

PROVINCE OF BRITISH COLUMBIA

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# Minister of Public Works

REPORT  
FOR THE FISCAL YEAR  
1960/61



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1962

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# Ministry of Public Works

REPORT

FOR THE YEAR 1951

1952



GOVERNMENT OF INDIA  
MINISTRY OF PUBLIC WORKS

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

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Annual Report of the Department of Public Works for the fiscal year ended March 31, 1961, in compliance with the provisions of the *Public Works Act*.

W. N. CHANT,  
*Minister of Public Works.*

*Office of the Minister of Public Works,  
Parliament Buildings, December 21, 1961.*

To His Excellency the Honorable the Governor, Perth  
WEST AUSTRALIA  
Perth, Western Australia

Dear Sir,  
I have the honor to acknowledge the receipt of your letter of the 14th inst. in relation to the proposed amendments to the Public Works Act, 1901, in connection with the proposed amendments to the Public Works Act, 1901.

Yours faithfully,  
W. V. THANE

Minister of Public Works

Office of the Minister of Public Works  
Government Buildings, Perth, W.A.

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*The Honourable W. N. Chant,  
Minister of Public Works,  
Parliament Buildings, Victoria, B.C.*

*SIR,—I have the honour to submit for your consideration the Annual Report for the fiscal year ended March 31, 1961.*

*Elsewhere in this Report will be found those of the heads of divisions. These set out in detail work accomplished and planned, tenders let and accepted, and Departmental accounts.*

*During the fiscal year under review continued emphasis was laid upon cost-control. This was referred to in my report to you for 1959/60, and I am pleased to report that further advances have been made. A study of the last eight major projects carried out, having a contract value of \$2,713,730, shows that extra costs amounted to \$34,282, or 1.27 per cent... This indicates that insistence on complete planning and firm specifications has succeeded in reducing these from a previous average of 8 per cent.*

*The recession in Canada appears to be passing, and it is my belief that this Department can expect an upsurge of work over the next few years. Departmental planning, in so far as personnel and administrative measures are concerned, has been prepared accordingly, and an accelerated programme can be faced with confidence.*

*Good relationships with other Government departments continue to grow and improve, and consequently our design divisions are being more frequently called upon for assistance. As a service department, this is part of our proper function, and we both welcome and encourage such requests.*

*Increased attention has been given to research in design, planning, and construction. Methods and materials are rapidly changing, and we are endeavouring to keep abreast of developments. Space will not allow of a detailed report of advances made, but it is perhaps sufficient to say that some very significant changes have been made in construction methods which will provide better buildings at lower cost.*

*In conclusion, Sir, I am pleased to report that staff morale is high and productivity has increased. Our Department is fortunate in having a number of very competent and loyal employees. They will, I know, continue to serve the people of this Province well.*

*A. E. WEBB,  
Deputy Minister.*

## REPORT OF THE PROVINCIAL ARCHITECT

A summary of tenders received and contracts awarded during the fiscal year 1960/61 appears at the end of the Public Works Report, and from this list two major projects stand out for particular comment.

The first was the final phase of construction of the Victoria Law Courts in the amount of \$1,686,000 calling for the total completion of the building, for which two prior contracts had previously been let. At the date of this Report the Law Courts are nearing completion and being readied for an official opening in the new year.

The second project of major interest was the Classroom and Faculty Building at Victoria University, situated on the Lansdowne Campus. When it became apparent that there was a very critical problem to be faced with a large influx of students for the fall semester, a crash programme was inaugurated to meet the contingency expeditiously and efficiently.

Plans and specifications were drawn up by the Department of Public Works with considerable rapidity, and a contract was let in the amount of \$329,423 in mid-July, 1960.

Six months later, with classes actually in operation, the E. B. Paul Building, named after the first principal of Victoria College, was officially opened by the Honourable the Premier of British Columbia on January 18, 1961.

Brief mention should be made of two other contracts, both located in Burnaby. The first, a testing laboratory for the Department of Highways, was planned during the fiscal year under review, and is currently nearing completion. The second contract called for the erection of steelwork, wall and roof cladding for a plumbing, steam-fitting and sheet-metal workshop and an electrical workshop. These buildings signalled the beginning of the second phase of development of the British Columbia Vocational School at Burnaby.

It is anticipated that a high percentage of construction will be achieved by March, 1963.

Among numerous projects in the active planning stage during the fiscal year 1960/61 were the following:—

- (1) *Essondale*.—Credit Union Building and Telephone Exchange. These contiguous buildings were required to accommodate expanded credit union facilities on the one hand and to permit the conversion of telephone services from manual to automatic on the other.
- (2) *Prince George*.—British Columbia Vocational School. An automotive and heavy-duty workshop and a heating plant were planned as the initial development of a vocational-school programme for Prince George and the surrounding area.
- (3) *Victoria*.—Victoria University. The planning of a complex of science buildings was commenced to provide for the Faculty of Science offices, seminar rooms, lecture theatres, and laboratories for chemistry, biology, and physics. This complex of buildings will form part of the nucleus of the Gordon Head Campus development.
- (4) *Vancouver*.—Planning was started on the College of Education, located on the campus of the University of British Columbia. The complex of buildings comprises four interrelated structures—a central lecture-room block, an office block, a classroom block, and a gymnasium.

A contract amounting to \$1,103,877 was recently let for the construction of the central block, and planning is proceeding rapidly at the present time on the balance of the work.

During the year professional assistance was made available to several Government departments, mainly those of the Provincial Secretary, Lands Service, and the British Columbia Hospital Insurance Service.

Seventeen different projects for senior citizens' homes throughout the Province, for which the Provincial Government offers a grant, were examined on behalf of the Provincial Secretary's Department.

Construction reports and criticisms were made on design and construction details. In several instances, in attempting to adhere to tight budgets, sound construction principles appeared to have suffered. These have been pointed out, with remedial suggestions, which in the majority of cases have had no significant effect on construction costs.

Residences and other buildings on the University of British Columbia Endowment Lands have similarly been scrutinized on behalf of the Lands Service. Among these projects reviewed have been two private residences and two fraternity houses.

The staff member loaned to the British Columbia Hospital Insurance Service continued his research work on specialized hospital areas, and also assisted in the evaluation of hospital plans submitted to the British Columbia Hospital Insurance Service for approval.

In the Architectural Division, staff was generally maintained throughout the year at the same numerical level, but considerable difficulty has been experienced in securing qualified replacements of high calibre for those members of staff who left during the year. It is very satisfying to report that the loyal co-operation of the staff of this Division has made it possible to achieve a high standard and output of work.

W. H. R. CURTIS, M.R.A.I.C., A.R.I.B.A., A.N.Z.I.A.,  
*Provincial Architect.*

## REPORT OF THE SENIOR ELECTRICAL DESIGNER

The Electrical Design Division has worked to capacity during the year. It was found necessary to enlarge the draughting staff to cope with the volume of work being produced by our Architectural Division, and to carry out the many electrical designs requested by various other departments of Government.

A total of over sixty projects of rewiring, alterations, and additions was designed and carried out for the Construction and Maintenance Division. Included in the major electrical designs correlated with the Architectural Design Division and which are now under construction or being planned are the College of Education; Victoria Law Courts; Prince George Vocational School; Burnaby Vocational School; Science and Biology Building, Victoria University; and the Animal Pathology Building, Abbotsford.

The co-operation and co-ordination extended by the Architectural, Construction and Maintenance, Mechanical, and Structural staffs have been excellent.

Extensive electrical designs for highway lighting and traffic signals have also been produced for the Department of Highways. Electrical designs were carried out on such major British Columbia highway developments as the Deas Tunnel Throughway, Burnaby Freeway, Upper Levels Highway, Fraser Valley section of the Trans-Canada Highway, Abbotsford-Chilliwack By-pass, and many other smaller projects.

Under design is the lighting for the new Port Mann Bridge and the China Bar Tunnel in the Fraser Canyon. This tunnel is comparable in length to the Deas Tunnel, and will have a very extensive lighting and electrical system.

It is worthy to note that over fifty electrical specifications were produced for the Department of Highways. Tenders were called by this Division, following Government policy of open tendering on all projects.

Electrical designs were also undertaken during the year for Departments of Education, Forestry, Commercial Transport, Recreation and Conservation.

Total combined value of electrical work carried out for the various departments during the year was in excess of \$750,000. It has been our pleasure to work with the various departments mentioned, who give us the utmost co-operation.

Technical advice and guidance were also given to Electrical Maintenance staffs throughout the year.

In conclusion, I would like to thank the Personnel Officer for his assistance in obtaining the additional staff which became necessary.

J. R. WALKER,  
*Senior Electrical Designer.*



*Daylight view of modern highway lighting, Capilano interchanges, Upper Levels Highway, Vancouver. Designed and supervised by Department of Public Works for Department of Highways.*

## REPORT OF THE CONSTRUCTION AND MAINTENANCE ARCHITECT

Changes in the organizational structure of the Department of Public Works at the beginning of the 1960/61 fiscal year make this report a record of the activities of the Division during its first year of operations in a dual capacity.

The period under review is of special significance, as in addition to its previous responsibility the scope of the Division's activities was extended to include supervision and control of site construction during erection of all Provincial Government buildings.

To ensure a superior programme of supervision and control on all new construction work, it is necessary for the following results to be striven for:—

- (1) Adherence to the standard of materials and craftsmanship demanded.
- (2) Avoidance of extra construction costs beyond the original contract price.
- (3) Prevention of error and detection of elements overlooked in drawings and specifications, and their correction before the contract is started.

The Division has been fortunate in having three project inspectors, who, by their efforts and loyalty, have enforced a high standard of workmanship and compliance with specifications. Supervision of this type, and site inspection by personnel of the headquarters staff, has achieved successful results in respect to item (1).

Item (2) is often found to arise from causes mentioned in item (3). Although the Division has been successful in forestalling extra costs arising from many causes, the full implementation of safeguards in respect to item (3) depends upon adequate means being made available.

During the year, project inspectors were appointed to, and site inspections carried out on, the following projects designed by the Architectural Division:—

- (a) Extension to the Random Poultry Testing Station, Abbotsford.
- (b) New Provincial Government offices, Mission.
- (c) Fire-escape stairs and bridges, Essondale.
- (d) Wilson Ranch barn, Colony Farm, Essondale.
- (e) Sallyport, Haney Correctional Institution.
- (f) Classroom and faculty block, Victoria University.
- (g) Law Courts, Victoria (Contracts 2 and 3).

In addition to the above, the Division also prepared sketch plans, working drawings, and specifications for the following construction, which was subsequently supervised in the construction stage by this Division's personnel:—

- (1) Conversion of the Young Offenders' Unit, Oakalla Prison Farm, into a hospital.
- (2) New extension to provide additional office and clinic facilities at the Health and Welfare Building, Kamloops.
- (3) Conversion of the old B.C. Telephone Building, New Westminster, into a Judicial Annex to the Court-house. (As drawings of the original structure were unavailable, personnel of this Division also measured and surveyed the structure to enable subsequent redesign work to be accomplished.)
- (4) Complete renovation of the existing premises and a new addition to the Charlie Lake Mines Building to provide office, laboratory, and extensive core-storage space.
- (5) Renovation and provision of additional cell accommodation, R.C.M.P. quarters, Penticton Court-house.

In response to inquiries from Government agencies and boards, this Division has continued to provide consultant services by preparing specifications and inspecting repairs and alteration work found necessary.

A continuation of our previous year's programme has enabled many recommendations contained in the Fire Marshal's reports to be implemented, thus removing fire-hazards and improving protection afforded. Sprinkler systems were installed and are now operative in Skeenaview Hospital, Terrace; Dellview Hospital, Vernon; Marpole Infirmary; and Jericho Hill School.

This Division has been confronted with instances where immediate major repairs to older structures were imperative. Repiping of water-supplies, reconstruction and preservation of stone and brick surfaces, renewal of floor coverings, and many other items have either become obsolete or defective after many years of service. As this work has often entailed an expenditure much greater than the allocated funds for the designated building in the current fiscal period, it has resulted in a serious drain on funds available for preventive maintenance.

During the year a number of municipal sewerage systems in areas where Provincial Government buildings are located, have become operative. These local improvements have entailed a number of new sewer connections to be made, and should help in reducing the troublesome and expensive repairs to septic tanks we frequently encounter.

The Division has maintained continuous liaison with our electrical and mechanical divisions, and their representatives have on a number of occasions accompanied members of our staff on inspections of various Government buildings. This has ensured a complete coverage of all the buildings services. A system of reporting by members of all divisions of any hazardous conditions which they may encounter when visiting buildings has been of help in providing adequate building inspection of all Government property. I would respectfully suggest every Government property should be visited by a senior member of this Division's staff at least once a year.

Arising from building inspections and reports received from our various agents throughout the Province, specifications have been prepared, notices posted, and contracts for work embracing many trades have been awarded. In this respect it is interesting to record this procedure has been followed in minor and major repair and redecoration work with a value of \$100 to \$10,000. Work above this amount was also advertised in local and trade papers.

Our Superintendents of Works have continued to resolve the daily problems of keeping buildings in their areas in operational conditions. As a result of their efforts, renovations, decorations, and maintenance have been achieved with a minimum disruption to the occupying Government departments' operations. Together with their staffs, they have continued to achieve a high standard of workmanship, which has contributed to the success of this years' programme.

We would like to take this opportunity of thanking all Government Agents, District Engineers, and others who, by their splendid co-operation, have made it possible for us to carry out our work with dispatch and efficiency.

E. C. CLARKSON, M.R.A.I.C., A.I.A.A.,  
*Senior Construction and Maintenance Architect.*

## REPORT OF THE CIVIL AND STRUCTURAL ENGINEER

Many varied and interesting projects were undertaken during the year by the Structural and Civil Engineering Division of the Public Works Department.

In last year's report our research on the use of light-weight aggregates was mentioned. One of the larger projects was the initial phase of the College of Education at the University of British Columbia, and it ushered in an important change in structural design policy. This building is of reinforced concrete, with the largest proportion of the concrete being composed of semi-lightweight expanded shale. Used in an experimental way on smaller projects, it has been found that semi-light-weight concrete is justified by cost considerations, providing a building is designed for its use. Great care needs to be exercised in the placing of light-weight concrete in order to avoid flotation of the lighter aggregate; this involves minimum slumps and the prudent use of vibrators.

The third and final contract for the completion of Victoria Law Courts was let during the fiscal year, and marked the end of one of the largest and most interesting jobs that our office has worked on in recent years. Other large projects completed were the E. B. Paul Building at Victoria University, electrical shop at Burnaby Vocational School, and Mission Court-house. The final phase of the Law Courts at Victoria contained the largest plumbing contract let out during the year.

During the year a collapse of the water-supply intake structure at Tranquille occurred, which necessitated emergency repairs, with final repairs and improvement taking place a few months later. The water-supply system at Tranquille consists of storage dams at Tranquille and Truda Lakes, which are approximately 30 miles from the institution. Flow of water to the institution, in Tranquille Creek, is regulated by three dams, which are filled in winter and emptied in summer. The water-intake structure is located about 2 miles north of the institution, and from there water is piped to the institution and farm. Tranquille Creek is a mountain stream running partly through barren country, and heavy rains create a sudden run-off, which assumes flood proportions at lower levels. These sudden flood conditions erode clay banks along the course of the river and create a high concentration of suspended solids in the water. These suspended solids are partially removed by settling in the intake structure and partly by filtration. During the spring freshets a large quantity of water, high in suspended matter, flows through the intake and overtaxes the settling action in the intake and the operation of the filters. The question is one of relative economics as to whether or not it would be justified to install a large filtration plant to remove excess solids for a comparative short period of time during the freshet season. As a result of these problems, a firm of consulting engineers was engaged to prepare a full report on the quality and quantity of water.

We are indebted to the Materials Division of the Department of Highways for the work it has performed on our behalf in respect to soils testing and concrete testing. All the concrete testing on Victoria Law Courts and a considerable programme of soil tests at Victoria University were done by the Materials Division.

J. R. SIMPSON, B.Sc., A.M.I.C.E., P.ENG., DIP.PUB.ADMIN.,  
*Senior Civil and Structural Engineer.*

## SEWAGE-DISPOSAL

Human life depends on an adequate supply of clean drinking-water.

In order to protect water-supplies, man has had to find a way to keep water-borne wastes away from these sources. Among the first historical traces of such measures are remnants of sewers, constructed in India about 3750 B.C. A number of similar structures were found in the Middle East around Bagdad. These were built about 2500 B.C. The first sewer by-laws were brought in by the Romans about A.D. 80 in order to protect their well-built sewer systems. Their main sewer, the "Cloaca Maxima," is still in use in to-day's Rome. The origins of modern city sewerage go back only for the last 160 years or so. Construction of these systems began nearly simultaneously in great cities as New York, Boston, London, Paris, and Vienna. In smaller centres, large-scale collection of human wastes into sewers began only in the twentieth century. Thus for centuries the problem of pollution was solved by ducting water-carried waste out of sight and away from the water-supply source. This worked well until the population increases of this century brought the end of the sewer-line of one city dangerously close to the water-supply of the neighbouring one. In some highly industrialized areas of the world, as in the Ruhr Valley in Germany, there are several cities located on the same river within a few miles. As the water has to be reused in these areas several times, the need for the treatment of sewage and raw water had to originate here.

Public opinion to the contrary, treatment costs now and probably for years to come exceed the value of recoverable constituents in sewage. No process of domestic sewage treatment that delivers an unobjectionable effluent has so far been devised that returns a profit. Some of the treatment costs may be defrayed by the recovery of valuable products. These include liquid for irrigation or coolant for power plants, sludge for its fertilizing value, grease for industrial reuse, grit for filling material, and sludge digestion gas for fuel. To these may be added any charges for capital expenditures which may be saved by a shorter sewer run to a plant instead of to a river or the open sea.

Overriding all these cost considerations are the intangible but very real benefits brought by non-pollution of water sources, rivers, streams, and beaches. On a continent where in many places shortage of water is causing concern, this aspect is assuming very real importance. There is also the economic consideration of using, rather than dumping, waste which has real value.

Growth of population in countries with high living standards necessitated treatment much more urgently than in areas with low ones, as the chemical wastes which appeared in ever-growing quantities in the sewage produced special problems. Also in countries with a high living standard, regard for the condition of beaches and bathing-places is high. First efforts to dispose of sewage by treatment were made around 1870. However, it was not until the 1930's that improved and more scientific methods were used.

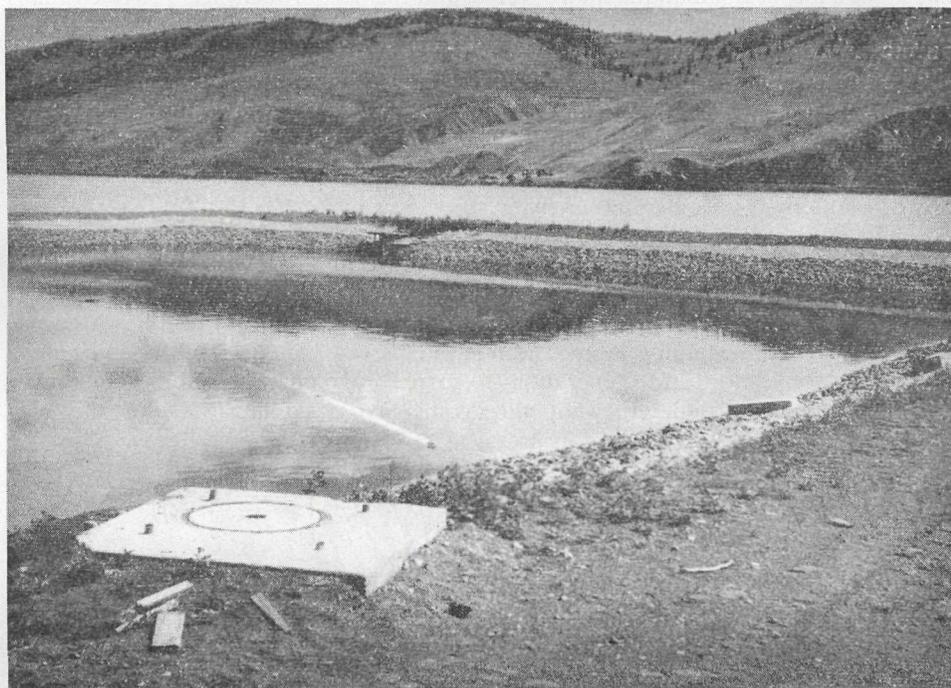
Treatment, generally speaking, is done by the municipality where the buildings are located. Therefore, sewage-disposal of Government buildings located in municipalities has presented no problems so far, and consist only in tying the plumbing of the building into municipal sewers. Where such are not available, a standard septic-tank and tile-drain system has been constructed.

Unless complaints about odours or pollution are received, this system is usually left to run itself.

Recently rural waste-disposal grew more and more complicated. There are two main reasons for this. First, subdivisions began to encircle institutions which

were not so long ago fairly distant from the city, and, second, detergents and new disinfectants began to appear in ever-increasing quantities in institutional waste.

At first the design of improved sewage-disposal treatment facilities was based on the miniaturization of city plants. As most big cities handle waste by the same principle as the ordinary septic tank, this principle was followed through in the design of three mechanized plants—namely, at Colquitz, Haney, and Oakalla. The treatment consists of clarifying anaerobic digestion and filtering. This means that after having separated the solids from the liquid by reducing the velocity of the flow, the solids are pumped or dropped into a digester, where they are decomposed. Sewer gas is produced. Decomposition is done by bacteria which do not require any oxygen, hence the process is called anaerobic. The process requires a few weeks if the digester temperature is kept between 85° and 95° F. At Provincial institutions, however, the installation and maintenance of special heating equipment would not be economical, and it is preferred to enlarge the digester, thus providing the longer storage capacity required for a cooler and slower process. The digested product is a black, slightly tarry-smelling, cake-like substance, which is an ideal soil-conditioner and a mild fertilizer. The liquid leaving the clarifier has to undergo further treatment. This is done by dropping it through a stone filter by way of self-propelled rotating sprinkler. An algæ-like green substance growing on the stones eats the waste remaining in the liquid. To get a better treatment, the effluent from this filter is recirculated once or twice through the clarifier before finally being discharged into a ditch or creek. Filtering requires the presence of oxygen, and is therefore called aerobic. The entire process, while very efficient, requires an investment of about \$100 to \$150 *per capita* and considerable operating time.



*Sewage lagoon, Tranquille School.*

Since about 1956, institutions and subdivisions began using a process which seems much more direct and simple. This process keeps air bubbling through raw sewage in great quantities. Bacteria in this air eat the sewage in the same manner as in a filter. Air is either sucked in by turbulence created by electrically driven propellers or blown in by blowers. This process was used in Burnaby in the design of a treatment plant which serves three Provincial institutions. Investment costs of such a plant area only about \$20 to \$30 *per capita*, and operating time is only about half of the digester-filter type. This process, however, uses substantially more electric power and is very sensitive to chemicals and disinfectants contained in the sewage. At the present time the National Research Council is experimenting with a small plant using the same process. This experimental unit does not require any fresh water, as it uses the purified liquid over and over again. Another advantage of this plant is the complete lack of any odours, so that it could actually be constructed in or near any heating plant or other service building. This, of course, would make operation and maintenance even more economical.

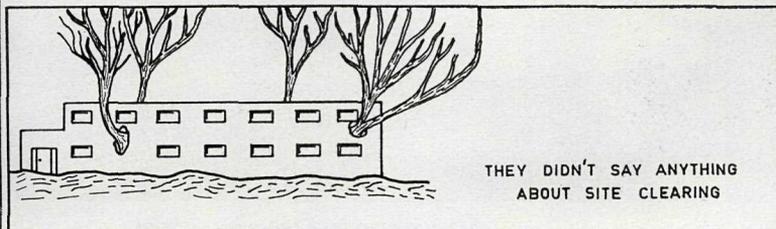
A method which is remarkable for its simplicity and low cost, and which has come to the fore in recent times, is known as "lagooning." Lagoons are ponds 3 to 5 feet deep, and sewage is discharged directly into them. They are, in effect, open septic tanks. The layman could be pardoned if he found it difficult to believe that these lagoons do not produce objectionable odours, but this is so. They can be landscaped and need not be unsightly. Operation costs are practically *nil*. On the debit side is the fact that they require fairly large areas in open locations, and by-products are lost. This Department, admittedly with some skepticism, installed such a lagoon a few years ago at the institution at Tranquille. This was done at the recommendation of the then Superintendent of Works, Mr. J. C. Martin, whose initiative was responsible for what, at that time, was considered a bold experiment. The lagoon has been an unqualified success, and this Department has provided many inquirers with plans and details.

Waste-treatment processes suited to special problems are under study. At the time these lines are written, this Department, in co-operation with the Health Department, is studying waste-disposal of an animal pathology laboratory. Due to the work done in the building and its location, special precautions, such as sterilizing wastes by heat, may have to be taken to prevent the spreading of diseases by water-borne pollution.

The entire subject of sewage-disposal, while not pleasant, is one that must be given more attention. It bears repetition that our water-supplies are too important to be jeopardized. Even in Canada, with its relatively low population, instances of rivers (such as the Saskatchewan) being polluted for hundreds of miles by waste and chemicals are becoming more common. This is a matter which must be dealt with now—not left for future generations to correct. To change established methods and habits is always difficult; what must come first is a realization that the need exists.



A. Paul,  
Engineer-in-training.



## REPORT OF THE MECHANICAL ENGINEER

### GENERAL

The Romans became famous for their beautiful and elaborate baths. People of all ages, and through the ages, have enjoyed the exhilaration of bathing and swimming in crystal-clear water. The sport is more popular now than ever, primarily because we have more pools. The modern pool is much simpler than its Roman counterpart, but the water is purer. Along with the pleasure of bathing, it has been discovered that pools have a decided therapeutic value. To this end, the Provincial Government operates and maintains five pools in five institutions.

It is no accident that the water in these modern pools is clear and sparkling, and has a beautiful blue cast or shade. There are three principal ways in which water in the pools can be kept fresh and clean:—

- (1) The *fill and draw*, in which the pool is filled with fresh water, used for a time, emptied and refilled.
- (2) The *flow through*, in which the pool is supplied by a continuous flow of fresh water.
- (3) The *recirculated*, wherein the water is recirculated, filtered, and sterilized, with only enough fresh water added to make up losses.

In most cases the recirculated pool has somewhat higher first cost, but is cheaper to operate (especially if the water has to be heated), and also provides the highest water quality. Water is a universal solvent which dissolves part of everything it touches. Natural waters are really never very pure. The impurities which affect the quality of the water used in pools are inorganic and organic. The inorganic impurities are usually the carbonates, which cause hardness in water, and are relatively easily disposed of by inorganic chemical, displacement, and filtering.

The organic material is quite a different story. Algæ cause turbidity in pool water, and certain bacteria are very harmful to health. These are removed by chlorinating and fine filtering of the recirculated water. However, since both regenerate in water, constant testing and attention to the water quality is required.

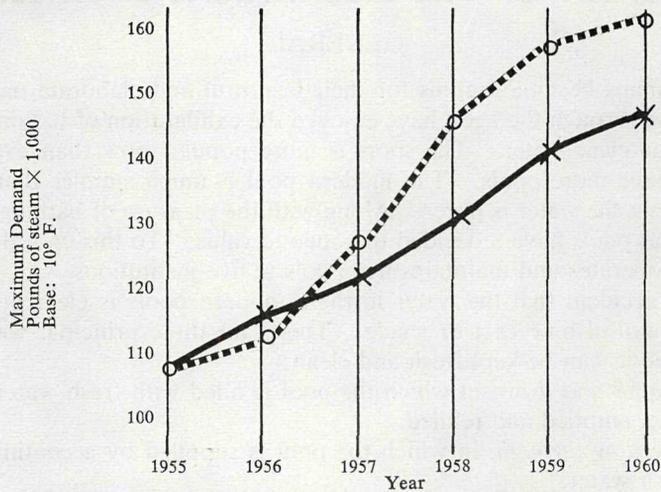
Pools operated by the Provincial Government are all of the recirculating type. All are checked very closely by the department staffs, as well as by the Department of Health inspectors. We take pride in maintaining the water quality well above the minimum standards set by the Department of Health.

### CAPITAL PROJECTS

Most of the capital projects designed and built by the Department this year are described elsewhere in this Report. The Mechanical Division participated in these projects to the extent of approximately 15 per cent of their contract value. It has been a year of steady growth, but with no particularly outstanding projects as far as this Division is concerned. It is an appropriate time to compare the estimate of growth pattern with actual growth.

In 1955 we conducted an intensive study of the requirements of the steam plant at the Provincial Mental Hospital, Essondale. The Hospital needed additional steaming capacity in the steam plant, but how much was economically justified? A study of the probable growth pattern of the Hospital was made in conjunction with the Mental Health Services. The accompanying curves show the comparison with the forecast at that time (o --- o --- o) with the actual loads encountered (x-----x-----x).

The actual growth pattern of the demand curve has increased, but not quite at the same rate as the forecasted demand.



The main reasons for the divergence, of course, have to do with the Mental Health Services. Sufficient here to say that the growth of the Hospital was not as great as was expected in 1955.

#### MAINTENANCE OF MECHANICAL EQUIPMENT

Two trends have continued this year, and we expect they will continue. These are the replacement of hand-fired coal-burning furnaces in the smaller detached buildings and houses with automatic oil-burners and the installation of summer cooling in Government offices.

Due to the increasing difficulty of obtaining coal in small amounts in smaller towns and villages of the Province, and the price which has to be paid, it is cheaper to install automatic oil-burners and burn oil for heating purposes. This is in addition to the added convenience.

Requests for summer cooling of buildings are still being received. Bearing in mind costs, only a few evaporative coolers have been installed, but the programme is continuing.

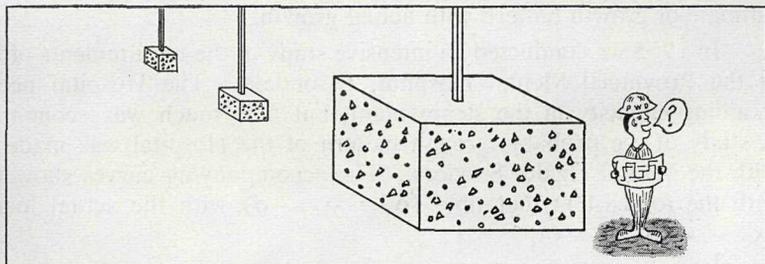
Maintenance of mechanical equipment continues, but the age of some of it requires fairly large expenditures to be made in the near future. This Division is making every endeavour to promote a policy of preventive maintenance, but its full implementation depends upon bringing existing equipment up to date.

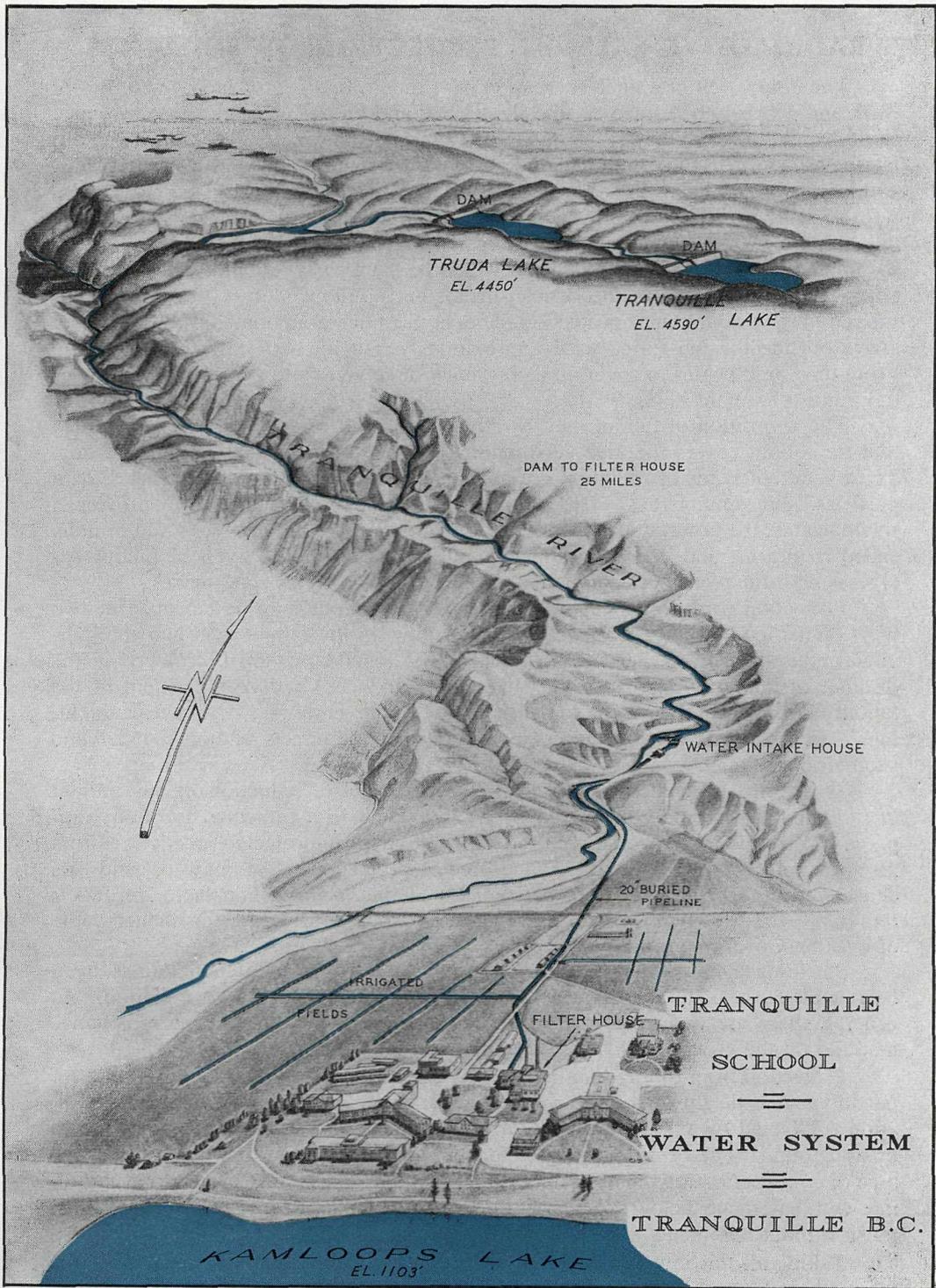
We wish to take this opportunity to thank the various operating staffs for their co-operation during the year.

W. E. MILLS, B.A.Sc., P.ENG., DIP.PUB.ADMIN.,  
*Senior Mechanical Engineer.*



H. Pejril,  
Technical  
Draughtsman.





Diagrammatic sketch of water-supply system at Tranquille School, Tranquille, B.C.

## RADIOACTIVE FALLOUT PROTECTION OF BUILDINGS

The detonation of a nuclear weapon near the ground causes large quantities of earth and debris to be forced up into the fireball and the resulting mushroom-shaped cloud—a cloud which may reach an altitude of 15 miles or more before levelling off. Earth and debris particles in the cloud vary in size from fine powder to large grains, and it is radiation from these particles that can damage living cells.

Most of the particles fall back to the earth's surface within two days (early fallout), while some remain aloft far longer (delayed fallout). In a nuclear attack the immediate and most serious danger would be from early fallout. Therefore, the term "fallout," as used in this article, means early fallout, and is the fallout considered in the evaluation of protection factors. Significant amounts of fallout do not arrive outside the blast area until approximately half an hour after an explosion. From then on it begins to cover an increasingly large area, and may eventually cover thousands of square miles.

The deposition of fallout may be likened to a fall of snow, and it is assumed that the fallout covers the area surrounding a structure in all directions uniformly. Three different kinds of radiation are associated with fallout—alpha particles, beta particles, and gamma rays. The primary aim of a fallout shelter is to provide a shield against the latter. Exposure doses of gamma radiation are measured in units called roentgens, and these doses are cumulative. The radioactivity of fallout decreases with time—rather rapidly at first, but more slowly as time passes.

Protection from the effects of radiation from fallout may be achieved in two ways. The first method is to place a barrier between the fallout field and the individual; this is termed "barrier shielding." The second method is to increase the distance of the individual from the fallout field and (or) reduce the extent of the fallout field contributing to the individual's dose; this is termed "geometric shielding." In most analyses it is necessary to consider the effects of both barrier and geometric shielding.

The term "protection factor" expresses the relative reduction in the amount of radiation that would be received by an individual in a protected location compared to the amount he would receive if he were in an unprotected location. From no protection (or zero), the scale or degree of protection moves upward, and it is considered that for the shelter of personnel a minimum protection factor of 100 is required. It is this figure which has been used when considering the shelter value of existing Government buildings.

Shielding against the effects of fallout is largely provided in buildings by a barrier of dense material between the occupants and the source of radiation. In general, there are two main sources of radiation in a building—from radioactive material on the ground and radioactive material on the roof.

Protection from roof radiation is mainly effected by the floors, roof, and interior partitions, and height of roof above the shelter area; protection from ground radiation is effected by exterior walls, interior partitions, and depth of the shelter area below ground. The depth below ground, the number and size of windows, and the type of construction are the most important factors in considering protection. Buildings with basements below ground obviously offer a higher degree of protection than those without basements.

Taking all this into consideration, it becomes obvious that structural design is the really important factor in fallout protection. Depth in the ground, thickness of floors and walls, and density of materials used all play a part. It is also obvious that the best, sometimes the only, time to render a building reasonably safe is at

the time of construction. It is a matter of pride to this Department that it has taken the lead in planning of this kind, and its efforts have brought widespread interest and duplication. To date three new Government buildings have been planned to provide high protection—the Law Courts building in Victoria, the Court-house at Mission, and the Animal Pathology Laboratory at Abbotsford. Others will follow. Extra cost of providing this safety factor is surprisingly low—less than 1 per cent—but the practice imposes problems on the architect, who must endeavour to retain solid walls and floors, keep window areas small, and yet produce a good looking and efficient building. A good example, to the informed observer, will be the Victoria Law Courts building.

This Department has nearly completed a survey of all Government buildings to determine protection against fallout. It has been found that frame construction offers little protection, and consequently buildings with this type of construction can be disregarded. In general, concrete and masonry buildings with concrete floors, provided they do not have too many window openings, offer the best degree of protection. Even if the protection factors of these buildings fall below the minimum, they can be improved at a reasonable cost. The protection offered by a material varies directly with its density (and thus its weight). The denser materials, such as lead, steel, concrete, brick, etc., are good, but economics limit the use of lead and steel for any large-scale use.

The writer had the privilege of attending a course at Arnprior, Ont., dealing with fallout protection, which was invaluable in assessing our own Government buildings. This experience, coupled with many spontaneous observations by others, reveals that our Department is recognized as playing a prominent part in what could be termed a necessary, but rather distasteful, subject.

J. R. SIMPSON, B.Sc., A.M.I.C.E., P.ENG., DIP.PUB.ADMIN.,  
*Senior Civil and Structural Engineer.*

## REPORT OF THE ARCHITECT-PLANNER

“Let the Municipal Council make this city of my birth great in the amenities of life, health and sanitation, let music and art grow under their auspices and make the dwellings of citizens the abodes of joy: let her citizens of all races and all sects and communities unite in goodwill and keep her fair name untarnished and her peace undisturbed; this is my prayer.”—  
*Sir Rabindranath Tagore, Bengali poet and Nobel Prize winner, 1913.*

This year's work cannot, by any stretch of the imagination, be termed monotonous, for it has contained much of interest, of disappointment, of elation, of surprise, and of frustration. A planner, in his true colours, never gives in, so if one route leads to a dead end, the answer may be found in some other mode of attack. Work, therefore, continues unabated on major schemes, which having received setbacks for a variety of reasons have now, through changed conditions, returned with renewed vigour.

The year commenced with an extremely successful one-day planning conference organized and held in Victoria. Favourable comment and reaction in town planning circles were forthcoming for its originality and content.

The Department was also represented at the International Town Planning Conference held in Vancouver.

The Department's exhibit at the Pacific National Exhibition has been brought up to date and additions made. Assistance was also given by the Division at the Junior Chamber of Commerce Fair and the Horticultural Exhibition, both in Victoria.

Schemes were prepared, and it is still hoped interest will be fostered, both public and private, in an urban renewal development around Bastion Square, Victoria. The Provincial Government, as the owner of five buildings in that vicinity, has a large stake in its environmental health.

A decision has now been handed down with regard to the perimeter of the Legislative Precinct, which necessitates a reappraisal of schemes already prepared, and this work is under consideration.

The most rewarding, yet to many others may be perplexing, event of the year now ending was the eventual taking-over of additional acreage at the Gordon Head Campus for the development of Victoria University. This will allow a steady and continuous development for generations to come. There will be a very difficult interim period with a split campus before the University can settle properly in its final location. Decisions of importance will need to be made with regard to the continuance, consolidation, and maintenance of the Lansdowne Road site.

The survey of Government properties continues unabated with the help of the Lands Department, and a new compilation of Government-held properties in built-up areas is now in the process of being steadily recorded.

Policy briefs have been prepared concerning Government parking, Provincial museums, siting of Government buildings within specified conditions, mimeographing and safe storage of essential Government records. Interdepartmental committees have now been set up to deal with these problems.

Continuing projects are concerned with traffic planning in the James Bay area, buildings required at Essondale, Jericho Hill School, and Court-houses for smaller communities.

An important project which has required great care and nurturing to keep alive is the civic centre project for the capital, of which the Law Courts building is an integral part. This scheme has now been adopted by the Centennial Committee as part of the Victoria City centennial project, but there are still many bridges to cross before finality can be claimed.

Planning saves time. By making provision for future growth we can avoid having to redesign our cities a few generations from to-day.

Planning saves money. We are spending millions correcting the mistakes of others. We should not duplicate or worsen these effects. A well-prepared plan for the development of any area means careful spending of public funds and ultimate savings for every taxpayer.

Proper planning ensures that our society is allotted the best available land for the purpose in mind.

The planner who persists in regarding his plan as an end in itself, regardless of public contribution, should be reminded to reflect that the ostrich who hides his head in the sand presumably exposes his valuable tail feathers to the raider!

The planner's plot: "Always behave like a duck—keep calm and unruffled on the surface, but paddle like blazes underneath" (with apologies to Lord Brabazon of Tara, 1938).

W. D. LOUGHER-GODEY,  
*Architect-Planner.*

## REPORT OF THE LANDSCAPE ARCHITECT

The joint efforts of the architect and the landscape architect produce the æsthetic environment of any building or group of buildings. Between them they create the external physical environment—the first impression—which pleases. The architect's work, on the one hand, has its functional as well as its æsthetic values, and it has become accepted and expected that he will produce a building pleasing to the eye. The landscape architect's function, however, being almost entirely in the realm of the artistic, has been accepted more slowly, most probably because his is a cost that can be omitted.

The art of landscape is therefore comparatively young, and it will probably be many years before the desirable balance is reached. It is most encouraging, however, to notice that even the most down-to-earth business and industrial corporations now insist on some form of landscaping around their buildings. Public buildings, it is felt, should take the lead in the presentation of landscape effects. To do so is to encourage others.

During the year this Division has designed, contracted, and produced several important developments. Of these, some are more worthy of note than others for their interest. The Victoria Law Courts, now nearing completion, has presented challenging problems in the treatment of grounds because of the limitations of space. To overcome these, extensive planters have been incorporated in the structure. These must be protected from leaching during the summer and yet provide adequate drainage during winter. Bearing in mind maintenance costs, these planters have been equipped with automatic sprinklers.

An unusual condition of this project, for British Columbia anyway, is turfing of all lawn areas around the building, thus producing green sward which, after three months, should give the appearance of having been in place for years and without the usual two to three years' treatment for weed eradication. This turf was trucked from the Vocational School site at Burnaby, where some 65,000 square feet of lawn was to be torn up to make way for new buildings. This turf has also been used to finish lawn areas at the Girls' Industrial School, the Testing Laboratory, and the Social Welfare building in Burnaby and Vancouver. Some will also be used at Victoria University.

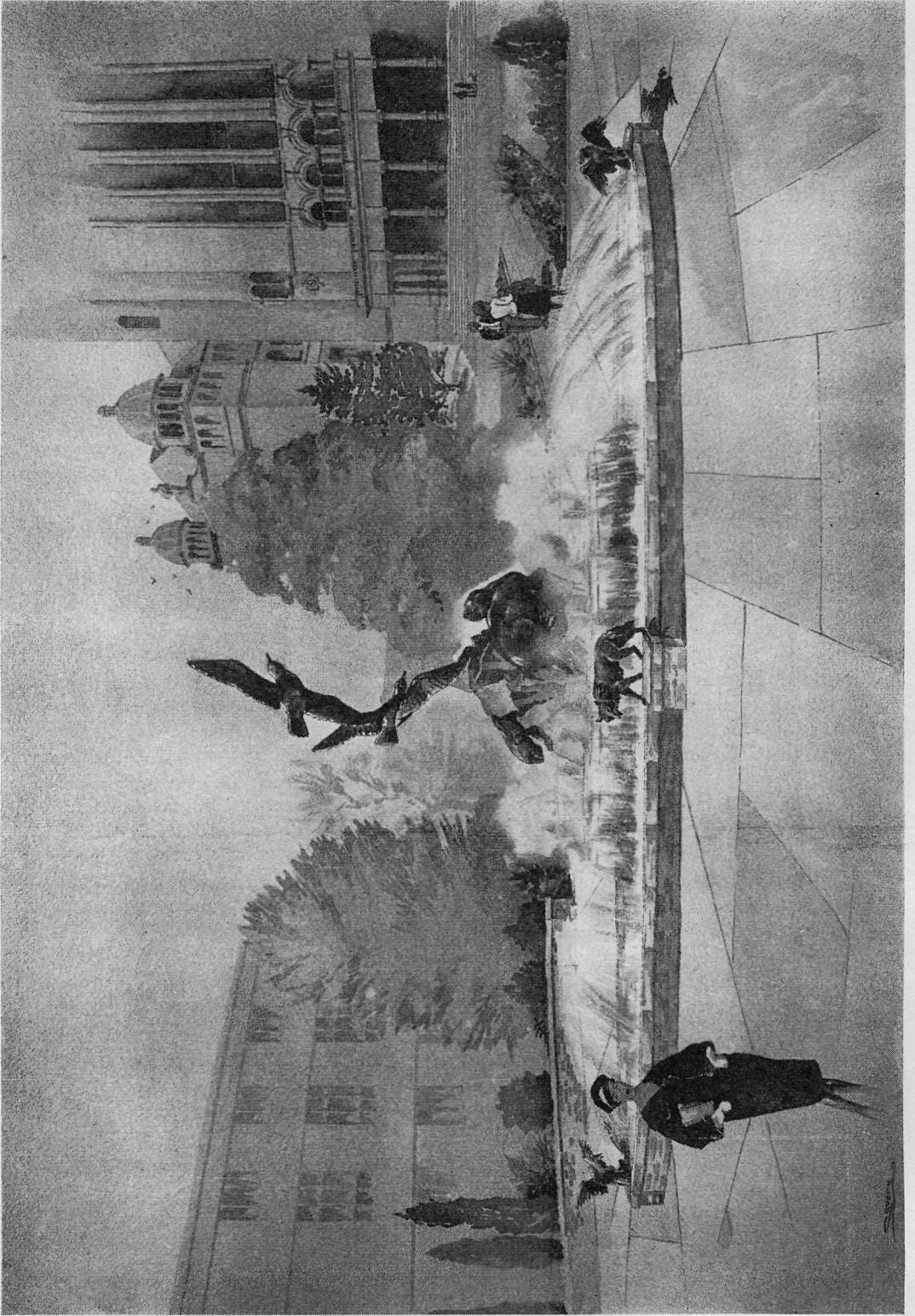
In designing landscaping features, every effort has been made to use courts, patios, paved areas, and planters rather than extensive flower-beds and plantings. This policy results in easier and less costly maintenance.

Gardening staff at Victoria and Vancouver have been consolidated into one staff under one supervisor of grounds in each area. This has proved to be most satisfactory, allowing greater flexibility and better coverage of work. It has also, in company with a policy of using mechanized equipment whenever and wherever possible, succeeded in lessening the amount of casual workers needed for seasonal work.

Two large projects for automatically controlled lawn irrigation have been devised and are nearing completion. These are at Government House and Victoria University. Controlled by time-clocks, these will provide unattended watering of lawns at times when full value will be obtained, and will sharply curtail the need for casual summer-time help.

A steady programme is being continued whereby grounds of Government buildings will be a credit both to the Government and to the community in which they are located.

R. H. SAVERY, M.A.I.L.A.,  
*Landscape Architect.*



## HISTORIC FOUNTAIN, VICTORIA

The historic fountain to be placed at the centre of the Parliament Buildings Precinct has been designed and will be built by the Department of Public Works. This is a pioneering lead in demonstrating how the work of the landscape architect can accent that of the architect. The present scheme is limited to a main walk between buildings with a piazza or square as a central motif. This will form the hub for a final scheme which will be developed in time.

A fountain was selected for two reasons. First, the ever-changing play of water by day and illumination by night provide high interest at all times. Secondly, it was the wish of the Government that a feature having historic significance and symbolism should form the centre of the area in which future expansion of Government buildings would occur. As the first exploration of British Columbia was from seaward, it seemed appropriate that a theme suggesting the sea should dominate. The fountain design has arisen from a desire to devise something which is imaginative and unusual.

The British Columbia of to-day came about by reason of the union of four colonies and territories: (1) The Crown Colony of Vancouver's Island (established 1849); (2) The Territory of the Queen Charlotte Islands (established 1852); (3) The Crown Colony of British Columbia (established 1895); (4) the Stickeen Territory (established 1862).

Also, it is coincidental, but factual, that these four areas have each their own separate and distinct Indian society. These were: (1) Vancouver Island—Kwakiutl, Nootka, and Salish; (2) Queen Charlotte Islands—Haida; (3) British Columbia—Interior Indians; (4) Stickeen Territory—Tahltan and Tlingit.

There is thus a good reason and means of tying the two sets of facts together. An additional one, which is most important, is that the first economic reason which brought about early exploration of this coast was the hunt for the sea otter. The skins of these animals were very much sought after and resulted in many expeditions.

To bring these together we have used animals as symbols. These will be supported by plaques setting out the historical facts. The centrepiece shows two sea otters—one looking down into the water, while the other looks up at two gulls wheeling overhead. The otters, the gulls, and a central rock plinth denote the sea. The four animals on the rim of the fountain are those most commonly used by the Indian societies (not tribes) as the leading or top figure on their totem-poles. They are the eagle (Vancouver Island), the raven (Queen Charlotte Islands), the wolf (Stickeen Territory), and bear (British Columbia). We have avoided pure Indian styling.

The fountain is of the surge and recirculate type. The motion of the water will suggest the waves of the sea breaking against a rock. It will be forced from many small jets spaced around the perimeter of the basin. Electrically controlled, it will surge in three successive waves, with the final one breaking on the central rock plinth. Fog jets will create an illusion of spray. A wind-force regulator located in the nearby Connaught Library will tune the force of water to the wind conditions, turning the pressure down when the wind is high and vice versa. The water will be recirculated by pumping, and only losses made good from city mains.

Night illumination will again be electrically controlled to provide an ever-changing play of colours. These will be predominantly blues and greens to accentuate the impression of the sea.

The symbolic theme was the thought of the Deputy Minister of Public Works, Mr. A. E. Webb. Historical material was prepared by Mr. Willard Ireland, Pro-

vincial Archivist; Indian material by Dr. G. Clifford Carl and Mr. Wilson Duff, of the Provincial Museum.

Design, clay models, and drawings were the work of Mr. Robert Savery, Landscape Architect to the Department of Public Works. With the help of the United Kingdom Trade Commissioner, bids were submitted by British statuary makers, and the firm of Birmingham Guild Limited has been commissioned to make the bronze figures and plaques. Public Works staff will carry out the construction.

The target date for activating the fountain is May 21, 1962. Progress to date indicates this target will be met.

## REPORT OF THE PERSONNEL OFFICER

*In common with the policy followed over the past two years, this year's Report will introduce staff members of the Department of Public Works. Scattered throughout this Report will be found photographs of engineers and draughtsmen of the Structural Division, together with a small sample of art-work produced by them.*

Early in 1960 it became evident that the Department would not be able to effectively discharge its increasing responsibilities unless the Department was organized on a simple basis that would allow flexibility to cope with new situations as well as fit the Department's needs and functions.

Many difficulties are encountered in organizational planning, but, if the organization is considered as the foundation upon which to build, and if all are aware of their part in it, then many rewarding results are provided. This office is the first to realize that no organization is ever perfect for all time, but ours is now tailored to fit present needs. Changes will likely occur. Planning must be considered a continuing process in order that a full team effort is achieved and maintained. Lastly, an organization is only as good as those working within it. An organization is not an object, but a collection of people.

An organization chart is attached to this report, and the functions of the various divisions will be briefly outlined.

### GENERAL

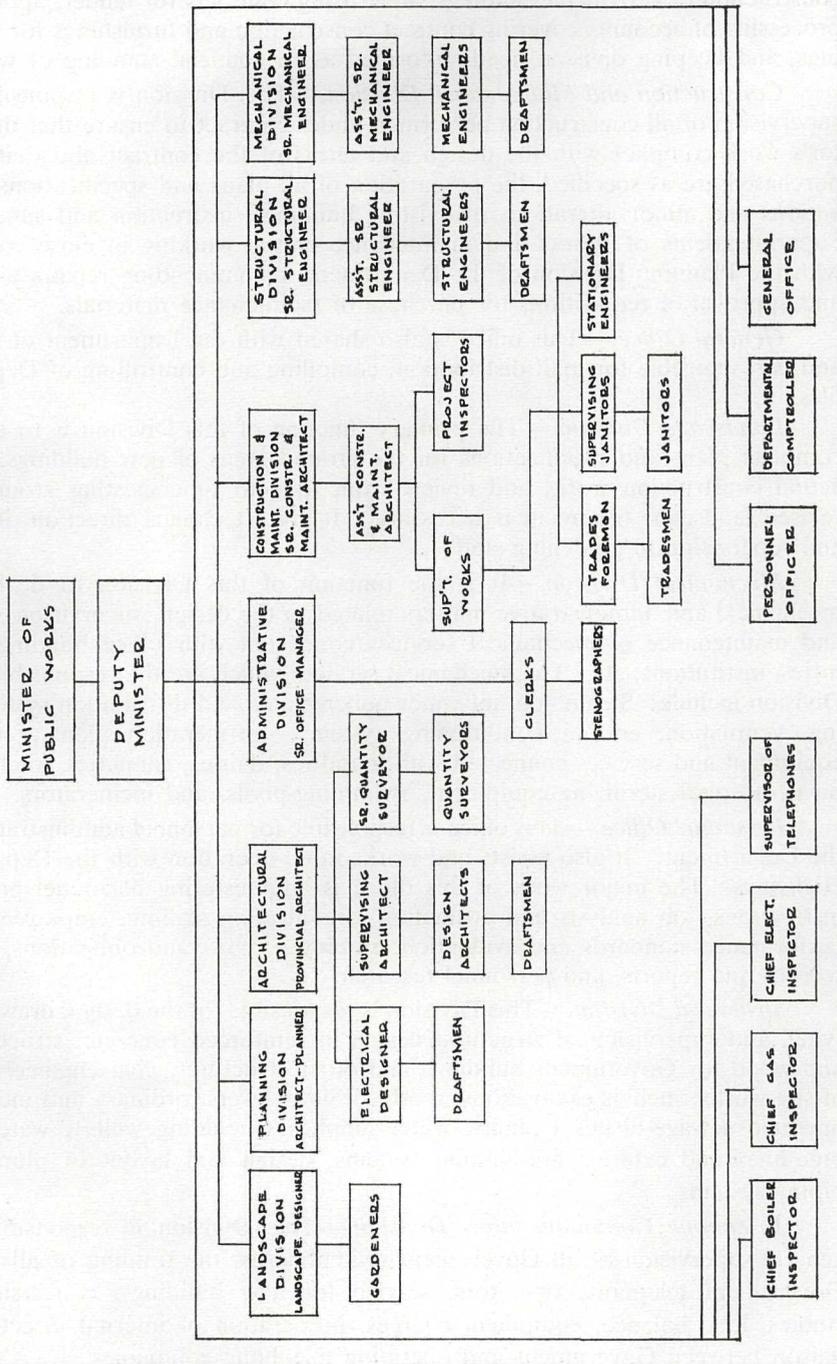
Under the authority of the *Department of Public Works Act* come construction, landscaping, heating, maintenance, and telephone communications of all Government buildings throughout the Province. This Department is also responsible for the administration of the *Gas Act*, the *Boiler and Pressure Vessel Act*, and the *Electrical Energy Act*. The primary function of the Department is service to other Government departments and to the general public.

### SPECIFIC

*Architectural Division.*—The purpose of this Division is to design and prepare sketch plans, presentation and working drawings, and specifications for all authorized capital projects and major alterations to existing buildings.

*Accounts Division.*—This Division is shared with the Department of Highways, and is responsible for the accounting for revenue and expenditure, preparation of budgets, and advising the executive on financial policies.

ORGANIZATION CHART · DEPARTMENT OF PUBLIC WORKS · MARCH 31 · 1960



*Administration Division.*—This Division is responsible for the general administration of the Department, preparation and dispatch of all specifications covering construction of Provincial buildings, advertising contracts for tender, approving and processing of accounts covering contract construction and furnishings for new buildings, and keeping division heads informed as to financial standing of work votes.

*Construction and Maintenance Division.*—This Division is responsible for the supervision of all construction performed under contract to ensure that the contractor's work complies with the design and terms of the contract and that materials purchased are as specified, the preparation of all plans and specifications for renovations and minor alterations of existing buildings, instruction and supervision of Superintendents of Works and maintenance crews, working in close co-operation with the Planning Division of the Department, recommending repairs as required, and approval of requisitions for purchase of maintenance materials.

*General Office.*—This office is also shared with the Department of Highways, and is responsible for mail distribution, compiling and controlling of Departmental files.

*Landscape Division.*—The primary function of this Division is to design and complete plans and specifications for the ground areas of new buildings, supervise actual construction work, and review from time to time existing grounds where revised landscape treatment is necessary. It gives technical direction, instruction, and supervision to gardening staff.

*Mechanical Division.*—It is the function of this Division to deal with the mechanical and administrative matters related to the design, supervision, operation, and maintenance of mechanical services connected with office buildings, laboratories, institutions, etc. The mechanical services which are the responsibility of this Division include: Steam and hot-water boiler plants and distribution systems; heating, ventilation, and air-conditioning systems; refrigeration plants; mechanical equipment and services connected with laundries, dairies, canneries, kitchen equipment, hospital sterilizing equipment, swimming-pools, and incinerators.

*Personnel Office.*—This office is responsible for personnel administration within the Department. It also assists and works in co-operation with the Department of Highways. The major work of this office is administering personnel policies and instructions, job analysis and evaluation, organization staffing, employee relations, performance standards and evaluation, employee rights and obligations, personnel records and reports, and personnel research.

*Structural Division.*—This Division is responsible for the design, drawing, specifying, and supervision of structural design in reinforced concrete, structural steel, and wood for Government buildings and other structures, civil engineering design of site works, such as excavations, roads, drains, sewers, ordinary and mechanically operated sewage-disposal plants, water-supplies (including wells), water storage, pipe-lines and exterior fire-fighting systems, design and layout of plumbing and piping systems.

*Telephone Communications Division.*—This Division is responsible for the general supervision of all Government switchboards, the training of all Provincial Government telephone operators, service for new buildings, conversion, traffic studies, load balance, equipment charges, preparation of internal directories, and liaison between Government and operating telephone companies.

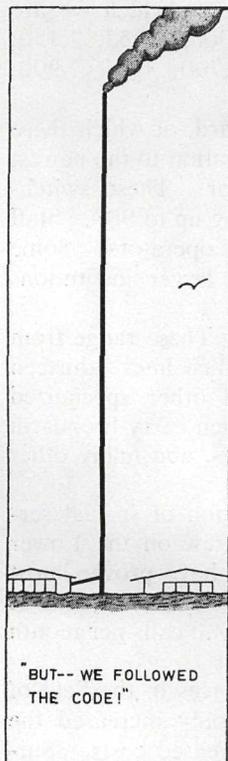
*Boiler and Machinery Inspection Division, Vancouver.*—This Division administers the provisions of the *Boiler and Pressure Vessel Act*, being responsible for approving the design of pressure vessels and their installation and related machinery.

*Electrical Inspection Division, Vancouver.*—This Division is responsible for administering the *Electrical Energy Act*, which governs the inspection and approval of all electrical installations in unorganized areas of the Province, municipalities and cities where service is required, and the approval of all plans and specifications for electrical installations within the industry.

*Gas Inspection Division, Vancouver.*—This Division is responsible for administering the provisions of the *Gas Act*, which governs the inspection of all installations of gas appliances in unorganized portions of the Province and in municipalities and cities where service is required.

This office would like to gratefully acknowledge the help, co-operation, and courtesy given by the other divisions of this Department, the Civil Service Commission, and the Superannuation Branch.

W. R. HENDERSON,  
*Personnel Officer.*



A. J. Perry-Whittingham,  
Junior Draughtsman.



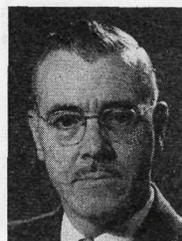
J. Relling,  
Senior Draughtsman.



A. Dery,  
Engineer—Grade 3.



J. Davies,  
Engineer-in-training.



T. O. White,  
Technical Draughtsman.

## REPORT OF THE SUPERVISOR OF TELEPHONES

The Telephone Division has again experienced a busy year, with the main portion of activity centring around the Parliament Buildings Telephone Exchange.

The Parliament Buildings switchboard, being the central telephone exchange for forty-six buildings, has increased its equipment facilities almost continuously since the original installation in 1909.

The first switchboard was a single-position fully manual board. It served eighty offices in the main building. In 1930 a two-position semi-automatic was installed. This piece of equipment served 300 locals. In 1951 the switchboard had reached its capacity, which was 400 locals, and a completely new switchboard was installed in the basement of the Douglas Building. The new board had a capacity of 700 locals and carried four positions. This was thought by all concerned to contain enough equipment for at least ten years. It was the largest automatic installation within the Province.

However, in 1958 traffic had built up to the point that orders were issued for a fifth position and 200 additional locals. In 1960 the traffic increased beyond all expectation and the sixth position was installed.

Figures taken from annual traffic counts since 1951 show the steady increase until 1957, and from this time forward a continued rapid growth, which we are still experiencing. Daily average in incoming calls: 1951, 2,000; 1952, 2,150; 1953, 2,300; 1954, 2,450; 1955, 2,600; 1956, 2,650; 1957, 2,700; 1958, 2,900; 1959, 3,400; 1960, 4,400.

In total, we now supervise forty-four positions of switchboard, of which there are ten different types, ranging from completely manual-type operation to the newest in the smaller-type automatic that does not require an operator. These switchboards carry as few as eighteen locals to the larger boards carrying up to 900. Staff requirement for switchboard service now totals more than seventy operators. Some of our switchboards are only open during business-hours, the larger institutions being staffed twenty-four hours per day.

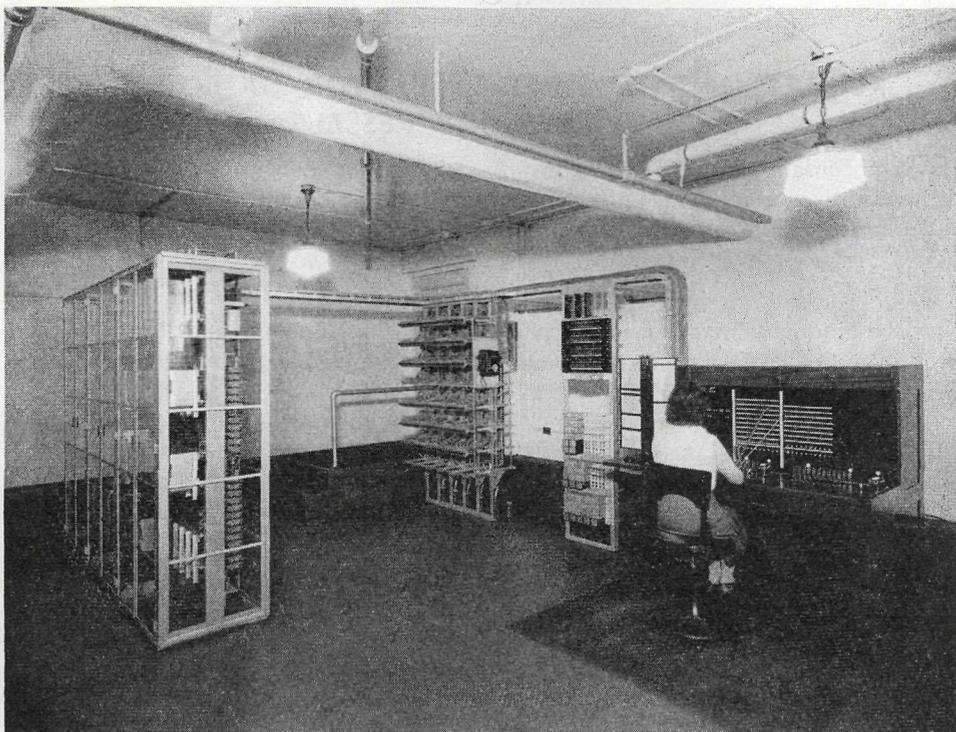
There are 1,071 business installations within the Province. These range from a single telephone to instruments carrying up to four central-office lines (thirteen instruments), nine stations of office intercommunication, and other specialized equipment. Other services include leased lines, private lines which carry fire-alarm circuits, teletype lines, control circuits for our two radio systems, and many other special services.

Foreign exchange service has now become our major portion of special services. We have lines between Victoria and Vancouver, also a few on the Lower Mainland. The Victoria-Vancouver Foreign Exchange circuits have proven most satisfactory. At the in-service date the average monthly traffic was 2,300 calls at a cost per call of \$2.16. To date we are averaging 16,000 to 17,000 calls per month at a cost of 32 cents per call.

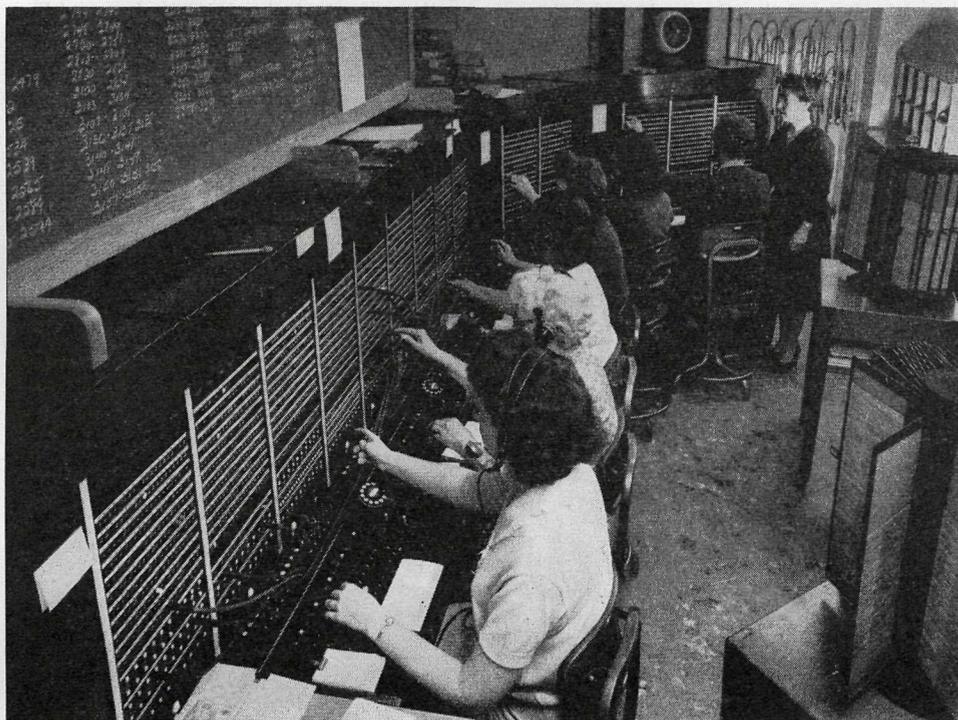
Now that the telephone industry has made such great advances in the field of automation, we find the newer types of equipment have not only increased the efficiency of Government offices, but in some cases actually decreased costs. Surveys are being taken continuously to modernize existing equipment.

The partial take-over of telephone accounting by the Public Works Department has been quite successful. The second phase of the operation will be completed within the next fiscal year, at which time all Provincial Government telephone accounts will be scrutinized, checked, and vouchered by this Division.

(MISS) RUTH E. THOMPSON,  
*Supervisor of Telephones.*



*1930: Two positions, 300 locals, one operator. Equipment was located in the same room.*



*1960: Six positions, 900 locals.*

## REPORT OF THE CHIEF INSPECTOR OF BOILERS AND PRESSURE VESSELS

In accordance with the provisions of the *Boiler and Pressure Vessel Act*, I have the honour to submit the fifty-ninth annual report of the Boilers and Pressure Vessels Inspection Division for the fiscal year ended March 31, 1961.

### GENERAL

The gradual increase of industrial density in the Kootenay and Prince George areas over the last ten years now warrants the establishment of resident district inspectors in Nelson and Prince George.

To this end, two young graduate mechanical engineers were appointed, which will enable us to rearrange staff so that by the summer of 1961 an office can be opened in Nelson, and by April of 1962 an office is planned for Prince George. This will result in a more efficient service in these areas than the annual itinerary method in force hitherto.

In the training of stationary engineers and welders, we have worked in close co-operation with the principals of the Vocational Schools in Burnaby and Nanaimo, the Vancouver Vocational Institute, and with the Director of High School Correspondence.

As a committee member, the Chief Inspector attended the Canadian Standards meeting at Ottawa in September to discuss interprovincial uniformity on rules governing boilers and pressure vessels.

### REGULATIONS

Much work has been done in the preparation of regulations governing welding and the qualification of welders. Meetings have been held with employer groups and labour delegations, resulting in valuable contribution to the proposed rules. It is expected these regulations will be ready for presentation in August, 1961.

### NEW CONSTRUCTION AND INSTALLATIONS

In spite of the recession, 131 new steam-boilers and 343 hot-water boilers were installed.

British Columbia boiler-shops built ninety-three boilers and 1,240 pressure vessels.

### ACCIDENTS AND REPAIRS

Three boilers were bulged by overheating and required patching. One new boiler was damaged by low water and required new tubes. No persons were injured. All repairs were made under an inspector's direction.

Three pressure vessels exploded and a valve on an air-compressor blew off. Three workmen suffered injuries.

SUMMARY OF WORK

	1960/61	1959/60	1958/59
Designs registered.....	718	560	528
Boilers built under inspection.....	93	115	126
Pressure vessels built under inspection.....	1,240	1,245	869
Total boilers inspected.....	3,771	3,899	4,371
Total pressure vessels inspected.....	2,138	2,226	2,043
New boiler installations.....	474	740	408
Engineers examined.....	580	555	623
Welders examined.....	1,624	1,828	1,923

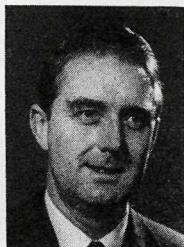
ENGINEERS' EXAMINATIONS

Class	Number Examined	Passed	Failed
First, A.....	24	13	11
First, B.....	13	10	3
Second.....	56	39	17
Third.....	126	100	26
Fourth.....	229	154	75
Boiler operator, A.....	43	30	13
Boiler operator, L.P.B.....	79	62	17
Boiler operator, H.P.B.....	10	7	3
Totals.....	580	415	165

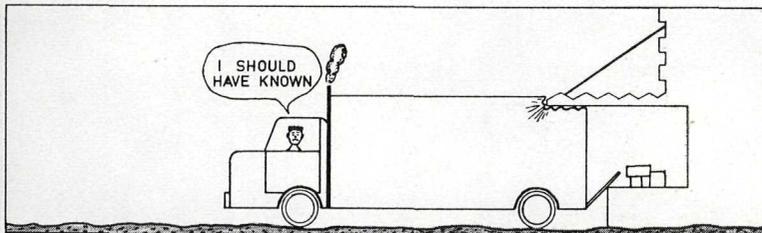
WELDERS' TESTS

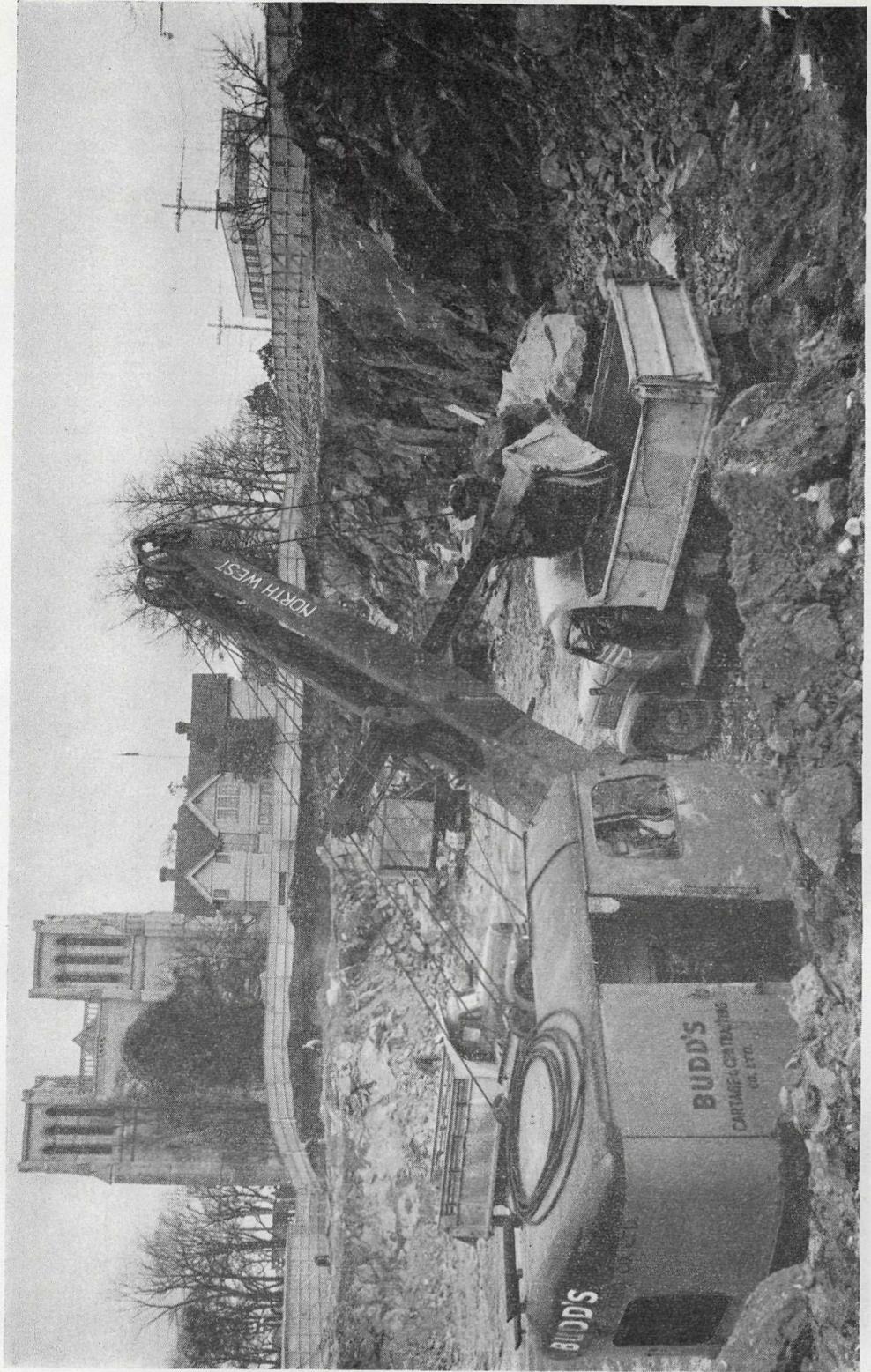
Grade	Number Examined	Passed	Failed
A.S.M.E.....	635	549	86
B. Electric.....	558	473	85
C. Oxy-acetylene.....	194	153	41
D. Pipe-line.....	106	99	7
Provisional.....	131	130	1
Totals.....	1,624	1,404	220

D. DENHAM, P.ENG.,  
*Chief Inspector.*

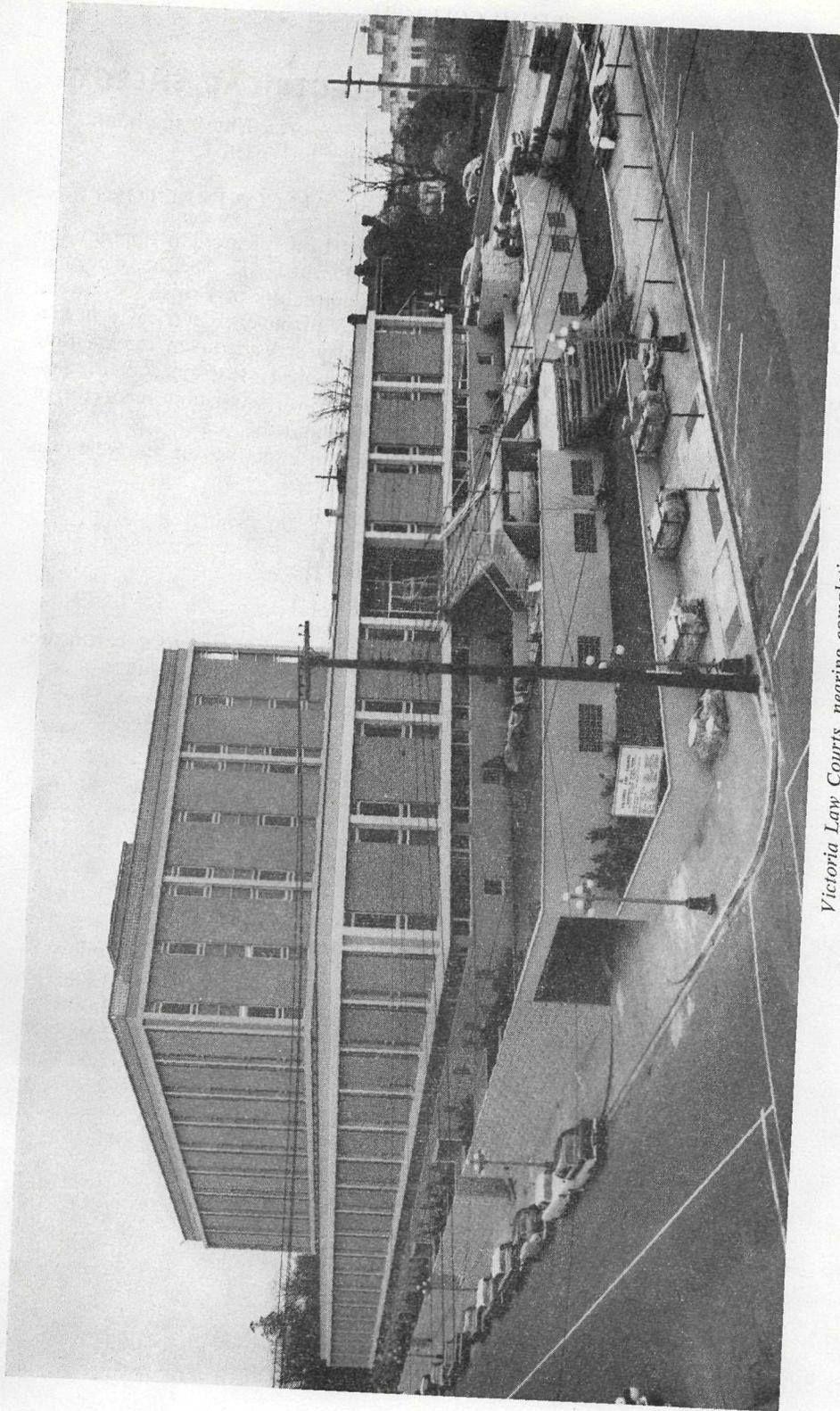


D. Walton,  
 Draughtsman—  
 Grade 2.





*Victoria Law Courts, as construction started.*



*Victoria Law Courts, nearing completion.*

## REPORT OF THE INSPECTOR OF ELECTRICAL ENERGY

In accordance with the *Electrical Energy Inspection Act*, I have the honour to submit my annual report for the fiscal year ended March 31, 1961.

### BOARD OF EXAMINERS FOR ELECTRICAL CONTRACTORS

The Honourable Minister of Public Works has been pleased to appoint the following members to the Board, effective January 1, 1961: K. McRae, electrical contractor, representing the Associated Electrical Contractors of British Columbia; G. Woodley, electrical contractor, representing the Vancouver Electrical Association; and C. Kilpatrick, electrical inspector for the City of Vancouver, representing cities and municipalities. Other members of the Board are L. Robson (Chairman), Chief Inspector of Electrical Energy, and G. A. Harrower, Assistant Inspector of Electrical Energy. Eleven meetings were held throughout the year.

The total number of certificates of competency in effect during the year was as follows:—

Class A .....	199	Class PB .....	127
Class B .....	420	Class PC .....	212
Class C .....	551	Class TB .....	1
Class PA .....	69	Total .....	1,579

Three hundred and forty-two candidates for electrical contractors' certificates of competency were examined during the year, with the following results:—

Class	Number of Candidates Examined	Passed	Failed
A .....	56	24	32
B .....	111	42	69
C .....	175	79	96
Totals .....	342	145	197

### PERMITS

The total number of permits issued during the fiscal year was as follows:—

April, 1960 .....	3,077	November, 1960 .....	3,886
May, 1960 .....	3,639	December, 1960 .....	3,006
June, 1960 .....	3,648	January, 1961 .....	2,988
July, 1960 .....	3,328	February, 1961 .....	2,524
August, 1960 .....	3,955	March, 1961 .....	2,997
September, 1960 .....	3,966		
October, 1960 .....	4,238	Total .....	41,252

DISTRICT OFFICES AND INSPECTIONS

The following is a record of inspections undertaken during the year:—

Office Location	Inspections		
	1960/61	1959/60	1958/59
Abbotsford .....	3,607	3,753	3,548
Alberni .....	2,287	2,213	2,865
Chilliwack .....	2,382	2,601	2,995
Courtenay .....	3,259	3,317	2,825
Cranbrook .....	2,042	2,149	2,576
Dawson Creek .....	1,427	1,657	1,440
Duncan .....	2,849	3,230	2,946
Fort St. John .....	1,556	1,080	1,317
Kamloops .....	2,268	2,929	2,859
Langley, Delta, and White Rock .....	2,087	2,520	3,013
Nanaimo .....	2,760	2,868	2,255
Nelson .....	2,219	2,123	1,969
New Westminster (three inspectors) .....	5,398	8,956	6,107
Penticton .....	2,556	2,214	2,362
Powell River .....	1,964	1,951	2,205
Prince George (two inspectors) .....	5,121	5,470	5,251
Prince Rupert .....	1,794	1,852	1,746
Quesnel .....	2,007	1,933	1,491
Richmond (two inspectors) .....	3,560	6,130	6,109
Salmon Arm .....	1,648	579	.....
Trail .....	1,964	2,203	1,712
Vancouver (West Coast, Gulf Islands, and Lillooet) .....	1,000	1,394	1,105
Vernon .....	2,157	2,727	2,824
Victoria (three inspectors) .....	8,031	8,622	8,231
Totals .....	65,943	73,651	69,324

Effective May 1, 1960, inspections for The Corporation of the City of Penticton were undertaken by this Division. The City of Penticton was incorporated with the district area, which was being inspected from an office located in Penticton.

REGULATIONS

The regulations governing certificates of competency for electrical contractors were revised during the year. Provision has now been made for a group of bona fide property-owners or tenants to undertake the construction of overhead electric lines in rural areas for the purpose of transmitting electrical energy to their several properties. This step was taken in order that such persons might contribute their labour in lieu of cash or other considerations for such construction and could in some instances make possible the extension of long rural lines formerly considered to be uneconomic.

Provision has also been made for the issuance of restricted certificates to cover specific types of electrical work and for special certificates which would cover installations of a special nature. Recognition has also been included for persons registered as professional engineers in the field of electrical engineering without the need for further qualifying examinations.

The schedule of fees remains at the same level, with the exception of fees for probational certificates. These are now at the same level as full certificates of equivalent rating.

CANADIAN STANDARDS ASSOCIATION

The Chief Inspector continued to represent the Province on the Approvals Council of the Canadian Standards Association and on committees on the Canadian Electrical Code. He continues to act as Chairman of the Canadian Electrical Code,

Part I, Committee, which Committee is responsible for the preparation and editing of the Canadian Electrical Code.

Two meetings of the Canadian Standards Association Approvals Council (Electrical) and of the Committee on the Canadian Electrical Code, Part I, were attended, the first during June in Vancouver and the second during November in Toronto. In addition, a meeting was attended in Montreal during the month of January to consider the proposal for manufacturer certification. Due to the limited scope of the Approvals Laboratories, some investigation has been under way with a view to supplementing laboratories approval service with a licensing scheme operated by Canadian Standards Association to permit a manufacturer to certify that electrical merchandise has been constructed in accordance with recognized engineering specifications. It is anticipated that when this proposal is finalized, it will be of great assistance to this Division in so far as deciding the basis for acceptance for electrical equipment which is beyond the normal scope of Testing Laboratories. It is anticipated that a request will be made for an enabling Order in Council at an early date.

The rules for the installation of electrical equipment are constantly under review in order to keep them up to date with respect to new materials and practices which are developed by industry from time to time.

#### EXAMINATION OF MOTION-PICTURE PROJECTIONISTS

The Division assisted the Provincial Fire Marshal in conducting four examinations for projectionists. The regulations covering such examinations provide that the Inspector of Electrical Energy be a member of this Examining Board in company with the Fire Marshal. In this connection, all fees arising from these examinations accrue to the credit of the Fire Marshal's department.

#### POLE-LINE PERMITS

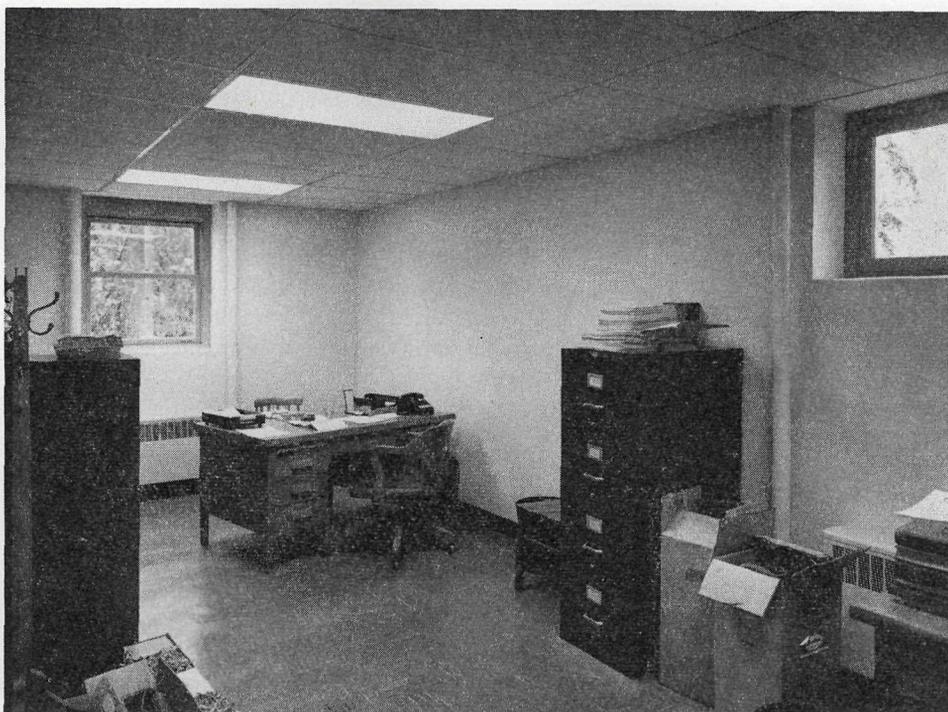
During the year the Division checked 972 applications for the erection of pole-lines on Crown lands or Provincial highways. Recommendations on each application were forwarded to the Regional Engineer of the Department of Highways. This was an increase of 217 over the previous year and reflects the continuing activity in providing electrical service throughout the Province.

#### ACCIDENTS

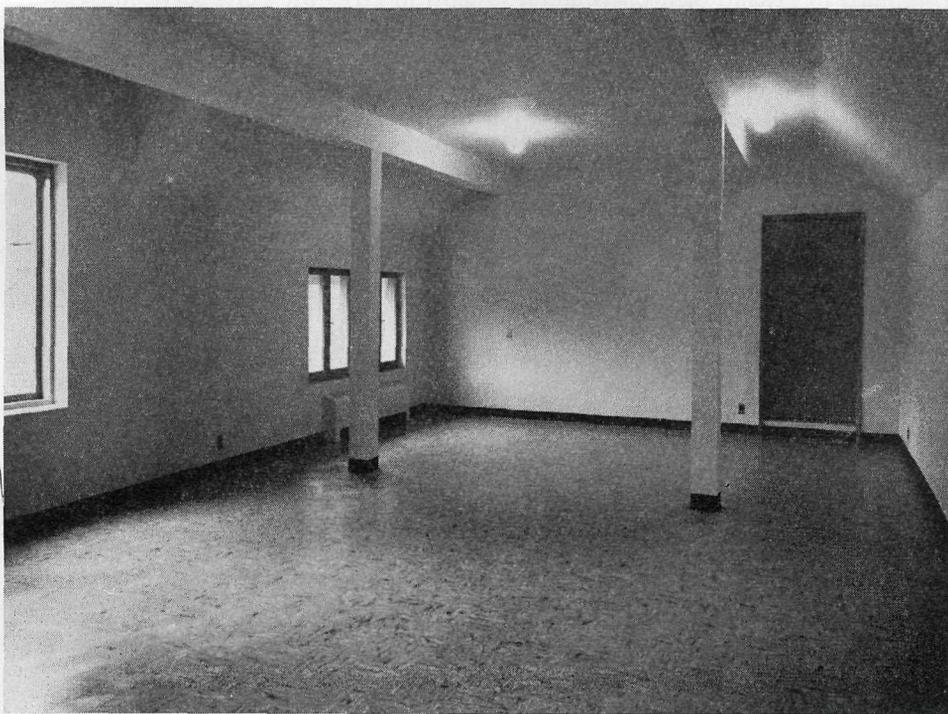
There were nineteen accidents recorded during the year, which is an increase of two in the number of accidents reported for the previous year. Seven of the accidents reported were fatal.

May I again express my appreciation for the splendid co-operation and continued interest in our problems by the Departmental staff during the year.

L. ROBSON, P.ENG.,  
*Inspector of Electrical Energy.*



*Interior views of old Girls' Industrial School (800 Cassiar Street, Vancouver)  
remodelled into office space.*



## REPORT OF THE CHIEF GAS INSPECTOR

### THE ACT

New regulations governing the installation, protection, and maintenance of gas mains, services, and meters in the Province of British Columbia were made by Order in Council No. 1707, approved July 19, 1960, and published in Part II of The British Columbia Gazette dated August 11, 1960.

Regulations respecting interim approval and interim listing of gas appliances were amended by Order in Council No. 1708, approved July 19, 1960, published in Part II of The British Columbia Gazette dated August 11, 1960.

The regulations governing the installation of gas piping, appliances, and venting in British Columbia were amended by Order in Council No. 1709, approved July, 1960, published in Part II of The British Columbia Gazette dated August 11, 1960.

### THE DIVISION

At present the staff consists of the Chief Inspector, Assistant Chief Inspector, sixteen Gas Inspectors, one Senior Clerk (Office Manager), one Clerk—Grade 2, one Clerk—Grade 1, two Clerk-Stenographers—Grade 2, one Clerk-Typist—Grade 1, plus one Clerk—Grade 1 (half time) in our Victoria office and one Clerk-Typist—Grade 1 (part time) in our Abbotsford office.

Night-school courses were once again conducted in Vancouver, Burnaby, Victoria, Nanaimo, Abbotsford, Vernon, Trail, Nelson, Kamloops, and Prince George. These courses were conducted jointly by this Division, the gas utility, and the School Boards. In the over-all picture, in excess of 1,100 persons attended these gas courses.

Natural gas was not distributed to any new areas during the year. The utilities continued to expand their distribution systems in areas presently serviced.

The use of natural gas is being more widely resorted to by industrial, commercial, and domestic establishments. There is every reason to expect this trend will continue, even though the rate of increase during the past fiscal year was below that of the previous, this being mainly due to a decrease in the number of new homes built. Plastic mains and services used in certain rural areas by the utilities have lived up to expectations.

### ACCIDENTS

During the fiscal year there was one death in the City of Victoria which was attributable to monoxide poisoning.

### SUMMARY OF WORK

	1960/61	1959/60	1958/59
New designs checked, industrial approval	601	639	411
Gas Codes distributed	2,182	574	811
Gas-fitters' licences issued	1,413	1,002	1,137
Gas contractors' licences issued	535	553	568
Provisional licences issued	862	1,190	1,281
Gas-fitters' examinations	184	303	264
Gas-fitters' re-examinations	71	123	137
Number of gas-fitters passed examination	239	343	277
Number of gas permits issued, municipalities	14,635	19,624	17,428
Number of gas permits issued by this Division	12,883	17,328	16,230
Permit application pads distributed	485	662	-----

A. G. KANEEN, P.ENG.,  
*Chief Gas Inspector.*

## **REPORT OF THE DEPARTMENTAL COMPTROLLER**

The following pages present in detail the expenditures relating to the construction, alteration, and repairs on the various Government buildings and institutions for the fiscal year 1960/61.

**A. E. RHODES,**  
*Departmental Comptroller.*

## STATEMENT OF EXPENDITURES, FISCAL YEAR 1960/61

## ADMINISTRATION AND MAINTENANCE VOTES

(For details see Public Accounts.)

Vote 299.	Minister's Office .....	\$21,249.01
Vote 300.	General Administration .....	174,643.83
Vote 301.	Parliament Buildings (Maintenance) .....	865,576.74
Vote 302.	Government House (Maintenance) .....	87,856.28
Vote 303.	Government Buildings (Maintenance) .....	3,422,333.98
Vote 305.	Rentals .....	421,642.49
Vote 306.	Gas Division .....	164,616.03
Vote 307.	Steam-boiler Inspection .....	141,380.37
Vote 308.	Electrical Energy Inspection .....	301,538.14
		<u>\$5,600,836.87</u>
Less credits—		
	Rentals, etc., Government buildings .....	137,866.41
	Repayable items, Rental Vote .....	320.00
		<u>\$5,462,650.46</u>

## CAPITAL

Vote 304.	Construction of Provincial Buildings (see expenditures by buildings listed below) .....	\$2,964,411.87
	Less Federal Government contributions .....	148,653.14
		<u>\$2,815,758.73</u>

## SUMMARY

Net expenditure, Department of Public Works—		
	Administration and maintenance .....	\$5,462,650.46
	Capital .....	2,815,758.73
		<u>\$8,278,409.19</u>

## VOTE 304—CONSTRUCTION OF PROVINCIAL BUILDINGS

Project No.	Description	Expenditure
332-B	Alterations to Allico Infirmary .....	\$9,997.17
242-B-2	Random Sample Poultry Testing Station, Abbotsford .....	53,868.89
299-B	Burnaby Vocational School .....	75,245.42
320-B	New residence, Department of Mines, Charlie Lake .....	15,760.60
322-B	New residence, Department of Highways, Charlie Lake .....	16,500.90
333-B	Charlie Lake Operation Centre and Core-storage Site, Department of Mines .....	121,835.05
6-B-31	Replacement of Wilson Ranch barn, Colony Farm .....	39,381.24
353-B	Connaught Fountain Garden, Superior Street, Victoria .....	5,159.43
9-B-18	Remodelling barn, Colquitz Mental Home .....	*
25-B-10	Sprinkler system, Vernon Home for Aged (Dellview) .....	4,720.86
355-B	Purchase of equipment, Douglas Building and Michigan Street Cafeterias .....	1,166.54
	Essondale—	
5-B-21	100-bed nurses' home and training centre .....	1,037.25
5-B-34	Renovations to butcher-shop .....	*
5-B-41	Sewage-disposal .....	1,323.22
5-B-53	300-bed unit, Port Coquitlam (Valleyview) .....	12,788.34
5-B-65	Addition to boiler-house .....	1,896.64
5-B-82	Water-distribution system .....	*
5-B-87	Laundry equipment .....	1,104.97
5-B-97	Fire-escapes, Home for Aged, Buildings 1, 2, and 3 .....	2,020.86
5-B-101	New substation and overhead circuits .....	6,977.29
5-B-102	Alteration and renovations to kitchens and staff changing-rooms .....	22,427.61
5-B-112	Ventilation, West Lawn Building .....	6,356.48
5-B-115	New cemetery .....	10,000.00
5-B-116	Landscaping, roads, and parking .....	15,000.00
5-B-119	Garbage-handling and incinerators .....	37,294.24

\* Funds released but no expenditure during fiscal year.

VOTE 304—CONSTRUCTION OF PROVINCIAL BUILDINGS—Continued

Project No.	Description	Expenditure
5-B-124	Fire-escapes, East Lawn Building .....	\$58,202.95
5-B-125	Installation of new telephone equipment .....	5,490.63
5-B-126	Sterile supply centre, East Lawn Building .....	7,884.76
5-B-127	Bathing facilities, Ward F 1 .....	1,052.86
5-B-128	Construction of Occupational Therapy Department .....	3,697.89
5-B-129	Toilet facilities .....	7,536.86
289-B	General expenses, surveys, supplies, etc. ....	150,583.50
208-B	Girls' Industrial School, Burnaby .....	1,914.12
311-B	Remodelling old Girls' Industrial School, Cassiar Street, Vancouver .....	2,860.00
335-B	Timber-clearing, Girls' Industrial School, Burnaby .....	5,560.00
371-B	Waterproofing Court-house, Grand Forks .....	16,500.00
	Haney Correctional Institution—	
123-B-2	Awnings, Administration Building .....	*
123-B-5	Development of grounds and irrigation system .....	6,066.45
123-B-6	Concrete footings for perimeter fence .....	585.98
123-B-11	Alterations to the main electrical switchboard .....	*
123-B-13	Sallyport .....	47,198.97
123-B-14	Water-supply .....	3,619.10
	Jericho Hill School—	
79-B-5	Sprinkler system .....	15,415.48
79-B-8	Playground area (sidewalk and steps) .....	1,177.13
342-B	Air-conditioning Forestry Building, Kamloops .....	14,123.00
319-B	Additions to the Health and Welfare Building, Kamloops .....	77,375.61
372-B	Ventilation of the Legislative Chambers .....	14,361.42
354-B	Fire precautions, Marpole Infirmary .....	16,183.20
346-B	Provincial Government offices, Mission and District .....	161,517.75
341-B	Motor-vehicle Branch accommodation for additional equipment .....	3,999.52
338-B	Conversion D.C. elevator, New Westminster Court-house .....	2,265.00
308-B	Purchase of a building in New Westminster for emergency Court-house accommodation and for interior amenities .....	118,270.01
	Oakalla—	
39-B-18	Security fence (South Wing and Royal Oak-Avenue) .....	19,551.14
39-B-51	Fire Marshal's recommendations .....	8,482.89
39-B-55	Conversion of supply circuits .....	1,065.80
39-B-57	Additional steam capacity .....	5,589.61
39-B-61	Renovation of Young Offenders' Unit building to hospital .....	68,217.73
39-B-62	Roads .....	7,202.20
292-B	Structural alterations, Parliament Buildings .....	47,062.46
368-B	Renewal of steam-lines, Parliament Buildings .....	12,073.55
337-B	Cell-block and renovations, Pentiction Court-house .....	8,727.07
201-B-1	Prince George Government building for Civil Defence .....	10,709.49
312-B	Prince George Vocational School .....	54,269.81
317-B	Waterproofing Prince Rupert Court-house .....	15,000.00
313-B	Government Agent's residence, Prince Rupert .....	261.90
351-B	Water-main extension on Interurban Road, Saanich .....	*
24-B-5	Sprinkler system, Skeenaview Hospital .....	14,152.25
331-B	Addition to Court-house, Terrace .....	2,652.42
340-B	Alterations to Topaz Avenue storage vault .....	2,909.35
	Tranquille School—	
10-B-12	Water-supply and sewage-disposal .....	8,160.70
10-B-37	Installation of showers .....	3,616.73
10-B-38	Fire-truck .....	27,825.00
10-B-39	Renewal of steam-lines .....	1,985.04
10-B-40	Houses .....	24,308.42
10-B-41	Alterations to main building .....	74,919.71
10-B-42	Boiler No. 1 .....	5,161.10
10-B-43	Renewal of steam-lines to residences .....	23.10
369-B	College of Education, University of British Columbia (Vancouver) .....	2,933.08
89-B-1	Administration offices—Seventh Floor, Provincial Health Building, Vancouver .....	84,154.62
345-B	Street-lighting, Heather Street, Vancouver .....	*
150-B-1	Storage space, Polio Pavilion, Vancouver .....	*
178-B-1	Alterations, Victoria University .....	19,802.91
352-B	Victoria University Furniture, Classroom and Faculty Block .....	188.69

\* Funds released but no expenditure during fiscal year.

## VOTE 304—CONSTRUCTION OF PROVINCIAL BUILDINGS—Continued

Project No.	Description	Expenditure
352-B	Victoria University—Contract No. 1 (clearing and excavation for Classroom and Faculty Building) and Contract No. 2 (Classroom and Faculty Block) .....	\$74,577.04
339-B	Victoria Law Courts .....	842,389.56
279-B-4	Alterations to switchboard, Victoria .....	3,340.40
31-B-3	Landscaping, Pearson Tuberculosis Hospital .....	42,957.26
31-B-5	Fire-alarm, Tuberculosis unit, Tenth and Willow, Vancouver .....	3,935.00
31-B-6	Renovations and waterproofing, Pearson Tuberculosis Hospital .....	16,400.86
	The Woodlands School—	
7-B-14	Storm-sewers .....	8,746.53
7-B-36	Fly-screens .....	1,031.00
7-B-37	Electrical distribution and rebuild vault .....	8,300.00
7-B-40	Landscaping, fencing, paving, etc. ....	172.29
7-B-41	Renovation to old kitchen .....	1,208.44
7-B-42	Toilet facilities, playing area .....	27.46
7-B-43	Sewer-line .....	10,975.66
	Highway garages, sheds, etc.—	
359-B	Material- and chemical-storage shed, Alberni .....	4,600.00
370-B	Equipment-shed, Anahim Lake (South Cariboo) .....	7,319.84
379-B	New wiring, Atlin garage (Atlin (North)) .....	521.77
363-B	Dry storage shed, Burns Lake (Omineca (West)) .....	4,500.00
334-B	Living accommodation, Chetwynd maintenance camp (South Peace River) .....	8,800.00
365-B	Three-bay equipment-shed, Cherryville (North Okanagan) .....	12,000.00
327-B	Material- and chemical-storage shed, Gibsons (North Vancouver) .....	4,268.05
358-B	Material- and chemical-storage shed, Horseshoe Bay (North Vancouver) .....	1,233.87
324-B	Three-bay equipment-shed, Hope (Yale) .....	22,000.00
377-B	Construction of a bunk-house for single men and install a pump-house and stand-by light plant at Honeymoon Camp (Fort George) .....	10,000.00
378-B	Construction of a dry storage shed at Houston (Omineca (West)) .....	4,500.00
367-B	Three-bay equipment-shed, Kimberley (Cranbrook) .....	11,695.03
381-B	Exhaust system in Merritt garage (Yale) .....	500.00
325-B	Additional garage facilities, Nelson (Nelson-Creston) .....	57,595.46
357-B	Material- and chemical-storage shed, North Vancouver (North Vancouver) .....	4,265.42
21-B	Heating system, Port Clements garage (Prince Rupert) .....	2,898.25
323-B	Addition to main garage, Prince George (Fort George) .....	22,138.79
380-B	Exhaust systems in the Princeton and Allison Pass garages (Similkameen) .....	130.91
366-B	Four-bay equipment-shed, Rock Creek (Grand Forks-Greenwood) .....	19,924.54
360-B	Material- and chemical-storage shed, Mayne Island (Nanaimo-Islands) .....	3,400.00
309-B	Materials for small storage shed at Sayward (Comox) .....	1,500.00
362-B	Dry storage shed, Smithers (Skeena (East)) .....	3,000.00
326-B	Material- and chemical-storage shed, Squamish (North Vancouver) .....	1,155.71
348-B	Heating for Tête Jaune equipment-shed (Fort George) .....	3,791.00
382-B	Exhaust system in Vernon garage (North Okanagan) .....	*
356-B	Material- and chemical-storage shed, Westview (North Vancouver) .....	2,299.77
		<u>\$2,964,411.87</u>

\* Funds released but no expenditure during fiscal year.

## FEDERAL GOVERNMENT CREDITS

299-B	Burnaby Vocational School .....	\$148,653.14
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## TENDERS RECEIVED AND CONTRACTS AWARDED

Description of Work and Names of Tenderers	Amount	Remarks
<i>Sprinkler System, Skeenaview Hospital, Terrace:</i>		
Fred Walsh & Son Ltd.....	\$13,364.00	
Automatic Sprinkler Co. of Canada Ltd.....	17,100.00	
Grinnell Co. of Canada Ltd.....	13,550.00	Awarded.
The Bay Co. (B.C.) Ltd.....	13,884.00	
<i>Janitorial Services, Provincial Government Buildings, Vancouver Area:</i>		
American Building Maintenance Co. Ltd.....	122,031.50	
Excelsior Building Maintenance Ltd.....	105,360.00	Awarded.
<i>Air-conditioning, Forestry Building, Kamloops:</i>		
H. Giddens Ltd., Kamloops.....	15,666.00	
Independent Refrigeration Ltd.....	12,814.00	Awarded.
Broadway Refrigeration & Air Conditioning Ltd.....	15,197.00	
M. & M. Heating, Vancouver.....	13,300.00	
<i>Alterations and Additions to Department of Mines Building, Charlie Lake:</i>		
Klassen Construction Ltd.....	106,444.00	Awarded.
Dyke Construction Ltd., Dawson Creek.....	108,872.00	
Stanzl Construction Co. Ltd.....	113,234.00	
<i>British Columbia Vocational School, Burnaby, Phase 2, Contract No. 1:</i>		
Alpha Steel Co. Ltd.....	82,813.00	
Western Bridge & Steel Fabricators Ltd.....	90,033.00	
Northern Asbestos & Building Supplies Ltd.....	89,914.00	
Permasteel Engineering Ltd.....	93,410.00	
Pacific Steel Erectors Ltd.....	77,610.00	Awarded.
Cloverdale Construction Co. Ltd.....	127,888.00	
<i>Victoria University, Victoria, Contract No. 2 (Classroom and Faculty Block):</i>		
E. J. Hunter & Sons.....	399,569.00	
Luney Bros. & Hamilton Ltd.....	341,665.00	
Burns & Dutton Concrete & Construction Ltd.....	355,000.00	
Narod Construction Ltd.....	365,963.00	
Cloverdale Construction Co. Ltd.....	369,948.00	
M. P. Paine Co. and Patterson Construction Co. Ltd.....	357,890.00	
Commonwealth Construction Co. Ltd.....	370,802.00	
Farmer Construction Ltd.....	329,423.00	Awarded.
<i>Conversion to Oil Firing of the Boiler Plant at Victoria University, Victoria:</i>		
W. R. Menzies & Co. Ltd.....	14,400.00	Awarded.
C. J. McDowell Plumbing & Heating Ltd.....	20,041.00	
Cal-Van Construction.....	16,654.00	
<i>Landscaping Pearson Tuberculosis Hospital, Vancouver:</i>		
Lloyd G. Scott Kitimat.....	39,493.38	
Beaver Construction Co. Ltd.....	35,640.00	Awarded.
Holland Landscapers Ltd.....	34,855.00	
Conniston Construction Co. Ltd.....	35,200.00	
<i>Clearing, Foundations, and Structural Steel Frame for One Building, British Columbia Vocational School, Prince George:</i>		
Lee Bilt Construction Co.....	46,558.00	
Cloverdale Construction Co. Ltd.....	51,972.00	
Narod Construction Ltd.....	65,000.00	
C. J. Oliver Ltd.....	46,500.00	Awarded.
<i>Contract No. 3, Law Courts, Victoria:</i>		
John Laing & Son (Canada) Ltd.....	1,956,088.00	
Luney Bros. & Hamilton Ltd.....	1,686,000.00	Awarded.
Commonwealth Construction Co. Ltd.....	1,758,723.00	
Farmer Construction Ltd.....	1,768,912.00	
Beaver Construction Co. Ltd.....	1,997,366.00	
<i>Addition to Health and Welfare Centre, Kamloops:</i>		
Wilson & Dalgleish.....	87,452.00	
McGregor Construction Co. Ltd.....	83,885.00	Awarded.
Taylor & Son Ltd.....	85,065.00	
Thomas F. Hall Ltd.....	89,945.00	
M. & G. Construction Co. Ltd.....	99,797.00	
<i>Landscaping Pearson Tuberculosis Hospital, Vancouver, Part 2 (Construction):</i>		
Beaver Construction Co. Ltd.....	33,500.00	Awarded.
E. H. Shockley & Son Ltd.....	34,524.00	
<i>Additions to Drainage System, The Woodlands School, New Westminster:</i>		
Mainland Installations Ltd.....	9,318.00	
Manson Bros. Ltd.....	8,900.00	
Salmac Construction Ltd.....	16,135.16	
Fownes Construction Co. Ltd.....	8,202.05	Awarded.
The Bay Co. (B.C.) Ltd.....	10,330.00	
Ward & Son Ltd.....	10,300.00	

## TENDERS RECEIVED AND CONTRACTS AWARDED—Continued

Description of Work and Names of Tenderers	Amount	Remarks
<i>Janitorial Service, British Columbia Vocational School, Burnaby:</i>		
American Building Maintenance Co. Ltd.	21,032.40	
Excelsior Building Maintenance Ltd.	14,416.00	
P.K. Floor & Building Maintenance Ltd.	14,656.21	
Best Cleaners & Contractors	17,748.00	
Mercury Maintenance Services Ltd.	22,593.00	
National Building Maintenance Ltd.	14,110.00	Awarded.
<i>Foundations, Buildings, Sewers, and Water Services, Incinerator Installation, Essondale Mental Hospital, Essondale:</i>		
P. B. Ford & Co.	32,980.00	
Mainland Installations Ltd.	35,505.00	
The Bay Co. (B.C.) Ltd.	27,572.00	
Regent Construction Co. Ltd.	26,208.00	
Marpole Construction Co. Ltd.	36,000.00	
Jarvis Construction Co. Ltd.	28,000.00	
Metro Construction Co. Ltd.	26,755.00	
Beaver Construction Co. Ltd.	28,841.00	
Chapman-Long Construction Ltd.	26,938.00	
C. E. Barker Ltd.	50,581.00	
D. Robinson Construction Ltd.	27,881.00	
Klassen Construction Ltd.	23,250.00	Awarded.
<i>Conversion of Building at 800 Cassiar Street (Old Girls' Industrial School), Vancouver:</i>		
M. & C. Contractors Ltd.	198,893.00	
C. J. Oliver Ltd.	189,950.00	
D. Robinson Construction Ltd.	188,666.00	
Doyle Construction Co. Ltd.	205,910.00	
Beaver Construction Co. Ltd.	184,658.00	Awarded.
E. H. Shockley & Son Ltd.	199,954.00	
Allan & Viner Construction Ltd.	195,300.00	
Mainland Construction Ltd.	192,309.00	
Hodgson, King & Marble Ltd.	194,272.00	
Ward & Son Ltd.	196,000.00	
Klassen Construction Ltd.	192,500.00	
Greenall Bros. Ltd.	191,789.00	
<i>Supply and Installation of Underground Steam and Condensate Mains to Serve Residence, Tranquille:</i>		
McKinnan Plumbing & Heating Ltd.	19,849.00	Awarded.
The Bay Co. (B.C.) Ltd.	20,259.00	
H. Giddens Ltd.	28,990.00	
The Abilene Contracting Co. Ltd.	28,550.00	
The A. & A. Plumbing & Heating Ltd.	20,000.00	
Barr & Anderson Ltd.	26,360.00	
Lockerbie & Hole (Western) Ltd.	28,964.00	
Interior Plumbing & Heating Ltd.	21,409.62	
G. P. Morrow Ltd.	21,455.00	
<i>Highways Laboratory Building, Burnaby:</i>		
P. B. Ford & Co.	106,170.00	
D. Robinson Construction Ltd.	96,417.00	
George Born Construction Ltd.	91,273.00	
Klassen Construction Ltd.	96,000.00	
Burns & Dutton Concrete & Construction Ltd.	96,867.00	
A. R. Grimwood Ltd.	97,156.00	
E. H. Shockley & Son Ltd.	92,172.00	
Coyne & Ratcliffe Construction Ltd.	114,000.00	
Lickley Construction Co. Ltd.	91,053.00	
Beaver Construction Co. Ltd.	89,516.00	Awarded.
Metro Construction Co. Ltd.	93,634.00	
Ward & Son Ltd.	93,920.00	
Mainland Construction Co. Ltd.	92,808.00	
John Laing & Son (Canada) Ltd.	95,240.00	

Printed by A. SUTTON, Printer to the Queen's Most Excellent Majesty  
in right of the Province of British Columbia.

1962

