling on the job, well trained and highly efficient. There is one consolation in the fact that the area left to be done south of latitude 58° 20′ is more accessible by the existence of access roads and, therefore, could involve a lower proportion of expensive helicopter services.

SURVEY INTEGRATION

Establishment of survey control monuments in urban and suburban areas for survey integration continues as described in the Topographic Division report. Valuable co-operation was provided by the Federal Surveys and Mapping Branch in the form of a first-order geodetic control party which established some 25 points in the Greater Vancouver area, thus providing a strong framework to support the expansion of second-, third-, and fourth-order control. The same party, before the end of the season, was also able to establish some nine first-order stations in the Greater Victoria region. This will be valuable when survey integration begins to receive attention in the Capital Region, and it will also be useful for pin-pointing the site of the Centennial survey monument dedicated on the 21st of June in Victoria. Another Federal survey party concentrated on second-order control in the City of Vancouver in co-operation with the city surveyor's office, liaison being provided by this Branch. The Provincial effort was divided between several areas in the Lower Mainland and in the Interior, as described in the Topographic report. One integrated survey area was proclaimed by Order in Council under authority of the *Official Surveys Act* (as amended in 1966). At the year-end final steps anticipating proclamation of a second area are well in hand.

Accumulating experience in connection with establishing integrated surveys is leading to clearer concepts of worth-while objectives and the means of obtaining them. It appears that a degree of flexibility is necessary whereby the principles of survey integration could be applied in the earliest stages in survey evolution, say, in a wilderness area and to continue thereafter. This means that specifications, mainly for accuracy and density of control, which directly influence costs, must be graduated on a sliding scale compatible with land values. On this basis it should be practicable to initiate survey integration in wilderness areas with the first primary survey operation, such as new district lots or rights-of-way. As further survey activity accrues in the area, in response to economic development, specifications may be progressively more rigorous, to the ultimate required, say, in an urban area of high land values.

Further consideration of a more equitable sharing of the cost of integrated survey is needed. The case of a single lot or a simple subdivision for an individual owner should have recourse to a degree of compensation for the extra cost of co-ordination, possibly through a tax credit. Large subdivisions, of course, may be expected to assume a proportionately larger share of the cost of integration, without the cost per lot being unreasonably high.

SURVEY INTEGRATION A BASIS FOR GEO-CODING

The following paragraphs aim to rationalize heretofor nebulous ideas in the mind of the writer, which now appear to have clarified sufficiently to merit expression for consideration, critical or otherwise.

A lot of attention is being given by various authorities to the problem of processing locational data and their digital expression, which has been referred to as " geo-coding." Various statistical disciplines are concerned with this problem, such as census, land classification, land capability and use, natural-resource inventories, etc. One feature common to all approaches to rational geo-coding is the degree of resolving power of the system; that is, how fine a specification of position or area is adequate. For certain studies concerned with geographical distribution, the unit location may be as large as, for example, a quarter-section of 160 acres; that is, one-half mile square. For another purpose, such as perhaps a market survey, this may be too coarse, and a finer resolution, down to units, say, the size of a town lot may be required. Certainly taxation would seem to require a geo-coding resolution compatible with separation of individual property units.

One area, concerned with geo-coding, close to the operations of surveyors, especially in Legal Surveys, is that of registration of land titles according to the *Land Registry Act* as administered by the Attorney-General's Department. In British Columbia the so-called Torrens principle, in effect for over a century, in return for compulsory registration of title (for a fee), purports to guarantee title. What resolution should a geo-coding system for land title registration have? It may be that anything less than the resolution (accuracy) specified for property boundaries is an inadequate compromise. This means that for intensive urban property subdivisions a positional resolution of more than one-tenth of a foot is too coarse. In rural and wilderness areas this specification could be relaxed to as much as a foot or, indeed, several feet. It follows that the unique identity and location of a legal parcel of land, based on the survey of its boundaries, would fully meet the resolution required for geo-coding land titles. A concern is brevity in the digital array identifying and locating a unit parcel. Happily, increasing storage capacity in the current electronic data-processing systems would appear to offer some relaxation in this restriction.

By adopting a convention of starting at, say, the northernmost angle point on the legal perimeter of a parcel, and if this could be at either end of a truly east and west boundary-line, referenced to grid azimuth, then take the most north-easterly angle point and express this by its co-ordinate position in our accepted polyconic rectangulars. We now are on the way to a unique digital label for identifying and geo-coding the parcel, but not quite all the way. Two wedge-shaped lots could happen to share this point, so we must include the co-ordinates for the next adjacent angle point on the perimeter, again using the convention of proceeding in, say, a clockwise direction. The inclusion of the second point removes all ambiguity at the price, however, of increasing the necessary array of digits. A resolution to one-tenth of a foot in co-ordinating the two corners should be sufficient even for high-value property. In such a case the co-ordinates for the pair of corners would run to 33 digits as, for example:—

Angle Point	Polyconic Rectangular Co-ordinates				Total Number of Digits
	Origin		Feet		
	Lat.	Long.	*X*	*Y*	
No. 1	48°	123°	−220073.2	364892.6	= 20
No. 2	(ditto)		−220001.1	364812.4	= 15
Total digits	2	3	16	14	35

If the convention of a false origin is adopted to make all *X* values positive, two minus signs could be dropped, reducing the required aggregate to 33 digits.

The assumption is made that the same geographic origin applies to both points, which would be true in most cases, especially if, when necessary, the zone were extended discretely to include both. In the event that one or both identifying points should fall on a natural boundary, such as a high-water mark, or on a curve, a further convention would be to transform the meandering boundary into a series of tangents or chords. These could be as short as 5 or 10 feet without compromising legal limits or value of the property. This approach is applicable, then, to parcels of any shape and whose perimeter could comprise any number of angle points. The underlying requirement is that all angle points of the perimeter, either regular or conventionalized, are co-ordinated on the North American Geodetic Datum in a rectangular system. This is precisely the end result of survey integration. This application to geo-coding exemplifies one of the primary potential advantages of survey integration—namely, a digital identity and geo-coding system for all legal parcels of land, free from ambiguity, having a resolution to a tenth of a foot, and within the capabilities of present-day electronic data-processing systems.

The data bank for each parcel would, in addition to the co-ordinates of identifying corners, store the co-ordinates of each of the other angle points on the perimeter, from which bearing, distance, and location of each and all of the sides could be computed and read out. Areas could also be derived. Other pertinent data covering ownership or title identity, plan number, assessment, tax status, services, etc., could be coded and retrieved. In complex cases more than one of the ordinary I.B.M. punch cards might be necessary for each parcel, or the whole " bag of tricks " could be stored on tape or disk.

A different universe for geo-coding a country or a province, complementary to the fragmented and haphazard universe of private-property parcels, would be a regular array of geographic units blanketing the whole. The permit and lease grid system of geo-coding adopted by the British Columbia *Petroleum and Natural Gas*

Act, by which each larger geographic block is broken down in quadrilateral units 30 seconds of latitude by 45 seconds of longitude, or a similar perhaps more convenient breakdown could form the basis of this blanket approach. Each unit could be geo-coded by the rectangular polyconic co-ordinates of, say, its north-east corner (20 digits to one-tenth foot). On each unit card could be entered the rectangulars of the other three corners and all legal corners it contains, as well as other types of data, such as well-sites, elevations, land classification, resource inventories, etc. Programmes could then be developed to process these data for a large variety of over-all statistical, legal, and economic readouts. The two banks of information systems, the over-all geographic breakdown on one hand and the fragmentary haphazard cadastral breakdown on the other, for any given tract of country could be used as a mutual check; that is, the total surface of one system should equal the total surface of the other. All this sounds like a colossal exercise in tedium, but that is just what modern data-processing systems appear to thrive on.

The foregoing line of thought, while perhaps over-simplifying the case for the sake of brevity, does show that the ultimate end product of survey integration—that is, the co-ordination of every angle point of every legal parcel of land, whatever shape—on the North American Geodetic Datum is the ultimate fully competent universal approach to precise geo-coding of all criteria concerning the surface of the earth, be it ownership, value, or whatever. Any other simpler approach might well be an expensive compromise.

BOUNDARY INSPECTION

In July the Commissioners for the British Columbia-Yukon-Northwest Territories Boundary, Mr. R. Thistlethwaite for Canada and the writer for British Columbia, made an inspection of this boundary (by helicopter from Whitehorse) along the 60th parallel from the lower crossing of the Tatshenshini River, Monument 166, west to Monument 185 on the right (west) bank of the Alsek River, where a landing was made. The monument at this point was found in good condition, but a rock cairn marking the tie point 3 chains north had been dismantled, presumably by a curious grizzly bear. Due to low cloud ceiling, Monument 187, 243 chains (approximately 3 miles) west and at 4,019 feet elevation, the westernmost terminal monument of the surveyed boundary, was obscured in cloud and thus inaccessible that day. The return flight followed along the boundary, except where detours were necessary around high ground engulfed in cloud. Several pits and mounds marking other monuments were observed, and the cut line through timbered portions was quite discernible. The area covered in this flight, especially at the west end, is possibly one of the most inaccessible in the whole Province and, especially near the Alsek River, a fantastic spectacle of raw wilderness having been comparatively only recently, in the geological sense, vacated by the ice mantle of the last glacial advance. An indelible impression of the area is also that there is yet a vast amount of unoccupied real estate in the north-west part of the Province. This westernmost segment of the British Columbia-Yukon Boundary, from Monument 166 to 187, was surveyed by Mr. A. F. Swannell, B.C.L.S., in 1958. Beyond Monument 187 to the west for some 38 miles to the International Boundary with Alaska, the 60th parallel ascends to traverse enormous icefields, and for this reason has not been surveyed. It can wait until the present icefield might dissipate, which may be a little time yet.

DISTANT FIELDS

Valuable extra-provincial liaison in surveys and mapping was effected during the year in a number of ways. In Ottawa during the week of February 6th to 10th

the Director attended a special meeting on geo-coding and the three-day 60th Annual Convention of the Canadian Institute of Surveying. Messrs. M. Perks, B.C.L.S., of the Legal Surveys Division, and A. D. Wight, B.C.L.S., of the Topographic Division, also attended these meetings. In September a special symposium on orthophoto mapping in Ottawa was attended by Messrs. A. H. Ralfs, Assistant Director, and C. R. Irving, Supervisor of the Photogrammetry Section of the Topographic Division. In October the Director and Mr. W. R. Young, Chief of the Geographic Division, attended annual meetings in Fredericton, N.B., of the Advisory Council on Cadastral Surveys, of the Permanent Canadian Committee on Geographical Names, and of the Federal-Provincial survey officers. Immediately following, in Ottawa, were meetings of the National Advisory Committee on Control Surveys and Mapping and a special conference on control surveys. While in Eastern Canada the Director utilized the opportunity to visit several Provincial survey headquarters at Fredericton, Halifax, St. John's, and Charlottetown.

A strong impression gained from these latter visits was the chaotic character of the primary cadastral partition of land surviving from early colonial days, when riparian frontage for each parcel of land was of paramount importance due to rivers serving almost exclusively as arteries of access, transport, and communication. Many such lots survive to this day with, say, 600 feet of river-frontage, 6 miles of depth, and in some cases with only 100 feet width at the back line. We receive occasional complaints about the irregularity of the district lot system in British Columbia, but compared to the old allotments in Eastern Canada our system seems almost elegant.

In December Messrs. A. C. Kinnear, Chief of the Air Division, and J. W. Gibbs, of the same Division, attended the annual meeting of the Puget Sound Section of the American Society of Photogrammetry, in Seattle, at which Mr. Kinnear was elected section president for 1968.

STAFF

There was an aggregate of 15 personnel separations during the year, which is about normal. Among these are two worthy of special comment. On June 30, 1967, Mr. Edward Phillip Creech, Technician 2 in the Air Division, retired on superannuation, having joined the Department as apprentice draughtsman April 1, 1920, which implies over 47 years' service. Mr. Creech, a native of Victoria, had a distinguished career in map compilation and draughting, serving in several divisions of the Branch, during which time he saw many changes both in people and in methods. The high standard of cadastral information on the Interim Map series and its correlation with the air-photo information is due in large measure to Mr. Creech's talents and his extensive background in all phases of map compilation.

Mr. Hubert Wilfred Ridley, Technician 1 in the Legal Surveys Division, resigned in March to enter private business, after nearly 25 years' service in the Branch. His initial assignment was in clerical and draughting work, after which Mr. Ridley took advantage of opportunities to serve as a field survey assistant for a number of years, including work on the British Columbia-Yukon Boundary survey. In this, as in all his endeavours, he did well, qualifying as head chainman and finally as assistant to the party chief. In later years this balance of office and field experience qualified him to take charge of the Plans Inspection Section in the Legal Surveys Division, which covered the introduction of electronic data-processing for this work. Mr. Ridley's long service with a consistent record of competence and reliability caused his resignation to be received with regret.

THE CENTENNIAL YEAR 1967

At 11.15 a.m. (Pacific Daylight Saving time) on June 21st, the day of the summer solstice, British Columbia participated in simultaneous nation-wide Centennial ceremonies, paying tribute to surveyors for their work in measuring and mapping Canada during its first centenary, 1867 to 1967, and the establishment during that period of the North American Geodetic Survey Datum across the length and breadth of our nation. The ceremony took the form of dedicating the site of British Columbia's Canadian Centennial survey monument in a selected spot in the precinct of the new Provincial Museum in Victoria, and lasted about a half-hour. Simultaneously, similar Centennial survey monuments were dedicated in all the Provincial capitals across the country, in Whitehorse, Yukon Territory, and in Ottawa, the National capital. The writer, in his official capacity of Surveyor-General and Director of Surveys and Mapping for the Province, was privileged to act as master of ceremonies. Invocation was by Brig. Victor C. Underhill, Salvation Army. The Honourable R. W. Bonner, Q.C., Attorney-General, gave the dedication address and unveiled the survey marker. Brief comments were made by several distinguished guests, His Worship H. R. Stephen, Mayor of Victoria; Mr. R. B. Young, Director of the Canadian Hydrographic Survey (West Coast Division); Mr. A. W. Wolfe-Milner, B.C.L.S., president of the British Columbia Land Surveyors Corporation; and Mr. A. H. Ralfs, Assistant Director of Surveys and Mapping for British Columbia and Provincial Councillor on the executive of the Canadian Institute of Surveying, which inspired the nation-wide scheme. Space does not permit quoting the full text of the proceedings, which are filed in the Provincial Archives, but two extracts from the Honourable the Minister's address have been selected, as follows:—

" It will be obvious, when we think about the importance of relative positions of survey points in human affairs, social, economic, and scientific, that since a point has position only, and no dimension of itself, that each one must be supported and marked, on a material which is stable, permanent, and visible, so that it may be discovered or recovered by anyone concerned. Regulations governing the survey of legal property boundaries in British Columbia specify an array of official survey markers according to the importance of the points or corners which they represent. Nowadays, these markers are of metal for permanence, and in certain cases are embedded in concrete. In early days in B.C., when district lots were surveyed out of the wilderness by the pioneer surveyors, the corner posts were usually hewn out of local timber growing close at hand, and were supported in a cairn of rocks. In addition, to help the settler find the corners of his homestead, the surveyors would cut blazes on nearby trees, each blaze facing in the direction of the corner post. These were called bearing trees, and even today many of them have survived the ravages of time to help the modern surveyor relocate an original lot corner in the course of extending his surveys to new subdivisions and rights-of-way. And so it will be with our Centennial survey point, here. But instead of blazing nearby trees, which might not please the Superintendent of Grounds, a beautiful and imaginative reference monument has been designed and is in the course of construction, to be installed here, near this Centennial point, when the final work on these precincts is approaching completion. Some interesting ideas for this monument were put forward by the supervising surveyor, Mr. W. A. Taylor, B.C.L.S., in the Legal Surveys Division of the B.C. Surveys and Mapping Branch, and were incorporated in an elegant and imaginative design by a local artist, Mr. J. C. S. Wilkinson. . . .

" In conclusion, this Centennial survey monument commemorates the establishment, during the century 1867 to 1967, of the North American Geodetic Survey

Datum from ocean to ocean. Into this vast network of precisely co-ordinated and permanently marked points, all surveys and mapping of man's natural and cultural environment, his properties and his works, may be integrated so that in his use of the land, chaos, conflict, and litigation may be replaced by order, co-ordination, and harmony. With similar survey monuments in other Provinces, the Territories, and in the National capital of Canada, it also signifies the pride and gratitude Canadians should take in and for this geodetic contribution to Confederation by our surveyors and engineers."

The master of ceremonies concluded the ceremony as follows:—

" In his remarks the Honourable Minister made reference to the use of astronomy by early surveyors and navigators. It is interesting, and I am sure Brigadier Underhill will be gratified to know, that the latest sophistication in geodetic surveying has caused surveyors, once more, to take inspiration from the heavens. By virtue of satellite triangulation, against a background of the celestial firmament, geodetic surveyors are now measuring huge triangles having 3,000-mile sides, less than 50 of which completely encompass the earth. So, it is encouraging to think that the North American Geodetic Datum, represented here today by this modest Centennial survey monument before us, will be extended to become part of a World Geodetic Datum, uniting all the continents and the oceans of the world into a rigid, measured geodetic structure. We would hope it may, in time, thus symbolize the harmonius co-ordination of all nations and peoples into a world unity of peaceful brotherhood."

In concluding this report for 1967 and resuming the vein of the introductory remarks, in the wisdom of old age, a father, when asked which of his many children was his favourite, replied, " The one which happens to be with me." When the writer reviews the procession of 17 circumsolar orbits of the Surveys and Mapping Branch from the perspective of his official cockpit, the more recent years seem to have been the most enjoyed and gratifying. Perhaps this is due to increasing accumulation of experience each year and the maturing capability of discerning the things of real value from those of lesser worth. The year 1967, Canada's Centennial Year, for this Branch was one of the best on record, but with just enough wayward symptoms to remind us that discipline, especially self-discipline, can never be relaxed. Always must we strive to do better.

By way of epilogue to the foregoing report the following lines from the late Harry Hughes Browne, Provincial land surveyor, 1862–1932, may be appropriate:—

Beneath this Cairn and Witness Post
A Land Surveyor's bones are laid:
The Bearing Trees inform his ghost
When hubs from Azimuth have strayed.

Along the front, where moved his tent,
Departure grew with Latitude,
But still he never saved a cent:
His recompense on high he viewed.

He seldom grumbled at his lot
(Surveyors are not built that way),
But made the best of what he got,
And called the fraction " Parcel A."

Methinks I hear this message short,
As from Polaris he looks down,
" Sir, I've the honour to report,
Your most obedient servant,

Browne."

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 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. In the above returns are all right-of-way surveys, including those for highways, railways, and transmission-lines. During the year, 1,143 sets of the above instructions were issued, as against 1,181 during 1966.

During the year, 643 sets of field-notes or survey plans covering the survey of 937 lots were received in this office and duly indexed, checked, plotted, and official plans prepared therefrom. Of the above-mentioned surveys, 905 were made under the *Land Act* and 32 under the *Mineral Act*. It is interesting to note that these 32 lots surveyed under the *Mineral Act* encompassed 284 mineral claims, this being made possible by the 1965 amendment to the *Mineral Act* allowing perimeter surveys of groups of mineral claims. At the present time there are approximately 100,442 sets of field-notes on record in our vaults.

There were 463 plans received from land surveyors covering subdivisions and rights-of-way surveys which were made under the *Land Registry Act*. This is an increase of 96 over the year 1966. These plans were duly indexed and checked, and certified copies deposited in the respective Land Registry Office.

In order that a graphic record may be kept of alienations of both surveyed and unsurveyed Crown lands together with reserves, a set of 262 reference maps covering the whole of the Province must be maintained. These show all cadastral surveys which are on file in the Department, and are kept up to date by new information as it accrues from day to day. Prints are available to the public (*see* Indexes 1 to 7 in the envelope attached to the back cover of this Annual Report).

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 of any parcel of Crown land in the Province.

It was necessary during the year, for status and revision purposes, to obtain 2,037 plans from the various Land Registry Offices.

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 diseases-free areas and pound districts), the Forest Service (descriptions of tree-farm licences and working circles), and the Lands Branch (descriptions for gazetted reserves, etc.). During the year, 349 of the above descriptions were prepared and checked.

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 diazo prints made during the year was 353,882, in the preparation of which 337,800 yards or 203 miles of paper and linen were used. The number of photostats, films, autopositives, etc., was 90,756. The number of Xerox copies made was 157,278.

Of the 353,882 diazo prints made, 56,757 were for the Surveys and Mapping Branch, 78,821 for other branches of the Department of Lands, Forests, and Water Resources, 192,230 for other departments of Government, and 26,074 for the public. Likewise of the 90,756 photostats, films, autopositives, etc., made, 27,447 were for the Surveys and Mapping Branch, 54,625 for other branches of the Department, 8,623 for other departments of Government, and 66 for the public.

The multilith machine turned out 708,588 copies during the year.

COMPOSITE MAP SECTION

This Section is responsible for the compilation and fair drawing of composite maps, mostly on a scale of 500 feet to 1 inch, of the more densely subdivided areas of the Province, and especially where they occur in unorganized territory. (*See* Index 3 inside back cover.)

During the year no composite mapping was done, but all of the maps situated within the Kamloops Land Registration were revised and brought up to date.

The main effort of this Section this year was the recompilation and renewal of reference maps which, through constant use, had become worn and dirty. In certain cases the scale of the new maps has been enlarged from 1 inch to 1 mile, to 1 inch to one-half mile. The total number of reference maps recompiled and redrawn during the year was 38.

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 applications 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
1962	2,941	1965	2,212
1963	2,944	1966	2,808
1964	2,827	1967	2,753

LAND REGISTRY OFFICE PLAN CHECKING SECTION

This Section supplies a service to the Land Registry Offices at Victoria, Vancouver, Kamloops, Nelson, Prince George, and Prince Rupert by giving a thorough and complete mathematical check to plans tendered for deposit in the said offices. This mathematical check is accomplished through the use of the electronic computer which is available to this Division.

During the year, 2,649 plans received this check, as compared to 2,463 in 1966 and 2,436 in 1965.

GENERAL

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	Driveable Pipe	Standard Rock	B.C.L.S. Bars
Purchased by private surveyors from headquarters	105	344	132	.....
Supplied to Departmental surveyors	75	684	88	2,300
Shipped to Government Agents for resale	535	3,462	548	725
Totals	715	4,490	768	3,025

COMPUTER OPERATIONS AND PROGRAMMING

During 1967 the use made of the Government I.B.M. 1620 computer continued to grow. However, during the past year the Data Processing Division has not kept statistics as in previous years, and so the hours of usage of computer and key-punching time are not available.

PROGRAMMING

The following new programmes were completed:—

(1) *Surmap 133 (" Cosmos ").*—This programme for the adjustment of mixed survey data on the spheroid has replaced the " Groom " programme originally obtained from Ottawa.

(2) *Surmap 134.*—This programme was specifically designed for the computation and adjustment of long traverses (with distance measurements by tellurometer) that do not lend themselves to a least square adjustment as in " Cosmos."

(3) *Surmap 135 (" Bride 2 ").*—This is an improved version of the original " Bride " programme for the adjustment of traverse networks. The new programme will compute and adjust mixed survey data—in the same way as " Cosmos "—but in terms of rectangular co-ordinates. Its principal application is the adjustment of the control networks required for integrated survey areas.

(4) *Surmap 136.*—A programme for the computation of sun azimuth observations primarily used by the Water Resources Branch.

(5) *Surmap 159 (Map-sheet Plotting Programme).*—This programme, designed and used by the Photogrammetric Section, enables co-ordinates resulting from the Block Adjustment Programme to be automatically plotted by map-sheets on a plotting-machine on line with the computer. This eliminates a tedious and time-consuming task in the map compilation process.

REPROGRAMMING IN FORTRAN IV FOR I.B.M. SYSTEM/360

System/360 was first made use of by the Surveys and Mapping Branch in July. It is a powerful computer as compared with the 1620 and provides a greatly increased memory capacity and speeds up to 12 times faster. By the end of the year, conversion to Fortran IV, including many minor improvements, had been completed for the following programmes:—

Old Programme	New Fortran IV Programme	Description
SM 113	LLS 113	Legal Survey Plan Checking and Traverse Programme.
SM 114	LTC 114	Reduction of Distance to Horizontal at Sea-level.
SM 117	LPS 117	Aerotriangulation Strip Adjustment.

Old Programme	New Fortran IV Programme	Description
SM 124	LTC 124	Direct and Inverse Geodetic Computations.
SM 125	LTC 125	Conversion between Geographicals and Polyconic Rectangular Co-ordinates.
—	LTC 126	Conversion from "Dominion Manual" to Polyconic Rectangular Co-ordinates.
SM 133	LTC 133	"Cosmos." Adjustment of Mixed Survey Data in Geographical Co-ordinates.
SM 135	LTC 135	"Bride." Adjustment of Mixed Survey Data in Rectangular Co-ordinates.

(NOTE.—The alphabetic prefixes to programme numbers are: LLS=Lands, Legal Surveys Division; LPS=Lands, Photogrammetric Section; LTC=Lands, Trigonometric Control Section.)

At the end of the year the above programmes were all running on System/360; however, the Branch is still dependent on the 1620 for several programmes. Work on converting these is in progress and should be completed early in 1968.

Inquiries regarding several programmes have been received from outside survey organizations, and, in accordance with Branch policy, listings of the programmes and instructions for their operation have been made available free of charge when the outside organization has access to a suitable computer.

SUMMARY OF OFFICE WORK FOR THE YEARS 1966 AND 1967, LEGAL SURVEYS DIVISION

	1966	1967
Number of field books received	654	643
,, lots surveyed	1,013	937
,, lots plotted	763	589
,, lots gazetted	828	702
,, lots cancelled	19	87
,, lots amended	230	353
,, mineral-claim field books prepared	92	25
,, reference maps compiled or renewed	35	38
,, applications for purchase cleared	1,302	1,093
,, applications for pre-emption cleared	65	41
,, applications for lease cleared	4,935	6,026
,, timber sales cleared	4,105	4,247
,, Crown-grant applications cleared	1,069	989
,, cancellations made	3,117	2,149
,, inquiries cleared	1,106	1,268
,, letters received and dealt with	6,488	6,569
,, land-examination plans	2,808	2,753
,, Crown-grant and lease tracings made	6,635	7,759
,, photostats made	163,714	90,756
,, diazo prints made	300,458	353,882
,, offset prints made	435,614	708,588
,, Xerox	----------	157,278

FIELD WORK

Subdivision of Crown Land

Two large acreage parcels were surveyed at Telkwa, two more on the Kettle River, one at Comox, and parts of several city blocks in Vancouver on False Creek. This latter work was to facilitate an exchange of lands with the Canadian Pacific Railway. Another exchange of land at Grand Forks required three acreage parcels to be surveyed. A small parcel of land on Hope Slough near Chilliwack, which had virtually gone unnoticed for many years, was brought into the register by survey. Small lots created are tabulated as follows:—

Waterfront Lease Lots

Stave Lake	32
Hannah Lake	33
Cluculz Lake	92
Fraser Lake	29
Babine Lake	35
Rail Lake	67
Sandspit	19
Total	307

Rural Roadside Lots

Cariboo Road near Williams Lake	60
Blackwater Road near Prince George	22
Chilliwack Lake	1
Lytton–Lillooet Highway	1
Total	84

Interdepartmental Surveys

Work for other departments accounted for a larger proportion of our time than is usual. The Department of Public Works requested and received a topographic plan and boundary survey at Raleigh Camp, completion of survey and registration of plans of the Wilkinson Road gaol property, posting of five parking-lots in the Government Buildings Precinct area in Victoria, a building-site at the Kamloops Vocational School property, two lots at Abbotsford Agricultural Centre, and one on McKenzie Avenue in Saanich for a vehicle-testing station.

The Forest Service required forest access roads to be surveyed through Indian reserves at Paul Lake, on the Harrison Lake–Lillooet River Road, and on the Chilliwack Lake Road. A radio repeater site and right-of-way to it was surveyed on the hill north of Grand Forks.

The Parks Branch had us make a survey on Wahleach (Jones) Lake and a further one at Seton Portage for a historical site.

A large reposting of streets in an area close to Grand Forks was done at the request of the Department of Highways.

The Public Utilities Commission requested the reposting of an old cemetery at Hazelton.

One large lot of 27 acres was surveyed at Ootischenia for the Land Settlement Board.

Reposting and Restoration

Although the programme of restoration by a full-time party was again impossible due to lack of a surveyor for this purpose, considerable reposting was again accomplished in connection with the many varied Departmental surveys carried out. The legal survey of highways accounted for the bulk of district lot and section corners which were remonumented this year, the total of which was 181.

Inspections and Miscellaneous Surveys

An inspection survey at Westview was carried out for the Lands Service to determine ownership of occupied land on the waterfront. Nearby at Myrtle Point a contested boundary between two properties was run and an opinion given to the Registrar of Titles.

Two mineral claims in the vicinity of Rock Creek were located and tied in by survey to quarrying operations, and a report was written.

The relationship of high-water mark at Cowichan Bay and Sidney was determined with respect to subdivision for which certificates were sought under section 102 (3) of the *Land Registry Act*, and one application rejected.

A survey which was started some years ago as a park-site for the Provincial Government was abandoned when it was found on survey that the donor did not own the site. However, the park-site was surveyed and plans prepared for signature of the actual owner.

Small rights-of-way were surveyed on the Ryder Lake subdivision near Chilliwack, at Grand Forks, Fraser Lake, and at Kamloops.

Other miscellaneous surveys were made at the University Endowment Lands and at Spences Bridge.

A resurvey of three lots on Cluculz Lake was necessary because of an error in posting in a survey done years ago for this Department.

Highways

Three survey parties accomplished a total of 60.3 miles of highway surveying. The bulk of this was carried out by a large party in the Merritt area, which accounted for 34.4 miles. The balance was almost equally divided between parties on the Northern Trans-Provincial Highway east of Prince George and on the Kootenay–Columbia Highway between Radium and Golden. Of the latter stretch, 9 miles was tied into the Provincial triangulation system.

TOPOGRAPHIC DIVISION

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

A continuance of the policy of the Interdepartmental Co-ordinating Committee on Surveys and Mapping whereby this Division was provided with the necessary funds for special mapping and survey control needs gave the opportunity for a very busy year.

The largest of the field parties operated in the north-east portion of the Province with headquarters at Fort Nelson. A continuation of last year's work for the Department of Mines and Petroleum Resources, it basically was an up-grading of the triangulation along with precise level control of the whole area between the 60th parallel, the 120th meridian, and the Alaska Highway, with the south boundary the only flexible one. Progress was made to the Fontas River.

One contract was awarded to Klondike Helicopters Ltd. that provided two Hiller UH12E helicopters for the Fort Nelson area for a period of four months and one Bell G3 for the Stewart area for a period of three months. Weather is always a major factor in any contract, and this year was a good example of what it will do to an operation, the contract having a minimum monthly charge maximum hours clause. At Fort Nelson, with better than average weather, the maximum hours were reached in three months, while at Stewart, with poor weather, all the time was used but the minimum hours flown.

The Department's De Havilland Otter aircraft was used to excellent purpose during June, July, and August on the Fort Nelson job, then assisted the Stewart crew in September. It was flown 450 hours, which was 150 hours more than the previous high record for one year's operation. Full credit for such a successful year must be given to the pilot-mechanic, who maintains as well as pilots the plane.

The relatively flat muskeg-covered work area of the Fort Nelson project is laced with seismic cut lines, and it was along these that the traverse and level lines were run. There was a great contrast in the condition and age of these cut lines, for they varied in width from 15 to 40 feet and from clear to overgrown. Up-to-date air-photo mosaics were made of the whole area, but it was impossible to ascertain from these the condition of the line, and consequently a great deal of time had to be spent on reconnaissance for the level and traverse routes. Camp-sites were chosen, and the bench-marks were located and set ahead of the level crews. After the traverse route was chosen, the crews set their own monuments as the placing of these required intervisibility. The two helicopters transported all the men and their equipment to the camp-sites and were used for reconnaissance, logging 807 hours between them during the three months they worked.

A system of interconnecting levels was run, and elevations were derived from the boundary monuments along the 60th parallel and the 120th meridian, and from the Geodetic Survey of Canada bench-marks along the Fort Simpson Trail. Additional elevations were also derived from bench-marks along the Alaska Highway and from Imperial Oil Company levels. A total of 216 new bench-marks were set and levelled, and 57 traverse stations were included in the level runs. The level crews fly-camped on the seismic lines at the pre-selected camp-sites and worked out in both directions from there. Fly-camping was a new experience to many of the temporary summer help, and most of them adapted well to it. Credit should be given to the instrumentmen, who managed to maintain a high level of morale amongst their crews, working under very adverse conditions.

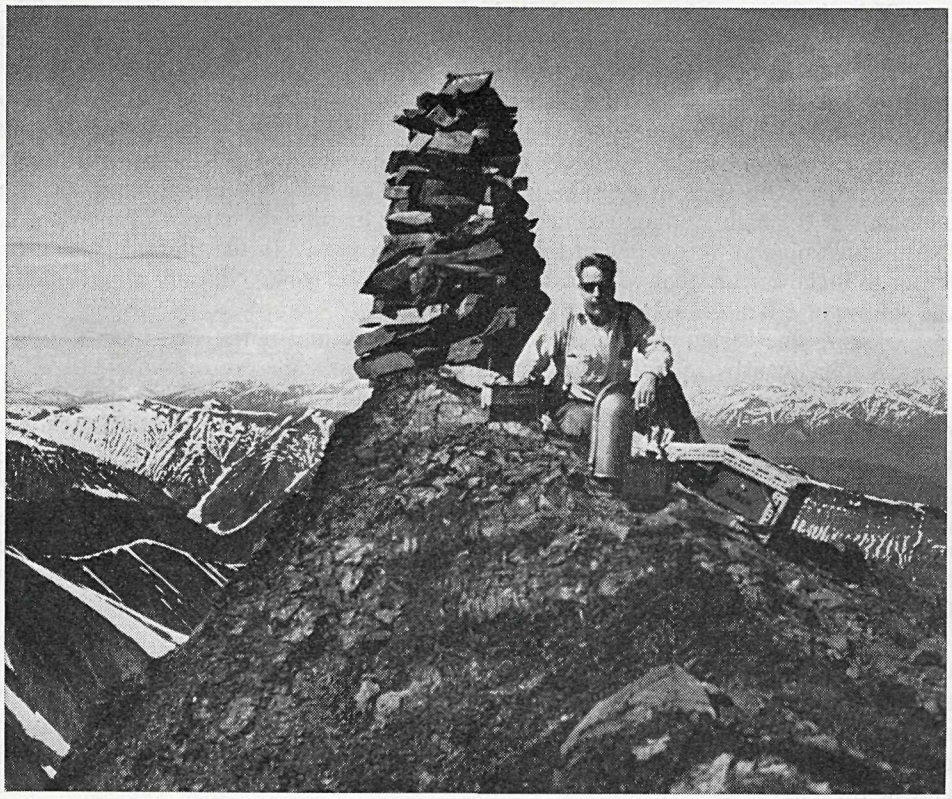
The traverses were also run along pre-selected seismic lines, with the angular work read with Wild T2 theodolites and the distances read with MRA3 telluro-

meters. All distances of under 1,000 feet were also check-chained. A total of 309 stations was occupied, of which 278 were new stations. Three ties were made to the British Columbia-Alberta Boundary and one to the British Columbia-Northwest Territories Boundary, as well as to seven bench-marks, two petroleum and natural-gas posts, and two right-of-way monuments. Field closures were made on all the traverse runs and indicated accuracy of 1:10,000 or better.

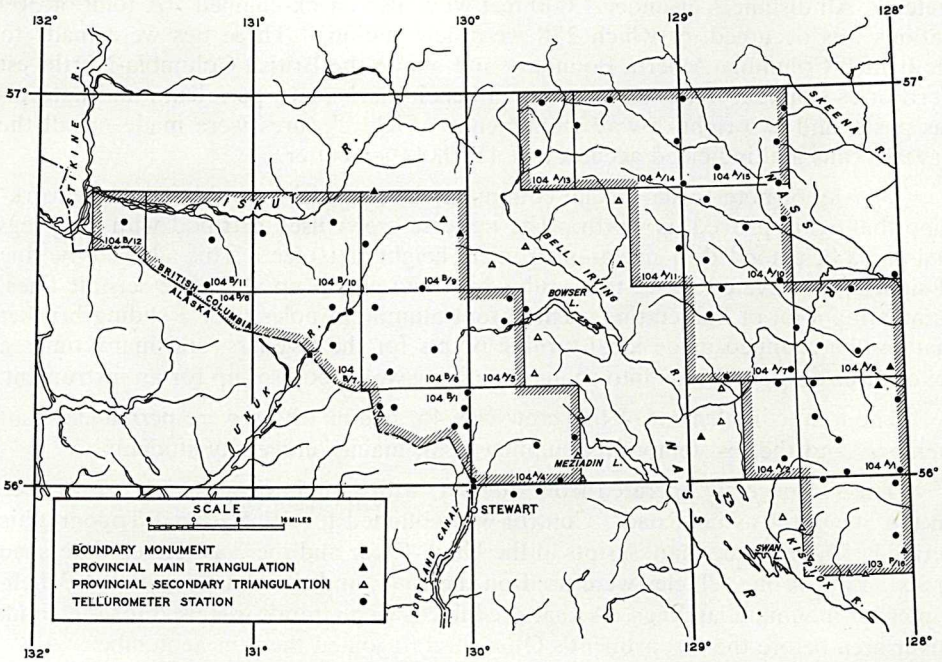
Worthy of note is the special equipment fabricated in the Air Division workshop that again proved its worth. The traverse crews used a tripod with long legs that could be extended to give an instrument height of 10 feet. This allowed the line of sight to be elevated above the scrub which had grown up along the seismic lines, eliminating a lot of line-cutting. The 6-foot aluminum poles with a sliding bracket that can be clamped made ideal turning points for the levellers, and many times a set of three of these driven into spongy footing gave a good set-up for an instrument.

The total complement of this crew was 45, five of whom were permanent-staff members and the rest temporary summer help, mainly university students.

The second crew operated from Stewart, with a main camp at Surprise Creek on the Stewart–Cassiar Road. Control was obtained for 17 National Topographic Series 1:50,000-scale manuscripts in the Unuk River and the Nass River watershed areas. Two of our vehicles were used on the road, and the chartered Bell G3 helicopter for mountain landings. A chartered fixed-wing aircraft was used for the Unuk River area before the Department's Otter aircraft joined them in September.



Topographic survey station "Shale," still standing, erected 1950. Location south of Bowser Lake, Nass River area, looking east.



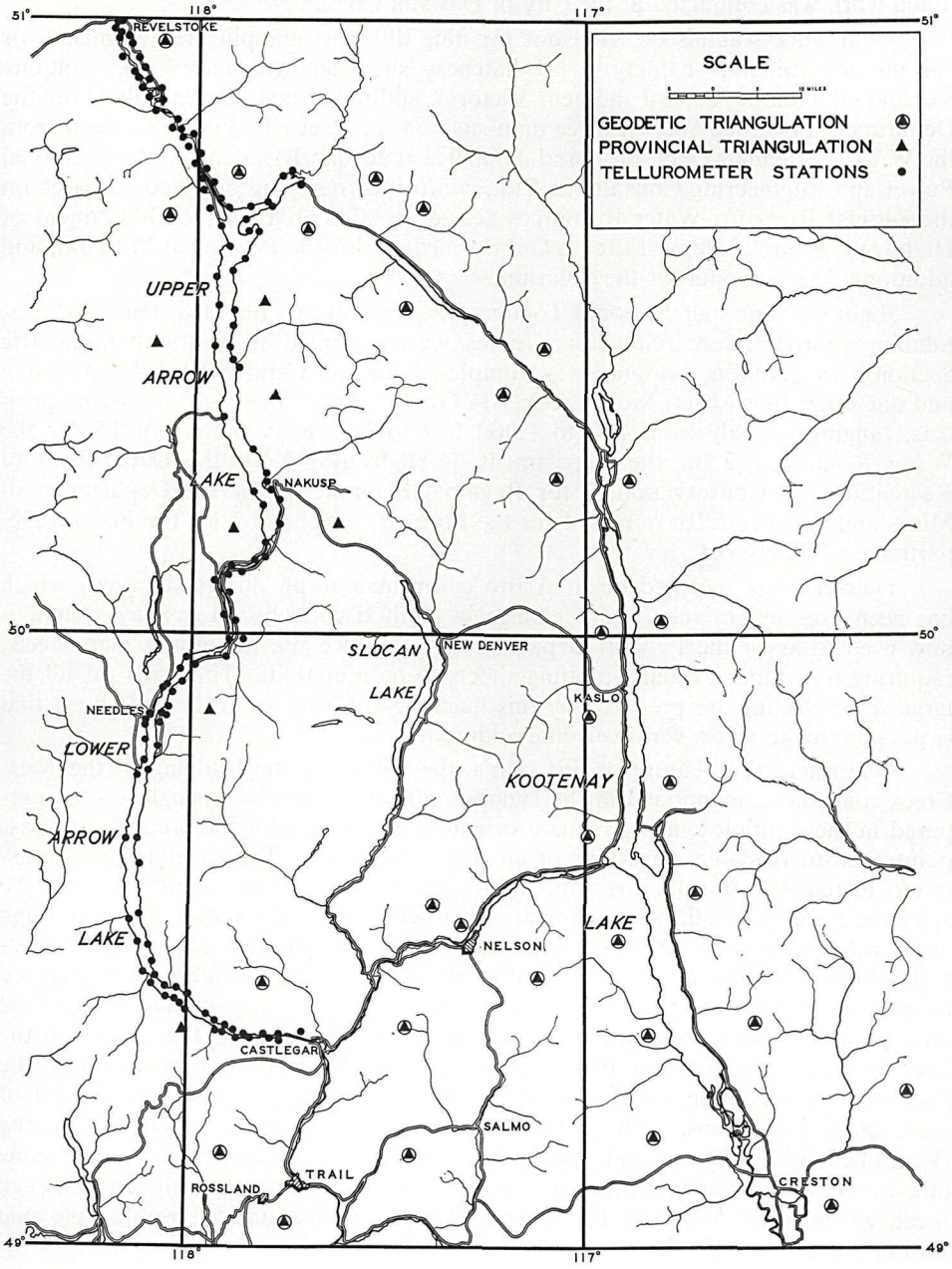
This chronic weather area with its high crags and many glaciers is a very difficult part of the Province in which to obtain control for topographic mapping. While the helicopter is the answer to many of the problems, it was found that not just any machine will do. The G3 used did the job, but, due to its limited performance, also posed extra problems for the surveyor in charge. Fine weather is a rare commodity in this area, and when it comes everything has to be organized to take full advantage and keep the extra trips to a minimum. Gasoline caches and consumption and the extra power for high landing and take-off, plus the inability to carry two men and a load to high places, were a few of the problems this year. In the future it would be better to make certain that when a similar area is to be surveyed, only a machine of the calibre of a Bell G3 B1 or better be chartered.

Having one assignment in the Arrow Lakes section of the Province, another was accepted nearby and the two partially combined. We were committed on a co-operative effort with the Geodetic Survey of Canada and designed a triangulation network between the existing geodetic stations at Trail, Creston, and Revelstoke. Following approval by the Geodetic Survey of this plan, the new stations were proved up and monumented in the field, using cars or helicopter as required. Our part of the work was completed on schedule, and the geodetic observing crew commenced its observations immediately, expecting to complete the Trail-Creston loop this year with the balance to be incorporated into its future programme in British Columbia.

The extra assignment consisted of establishing a network of stations by tellurometer traverse above the take line of the proposed flooding of the Arrow Lakes to aid in the preservation of existing cadastral surveys. This traverse was to be tied to a second-order triangulation control network with sides of approximately 10 miles commencing at the geodetic stations in the south and tying in to those at the north end of the Arrow Lakes, and will be included in the co-operative survey now in progress. The traverse stations so set will also be a basis for future cadastral surveys following the flooding. Twelve new main triangulation stations were set and 132

tellurometer control points were fixed, with trigonometric levels carried through these systems. Fourteen ties were made to the control stations from the triangulation, which has the effect of breaking the lengthy traverse into 14 independent traverse loops. Up-to-date air photography flown in June allowed field air-photo identification to be made at each station occupied where practical.

Use was made of boats and cars for transport, and a helicopter chartered from Okanagan Helicopters Ltd. on a day basis was used for the high stations. Due to the high temperatures that were reached in this area in August, a forest closure forbade slash-burning, which was fortunate as it allowed completion of instrument



work on schedule before smoke haze interfered with visibility. Temperature readings of over 100° F. were recorded, which was responsible for some sizeable meteorological readings for the tellurometers.

Numerous integrated survey projects were worked on during the year. The first was in the Municipality of the District of Surrey, completing that portion of the municipality that has now been declared as Integrated Survey Area No. 1. Next were the Municipalities of the Districts of North and West Vancouver and the City of North Vancouver. At Nelson, work was accomplished there before moving on to Cranbrook, to finish the control commenced a year previous. Finally some additional work was completed at the City of Dawson Creek.

Field work was also carried out for nine different mapping requirements for various departments—namely, a fish-hatchery site near Abbotsford, the Colquitz Vocational Training School site near Victoria, additional mapping at Saltair for the Department of Public Works, three dam-sites on the Peace River downstream from the W. A. C. Bennett Dam, proposed dam-sites at Jordan River for the International Power and Engineering Consultants Ltd., control for mapping of a flooding area on the Kitimat River for Water Resources Service, a slide area for the Department of Highways, an archæological site on Gabriola Island for the Provincial Museum, and additional site mapping for the Solarium.

Eight and one-half National Topographic map-sheets, plus two partial sheets, totalling approximately 2,860 square miles, were compiled in the Photogrammetric Section. In addition, bridging was completed for the Central E. & N. mapping and one other map-sheet, Mess Creek 104 G/10. There were 24 large-scale projects, ranging in scale from 100 to 1,000 feet to 1 inch, consisting of 15 for the Water Resources, 2 for the Department of Highways, 2 for the Department of Recreation and Conservation, 2 for Regional Planning, 1 for the Department of Mines and Petroleum Resources, 1 for the Forest Service, and 1 for the Federal Department of Transport.

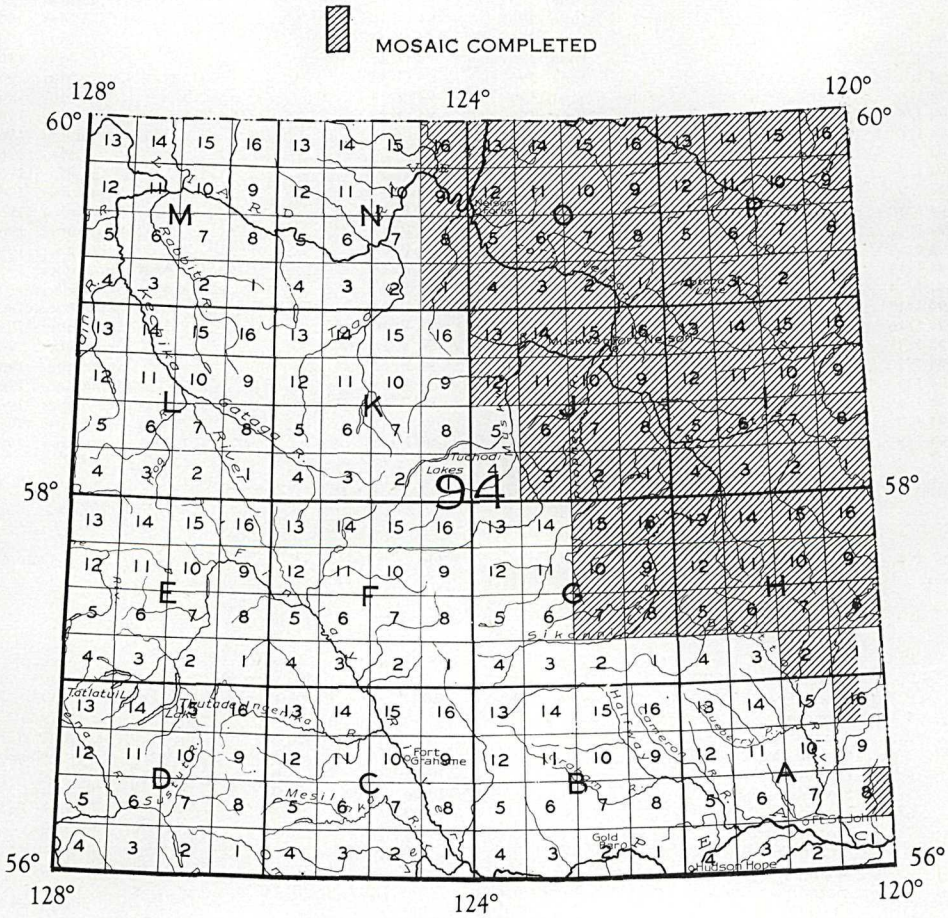
Delivery was accepted of an Aristo co-ordinatograph during the year, which has been used extensively, and a change in method whereby an overlay system is now used to assist the Federal Department to produce the lithograph map-sheets, requiring four times as many plotting sheets to be prepared. The grids for all the large-scale plotting are prepared by this machine, and the accuracy and speed that is possible make this a very welcome addition.

One interesting feature of this year's operation was the bridging of the Mess Creek map-sheet, mentioned in the synopsis above. First, by a single bridge prepared in the multiplex, using relative orientation only to plot the control and pass points and to read the elevations of all points required. The sheet is then transferred to the A7 co-ordinatograph, where, using the EK5 automatic features, the x, y, and z values of all these points are recorded. This information is put through our I.B.M. strip adjustment programme and finally through the block adjustment, from which is received the final co-ordinates. These results are segregated by programme into mapping areas and fed to the Calcomp digital incremental plotter for automatic plotting on paper in half map-sheet form. It is hoped in the near future to obtain stable base material for this machine and so eliminate the final step, which is the transferring from the paper to stable base material all of these plotted positions. This Calcomp plotter, just recently purchased by the Department of Highways and installed in the Computer Centre, is an enormous time-saver; for example, there were approximately 900 points on the Mess Creek sheet, which were plotted in 1½ hours. To do this manually it would take one man approximately six days.

The Draughting Section reports the compilation of 28 standard topographic manuscripts at the scale of 2 inches to 1 mile and 80 large-scale mapping plans at various scales. In addition, the plotting of the cadastral survey on 70 Federal Government 1:50,000-scale manuscripts was completed. One hundred and thirty-eight mosaics were assembled, 122 of which were of the Fort Nelson project. These were photo-rectified to scale and sent out to the field party for use in choosing routes and assisting the crews in many ways. They were the only maps available that showed the seismic lines. The other 16 mosaics were distributed to the various departments requesting them. Two integrated survey plans were completed.

The Federal Government now has 64 of our 1:50,000-scale manuscripts on hand for printing, which are in various stages of reproduction.

Copies of the photogrammetric large-scale mapping and the completed manuscripts listed following this report are available on request. (*See* indexes contained in the envelope attached to the back cover of this Report.)



INDEX OF AIR-PHOTOGRAPH MOSAICS

Approximate scale of mosaics: 1 inch equals one-half mile. Each mosaic covers one-half of a National Topographic Series map (example, 94 H/6 E. ½), and the price of each sheet is 60 cents per copy. Prints available from Legal Surveys Division, Surveys and Mapping Branch, Department of Lands, Forests, and Water Resources, Victoria, B.C.

List of Air-photograph Mosaics Showing Date of Air Photography

Sheet No.	Date of Air Photo
94 A/8, E	1964
94 A/16, W.	1964
94 G/7	August, 1967
94 G/8	August, 1967
94 G/9	June–August, 1967
94 G/10	June–August, 1967
94 G/15	June, 1967
94 G/16	June, 1967
94 H/1, W.	June, 1964
94 H/2	June, 1964
94 H/5	August, 1967
94 H/6	August, 1967
94 H/7	August, 1967
94 H/8	August, 1967
94 H/9	June–August, 1967
94 H/10	June–August, 1967
94 H/11	June–August, 1967
94 H/12	June–August, 1967
94 H/13	June, 1967
94 H/14	June, 1967
94 H/15	June, 1967
94 H/16	June, 1967
94 I/1	June, 1967
94 I/2	June, 1967
94 I/3	June, 1967
94 I/4	June–August, 1967
94 I/5	June, 1967
94 I/6	June, 1967
94 I/7	May–June, 1967
94 I/8	May–June, 1967
94 I/9	May, 1967
94 I/10	May, 1967
94 I/11	September, 1966
94 I/12	May–September, 1966
94 I/13	September, 1966
94 I/14	September, 1966
94 I/15	May, 1967
94 I/16	May, 1967
94 J/1	June–August, 1967
94 J/2	June–August, 1967
94 J/3	June–August, 1967
94 J/6	June, 1967
94 J/7	June, 1967
94 J/8	June, 1967
94 J/9	September, 1966
94 J/10	September, 1966
94 J/11	May–June, 1967
94 J/12	May–June, 1967
94 J/13	May, 1967
94 J/14	May, 1967
94 J/15	September, 1966
94 J/16	September, 1966
94 N/1	May–June, 1967
94 N/8	May–June, 1967
94 N/9	May, 1967
94 N/16	May, 1967
94 O/1	September, 1966
94 O/2	May–June, 1967
94 O/3	May–June, 1967
94 O/4	May–June, 1967
94 O/5	May, 1967
94 O/6	May, 1967
94 O/7	May, 1967
94 O/8	May–September, 1966
94 O/9	May–September, 1966
94 O/10	May, 1967
94 O/11	May, 1967
94 O/12	May, 1967
94 O/13	May, 1967
94 O/14	May, 1967
94 O/15	May, 1967
94 O/16	May–September, 1966
94 P/1	May, 1967
94 P/2	May, 1967
94 P/3	September, 1966
94 P/4	May–September, 1966
94 P/5	May–September, 1966
94 P/6	September, 1966
94 P/7	May–September, 1966
94 P/8	May–September, 1966
94 P/9	May–September, 1966
94 P/10	May–September, 1966
94 P/11	September, 1966
94 P/12	September, 1966
94 P/13	September, 1966
94 P/14	May–September, 1966
94 P/15	May–September, 1966
94 P/16	May–September, 1966

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′	10′–20′	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

[1] One map (5E).

LARGE-SCALE MAPPING—*Continued*

No.	Name	Available	Scale	Contour Interval	No. of Sheets	Date
19	Doukhobor Lands—					
	Grand Forks	Yes	1″= 400′	5′–10′–25′	2	1953–54
	Krestova-Raspberry, etc.	Yes	1″= 400′	5′–10′–25′	7	1953–54
	Krestova Revision	Yes	1″= 400′	Planimetric	1	1963
20	Brooks Peninsula	No	1″=1,320′	50′	----	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 Creek	Yes	1″=1,320′	50′	26	1955–56
M 8	Upper McGregor River	Yes	1″=1,000′	20′	3	1956
M 9	Sinclair Mills	Yes	1″= 500′	20′	48	1956–62
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 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
M 41	Summit Lake Diversion	Yes	1″=1,000′	20′	3	1959
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	1958–60
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′	98	1958–59, 1961–63
M 63A	Parsnip River Pondage Addition	Yes	1″=1,000′	20′	5	1962
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′ and 20′	25	1959
M 76	Nanaimo	Yes	1″= 500′	10′ and 20′	20	1960
M 77	Prince George	Yes	1″=1,000′	20′	17	1960–61
M 83	Oakalla	No	1″= 40′	2′	4	1960
M 84	Victoria University, Gordon Head	No	1″= 40′	2′ and 5′	5	1960
M 88	South Okanagan	Yes	1″= 500′	10′ and 20′	11	1963
M 88	South Okanagan	Yes	1″=1,000′	20′	5	1964–65
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″= 200′	5′	15	1961

2 *See* Map No. 17.

LARGE-SCALE MAPPING—*Continued*

No.	Name	Available	Scale	Contour Interval	No. of Sheets	Date
M 90A	Similkameen	Yes	1″= 200′	5′	19	1965
M 90B	Similkameen	Yes	1″= 200′	5′	24	1966–67
M 92	Skeena River	Yes	1″= 500′	10′	11	1962
M 98	Aberdeen-Haddo Lake	Yes	1″= 500′	10′	4	1960
M 100	Essondale	No	1″= 50′	2′	4	1962
M 100	Essondale	No	1″= 100′	Spot heights	2	1962
M 105	Clearwater Lake-Azure Lake	Yes	1″=1,000′	50′	6	1962
M 107	Campbell River	Yes	1″=1,000′	20′	5	1961
M 108	Kootenay River	Yes	1″= 500′	Planimetric	12	1961
M 109	London Mountain (Mount Whistler)	Yes	1″= 200′	20′	3	1961
M 111	Clearwater River Dam-site	Yes	1″= 250′	5′	4	1961
M 113	Nanaimo	Yes	1″= 500′	5′–10′	8	1963
M 114	Tranquille	No	1″= 50′	2′	2	1962
M 114	Tranquille	No	1″= 100′	2′	3	1962
M 117	Liard River	Yes	1″=1,000′	20′	68	1962
M 117	Liard River Dam-site	Yes	1″= 500′	10′	7	1962
M 118	Nitinat	Yes	1″= 500′	10′ and 20′	7	1962
M 121	Winfield	Yes	1″= 500′	10′ and 20′	4	1961
M 122	Stuart Lake Pondage	Yes	1″=1,320′	20′	9	1962
M 125	Port Hardy	Yes	1″= 100′	2′ and 4′	4	1962
M 126	Thompson River	Yes	1″= 200′	10′–20′	3	1962
M 127	Parksville	Yes	1″= 500′	10′	5	1965
M 129	Aleza Lake	Yes	1″= 40′	2′	1	1962
M 130	McGregor River Pondage	Yes	1″=1,000′	20′	6	1962
M 131	Long Lake	Yes	1″=1,320′	50′–100′	4	1962
M 134	Kamloops Lake	Yes	1″=1,000′	20′	4	1962
M 135	Quesnel	Yes	1″= 500′	10′	7	1963–65
M 136	Haney	Yes	1″= 500′	25′	2	1962
M 138	Hobson Lake Extension	Yes	1″=1,000′	50′	2	1962
M 139	Norbury Creek	Yes	1″= 400′	10′	1	1962
M 141	Legislature Precinct, Victoria	No	1″= 40′	2′	2	1963
M 141	Legislature Precinct, Victoria (under-surface plan)	No	1″= 40′	-------	1	1963
M 142	Kaleden	Yes	1″= 500′	10′	1	1963
M 144	Marysville	Yes	1″=1,000′	25′ and 50′	1	1963
M 145	Kamloops Government Buildings	No	1″= 40′	2′	1	1963
M 146	Brannan Lake School	No	1″= 100′	10′	1	1963
M 146	Brannan Lake School	No	1″= 50′	2′	1	1963
M 150	Prince George Gaol	No	1″= 100′	10′–20′	----	1963
M 150	Prince George Gaol	No	1″= 50′	2′–5′	----	1963
M 151	Prospect Lake	Yes	1″= 200′	2′	1	1963
M 152	Ruby Burn	Yes	1″= 200′	5′	1	1963
M 155	Sechelt	Yes	1″= 500′	20′–50′	23	1964
M 158	Parksville Building Site	Yes	1″= 600′	20′	1	1964
M 160	Ladysmith	Yes	1″= 600′	20′	1	1964
M 161	Hudson Bay Mountain	Yes	1″=1,000′	50′	8	1964
M 162	Haney By-pass	No	1″= 100′	2′ and 5′	24	1964
M 163	Slesse Creek Bridge	Yes	1″= 300′	5′ and 20′	1	1964
M 164	Saanich Garbage Disposal	Yes	1″= 200′	5′	1	1964
M 165	Saltair Gaol Site	No	1″= 100′	5′	1	1964
M 165	Saltair Gaol Site	No	1″= 200′	50′	1	1964
M 168	Peace River Pondage (Findlay River)	Yes	1″=1,320′	25′–2,500′, then 50′	31	1965
M 170	Gibson Pass	Yes	1″=1,000′	25′–50′	3	1965–66
M 171	Black Tusk Meadows	Yes	1″= 200′	5′	2	1965
M 171	Black Tusk Meadows	Yes	1″= 500′	10′	1	1965
M 172	Chilcotin Road	Yes	1″= 100′	5′	9	1965
M 172	Chilcotin Road	Yes	1″= 200′	10′	16	1965–66
M 173	Copeland Mountain	Yes	1″=1,000′	50′	4	1965
M 175	Shuswap Canal Diversion	Yes	1″= 200′	5′	10	1965–66
M 176	Stewart	Yes	1″=1,320′	100′	2	1965
M 178	Sparwood	Yes	1″= 200′	5′ and spot heights	3	1965
M 179	Niskonlith	Yes	1″= 400′	50′	1	1965
M 180	Colwood-Langford	Yes	1″= 200′	5′	25	1967
M 181	Nematode	Yes	1″= 200′	5′	1	1965
M 182	Stikine-Iskut Pondage	In hand	1″=1,000′	20′	----	-------
M 182	Stikine-Iskut Dam-sites	Yes	1″= 200′	10′	4	1965
M 182	Stikine-Iskut Pondage	Yes	1″=1,000′	20′–100′	53	1965–66
M 186	Revelstoke	Yes	1″= 100′	2′	4	1966
M 188	Otter Lake	Yes	1″= 200′	5′	4	1966
M 189	Shuswap-Okanagan	Yes	1″= 200′	5′ and spot heights	3	1966

LARGE-SCALE MAPPING—*Continued*

No.	Name	Available	Scale	Contour Interval	No. of Sheets	Date
M 196	Keremeos	Yes	1″= 200′	5′	2	1966
M 197	Hurley Pass	Yes	1″= 400′	25′	5	1966
M 198	Peachland	Yes	1″= 500′	10′	3	1966
M 200	Merritt	Yes	1″= 200′	2′	6	1967
M 201	Archæology	Yes	1″= 100′	5′	1	1966
M 202	South Revelstoke	Yes	1″= 100′	2′	5	1966–67
M 204	Prince George West	Yes	1″= 200′	10′	9	1967
M 205	Nelson-Liard Pondage	In hand	1″=1,000′	20′	----	-------
M 210	Kechika	In hand	1″=1,000′	20′	28	1968
M 215	Anyox-Portland Canal	Yes	1″=1,320′	25′	7	1967–68
M 216	Black Mountain Irrigation District	Yes	1″= 500′	20′	1	1967
M 217	False Narrows	Yes	1″= 100′	20–100 cm.	1	1967
M 218	Hells Gate	Yes	1″= 50′	5′	1	1967
M 218	Hells Gate	Yes	1″= 200′	50′	1	1967
M 220	Floods-Hope	In hand	1″= 100′	5′	----	-------
M 222	Sayward-Beaver Cove	In hand	1″= 400′	20′	----	-------
M 226	Salmon River	In hand	1″= 500′	10′	----	-------
M 228	Portage Inlet	Yes	1″= 16′	2′	2	1967
M 230	Peace River Dam-sites, C. and E.	In hand	1″= 200′	5′	----	-------
M 232	Squamish	In hand	1″= 200′	5′	----	-------
M 233	Jordan River	Yes	1″= 600′	20′	3	1968
M 234	Gulf Islands	In hand	1″=1,320′	25′	----	-------
-------	Government House Grounds	No	1″= 20′	2′	2	1959
-------	Victoria University Campus	No	1″= 20′	2′–5′	5	1960
-------	Colquitz Mental Home	No	1″= 20′	2′	1	1963

BRITISH COLUMBIA TOPOGRAPHIC SURVEYS SHOWING DATES OF FIELD WORK

Manuscripts complete except as follows:—

* Field work not complete, photo identification of shoreline stations only.
† Field work completed, no manuscript available.
‡ Compilation completed, no manuscript available.

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/5, W.	‡1963
92 B/6, W.	1955
92 B/11, W.	1955
92 B/12	1938, 1955, 1963
92 B/13	1942, 1943, 1951
92 B/13	†1963
92 B/14	‡1951, 1968
92 C/8	1937, 1938
92 C/8	‡1963
92 C/9	1937, 1938
92 C/9	‡1963
92 C/10	1937, 1938
92 C/10	‡1965
92 C/11, E.	1938
92 C/11, E.	‡1965
92 C/13, E.	1938
92 C/14	1938
92 C/14, E.	‡1965
92 C/15	1937, 1938
92 C/15	‡1965
92 C/16	1937, 1938, 1942
92 C/16, part	‡1965
92 C/16, part	†1965
92 E/1, E.	1942
92 E/7, E.	1946
92 E/8	1943, 1946
92 E/9	1938, 1940, 1947
92 E/10	1947
92 E/14	1948
92 E/16	1947
92 F/1	1942, 1943
92 F/1	†1965
92 F/2	1938, 1940, 1942
92 F/2, part	‡1965
92 F/2, part	†1965
92 F/3	1938, 1940, 1941
92 F/4	1942
92 F/5	1937, 1938, 1943
92 F/6	1938, 1940, 1941, 1942, 1943
92 F/7	1940, 1941, 1942, 1943
92 F/7, part	†1965
92 F/8	1942, 1943, 1950
92 F/8, part	†1965
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, E., part	1950
92 F/16, E., 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

British Columbia Topographic Surveys Showing Dates of Field Work—*Continued*

Sheet	Date
92 G/14	1952
92 H/1	1920, 1923, 1950
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/4, W.	*1962
92 J/15	1948, 1949
92 J/16	1948, 1949
92 K/1, E., part	1950
92 K/2, E.	*1962
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 K/8, W.	*1962
92 K/10, W.	*1962
92 K/11	*1962
92 K/12	*1962
92 K/13	*1962
92 K/14	*1962
92 K/15	*1962
92 L/1	1932
92 L/2	1931, 1932
92 L/3	1948
92 L/4	1948
92 L/6	1931, 1934, 1940
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/2	*1962
92 M/3	1959
92 M/4	1959
92 M/5	1959
92 M/6	*1962
92 M/11, W.	*1962
92 M/12	*1962
92 M/13	*1962
92 M/14, W.	*1962
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, E.	1959
93 A/1, W.	‡1959
93 A/2, E.	1936, 1959, 1960
93 A/2, W.	‡1959
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, E.	‡1934, 1960
93 A/10, W.	‡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/6	†1963
93 B/7	†1963
93 B/8	1952
93 B/9	1950
93 B/9, W.	‡1965
93 B/10	†1963
93 B/11	†1963
93 B/12	†1963
93 B/13	†1963
93 B/14	†1963
93 B/15	†1963
93 B/16	1950
93 B/16, W.	‡1965
93 C/5	1959
93 D/2	*1962
93 D/3	*1962
93 D/4	*1962
93 D/5	*1962
93 D/6	*1962
93 D/7, E.	1958
93 D/7, W.	*1962
93 D/8	1958, 1959
93 D/11, E.	*1962
93 E/5, W.	*1963
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
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

British Columbia Topographic Surveys Showing Dates of Field Work—*Continued*

Sheet	Date
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 L/15	1962
93 L/16	1962
93 M/1	1962
93 M/2	1963
93 M/5	1949
93 M/7	1963
93 M/8	1963
93 M/9	1963
93 M/10	1963
93 M/11	1963
93 M/12	1949
93 M/13	†1963
93 M/14	†1963
93 M/15	†1963
93 M/16	†1963
93 N/1	†1962
93 N/2	†1962
93 N/3	†1962
93 N/4	†1962
93 N/5	†1962
93 N/6	†1962
93 N/7	†1962
93 N/8	†1962
93 N/9	†1962
93 N/10	†1962
93 N/11	†1962
93 N/12	†1962
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 D/1	†1963
94 D/2	†1963
94 D/3	†1963
94 D/4	†1963
94 D/5	†1963
94 D/6	†1963
94 D/7	†1963
94 D/8	†1963
94 E, part	1939
94 F, part	1939
94 L, part	1940, 1941
94 M, part	1941
102 I/8, E.	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, E.	‡1961
103 A/1	‡1961
103 A/2, E.	‡1961
103 A/6, E.	*1963
103 A/7	*1963
103 A/8	‡1961
103 A/9	‡1961
103 A/10	*1963
103 A/11	*1963
103 A/13, E.	‡1961
103 A/14	*1963
103 A/15	*1963
103 A/16	*1963
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/15, E.	‡1961
103 G/16	‡1961
103 H/1, W.	*1963
103 H/2	*1963
103 H/3	‡1961
103 H/4	‡1961
103 H/5	‡1961
103 H/6	‡1961
103 H/7	*1962
103 H/8	*1962
103 H/10	*1962
103 H/15	*1962
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/1	†1967
104 A/2, E.	†1967
104 A/2, W.	1950
104 A/3	1950
104 A/4	†1967
104 A/5, E.	1950
104 A/5, W.	†1967
104 A/6	1950
104 A/7	†1967
104 A/8	†1967
104 A/10	†1967
104 A/11, E.	†1967
104 A/11, W.	1951
104 A/12	1951
104 A/13, E.	†1967
104 A/13, W.	1951
104 A/14	†1967
104 A/15	†1967
104 B/1	†1967
104 B/7	†1967
104 B/8	†1967
104 B/9	†1967
104 B/10	†1967
104 B/11	†1967
104 B/12, E.	†1967
104 B/12, W.	†1966
104 B/13, E.	‡1965
104 B/13, W.	†1966
104 B/14	‡1965
104 B/15	‡1965
104 B/16	1951
104 G/1	1951
104 G/2	‡1965
104 G/3	‡1965
104 G/4, E.	‡1965
104 G/4, W.	†1966
104 G/5, E.	‡1965

British Columbia Topographic Surveys Showing Dates of Field Work—*Continued*

Sheet	Date
104 G/5, W.	†1966
104 G/6	‡1965
104 G/7	‡1965
104 G/8	1951
104 G/9	1951
104 G/10	†1966
104 G/11	†1966
104 G/12	†1966
104 G/13	†1966
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, W.	1953
104 N/7, E., part	1953
104 N/11, W.	1952
104 N/12	1952
104 N/13	1952
104 P, part	1941
104 P/15	1941

GEOGRAPHIC DIVISION

W. R. YOUNG, B.C.L.S., CHIEF

As indicated by the number of map-sheets reproduced and distributed, volume of correspondence, and requisitions for maps, the Geographic Division enjoyed a very active year in 1967. Table E shows that the number of maps issued to Government departments and the general public exceeds six figures by a wide margin, climbing from 95,540 in 1966 to a record 114,723 in 1967. Correlative to this 20-per-cent upsurge in map distribution was an 18-per-cent increase in letters received and attended to. The value of maps sold and distributed also rose to an all-time high record of $73,550. As a reflection of the trend during the last decade, the number of maps distributed in 1957 totalled only 55,167, with a value of $20,441.

The Division lost the services of its Chief Draughtsman, who resigned in July to take a teaching position in the Victoria Technical School. We wish him every success in this new endeavour. There was only one other resignation in September, from the Trigonometric Control Section. Other personnel changes which occurred during the year were the promotion of Mr. L. G. Smith (Senior Draughtsman), who won by competition the Chief Draughtsman's position with a grade of Technician 1. Two other promotions occurred, of Draughtsman 1 to Draughtsman 2, by successfully passing qualifying examinations after the requisite amount of service.

It was noted in last year's Lands Service Annual Report that in spite of a backlog of 122 Provincial manuscripts awaiting printing at Ottawa, the number of Provincial topographic manuscripts prepared and reproduced at 1:50,000 scale by the Canadian Government, Ottawa, during 1966 was *nil*. In contrast, the Federal Government reproduced 62 Provincial manuscripts in 1967 and the backlog fell to 64. These are listed in Table K. Now that the reorganization of Federal mapping agencies is virtually complete, we anticipate further reduction of the number of manuscripts awaiting lithography. Major stocks were also received of another 48 half-sheets at 1:50,000 scale which were produced from Federal Government manuscripts. In addition, a small supply of 20 provisional 1:50,000 sheets, five 1:250,000 sheets, and two 1:25,000 sheets was obtained from Federal Government mapping agencies.

The Geographical Gazetteer of British Columbia, 1966, was received from Ottawa for distribution to Provincial Government offices early in the year and for public distribution through the Queen's Printer, Ottawa, or the Queen's Printer Bookshop, 657 Granville Street, Vancouver, B.C.

A total of 15 maps was prepared and reproduced by the Geographic Division in 1967 (*see* Table H). Seven were entirely new, three were reprints with no revision, one was over-printed with roads, and four were completely revised reprints.

One of the most popular maps ever produced by this Division made its appearance in the latter months of 1967. Map SGS-1 (Vancouver Island) was lithographed at 1-inch-to-6-miles scale, the maximum scale that would show the whole Island on a 30″ x 42″ sheet. Several factors have contributed to its popularity. This was the first full map produced by the Geographic Division using the technique of shaded relief. Also, the 10-colour reproduction allows both cultural and physical detail to be shown to maximum advantage. Map SGS-1 is further enhanced by the addition of historical and geographical notations and authentic border illustrations of Indian artifacts. Besides the Vancouver Island map, four new Provincial land status sheets at 1:250,000 scale also appeared—namely, 92P (Bonaparte River),

93A (Quesnel Lake), 93I (Monkman Pass), and 93J (McLeod Lake). As noted in the 1966 Annual Report, these sheets complete the replacement of Pre-emptor Maps 3G, 3J, and 3A. At the end of 1967, only two Pre-emptor Series maps were still being distributed, 3C (Stuart Lake) and 3E (Peace River). Two new maps at 1-inch-to-2-miles scale were lithographed. These were second status editions of 82L/SE (Sugar Lake) and 82L/SW (Vernon). A road revision was over-printed on the 1960 edition of 92E (Nootka) so that it may be matched with the newer adjoining sheets, 92F and 92L.

When Table J (Maps Being Prepared by Geographic Division during 1967) is examined, it may be seen that with the forthcoming publication of sheets 92N (Mount Waddington) and 92L–102I (Alert Bay) we will have achieved full land status coverage at either 1:250,000 or 1-inch-to-2-miles scale for all of the heavily populated part of the Province south of 55° north latitude.

As has been usual in the past, the Geographic Division completed a variety of special projects for other Governmental departments or the public (*see* Table F). Examples of such work are publication of a fourth edition of the British Columbia Air Facilities Map, metes and bounds descriptions for revised boundaries of school districts, preparation of strip maps for the Tourist Accommodation Directory, and road classifications for several Canadian and American publishers of highway maps. A total of 22 jobs with a combined value of $2,927.13 was recorded.

Though the 48 map-sheets or charts checked for the Canadian Permanent Committee on Geographical Names was 37 fewer than in 1966, the number of names checked was 1,590 higher. Three hundred and fourteen new place-names were recorded on file cards. A six-year statistical résumé of work connected with geographical names is contained in Table D.

The Research Officer made a field trip to the Kamloops area in connection with revision of Land Series Bulletin No. 6 (Kamloops). He also prepared minor revisions of Bulletins Nos. 2, 4, 7, 8, 9, 10, and 11 for reprinting, while Nos. 1, 5, and 6 were reprinted without revision to replace depleted stocks. Altogether, 35,500 bulletins were produced by the Queen's Printer in 1967. In addition, a brief outline of general information for persons interested in applying for Crown land was over-printed on the margin of the fold-out map in Land Series Bulletin No. 11 (The Acquisition of Crown Lands in British Columbia). This enables the map to be printed and distributed separately from the bulletin and is particularly useful when replying to land inquiries of a very casual or general nature.

Two members of the Division journeyed to the Southern Interior for the purpose of checking cultural detail on Maps 92J/NE (Bridge River), 92I/NE (Kamloops Lake), and 82L/NW (Shuswap Lake). The information obtained will appear on the editions of those sheets currently being prepared.

Work completed by the Trigonometric Control Section is summarized in Tables A, B, and C. Least-square adjustments by the "Groom" (I.B.M. 1620) or "Cosmos" (I.B.M. 360) computer programmes (Table A) involved 448 triangles or traverse stations in eight locations. Another major computational programme using the "Bride" system of least-square adjustment saw 765 traverse stations in Delta and Surrey processed. Some 220 petroleum and natural-gas well-site plans were checked in 1967.

Complete Indexes to Published Maps, Indexes 8 to 14, may be found in the manila envelope attached to the back cover of this Annual Report.

STATISTICAL COMPUTATIONS

Table A.—Least-square Adjustments by "Groom" or "Cosmos" Completed

Net	Locality	Type of Bearings	Number of Triangles or Traverse Stations Involved
Provincial	Fort Nelson and Liard River	True	136
Provincial	North-eastern British Columbia	True	126
Provincial	Kelowna	True	7
Provincial	Greater Vancouver	True	18
Provincial	False Creek (Vancouver)	True	52
Provincial	Stikine-Iskut Rivers	True	66
Provincial	Delta Municipality	True	18
Provincial	Chilko Lake and vicinity	True	25

Table B.—Least-square Adjustments by "Bride" Completed

Net	Locality	Type of Bearings	Number of Triangles or Traverse Stations Involved
Provincial	Kelowna	Grid	42
Provincial	Delta and Surrey Municipalities	Grid	765
Provincial	Nanaimo	Grid	50

Table C.—Records

	1962	1963	1964	1965	1966	1967
Index cards—						
New	917	781	1,475	1,693	673	1,184
Old (rewritten)	9	6	293	1,453	2,482	912
Total on file	33,291	34,072	35,547	37,240	37,913	39,097
Requests for control attended to	417	341	389	334	368	361

Well-site surveys checked during 1967, 220.

Table D.—Canadian Permanent Committee on Geographical Names

	1962	1963	1964	1965	1966	1967
Number of map-sheets or charts checked	35	59	22	93	85	48
Number of names checked	7,168	6,821	6,090	5,584	11,428	13,018
Number of new names recorded	215	375	277	402	440	314

Table E.—Map Stock and Distribution

	1962	1963	1964	1965	1966	1967
Number of requisitions filled	10,549	8,700	10,395	9,429	9,550	11,639
Maps issued to department and public	99,324	78,165	88,322	86,755	95,540	114,723
Maps received into stock	130,420	116,705	71,178	107,741	155,133	261,314
Total value of maps issued	$35,391	$48,674	$58,469	$56,152	$62,977	$73,550.82

Table F.—Geographic Work for Other Departments and Public

	1962	1963	1964	1965	1966	1967
Total number of items	18	18	19	20	23	22
Total value of work	$1,708	$1,729	$5,213	$4,460	$4,307	$2,927.13

Table G.—Letters

	1962	1963	1964	1965	1966	1967
Letters received and attended to	8,790	7,274	8,469	7,297	8,007	9,481

Table H.—Maps Prepared and Reproduced by the Geographic Division, Victoria, during 1967

Map No.	Name	Scale	Remarks
SGS-1	Vancouver Island (first edition)	1 in. to 6 mi.	New, 10 colours, contoured.
1K	South-western British Columbia planimetric	1 in. to 10 mi.	Reprint, no revision.
1KL	South-western British Columbia landforms	1 in. to 10 mi.	Reprint, no revision.
92E	Nootka (first status edition)	1:250,000	Road over-print only.
92F	Alberni (third status edition)	1:250,000	Reprint, complete revision.
92J	Pemberton (third status edition)	1:250,000	Reprint, complete revision.
92P	Bonaparte River (third status edition)	1:250,000	New, seven colours, contoured.
93A	Quesnel Lake (first status edition)	1:250,000	New, seven colours, contoured.
93I	Monkman Pass (first status edition)	1:250,000	New, seven colours, contoured.
93J	McLeod Lake (first status edition)	1:250,000	New, seven colours, contoured.
82 L/S.E.	Sugar Lake (second status edition)	1 in. to 2 mi.	New, seven colours, contoured.
82 L/S.W.	Vernon (second status edition)	1 in. to 2 mi.	New, seven colours, contoured.
92 G/S.E.	Langley (second status edition)	1 in. to 2 mi.	Reprint, complete revision.
92 H/N.W.	Yale (second status edition)	1 in. to 2 mi.	Reprint, complete revision.
92 H/S.E.	Princeton (second status edition)	1 in. to 2 mi.	Reprint, no revision.

Table I.—Provincial Government Topographic Manuscripts Prepared and Reproduced at 1:50,000 Scale by the Canadian Government, Ottawa, during 1967

Map No.	Name	Map No.	Name
82 K/11, W.	Trout Lake (first edition).	93 I/12, E. & W.	Missinka River (first edition).
82 K/12, E. & W.	Beaton (first edition).	93 I/13, E. & W.	Sentinel Peak (first edition).
82 M/13, E. & W.	Raft River (first edition).	93 I/14, E. & W.	Kinuseo Falls (first edition).
92 N/8, E. & W.	Stikelan Creek (first edition).	93 I/15, E. & W.	Kinuseo Creek (first edition).
92 N/10, E. & W.	Razorback Mountain (first edition).	93 O/1, E. & W.	Mount Reynolds (first edition).
92 N/15, E. & W.	Tatla Lake (first edition).	93 O/6, E. & W.	Morfee Lakes (first edition).
92 P/4, E. & W.	Clinton (first edition).	93 O/8, E. & W.	LeMoray Creek (first edition).
92 P/5, E. & W.	Jesmond (first edition).	93 O/13, E. & W.	Mount Selwyn (first edition).
92 P/12, E. & W.	Gustafsen Lake (first edition).	93 P/1, E. & W.	Kiskatinaw River (first edition).
92 P/13, E. & W.	Chimney Lake (first edition).	93 P/2, E. & W.	Flatbed Creek (first edition).
93 D/7, E.	Bella Coola (first edition).	93 P/3, E. & W.	Bullmoose Creek (first edition).
93 D/8, E. & W.	Stuie (first-edition).	93 P/4, E. & W.	Sukunka River (first edition).
93 I/8, E. & W.	Narraway River (first edition).	93 P/7, E. & W.	Sundown Creek (first edition).
93 I/9, E. & W.	Belcourt Creek (first edition).	93 P/8, E. & W.	Tupper Creek (second and first editions respectively).
93 I/10, E. & W.	Wapiti Lake (first edition).		
93 I/11, E. & W.	Monkman Pass (first edition).	94 B/4, E. & W.	Wicked River (first edition).
		104 N/2, E. & W.	Nakina (first edition).

Table J.—Maps Being Prepared by the Geographic Division, Victoria, during 1967

Map No.	Name	Scale	Remarks
1G	East Central British Columbia	1 in. to 10 mi.	In lithography.
1JR	British Columbia Relief Map	1 in. to 30 mi.	In draughting.
92B/C	Victoria (second edition)	1:250,000	In draughting.
92L/102I	Alert Bay (first edition)	1:250,000	In draughting.
92M	Rivers Inlet (second edition)	1:250,000	In lithography.
92N	Mount Waddington (first edition)	1:250,000	In draughting.
93C	Anahim Lake (second edition)	1:250,000	In draughting.
93K	Fort Fraser (third-edition)	1:250,000	In compilation.
103H	Douglas Channel (second edition)	1:250,000	In compilation.
82 L/N.W.	Shuswap Lake (second edition)	1 in. to 2 mi.	In compilation.
92 H/S.E.	Princeton (third edition)	1 in. to 2 mi.	In draughting.
92 H/N.E.	Tulameen (third edition)	1 in. to 2 mi.	In compilation.
92 I/S.W.	Lytton (second edition)	1 in. to 2 mi.	In draughting.
92 I/N.E.	Kamloops Lake (second edition)	1 in. to 2 mi.	In draughting.
92 J/N.E.	Bridge River (first edition)	1 in. to 2 mi.	In compilation.

Table K.—Provincial Government Topographic Manuscripts Being Prepared at 1:50,000 Scale by the Canadian Government, Ottawa, during 1967

Map No.	Name	Map No.	Name
82 F/3, E. & W.	Salmo (second edition).	92 P/11, E. & W.	100 Mile House (first edition).
82 L/7, E. & W.	Lumby (first edition).	92 P/14, E. & W.	Lac la Hache (first edition).
82 L/10, E. & W.	Mabel Lake (first edition).	92 P/15, E. & W.	Canim Lake (first edition).
92 I/12, E. & W.	Lillooet (first edition).	92 P/16, E. & W.	Mahood Lake (first edition).
92 I/13, E. & W.	Pavilion (first edition).	93 A/3, E. & W.	Murphy Lake (first edition).
92 L/10, E. & W.	Alert Bay (first edition).	93 A/4, E. & W.	150 Mile House (first edition).
92 M/3, E. & W.	Belize Inlet (first edition).	93 C/5, E. & W.	Atnarko (first edition).
92 M/4, E. & W.	Cape Caution (first edition).	93 I/16, E. & W.	Redwillow River (first edition).
92 M/5, E. & W.	Goose Bay (first edition).	93 O/11, E. & W.	Cut Thumb Creek (first edition).
92 N/1, E. & W.	Chilko Mountain (first edition).	93 O/12, E. & W.	Blackwater Creek (first edition).
92 N/7, E. & W.	Mount Queen Bess (first edition).	93 O/14, E. & W.	Point Creek (first edition).
92 N/9, E. & W.	Tatlayoko Lake (first edition).	93 P/5, E. &. W.	Burnt River (first edition).
92 P/2, E. & W.	Criss Creek (first edition).	93 P/6, E. & W.	Gwillim Lake (first edition).
92 P/3, E. & W.	Loon Lake (first edition).	104 K/16, E.	Nahlin River (first edition).
92 P/6, E. & W.	Green Lake (first edition).	104 N/1, E. & W.	Nakina Lake (first edition).
92 P/7, E. & W.	Bridge Lake (first edition).	104 N/3, E.	Sloko River (first edition).
92 P/10, E. & W.	Deka Lake (first edition).		

W. A. C. Bennett Dam, September 15, 1967.

B.C. Government air-photo stereogram (for third-dimensional viewing).

AIR DIVISION

A. C. KINNEAR, B.C.R.F., CHIEF

FLYING OPERATIONS

A total of 83 projects, out of a total of 94 requested, was completed during the year, with the highest amount of hours flown ever recorded in the Division. Both Beech aircraft flew a total of 706½ hours during the flying season to expose 34,540 new negatives covering 67,420 square miles.

The weather during the main flying season was most co-operative in the areas of highest-priority forest inventory sustained-yield units. Even though the unseasonably cold spring weather delayed the start of field operations about three weeks, photography in North-eastern British Columbia was completed during April and May in time for the field survey parties on the ground to make full use of the prints. The one major project that was not completed was in the Smithers area for ARDA. This particular project will be carried forward to be completed in 1968.

Ektachrome colour and Ektachrome infra-red films were exposed again this year with excellent results. The usefulness of these special films has been proven, and the added cost over standard panchromatic film is justified for special studies.

Again another season of no photographic time loss, owing to aircraft unserviceability, has been recorded, which speaks highly of the efficiency and conscientiousness of the maintenance staff and the programme of thorough preventive maintenance.

Early in the year the Department of Transport issued a directive which required many models of the Beech 18 aircraft (of which ours is one) to have the main spar X-rayed every 200 hours. Both BCD and BCE aircraft were X-rayed prior to the field season. Later in the summer the Department of Transport eased this regulation to read every 500 hours instead of every 200 hours. At the present rate of accumulating time on the aircraft, the next X-ray will come due midway through the next flying season.

Owing to a leak in the starboard outer gas tank, the BCE aircraft was operated for approximately the last month of the season at somewhat reduced maximum range. In effect, it was a reduction of 1½ hours in the maximum endurance of the aircraft. It was decided to continue to operate this way for the remainder of the season because of the rapid reduction of available photographic light per day at this time of the year, and because of the problems involved, such as the necessity of removing the wing in order to repair the tank. The tank is now being repaired and all other tanks are being checked during the routine winter maintenance.

A lack of experienced air survey pilots during the flying season hampered operations, and some loss of photographic weather was experienced this year. The I.F.R. (Instrument Flight Regulations) capability of the photographic aircraft could not be utilized due to the inexperienced pilots.

Two new Zeiss RMK 30/23 12-inch focal-length air survey cameras were put into service during the summer and used primarily on the Forest Inventory programme. These cameras were a welcome replacement to the older and unreliable O.S.C. equipment, and should serve their purpose for years to come. Large-scale colour photography was also exposed in these Zeiss cameras.

The accompanying graph of hours flown by aircraft of this Division during the past 20 years shows the record achieved in 1967 and also shows the diversification of flying operations over these years. Modifying the photographic aircraft with I.F.R. equipment has allowed the operations to be conducted with more mobility

and weather opportunities can be utilized as they occur throughout the Province. In providing an experienced and conscientious air crew with modern equipment, high productivity can be expected.

Complete records of accomplishment for the year will be found at the end of this report.

PLANIMETRIC MAPPING

The plotting of control and compilation of surveys for the mapping of Forest Service inventory areas was completed for the following sustained-yield units: Fort Nelson, Kinbasket, Rivers Inlet, Big Valley-Cottonwood, Nootka, Bowron, Sechelt, and Ashnola-Similkameen. The services of the I.B.M. 1620 computer were used for the first time in this Division to adjust two long traverse routes in the Ashnola and Similkameen areas. The results were very gratifying, and it is intended that more control data will be accommodated in this manner in the future.

Control for 347 20-chain sheets and five 40-chain sheets was plotted during the year.

Principal-point lay-down sheets (474) were made from nearly 15,000 new air photos taken during the 1966 and 1967 field seasons, and Kail plotting was completed for 295 sheets.

Final tracings at the 20-chains-to-1-inch scale were completed for 140 map-sheets in the sustained-yield unit areas as well as 21 map-sheets at the scale of 40 chains to 1 inch in the Quatsino area for the Surveyor of Taxes.

The use of final planimetric maps can be measured by the fact that nearly 6,500 Ozalid prints were made from the final tracings on hand.

The revision of district lot surveys on both the 20-chain and 40-chain sheets is a task that continually falls behind in accomplishment. The new work of mapping current sustained-yield unit areas does not allow time to keep revisions up to date, and consequently, within perhaps a month's time, the map recently produced can be out of date and unreliable. This condition, while recognized, cannot be overcome with the existing work load.

The final indexing of all new photography taken during 1967 was plotted on auto-positive sheets for use in the Air Photo Library.

Two special mapping projects, outside the use of this Department, were undertaken for specific purposes. The first was a planimetric map at a scale of 1,000 feet to 1 inch of the Greater Vancouver watershed area, and the second was the mapping of a lot on Vancouver Island for the Surveyor of Taxes at both a 20-chain scale and a 40-chain scale.

This Section has been faced, during the past year, with a particularly heavy turnover of personnel. Promotions and transfer of experienced mapping assistants to other departments and the resignations of junior personnel have resulted in a loss of accomplishment. More time has been expended this year, and will continue into next year, by the remaining senior members on training the replacement staff.

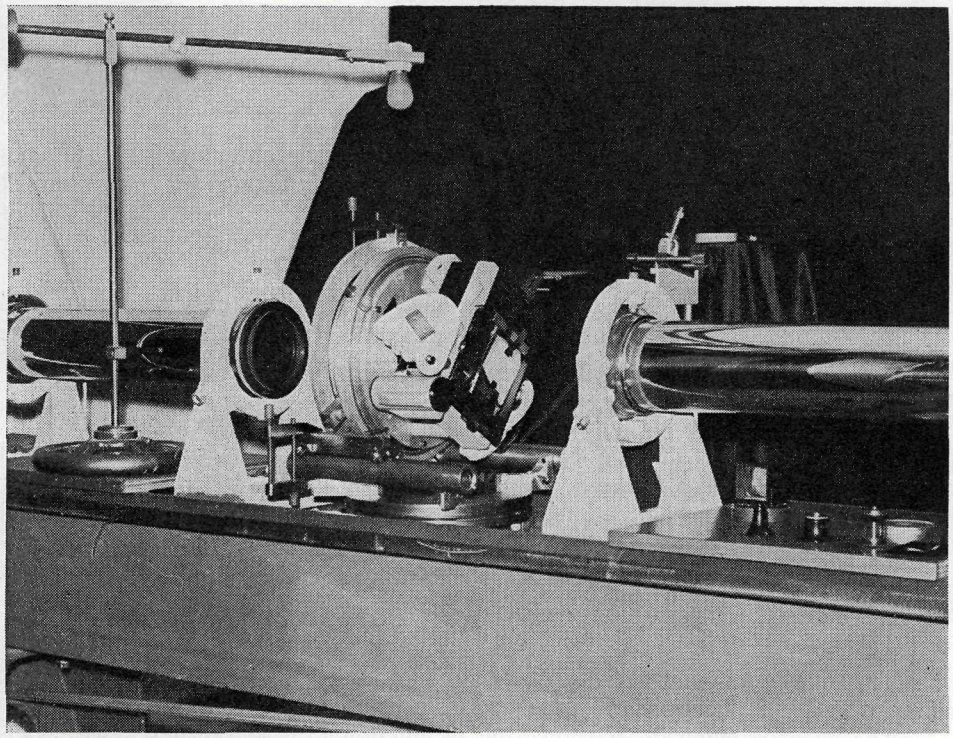
The retirement of Mr. E. P. Creech, Technician 2, in charge of this Section, was marked by many tributes by all of his friends in Surveys and Mapping Branch. Mr. Creech leaves the Division a monument of ability and integrity that will long be remembered. Mr. L. D. Hall, Mapping Assistant 4, was appointed to succeed Mr. Creech on June 12, 1967.

INSTRUMENT-SHOP

A year of high production, including maintenance of existing equipment and the design and building of specialized instruments, is recorded in the Instrument-shop.

Among the items requiring considerable time and technical competence was the system developed for the Department of Highways to record highway features on 16-mm. film from a moving vehicle. The Department of Highways provided a Bolex 16-mm. movie camera, and the Instrument-shop designed and built the auxiliary equipment necessary to convert the camera to an automatic recorder. A total of 475 man-hours was expended on this project alone, but if it provides the information necessary for safer highway design, the time was well spent.

Another highly technical and specialized project was the work done on the Forest Service Linhof 70-mm. cameras for stereo-photography from a helicopter. Considerable modifications were required to convert these cameras for this purpose, and the results should be evident during the next field season. These cameras were not designed with a photogrammetric purpose in mind, and some optical readjustments had to be made. For example, new fiducial marks were manufactured in the Instrument-shop and installed in both cameras, after which they were placed in a collimator for assessment and measurement. A photograph of this procedure is shown below.



Seventy-mm. Linhof camera, used for helicopter air photography, mounted for testing in Instrument-shop collimator.

Considerable investigational work was carried out in addition to actual construction and maintenance projects. Tests for determining optimum exposures on Ektachrome colour and infra-red film for both 9-inch and 70-mm. sizes were conducted and served to reduce field testing times.

Sensitometric values were studied on processed panchromatic film to determine variances caused by the rewind system of air-film processing. As a result of these studies, a change in chemical formula for processing was indicated, and a suggested change in field exposure settings would allow a greater latitude for field operations.

The end result was a photographic print that gave a greater tonal range with better definition throughout.

A total of 144 projects was completed in the Instrument-shop this year, among which were redesign and start construction of two new epidiascopes; design and construct a new print-drying " whirler "; construct a new aircraft camera mount to install either the Wild 6-inch or the Zeiss 12-inch camera; adapt survey bolts and equipment for use in the survey of North-eastern British Columbia; service electronic printers in Process Laboratory; repair and adjust Forest Service binoculars and hand-compasses.

The Instrument-shop is rapidly moving into the area of scientific development of equipment and methods to be used in the future. The new camera equipment now in use in Air Division aircraft has resulted in a decreased amount of camera maintenance required, and the shop personnel can devote its talent to the more sophisticated pieces of equipment required in Surveys and Mapping Branch. Modern methods require modern equipment and techniques, and we are fortunate in having an Instrument-shop that can make this transition.

AIR PHOTO LIBRARY

Total revenue from the sale and loan of air photographs was slightly over $75,000 this year in spite of the decreased demand for reprint purchases. The loans increased to 105,994 copies, some 9,000 prints over last year.

While total figures may vary from year to year and become interesting statistics to analyse, the over-all use of the Air Photo Library continues to play a prominent roll in the function of this Division. This use is evident in the graph at the end of this report showing the total sale and loan of air photos during the past 20-year period.

One of the gratifying uses of air photos today is in the elementary- and secondary-school systems throughout the Province. More and more requests are being handled in the library from teachers preparing social studies and geography assignments for their students.

Stereograms of geographical features are being made in the library for use, particularly, in schools throughout the Province. These stereograms are reprinted on 10″ x 10″ photographic paper and are being sold at the current price of an air photo. It is intended to produce more of these stereograms as interesting geological features are seen.

Complete statistics for traffic through the library will be found at the end of this report.

PROCESS LABORATORY

The total production of 10″ x 10″ reprints during 1967 did not reach the peak achieved in 1966, but the figure of 184,527 is still impressive.

The accompanying chart shows the production rate of reprints since 1947, when the Process Laboratory was first organized, and the figures speak for themselves.

In anticipating the continuing use being made of British Columbia Government air photos, a second electronic printer was put into service during the year and is producing the same high-standard print as the original Cintel printer. This type of equipment not only allows the production of mass-produced quality reprints, but it reduces the time customers formerly had to wait for reprint service.

Infra-red Ektachrome positive film was processed, giving excellent results for studies in forest entomology, and Ektachrome colour positive film was processed for orchard studies by the Department of Agriculture. The many uses being dis-

covered for various colour films brings this medium in from the experimental stage to a full production basis, and more of this type of film will be required in the future.

Production figures for all services of the Process Laboratory will be found at the end of this report.

STATISTICS

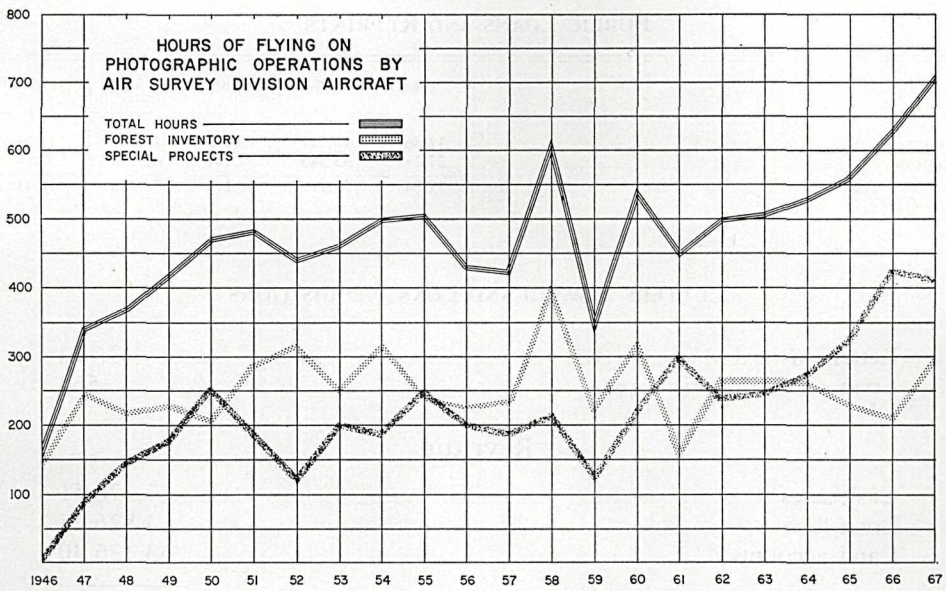
1967 Air Operations Cost Summary by Projects

	Aircraft-hours	Accomplishment: Number of Photographs	Accomplishment: Square Miles	Line Miles	Flying Costs	Photographic Costs	Total Costs
A. 40-chain vertical cover—	Hr. Min.						
1. New cover (topographic) — Blocks 94 G, H, I, J, N, and O	90 20	3,845	19,685		$5,883.03	$7,277.64	$13,160.67
2. Revision—							
Agriculture Department—ARDA	144 45	4,515	21,180		$9,426.96	$8,545.77	$17,972.73
Surveyor of Taxes—Block 94A	18 15	635	3,080		1,188.54	1,201.90	2,390.44
Sub-totals	163 00	5,150	24,260		$10,615.50	$9,747.67	$20,363.17
Totals	253 20	8,995	43,945		$16,498.53	$17,025.31	$33,523.84
Average cost		$3.73	$0.76				
B. 20-chain vertical cover, Surveys and Inventory Division—							
1. New cover—							
Ashnola-Similkameen P.S.Y.U.	29 40	2,505	2,895		$1,932.07	$4,741.35	$6,673.42
Fort Nelson P.S.Y.U.	91 50	6,375	7,530		5,980.72	12,066.30	18,047.02
Kinbasket P.S.Y.U.	74 35	5,695	5,005		4,857.30	10,779.22	15,636.52
Nootka P.S.Y.U.	25 20	1,910	3,040		1,649.85	3,615.16	5,265.01
Rivers P.S.Y.U.	11 00	780	1,035		716.38	1,476.35	2,192.73
Sub-totals	232 25	17,265	19,505		$15,136.32	$32,678.38	$47,814.70
2. Revision—							
Big Valley-Cottonwood P.S.Y.U.	12 00	1,120	1,370		$781.51	$2,119.88	$2,901.39
Bowron P.S.Y.U.	12 45	360	325		830.36	681.39	1,511.75
Lardeau P.S.Y.U.	12 50	775	625		835.78	1,466.88	2,302.66
Sechelt P.S.Y.U.	13 40	1,285	1,650		890.05	2,432.19	3,322.24
Sub-totals	51 15	3,540	3,970		$3,337.70	$6,700.34	$10,038.04
3. Improvement flying, all districts	9 50	195			$640.40	$369.09	$1,009.49
Totals	293 30	21,000	23,475		$19,114.42	$39,747.81	$58,862.23
Average cost		$2.80	$2.51				
C. Special projects—							
Agriculture Department — Okanagan Fruitlands	2 00	183		108	$130.25	$346.37	$476.62
Chief Forester—Walhachin-Savona	1 00	7		5	65.13	13.25	78.38
District Foresters—Forest burns	7 20	295		176	477.59	558.36	1,035.95
District Forester, Nelson—							
Bloom-Gilnockie Creeks	45	27		17	48.85	51.10	99.95
Bonanza-Murphy-Sheep Creeks	1 00	51		23	65.13	96.53	161.66
Fennell Creek	1 00	16		10	65.13	30.28	95.41
Horsethief Creek	40	38		24	43.42	71.92	115.34
Kid-Blackshanty-Lamb Creeks	45	23		33	48.85	43.53	92.38
Lassie Lake-West Kettle River	2 00	76		63	130.25	143.85	274.10
Lussier-Coyote-Whiteswan	1 00	66		44	65.13	124.92	190.05
Shannon-McDonald Creeks	1 45	69		44	113.97	130.60	244.57
St. Mary-White Rivers	1 00	55		35	65.13	104.10	169.23
Yahk-Hawkins Creeks	2 50	106		88	184.52	200.63	385.15
Federal Forestry Department—Aphid forest damage	4 35	82		34	298.49	155.21	453.70
Forest Engineering—							
Ahbau East	40	21		11	43.42	39.75	83.17
Barriere	40	64		45	43.42	121.14	164.56
Cayoosh Creek	1 30	50		33	97.69	94.64	192.33
Flathead-Sage	45	59		44	48.85	111.67	160.52
Fly Hills	2 25	16		12	157.39	30.28	187.67
Harrison	25	30		21	27.13	56.78	83.91
Howser Creek	1 25	60		45	92.26	113.57	205.83
McLeod-Tsilcoh	1 45	75		63	113.97	141.96	255.93
Nation River-Aiken Lake	30	22		19	32.56	41.64	74.20
Peace Pondage	13 25	209		330	873.77	395.59	1,269.36
Stellako River	6 00	68		42	390.75	128.71	519.46
Willow River	40	19		14	43.42	35.96	79.38

1967 Air Operations Cost Summary by Projects—*Continued*

	Aircraft-hours	Accomplishment: Number of Photographs	Accomplishment: Square Miles	Line Miles	Flying Costs	Photographic Costs	Total Costs
C. Special projects—*Continued*							
Geographic Division—	Hr. Min.						
Duncan Lake	1 00	55		45	$65.13	$104.10	$169.23
Mackenzie Townsite	15	3		2	16.28	5.68	21.96
Greater Vancouver Water District—Vancouver water supply	4 45	215		239	309.35	406.94	716.29
Highways Department—							
Hells Gate	1 00	5		1	65.13	9.46	74.59
Legislative Precinct	45	16		9	48.85	30.28	79.13
Sayward-Beaver Cove	2 00	81		79	130.25	153.31	283.56
Land Inspection Division—							
Callaghan Creek	35	49		29	37.99	92.74	130.73
Cormorant-Malcolm Islands	3 50	84		64	249.65	158.99	408.64
Cowichan-Genoa Bay	25	14		12	27.13	26.50	53.63
Crofton-Chemainus	35	25		24	37.99	47.32	85.31
Daisy Lake-Pemberton	2 15	100		64	146.53	189.28	335.81
Gambier Island	2 55	135		92	189.95	255.52	445.47
Harmac	20	13		13	21.71	24.61	46.32
Harrison Lake	3 50	214		164	249.65	405.06	654.71
Howe Sound	50	42		37	54.27	79.50	133.77
Ladysmith	30	18		11	32.56	34.07	66.63
Lillooet Lake	2 05	116		96	135.68	219.56	355.24
Nelson Island	55	44		34	59.70	83.28	142.98
Nitinat Lake	1 10	36		26	75.98	68.14	144.12
Northern Trans-Provincial Highway	1 45	62		100	113.97	117.35	231.32
Pitt Lake	2 00	88		66	130.25	166.56	296.81
Port Renfrew-San Juan	25	17		12	27.13	32.18	59.31
Powell River	50	13		8	54.27	24.61	78.88
Redonda Island	50	17		13	54.27	32.18	86.45
Sooke Harbour	25	16		14	27.13	30.28	57.41
Squamish River	30	19		14	32.56	35.96	68.52
Wasa-Fort Steele	2 25	33		26	157.39	62.46	219.85
Mines and Energy Resources Department—Colour test	2 15	86		20	146.53	162.78	309.31
Public Works Department—							
Haney	35	6		4	37.99	11.36	49.35
Kelowna Vocational School	50	8		2	54.27	15.14	69.41
Nelson Vocational School	30	3		1	32.56	5.68	38.24
Woodlands School	15	5		1	16.28	9.46	25.74
Surveyor of Taxes—							
E. and N. lands	1 05	86		70	70.55	162.78	233.33
Texada Island	1 00				65.13		65.13
Topographic Division—Gabriola Island	15	5		1	16.28	9.46	25.74
Water Resources—							
Black Mountain Irrigation District	3 00	60		38	195.38	113.57	308.95
Fraser River low water	2 00	105		120	130.25	198.74	328.99
Libby reservoir	2 45	125		65	179.09	236.59	415.68
Lower Squamish River	45	54		28	48.85	102.21	151.06
Okanagan Valley	2 00	94		30	130.25	177.92	308.17
Winter flooding	6 00	265		200	390.75	501.58	892.33
Internal—							
Bennett Dam	15	6		2	16.28	11.36	27.64
Duncan Dam	15	3		1	16.28	5.68	21.96
Fort Nelson control strip	30	20		5	32.56	37.86	70.42
Gulf Islands	2 25	285		215	157.39	539.43	696.82
White Rock	50	12		10	54.27	22.71	76.98
Totals	124 30	4,545		3,490	$8,108.16	$8,602.57	$16,710.73
Average cost		$3.68		$4.79			
D. Miscellaneous flying—							
Highways Department — Administration flights	3 30				$227.94		$227.94
Mines Department—Oblique photography	4 55				320.20		320.20
Internal—							
Administration flights	5 05				331.06		331.06
Aircraft maintenance[1]	4 20						
Camera maintenance[1]	2 30						
Training[1]	14 50						
Totals	35 10				$879.20		$879.20
Grand totals	706 30	34,540	67,420	3,490	$44,600.31	$65,375.69	$109,976.00[2]

[1] Cost of maintenance and training charged to all projects.
[2] Does not include purchase of two Zeiss RMK 30/23 aerial survey cameras.



Orders for Standard Prints (9 by 9 Inches) from British Columbia Negatives, 1967

	Reprints		Loans	
	Requisitions	Number	Requisitions	Number
Public—				
Individuals	972	4,034	134	1,762
Companies	216	2,476	39	511
Mining	631	24,921	216	7,072
Universities and schools	229	5,644	26	624
Towns and cities	44	1,395	6	38
Commercial air surveys	143	2,438	35	423
Real estate	53	138	17	130
Forest industries	364	9,872	136	2,563
Totals	2,652	50,918	609	13,123
Federal Government—				
Department of Energy, Mines, and Resources	49	3,512	7	49
Fisheries Department	12	312	------	------
ARDA	45	8,543	219	35,825
Miscellaneous	73	420	16	399
Totals	179	12,787	242	36,273
Provincial Government—				
Land Inspection Branch	80	10,872	55	258
Surveys and Mapping Branch	226	24,989	142	25,174
Water Resources Service	52	1,860	63	1,291
Forest Service	203	75,414	526	22,781
Department of Highways	89	2,060	191	2,802
Department of Finance	36	2,777	21	218
Department of Agriculture	27	1,092	15	61
Department of Mines	28	898	18	335
British Columbia Hydro and Power Authority	16	166	9	101
Regional Planning Board	7	150	18	107
Department of Recreation and Conservation	33	401	184	3,401
Miscellaneous	12	143	16	69
Totals	809	120,822	1,258	56,598
Grand totals	3,640	184,527	2,109	105,994

Public Loans and Reprints

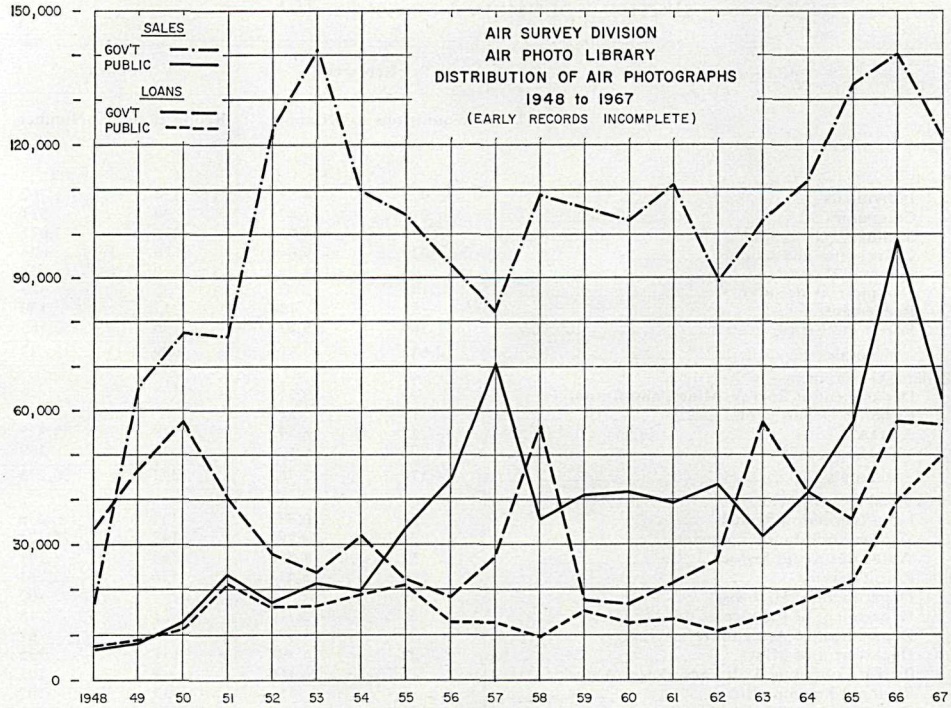
	1963	1964	1965	1966	1967
Loans	12,568	16,727	13,033	15,680	13,123
Reprints	27,281	35,385	53,141	61,276	50,918
Totals	39,849	52,112	66,174	76,956	64,041

Letters Inward and Loan Requisitions

Letters inward	3,124
Loan service requisitions	564

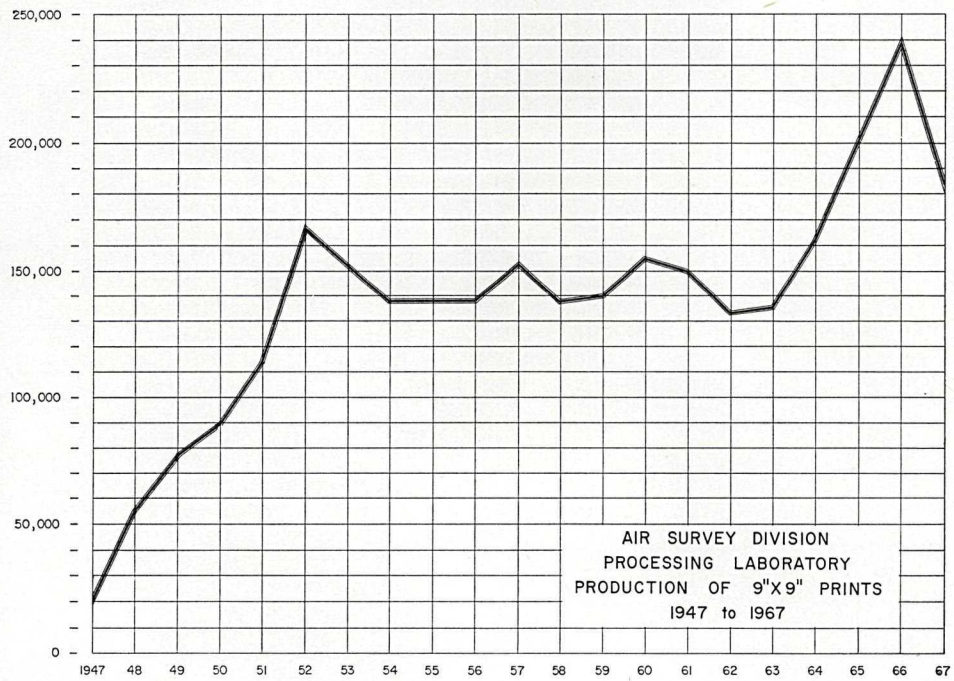
Revenue

Cash sales	$7,370.51
Loan fees	4,826.68
Land accounts	63,126.40
Total	$75,323.59



Process Laboratory, Production Record to 1967

	1946–64	1965	1966	1967	Grand Total
Processing completed—					
Air films—					
R.C. 8, O.S.C., Zeiss	411	116	112.5	140.5	780
F24 and Eagle	2,821	5	3	3	2,832
F24 and obliques	74.5	1	----------	----------	75.5
Test rolls	23	3	2	1.5	29.5
Colour films (R.C. 8 and Zeiss)	5.5	2	1	5	13.5
70-mm. black and white ft.	1,860	800	875	1,200	4,735
70-mm. colour ft.	100	----------	650	----------	750
Topographic—					
116	3,866	75	78	----------	4,019
K20 (Dominion Hydrographic)	5	2	2	3.5	12.5
Printing completed—					
Standard prints, 5 by 5 inches enlarged to 10 by 10 inches	1,849,725	56,831	56,960	39,810	2,003,362
Contact prints, 5 by 5 inches	46,087	----------	----------	----------	46,087
Kenora prints, 9 by 9 inches reduced to 5 by 5 inches	4,132	----------	----------	----------	4,132
Contact prints, 10 by 10 inches	289,874	143,855	183,419	144,717	761,901
Contact prints, 20 by 24 inches and larger	3,758	1	22	2	3,783
Enlargements, up to 40 by 96 inches	26,421	1,752	1,160	1,301	30,634
Topographic, 11 by 14 inches	22,390	114	1,184	66	23,754
Lantern slides, 2 by 2 inches and stereo	384	----------	----------	----------	384
Autopositive films, up to 40 by 42 inches	8,128	82	74	228	8,512
Film transparencies, up to 40 by 46 inches	1,019	83	336	182	1,620
Film transparencies (photo drawings)	----------	----------	----------	19	19
Kelsh (A7, A8) and miscellaneous ground negatives	4,311	578	359	980	6,228
Requisitions completed	33,403	3,263	3,616	3,976	44,258



UNIVERSITY
ENDOWMENT LANDS

UNIVERSITY ENDOWMENT LANDS

M. E. FERGUSON, PROJECT MANAGER

As there was no change in our general administration nor implementation of legislation to set up the proposed development corporation, this annual report will be confined to rather normal events relative to our maintenance and operation.

The Department of Highways completed the first section of South-west Marine Drive, which was started in 1966. In addition, they cleared the right-of-way for most of 16th Avenue. Unfortunately, funds were apparently not available to proceed with 16th Avenue nor extend the Marine Drive portion, with the result we have encountered rather difficult traffic problems and a sharp increase in motor-vehicle accidents. With the continued increase in attendance at the University, it is obvious our traffic problems will continue to grow until 16th Avenue is completed and South-west Marine Drive is constructed to connect to the parking areas on campus.

New construction in the area was naturally limited as there are no vacant residential lots available. Two new fraternity houses were constructed, and one shopping centre of stores and offices started. The balance of building construction was, in the main, for swimming-pools and remodelling of older homes.

Final details were completed and an agreement signed to provide cablevision in the area. The coaxial cable servicing most of the area where the installation is to be underground has been installed, and it is now anticipated the overhead lines will be installed early in 1968.

Some difficulties were encountered in delivery of the 30-inch steel pipe for the new water main to be located on 16th Avenue. The 12-inch main from Cleveland Way to the university campus was completed during the summer, and delivery of the larger main is now anticipated for early 1968.

The new Fraser-Burrard Regional Hospital District was brought into being during 1967, with the result the University Endowment Lands will contribute financially through general taxes to hospital costs in this regional district. The representative on the board for the University Endowment Lands is Mr. A. C. Kelly, who is also Chairman of the University Endowment Lands' Ratepayers Committee.

Regarding taxes in the area, the general tax mill rate was increased 0.25 (¼) of a mill although the school tax rate increased almost 4 mills. Present indications are that 1968 will see the first major increase in general taxes in several years, but this is only to be expected when one considers the fact the general mill rate in 1959 was 17.80 mills and the 1967 rate was only 18.01 mills.

The following tabulation shows comparative figures for the past 10 years regarding revenue, plus a summary of building permits.

NUMBER AND VALUE OF BUILDING PERMITS ISSUED FOR THE CALENDAR YEARS 1965, 1966, AND 1967

	1965		1966		1967	
	Number	Value	Number	Value	Number	Value
New school	1	$354,894.00	—	—	—	—
New commercial buildings	2	63,000.00	—	—	1	$150,000.00
New fraternity houses	1	70,000.00	1	$66,087.00	2	235,000.00
New students' centre	—	—	1	135,000.00	—	—
Alterations to dwellings	9	40,800.00	11	69,700.00	10	71,800.00
Alterations to schools	—	—	1	3,000.00	1	150.00
Alterations to commercial buildings	—	—	2	5,000.00	1	16,377.00
Alterations to fraternity houses	2	42,000.00	—	—	—	—
Alterations to churches	—	—	1	1,500.00	—	—
Garages, etc.	5	4,785.00	5	3,350.00	5	6,648.00
Swimming-pools	1	5,000.00	1	4,000.00	—	—
Totals	21	$580,479.00	23	$287,637.00	20	$479,975.00

SUMMARY OF REVENUE DURING THE PAST 10 YEARS TO DECEMBER 31, 1967

Year	Local Improvement Taxes		Loans		Land Sales		Water Account	Leases and Sundry Rents		No. 1 Ravine Fill	Garbage, Permits, and Miscellaneous Revenue	Total Revenue
	Principal	Interest	Principal	Interest	Principal	Interest		Principal	Interest			
1958	$8,832.53	$17.97	$11,067.28	$544.28	$2,000.00	$92.50	$67,388.26	$13,915.03	.....	.....	$2,223.97	$106,081.82
1959	6,758.89	6.24	5,051.43	245.03	.....	.....	70,867.86	6,682.33	.....	.....	1,894.11	91,505.89
1960	7,352.79	20.91	3,123.88	166.07	.....	.....	82,346.14	16,168.73	.....	.....	3,337.84	112,516.36
1961	12,427.09	31.35	537.87	12.56	.....	.....	84,435.63	11,768.33	.....	.....	10,333.27	119,546.10
1962	10,320.99	16.49	.....	.....	.....	.....	86,400.08	15,277.73	.....	.....	11,213.19	123,228.48
1963	10,384.36	40.17	.....	.....	.....	.....	112,994.52	10,653.33	.....	.....	10,443.74	144,516.12
1964	8,349.54	12.14	.....	.....	.....	.....	126,986.47	21,197.34	.....	.....	32,219.69	188,765.18
1965	8,712.46	74.45	.....	.....	.....	.....	117,757.11	34,833.75	.....	.....	32,353.31	193,731.08
1966	8,825.13	16.84	.....	.....	.....	.....	114,098.68	34,799.64	$63.07	$4,359.90	16,276.16	178,439.42
1967	17,963.94	42.10	.....	.....	.....	.....	135,870.74	49,745.23	80.77	2,085.60	33,511.69	239,300.07
Ten-year totals	$99,927.72	$278.66	$19,780.46	$967.94	$2,000.00	$92.50	$999,145.49	$215,041.44	$143.84	$6,445.50	$153,806.97	$1,497,630.52

LAND SETTLEMENT BOARD

LAND SETTLEMENT BOARD

During the year the sales made by the Board amounted to $42,484.36. One hundred and twenty-two purchasers completed payment and received title deeds, and one borrower paid up in full and received release of mortgage. Collections were as follows:—

Loans	$1,192.07
Land sales	80,275.63
Miscellaneous revenue	40,787.38
Total	$122,255.08

The above figures include collections from the sale and rental of Doukhobor lands in the amount of $66,737.92.

Negotiations were completed for the sale of certain lands, situated south of Brilliant, to Selkirk College for regional college purposes. Additional lands adjacent to the college-site were leased for use as playing-fields and for recreational use.

Registration of plans of subdivisions of areas in the vicinity of Krestova, which were surveyed in 1966 in an endeavour to meet the demands of those Doukhobors who were desirous of acquiring property at this location, enabled the Board to continue the sale of lands as recommended by Justice Arthur H. Lord, who was appointed as a sole Commissioner to investigate Doukhobor lands under the provisions of the *Doukhobor Lands Allotment Inquiry Act*. The majority of the lots in these subdivisions have been sold.

PERSONNEL OFFICE

PERSONNEL OFFICE

K. M. HANSON, PERSONNEL OFFICER

	1967	1966	1965	1964
Recruitments for continuous staff	55	55	45	25
Reclassifications	39	42	12	18
Promotions	19	22	23	4
Internal transfers	11	7	3	6
Transfers to other departments	17	12	9	7
Terminations for continuous staff	43	44	28	15
Retirements	3	5	2	1
Short-term casual appointments	77	58	55	42
Transfers from other departments	12	—	—	—

Upon referring to the table of statistics, the year 1967 compared favourably with the previous year in that turnover remained as high and considerable activity was noted in reclassifications, recruitment, and promotions to other departments.

The establishment of the Department remained stable this year, as no new positions were added.

Considerable interest has been shown by the staff of the Land Inspection Division in the appraisal course offered each year. In 1967 nine Deputy Land Inspectors and nine Land Inspectors took lectures and examinations at Parksville from March 5th to 17th (Appraisal II). Other members of the staff endeavouring to improve themselves included Messrs. R. H. McAra, K. M. Bridge, B.C.L.S., and P. J. Brennan, B.C.L.S. These employees were awarded Diplomas in Public Administration, having completed the three-year Executive Development Training Plan. Other personnel taking this course are Messrs. D. M. Thom (third year), A. F. Smith (second year), V. Knapick, R. S. Oberg, and R. Paine (first year). Messrs. G. H. Fielding and W. Fry completed the correspondence course in Basic Public Administration.

The year 1967 compared favourably with 1966 as far as promotions and reclassifications were concerned, with 19 promotions and 39 reclassifications. The most significant of these was the promotion of Mr. R. Torrance to Deputy Minister of Lands. Others either reclassified or promoted included Mr. D. Borthwick, Superintendent of Lands, to Director of Lands; Mr. W. R. Redel, Assistant Superintendent of Lands, to Co-ordinator, Lands Service; Mr. F. M. Cunningham, Assistant Chief Land Inspector, to Assistant Director of Lands; Mr. A. F. Smith, Administrative Officer 3, Land Administration, to Assistant Chief Land Inspector; and Mr. G. H. Wilson, Land Inspector 4, to Administrative Officer 3, Land Administration. In the Surveys and Mapping Branch, Messrs. L. D. Hall, D. K. Reed, C. H. Salmon, and L. G. Smith received reclassifications to their present positions.

This year saw the retirement of three long-service employees. These were Mr. E. W. Bassett, Deputy Minister (41 years); Mr. E. P. Creech, Technician 2, Air Surveys Division (46 years); and Miss C. Stephenson, Senior Clerk, Land Settlement Board (42 years).

In March, 1967, Mr. J. S. D. Smith, Land Inspector, Nelson, died at the age of 42. His untimely death followed 15 years' service with the Land Inspection Division.

MAIL AND FILE ROOM

MAIL AND FILE ROOM

DAVID S. PRESTON

Letters received in the Department during 1967 amounted to 247,791, compared to 237,688 in 1966, an increase of 4.25 per cent.

The drop shown in the attached table of new files created does not necessarily mean there were less files set up for correspondence, because many file requests can be handled by reinstating number designations of microfilmed files.

Additional shelving has been constructed in the Topaz Avenue storage vault, and segregation of the less-active material in the main filing vault for transmission to the Topaz vault is now under way. It is anticipated that the new shelving in the Topaz vault will provide filing space for two or three years. Ultimately, possibly within five to seven years, there will require to be a second microfilming of completed and inactive files.

LETTERS INWARD

Branch	1966	1967	10-year Average, 1958–67
Lands	58,813	57,879	48,386
Forests	125,563	132,428	141,927
Water Resources	31,186	32,362	27,547
Surveys and Mapping	22,126	25,122	20,473
Totals	237,688	247,791	238,332

LETTERS OUTWARD (RECORDED) [1]

Branch	1966	1967	10-year Average, 1958–67
Lands	9,943	12,025	13,707
Forests	2,150	1,916	1,941
Water Resources	3,916	4,500	2,965
Totals	16,009	18,441	18,613

[1] Interoffice, agency, general inquiries, requests for maps, etc., not recorded.

MISCELLANEOUS REPORTS

Designation	1966	1967	10-year Average, 1958–67
Forest-fire reports	1,967	3,216	4,662
Logging-inspection reports	11,048	8,761	13,502
Land-classification reports	6,192	5,920	4,489
Stumpage-adjustment notices	2,935	3,455	3,538
Totals	22,142	21,352	26,191

New Files Created

Designation	1966	1967	10-year Average, 1958–67
"O" files	6,983	5,865	6,108
Timber-mark files	1,550	1,449	1,400
Timber-sale files	1,472	1,148	2,345
Totals	10,005	8,462	9,853

Film reference, 1,779.

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