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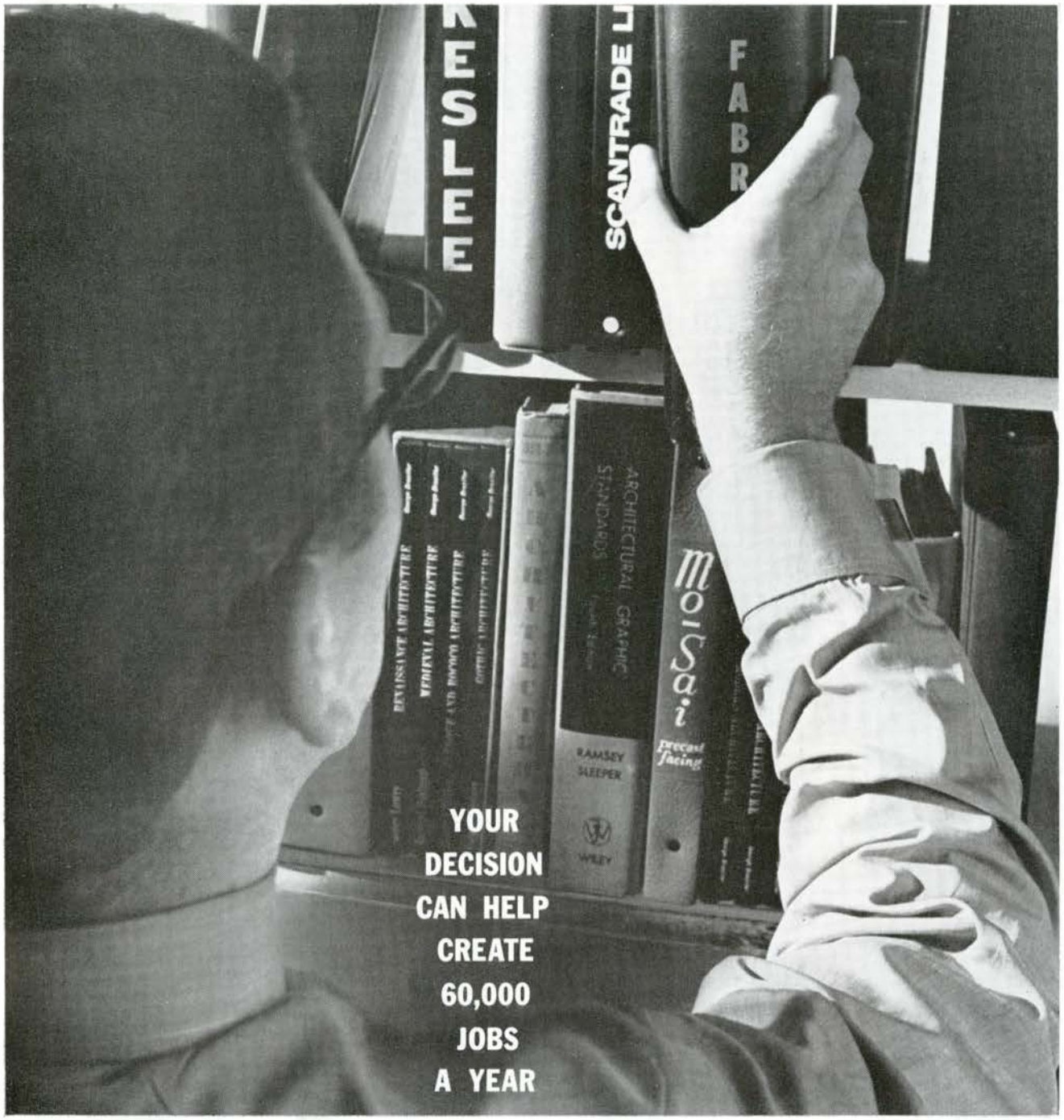
JULY 1963

RAIC JOURNAL



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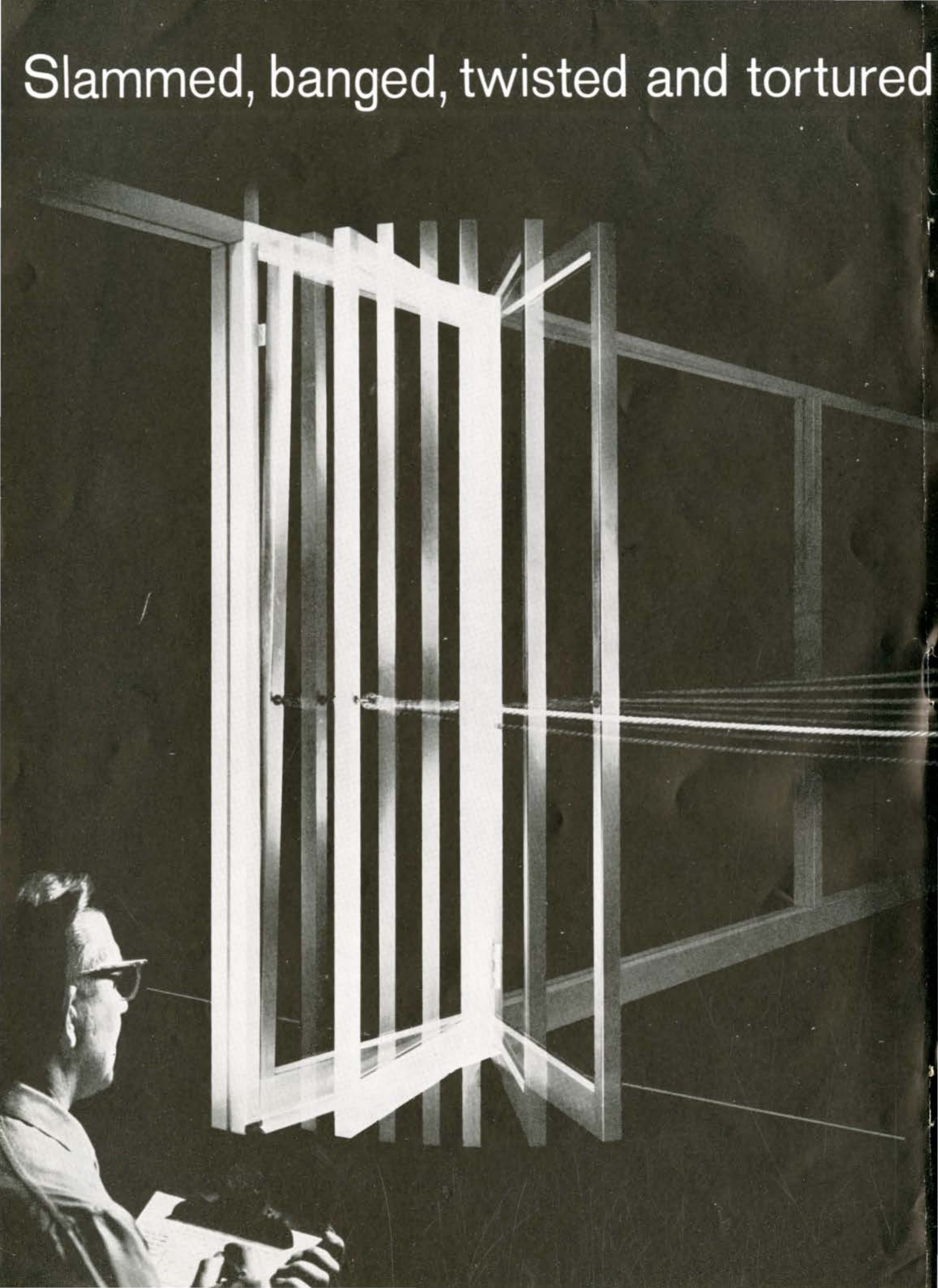

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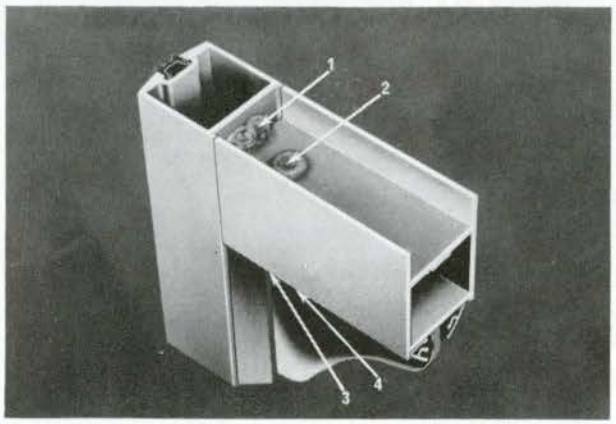

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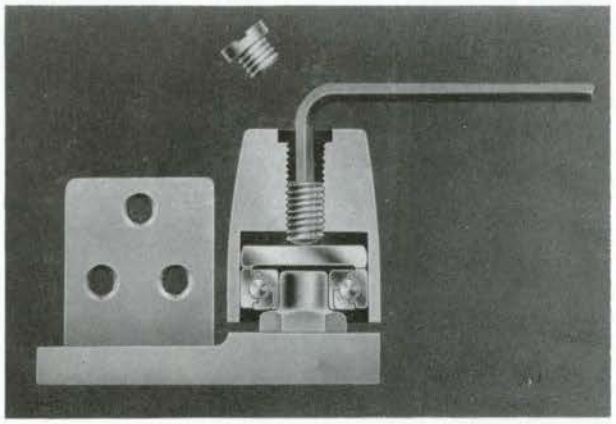

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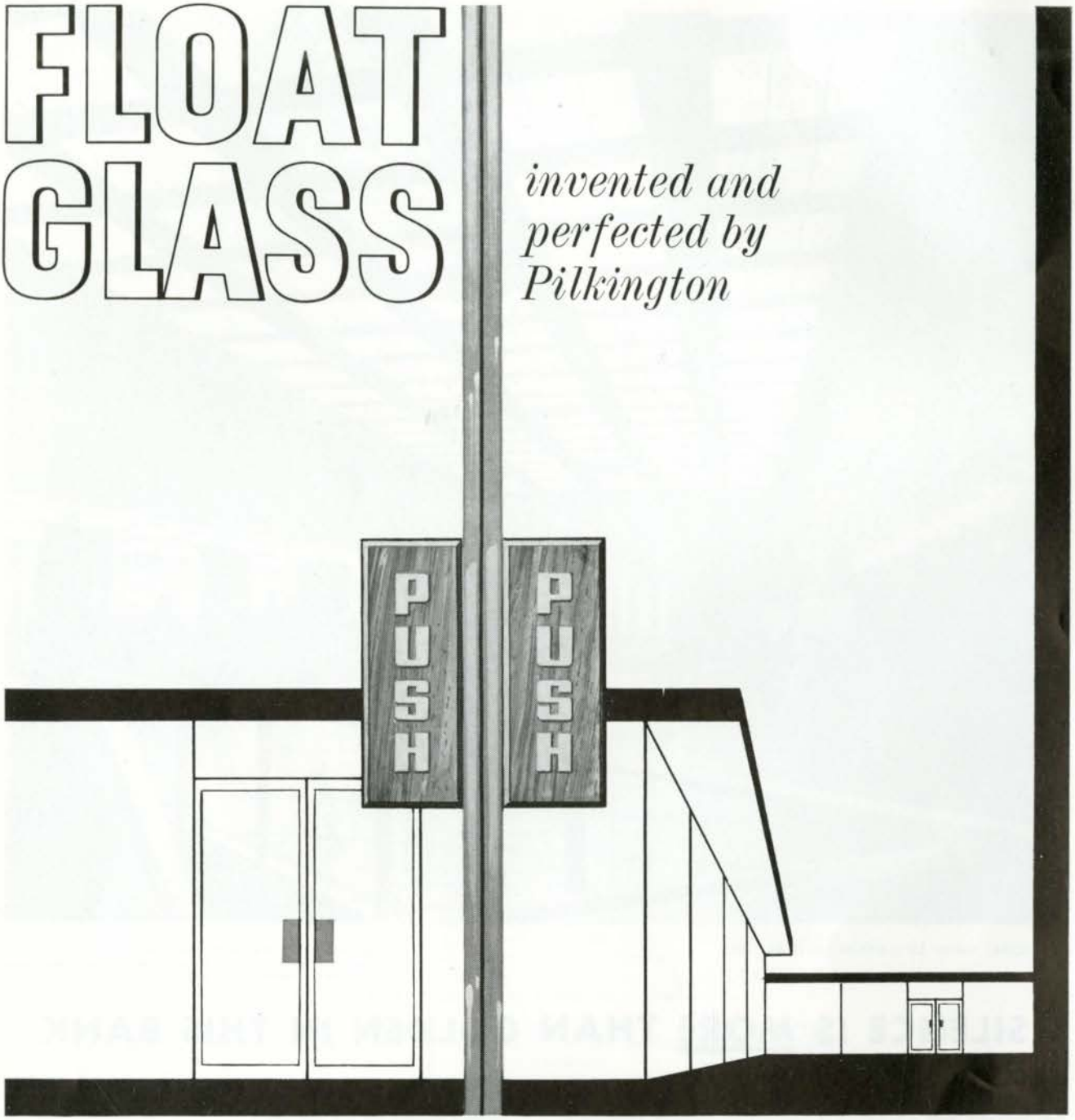

It had long been the glassmakers' dream to produce a ribbon of glass with perfect flatness, a brilliant fire-polish on both sides and no distortion, but without the customary need to grind and polish the surface of the glass. In 1952, Pilkington's research team believed they had finally evolved a method for making this dream glass. Seven years later float glass had become a reality.

Pilkington had made the glassmakers' dream come true by casting a ribbon of glass on to a bath of molten metal which, while not marking the under surface of the glass, enables it to take on the perfect flatness of the molten metal. Controlled heating melts out all the irregularities, and the glass leaves the bath with both sides perfectly flat and parallel.

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INSTITUTE NEWS

Mr Robbins L. Elliott, Executive Director of the RAIC for the past five years, leaves the Royal Institute at the end of July to become Director of Planning in the National Centennial Administration, the group headed by Mr John Fisher which is responsible for planning and implementing projects to mark Canada's 100th birthday. The announcement of Mr Elliott's resignation was received too late to publish in our last issue, but we did manage to insert a letter to the membership from Mr John L. Davies (*F*), President RAIC, announcing the new appointment and inviting suggestions for suitable candidates for the executive directorship.

Replacing Mr Elliott will not be easy. Establishment of the position of executive director followed a survey by a firm of management consultants of means to strengthen the RAIC and improve Institute services to members. Mr Elliott approached his task with vigor and imagination, displaying a grasp of detail and a gift for administration, coupled with a tenacity of purpose and an ability to win the respect and co-operation of busy members of a busy profession, which, as the President's letter said, "in less than five years has transformed the Institute from a relatively unknown professional body to a vigorous society operating as a full partner within the construction industry". Mr Elliott's interest in Centennial planning is not of recent origin. He has represented the RAIC on the Canadian Centenary Council since its inception and for the past two years served as chairman of the Research and Development Committee. His many friends in the Institute and throughout the building construction community will wish him every success in meeting his new challenge.

COMPETITION

Over half the architects registered in British Columbia have signified their intention to enter the competition for the design of the new Simon Fraser University in Burnaby, adjacent to Vancouver. Warnett Kennedy, the professional adviser, announces 62 registrations from individual architects; 24 from firms of architects, and 8 from special groups of architects. Entries must be submitted by July 27th. The object of the competition, which is limited to architects resident in BC, is to choose architects for work to be commissioned estimated at $15 million. Five awards of $5,000 each will be made.

INVITATION TO COMMENT ON PLANNING EDUCATION

Architects have been invited to comment on training in planning, to assist in the inquiry into arrangements for professional education in town and regional planning being conducted by Prof. John Willis. (See May *Journal*, page 64.) Correspondence should be addressed to Edmund D. Fox, Secretary of the Inquiry, P.O. Box 6064, Station D, Ottawa.

ASSOCIATION WANTED

Architect with existing practice seeks association with another progressive firm. Reply to *Journal*, Box No. 114.

POSITIONS WANTED

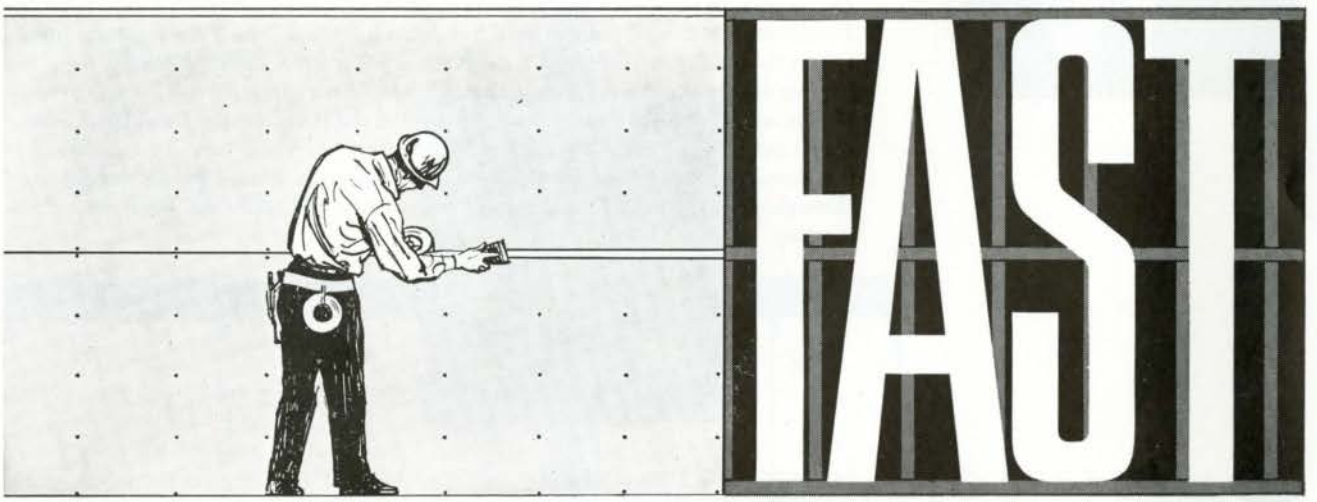
New Canadian seeks employment as architect anywhere in Canada, but preferably Montreal. Five years experience as qualified architect in Germany, doing design, construction and completion of private and commercial structures. Write Helmet Fell, c/o P. Perry, 2135 St Marc St, Apt 5, Montreal, P.Q.

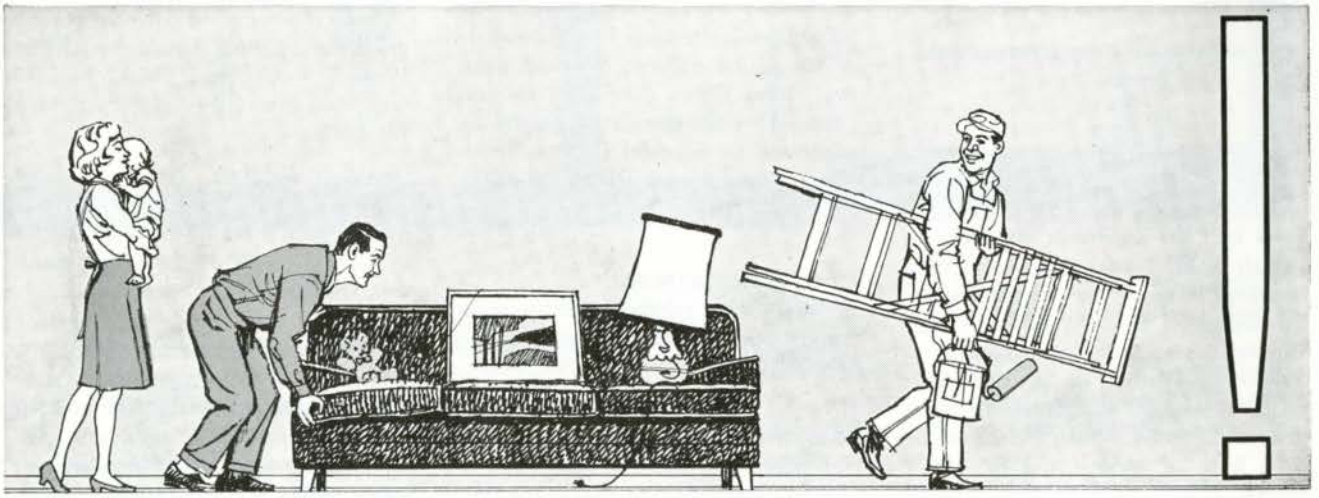
Arriving in Vancouver in August, architect willing to commence work immediately seeks position as architectural assistant or draughtsman in that city. Twenty-nine years old; five years postgraduate experience; B.Arch.; ARIBA. Write B. V. Cooke, 1 The Links, Welwyn Garden City, Hertfordshire, England.

Qualified architect, Turkish national, French speaking, presently working in Switzerland, seeks interesting situation in Canada. Write Barlas Dogu, Rennweg 1, Zurich 1, Switzerland.

BOOKLET ON FIRES IN SCHOOLS

School Fires, An Approach to Life Safety, published by the National Research Council in Washington, presents an impartial study of school fire safety aimed at stimulating co-operation among organizations and individuals in order to achieve better and safer schools. Price is $2.50 and copies are available from the Printing and Publishing Office, National Academy of Sciences, NRC, 2101 Constitution Avenue, Washington 25, D.C.





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(continued from p. 11)

ELECTRIC HEATING STANDARDS FOR ONTARIO

Standards of the Electric Heating Association of Ontario have been revised and now include apartment buildings. Copies are available from local supply authorities or directly from the Electric Heating Association of Ontario, 620 University Avenue, Toronto.

THIRD INTERNATIONAL BUILDING RESEARCH CONGRESS

The third Congress of the International Council for Building Research, Studies and Documentation (CIB), open to all interested persons, will be held in Copenhagen during late June and early July of 1965. How to meet the challenge of the ever increasing need for more and better housing throughout the world will be the theme of the congress and papers delivered will deal with the industrialization of the entire building process, its organization and productivity, determination of functional requirements, and provision of knowledge to the practitioner, with special attention being given to the specific problems of countries faced with the need for sudden and rapid industrial development. Papers will be prepared by members of CIB and distributed, in advance, to congress members.

Requests for further information should be sent to: The General Secretary of CIB, P.O. Box 299, Rotterdam, The Netherlands; or, the Director, DBR, NRC, Ottawa 2.

ERRATUM

The editors regret the occurrence of a compositional error in Dr Howarth's appraisal of the Fine Arts Centre and School of Architecture, UBC, published in the May *Journal*. On page 34, the phrase "a kind of porte cochère" was printed as "a porte kind of cochère".

MAN IN A LANDSCAPE ON CBC TV

Skeleton and Skin and Wall and Window, two programs written and presented by James H. Acland and originally scheduled to appear on the CBC summer series of Explorations (Man in a Landscape) on July 17 and 24, have been re-scheduled for August 7th and 24th. (See announcement in the July *Journal*.)

LEGAL NOTES

MECHANICS' LIENS, PART III

"LIEN" RIGHTS IN THE PROVINCE OF QUEBEC

BY NORMAN MELNICK

While the common law provinces of Canada have enacted Mechanics' Lien laws for the benefit of contractors, subcontractors, and suppliers of labour and materials, there is no Mechanics' Lien legislation in the province of Quebec. There is, however, an analagous right of "mechanics' lien" in Quebec and while this expression is loosely used in the Quebec context, it is more correctly described as a privilege or right of preference which is extended to workmen, suppliers, contractors, and architects over other or ordinary creditors who are without such preference or privilege in the circumstances of a general contractor's or owner's defaulting.

Thus, those who perform work or services or who supply labour or material and who thereby enhance the value of any land enjoy, in the province of Quebec, what is generally referred to as a "mechanics' lien".

The relative Article of the Quebec Civil Code reads as follows:

"The workman, supplier of materials, builder and architect have a privilege and a right of preference over all other creditors on the immoveable, but only upon the additional value given to such immoveable by the work done or by the materials."

This privilege entitles this class of persons to a priority over other creditors on the distribution of the proceeds of a judicial sale of the property, but the preference only extends to the additional value applied to the land by virtue of the work done and the material supplied.

To preserve their privilege, the builder and the architect must register, within thirty days of the end of the work, a notice of such privilege and must also give notice of such registration to the owner. The privilege extends only with respect to the work done after such notification.

The owner, having been so notified, is entitled to hold back, out of the money due to the general contractor, enough money to meet the builder's or architect's privilege claims.

Once the notice of privilege is registered in the Land Registry Office, it becomes a cloud on the owner's title. The claimer of the privilege must then sue within six months of the end of the work to enforce the privilege, that is, to have it adjudged valid, and if not paid, to force a sale of the property.

As has been stated, the privilege also extends to suppliers of materials to a construction project which subsequently goes into default. If the supplier sells directly to the owner, he merely has to register his claim for privilege against the land within thirty days of the end of the work and sue the owner within three months of that date. If, however, he sells to the general contractor or to a subcontractor, his privilege extends only in respect of the materials supplied after he has notified the owner of his contract to supply such materials and before actual delivery thereof, and provided he has registered his claim and sues the contractor (also joining the owner as a party to the action) within three months.

The general contractor and the architect, when dealing directly with the owner, also have a privilege which they must register within thirty days of the end of the work and they must bring suit against the owner within six months from this date, if they are to preserve their privilege.

Quebec law extends this extraordinary preference to builders, architects, and material men because it recognizes the value of their work in enhancing the value of land, but it also imposes upon this class of persons an obligation to adhere strictly to the formalities and technicalities of preserving and enforcing their privilege.

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BOOK REVIEWS

BUILDING BY THE SEA BY ERIC R. ARTHUR (F) AND JAMES ACLAND. UNIVERSITY OF TORONTO PRESS.

BY IAN MACLENNAN

The Maritimes, an article based on the book "Building by the Sea", appears in this issue, on page 29.

A photographic study of maritime architecture, *Building by the Sea*, has recently been presented to the Dominion Archives of Canada, the four provincial governments, and the University of Toronto. This is a long overdue appreciation of the architectural history and flavor of the four eastern provinces and Cape Breton, and it is good to see the neglect remedied by such an interesting and distinguished volume.

The photographs, taken by a gifted photographer, Prof. James Acland, of the School of Architecture, University of Toronto, are sometimes in black and white, sometimes in color, and in both instances the unique feeling of maritime houses, and the strangely appealing streets, has been caught with sureness and artistry.

These studies are preceded by a foreword from Dr Eric Arthur, written in his own elegantly simple style. He tells us that this photographic study was made possible by a generous Canada Council grant towards the project; but the scope of the work was necessarily limited, not only financially, but because of a "certain urgency about the work." (Many photographs, particularly of streets, were taken in districts already designated as reconstruction areas, and except for the name of place or street, the buildings are undocumented.) The text is informative and challenging – Dr Arthur casts his fly rod with expert ease to stimulate and perhaps persuade any historian, photographer (or even architect) that a Maritime expedition might be rewarding for him too. "It is hoped," he writes, "that these photographs will inspire local societies and amateur enthusiasts to document the buildings that we have found important."

Dr Arthur hopes also that this present study might do three things: draw attention to buildings that, because of the quality of their architecture and possible historic association should be preserved not as museums, but in their original use; possibly indicate a manner of building (the tradition of continuity in the street face) that should be revived; and, finally, perhaps indicate that streets or sections of streets in some areas of blight might be rehabilitated with advantage to the tenants and the projects as a whole.

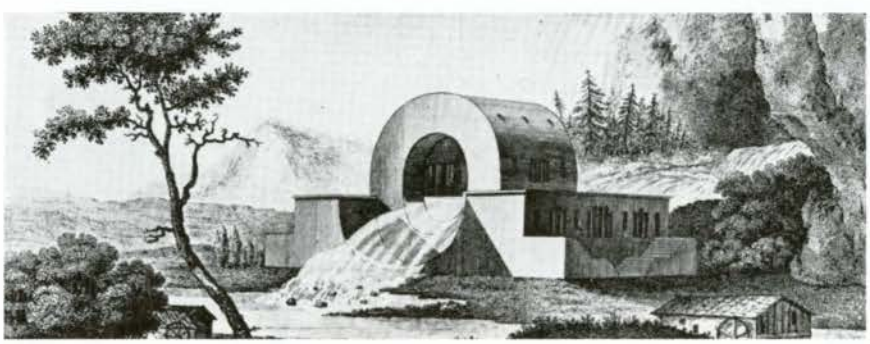
The main essence of the book, however, seen both through Prof. Acland's beautiful and evocative photographs, and the written preface, is the joyous quality in the undertaking. "There are," says Dr Arthur of this adventure in the Maritimes, "a thousand things to delight the eye . . ."

"And dwelling on one aspect of this delight . . . beautiful though less colorful than boats or floats were the shingled sheds and cottages which we found singly or in groups. . . . Grouping of the humblest buildings seems at times to have been done by a master hand, and shingles gray with age and salt winds seem inseparably bound to the soil."

Building by the Sea is a handsome trail blazer in the study of maritime architecture, but Dr Arthur urges a further exploration. "What is needed," he writes, "and may yet be a very important contribution to the centenary program in 1967, is a national inventory of buildings of historic interest and architectural merit. Such an inventory would be of inestimable value not only for the knowledge we would then have of our national heritage, but, if used with taste and discrimination, would be a boon to departments of tourism in every province".

DRAWINGS BY ARCHITECTS by Claudius Coulin Reinhold Publishing Corporation, N.Y. 1962. $14.25.

BY JONAS LEHRMAN



House for the Inspectors of the Loue River Source, ca.1780, by Claude-Nicolas Ledoux, taken from "Drawings by Architects".

This book, the first of its kind, is a compilation of sixty-five architectural drawings, from preliminary sketches to finished perspectives, arranged chronologically over twelve centuries. Each drawing is accompanied by a caption describing the method of drawing, and the exact size of the original; fortunately, most of these are reproduced full size, an important factor in one's appreciation of the drawing. There is no colour, presumably on account of cost, but neither is there any change in the texture of the paper. Since the originals vary from copper engravings to charcoal on tracing paper it is unfortunate that the overall impression is one of black line (albeit varied between softness and precision) on gray.

Drawings by Architects primarily serves as an interesting architectural miscellany of very wide range. It is quite fascinating to leave van de Velde's careful pencil drawing of a fish knife and fork for the boldness and drama of a chalk drawing, by Gaudi, of the west façade of the Sagrada Familia; to study Buckminster Fuller's proposed exhibition building, typically drawn with a stylus on the matrix of a duplicating machine, to admire Scharoun's sweeping pencil and wash drawing of a 'Dynamic shelter for city and people' and then to pass on to Arne Jacobsen's studied sketch of his formal SAS Royal Hotel, Copenhagen.

Significantly enough, it is Aalto's pencil sketches on tracing paper for the Carré residence in Bazoches, France, that illustrate more than any other the developing stages of an architect's work. On one sheet of paper 9½ in. by 11¾ in., reproduced full-size, are elevational studies, a list, a part section, a series of dimensions, a sill, and other

Farmhouse at Monks Eleigh, Suffolk, taken from "The House and Home".

details. This is the architect at work, this is the development of an idea, and not surprisingly it explains far more about the building than the formal drawing carefully prepared for a client.

In this volume, the reader is left to form his own conclusions. In a future study, it would be interesting to compare these manners of drawing with each other, to relate each architect's technique with his approach to his work, and finally to compare the character of the architect's drawing with that of his ultimate message, the completed building.

THE HOUSE AND HOME by M. W. Barley. 208 pp. illus. Macmillan of Canada 1963. $6.50.

BY JONAS LEHRMAN

This book forms the third in the "Visual History of Modern Britain Series" and is written by an historian and archaeologist. Stage by stage the reader is taken through the development of the English house both by means of a very readable text and informative notes (dealing with ways of life rather than styles of architecture) and by an excellent series of 239 photographs which begin with the Bayeux tapestry and end with local authority housing in England and Scotland.

Although varying ways of life are reflected in the changing concept of the house, the author points out that "home life is still, as it always has been, constructed round a framework of customary ways easily modified in detail but remarkably resistant to radical alteration." It is salutary to see how early was the acceptance, and what were the social implications, of one and two storey and split-level homes; how really old are the problems of open and closed plans, circulation space, storage space, the role or even absence of furniture, comfort and convenience, status, fashion (the influence of society and magazines two centuries ago), rooms not used as the architect intended, the expression of frame and infill, the ever present regional influences, and the force of urban and rural traditions. It is also interesting to see the initial appearance a century ago of many qualities valued today — compactness, urban character, the functional tradition.

This is not a book by an architect for the immediate and practical aid of other architects in their current design problems, but it is a very good book about domestic building. It places the present day dwelling in its context, and clearly illustrates the social significance of this field of architecture.

Structural steel fabricators & erectors: York Steel Construction Ltd./Contractor: H. G. Winton Ltd./Architect: Doug M. Hall/Engineers: Reicher Bradstock & Associates Ltd.

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When the new 11-storey Winton Office Building on Eglinton Avenue in Toronto is finished it will look much like any other building. It has all the strength and built-in quality of traditional steel frame construction, and yet the remarkable thing about this building is that no less than 14 per cent was saved on the total construction cost by using high-strength, lightweight ALGOMA-44 steel and applying a revolutionary new construction technique. Prefabricated steel frames delivered to the site cut construction time in half. Even though erection of the frame took place in mid-winter, it progressed at a rate of no less than 3½ floors per week. Further important savings were achieved by using ALGOMA-44 steel which allowed the use of lighter foundations. □ The new Winton office building marks a new development in the Canadian building industry; proof once more that it always pays to think steel first.

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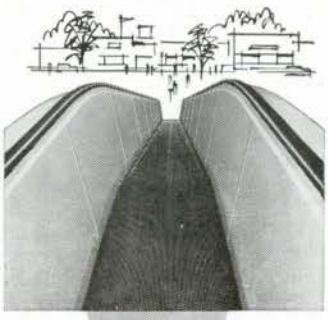
1. Sandvik type walkway by FIAM Milan, Italy.

FOR EXHIBITIONS AND STADIA—PEDESTA-RIDE provides continuous horizontal multi-level "sidewalk" transportation with greater convenience, ease, and speed.



FOR OVERPASSES OR TRANSVERSE TRAFFIC—Where transportation is required between parking or service areas, across roadways or between stores and departments.

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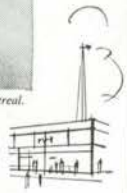

2. Sandvik type walkway, Sydney, Australia.

FOR TRANSPORTATION TERMINALS—PEDESTA-RIDE provides continuous passenger transfer between traffic areas in airports, rail stations, subways, etc.

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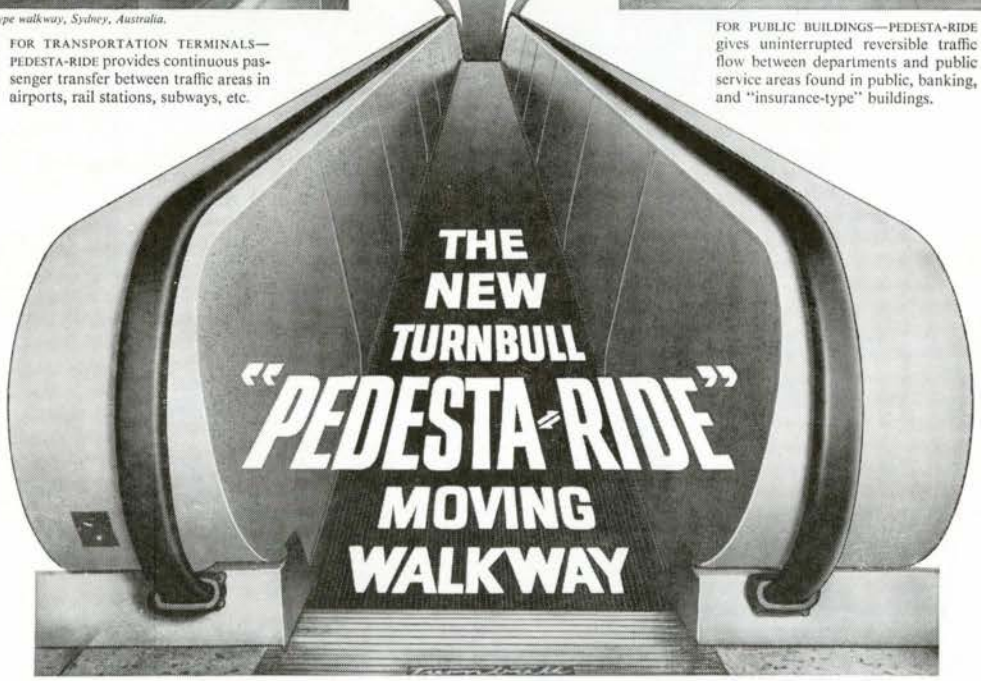

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PEDESTA-RIDE is the modern answer for safe, effortless traffic movement in transportation terminals, public buildings, exhibitions, or wherever people want to move from one place to another.

TURNBULL ELEVATOR, who manufacture PEDESTA-RIDE, are the exclusive users in North America, of the rubber-covered SANDVIK steel-band conveyor belting which has been proven in use, and made moving sidewalks practical, all over the world.

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Anaconda Copper Metals help protect and beautify the Wrigley Building

Long, clean planes of warm brick and bronze give the new Wrigley Building a look of calm, Gibraltar-like strength. Approximately 35,000 pounds of Anaconda Copper Metals help protect and beautify this serene and superbly practical structure. The striking facia is Muntz Metal bonded to plywood. Flashings are also Muntz Metal. Columns, entrance, window frames, glazed partitions and handrails are of extruded bronze. Applications of Lemon Oil impart a rich, mellow lustre to the metals. For information and literature on the architectural uses of copper metals write: Anaconda American Brass Limited, New Toronto (Toronto 14), Ont. Sales Offices: Quebec, Montreal, Winnipeg, Calgary, Vancouver.

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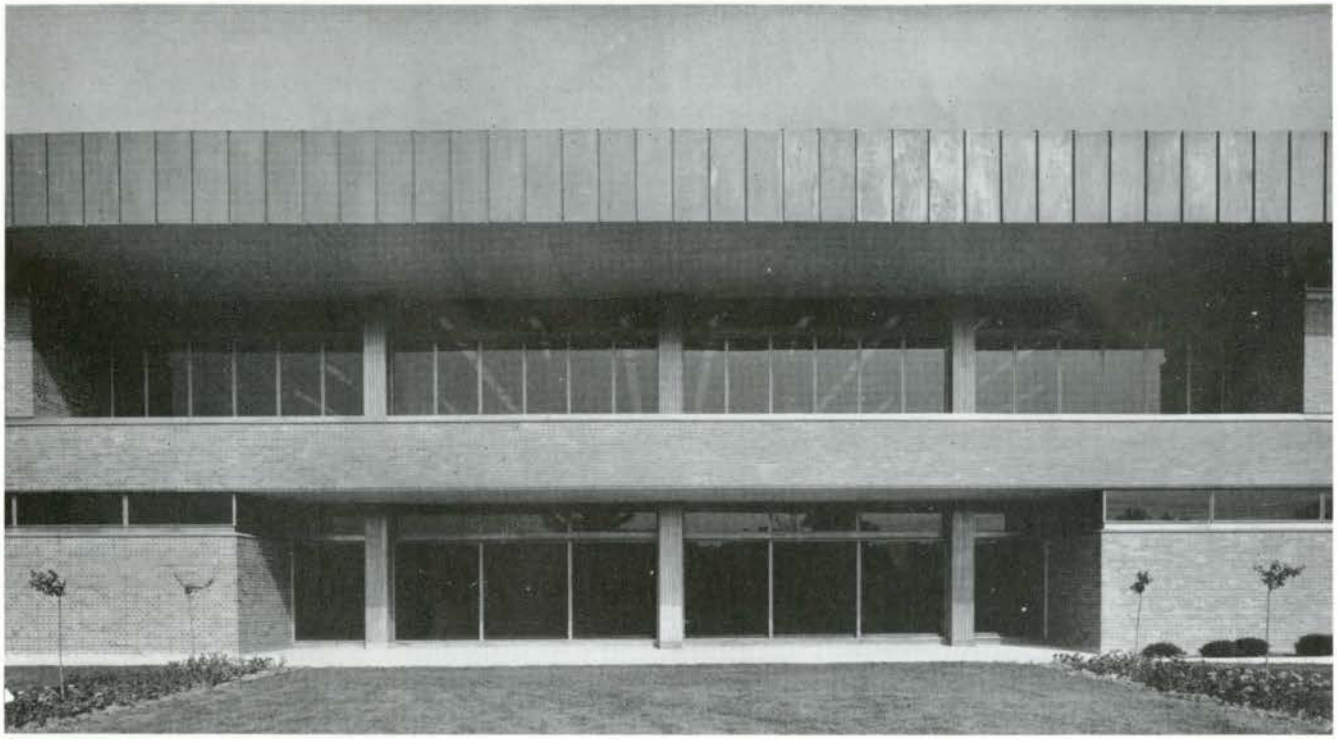

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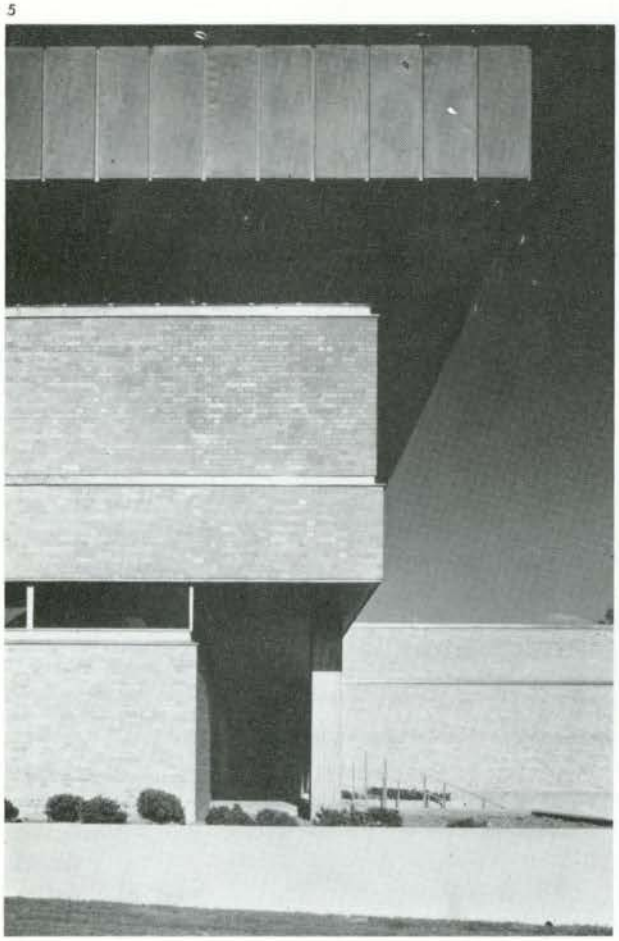

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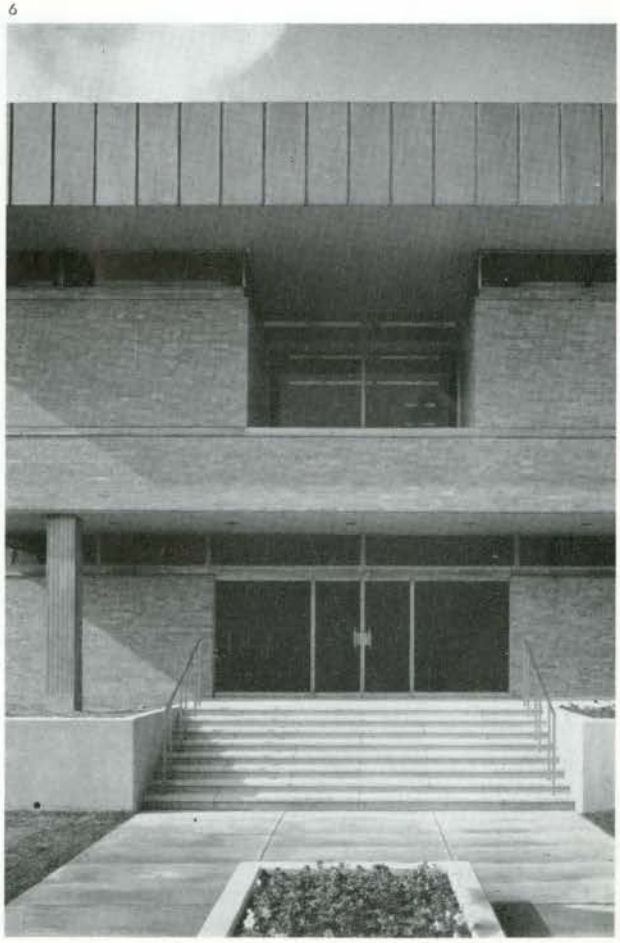

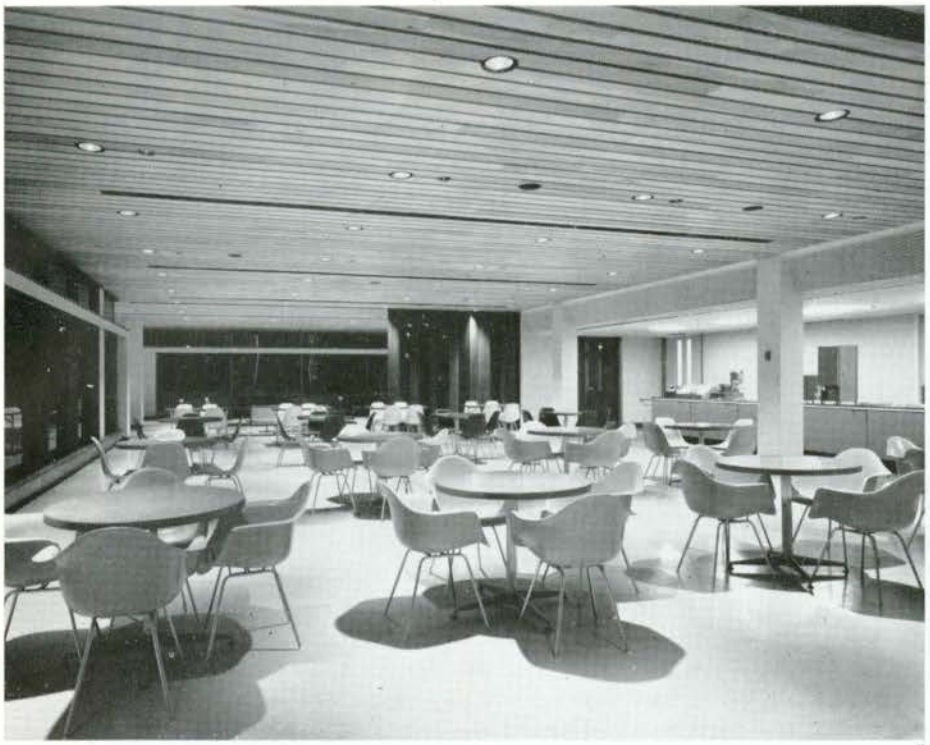

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4. Recessed openings of the cafeteria at ground level and executive offices above.

Ouvertures en retrait de la cafétéria au rez-de-chaussée et des bureaux de la direction à l'étage.

5. South-west corner of the office block and the 'carefully detailed' plant wall in the background.

Angle sud-ouest de l'édifice à bureaux et détail soigné du mur de l'usine au premier plan.

6. The south, main entrance elevation with recessed opening above.

Elevation sud; entrée principale et ouvertures en retrait au-dessus.

7. The cafeteria. Openings are to the north and west providing a view to the woodland and park.

La cafétéria ouverte au nord et à l'ouest sur le bois et le parc.

8. Executive offices and board room at the second floor level.

Les bureaux de la direction et la salle du conseil, à l'étage.

9. The reception area and stairway to the main entrance.

Hall et escalier conduisant à l'entrée principale.

10. The brick parapet tying office and plant together is broken by the 'rail' entrance.

Muret de brique reliant les bureaux à l'usine, brisé par l'entrée du 'rail.'

PHOTOGRAPHY BY ROGER JOWETT

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WRIGLEY BUILDING · AN APPRAISAL

BY JOHN ANDREWS

It is only within recent years that light industry has been relocated and become part of an overall suburban environment away from the urban industrial area. This move from the urban areas has involved the use of less expensive land; hence larger sites and the opportunity to place greater emphasis on the symbolic value of the building as an advertisement for the particular company.

The problem of relating buildings one to the other, to the site, and to the community as a whole has become more complex. Each building has come to express the role of a product in commerce and consequently there is no overall visual order.

One such type of building is the Wrigley plant at Don Mills, located on a generous twelve acre site overlooking a magnificent ravine park, on a street with buildings of a similar nature. The initial impact of the Wrigley building to the motorist on Leslie Street leaves a lasting impression. The office block with its long sweeping lines of brick dominates the street and is scaled to the fleeting glimpse available from a fast moving automobile.

The richness of the brick and bronze give it an earthfast masculinity quite distinctive amongst its effeminate and eclectic neighbours. By careful attention to the use of material in the articulation of major masses a reasonably successful marriage between office building and plant has been achieved — a problem hitherto traditionally solved by the standard binuclear approach. Indeed, if the sole purpose of the Wrigley building is to create, in a fleeting instant, as strong as possible an impression for an advertisement for chewing gum, then there is little doubt that this is a good building.

Landscaping is non-existent. A minor clump of evergreens makes a half-hearted attempt to conceal the loading docks from the main entrance. Two trivial flower beds outside the cafeteria only further emphasize the fact that when a wall is opened up to allow an extension of space beyond the building then some recognition within the site must occur. Nothing of the planting or site work attempts to relate the scale of the building to the site, or the site to its environs. It is unfortunate that with such an obviously ample budget landscaping has not been considered as part of the overall architectural concept.

Absolute expressionism is not an ingredient of good architecture even though form may follow function. The continuous brick parapet ties the related masses of plant and office together and is the device giving the building a strong feeling of unity. The parapet is interrupted and the illusion destroyed where the rail siding enters the building. It is unfortunate that the opportunity to introduce another mass to the overall composition, and at the same time preserve the integrity of the architectural statement, has been ignored.

The successful representation of an image is only one small facet of an architect's responsibility to his client and environment. It is when entering the building that a degree of superficiality becomes more apparent.

The main entrance is quite democratic, being used by both employees and visitors. But in order to arrive there, the employee must enter through the loading dock, travel up a ramp behind a wall, out again under a projection of the building, finally to enjoy the indulgence of entering by the front door. The entrance lobby, devoid of people, furniture, or any sense of welcome, is an anticlimax to the promise of the outside and depends entirely for its success as an entrance on a small sign saying 'offices up'. 'Up', via a beautifully detailed bronze stairway, is a repeat of the previous experience, this time with the addition of some furniture, a tree, and a person (the receptionist).

By the time one is ushered into the inner sanctum the promise of the exterior has been lost and the simple elegance of partition detailing and magnificence of view become rather secondary. The broad overhang and deeply recessed windows provide the desired amount of sun control and create a fine sense of protection from within. The employee, having enjoyed a brief moment of glory in gaining entrance by the front door, is immediately relegated to the rabbit-warren corridor between the entrance, locker rooms, amenities, and working areas. Within the building every consideration is shown for the physical needs of the inhabitants in the form of a handsome cafeteria with a view, lounges, and billiard room. The plant itself is plainly and simply constructed of precast concrete beams and slabs, to ensure a minimum of dust.

The major criticism of this building is the unconvincing transition from outside to inside. It looks well from the outside and creates a lasting impression on one's mind. It functions well internally as every consideration has been shown for the inhabitants. However, this poor transition leads to the conclusion that the architect has been required to 'elevate' a plant layout without the opportunity of providing a totally integrated solution, an integration of the building with the site, and the site with its environs.

Is the architect to continue to be basically concerned with only the external appearance of industrial buildings?

THE MARITIMES

In the summer of 1962, on a Canada Council grant, Eric Arthur, with James Acland as his colleague, directed a survey of Maritime architecture which they recorded in the book Building by the Sea. *(See review on page 17.) Photographs were taken by Prof. Acland, the text written by Dr Arthur. Some of these photographs and the main portion of the text are reproduced in the following article along with captions and a history written, for this article, by Prof. Acland.*

In accordance with the terms of the grant Dr Arthur has presented, through the Canada Council, sets of Building by the Sea *to the governments of the Maritime provinces, the Dominion Archives, and the University of Toronto Library. He has expressed his gratitude "to individuals who gave advice or opened their house in the interest of the survey" and mentioned particularly: Colonel Wallace Alward, architect, Saint John; Sir Brian Dunfield, Justice of the Supreme Court, Newfoundland; Charles Fowler, architect, Halifax; Dr Frank MacKinnon, Principal, Prince of Wales College, Charlottetown; George E. MacLaren, Chief Curator of History, The Nova Scotia Museum, Halifax; Douglas Shadbolt, Director, School of Architecture, Nova Scotia Technical College, Halifax; Neil Stewart, architect, Fredericton.*

Quoting Prof. Acland, "This study is the direct result of Dr Arthur's enquiring eye and imaginative insight. Once again, he has proven his skill as a catalyst, shaping research in areas which have long been dormant."

1

THE MARITIMES BY ERIC ARTHUR

This photographic study of building in the Maritime provinces arose from visits to Saint John and St John's over several years, followed by a recent and more intimate acquaintance with Charlottetown. It became evident to the writer that these cities had not only their historic buildings of great interest, but something else of even greater significance for this century. That was an urban flavour in their residential street architecture that was always rare in the rest of Canada, and has now almost ceased to exist.

It comes, of course, from the connecting of one house to another in two's, three's or more, and a continuity that is emphasized and enlivened by cornice line, the rhythm of windows and the even spacing of doors. Such an architecture gives dignity and purpose to a street, and is the kind that reached its zenith in cities like Bath or Brighton and a thousand other towns and villages in the United Kingdom and Europe. There is, however, a striking difference. The terraces and larger units in the Maritimes differ from the British, and most of the European examples, in that they are almost always of wood instead of stone, and ours are gay with all the colours of the spectrum.

Paradoxically, one finds, when one leaves the cities of the Maritimes for the villages, that one is in a black and white world of houses and churches whose brilliance and charm is heightened in the seaports by a foreground of gay boats and scarlet or green sheds and, not infrequently, a turquoise sea. Nowhere in Canada — one might say without exaggeration, nowhere in the world — is colour used so effectively in buildings as in the Maritimes. It is an integral part of the vernacular architecture of the country, and I was happy to see that in Mulgrave Park in Halifax, the Central Mortgage and Housing Corporation had continued that cheerful tradition with great success in a new housing estate.

It is difficult to determine why we lost this essential element of urbanism in the post-war subdivisions of Canada, not excluding the Maritimes. In its place, we have single cottages on their own lots in a thousand suburbs, and whether they be cottage or expensive ranch house, they contribute nothing to street design. One reason for the single house may be that the average home owner associates continuity with row housing, and the more houses he has attached to his own, the lower he feels in the social scale. Such an attitude is peculiarly of our time. The ducal owners of houses in St James' Square or Belgravia in London never, one can be sure, associated their dwellings with row housing, nor do the fortunate owners of houses in the older sections of Baltimore or Washington. Apart from the aesthetic qualities of the terrace or row house, the advantages in cost are considerable — a fact of which Wartime Housing seemed quite unaware.

While the 'townscape' — to use a word current in architectural circles — was the principal object of study, two others proved irresistible to two architects on tour in the Maritimes. It is impossible to give one precedence over the other, but one was the isolated building, whether secular or ecclesiastical, and the other the vernacular of the country. To the person from the mainland, there are a thousand things to delight the eye — objects that range all the way from lobster floats to boats as gay as any painted by Van Gogh. What strikes the architect is the ingenuity and the high standard of design that goes into a hundred objects of daily use. It is quite unselfconscious, and whether one was looking at a lobster trap or fish flake, one felt that there was the culmination of an evolutionary process as old as man's contact with the sea.

Equally beautiful though less colourful than boats or floats were the shingled sheds and cottages which we found singly, or in groups. Designed by anonymous builders, they fit so perfectly into the landscape both in form and material. Grouping of the humblest buildings seems at times to have been done by a master hand, and shingles gray with age and salt winds seem inseparably bound to the soil. As though to emphasize this indivisibility, few cottages in the countryside allow any transition with the fields by a flower bed of even pocket size.

Page 29. United Baptist Church, St Andrew's, NB. Perhaps one of the most charming and unassuming exercises in carpenter Gothic to be found in the Atlantic provinces.

1. Petty Harbour, Nfld. Jetty and weir competitively encroaching on the narrow gut.

2. Salmon River, NS. In the clay estuaries of the river system the tiny fishing community hides for shelter behind a small hillock. Not protected by planting, the buildings remain open to sunshine.

3. Cape St Mary, NS. Huts for fishing gear — the boxy shingled shed without architectural pretensions.

4. Victorian gusto in wood; a virile handling of wood detailing not far removed from the shipwright's figurehead.

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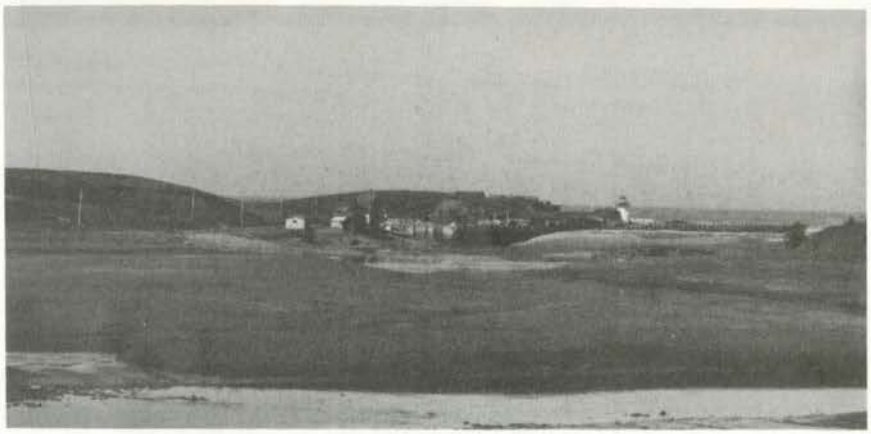

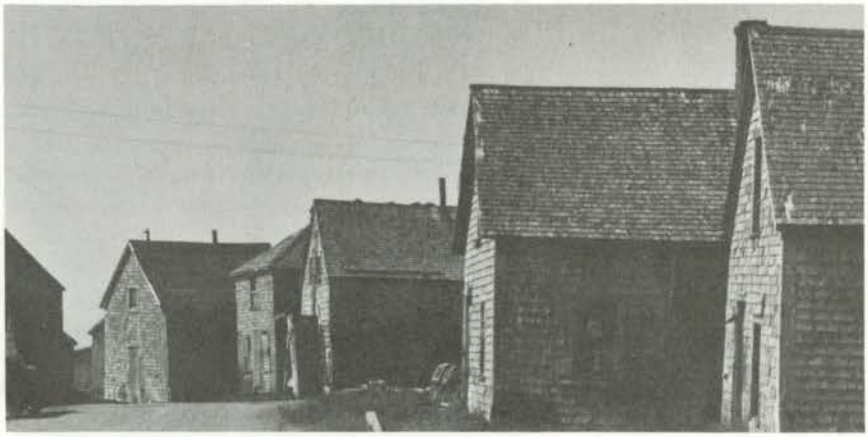

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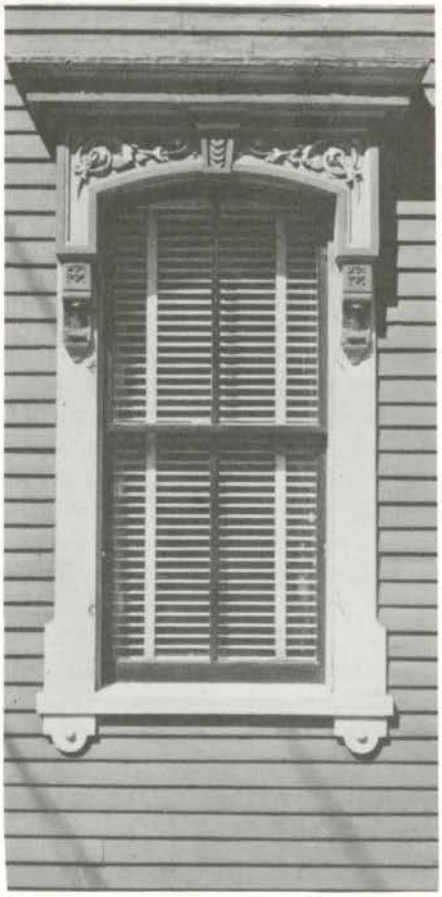

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If much of the vernacular architecture of the Maritimes is impermanent and in wood, one's definition of the indigenous must include those very solid buildings to be found on the Water Street of a dozen towns and cities. We have them in Ontario, but almost always the city has abandoned them. Not so in the Maritime provinces, where Water Street is still the pulsating heart of the city. It was there that we found the ship builders, the canneries, the box factories, the chandlers, and the warehouses. It was there, too, that we met Spanish and Portuguese fishermen from the Grand Banks — men we would meet later looking wistfully into shop windows, or kneeling reverently before the Virgin in their own chapel in the great Basilica which dominates St John's.

Water Street and its heavy traffic, its smells and noises, is not, usually, a tourist attraction, but there one frequently sees great architecture, indigenous buildings that almost certainly never had their birth on paper. It is seen at its best in Canada, in Halifax, where magnificent spaces are formed by walls of different texture, material and colour. Some are rugged as the Cyclopean walls of Greece, some rugged on a smaller scale, like the rubble walls of the Cotswolds, and the beauty of both is heightened by their rising starkly out of a floor of concrete or, incredibly.in one case, from a bed of chains. They are walls that would have delighted Piranesi or Dance, the designer of Newgate. We gathered that these buildings were little known or appreciated even in Halifax, but it was our firm conviction that their disappearance through neglect or thoughtless removal would be a national loss.

This study of architecture, which included all four eastern provinces and Cape Breton, was concerned more with 'townscape' than with those buildings that should come under the heading of national or provincial monuments, but, in an investigation, over several weeks, covering highways and not a few byways, many houses, churches and public buildings that should be known to a wider audience than local historical societies were noted. What is urgently needed, and may yet be a very important contribution to the centenary program in 1967, is a national inventory of buildings of historic interest and architectural merit. Such an inventory would be of inestimable value not only for the knowledge we would then have of our national heritage, but, if used with taste and discrimination, would be a boon to departments of tourism in every province.

In Great Britain, more than one department of government reports to the Ministry of Housing and shows by photograph, measured drawings, and historical and structural documentation those buildings that should be retained in reconstruction areas. One would like to think that this present study might do three things. It might draw attention to buildings that, because of the quality of their architecture and possible historic associations, should be preserved not as museums, but in their original use; it could indicate a manner of building (the tradition of continuity in the street facade) that should be revived; and, finally, it could indicate that streets or sections of streets in some areas of blight might be rehabilitated with advantage to the tenants and the project as a whole.

An unavoidable weakness in this album of photographs is that, except for the name of place or street, the buildings are undocumented. The Canada Council made a generous grant toward the project, but it was sufficient to cover only photography and travel. There was, too, a certain urgency about the work. Many photographs, particularly of streets, were taken in districts that are already designated as 'reconstruction areas' — ripe for demolition and rebuilding. If the study had proceeded in the necessarily leisurely fashion that would be required of an exhaustive historical survey, delay of many months, or a year, would have resulted in much going unrecorded.

5. Military Road, St John's, Nfld. The cul-de-sac street, the continuous terrace wall, and the anonymous restraint of the detailing make this a superb exercise in 19th century planning.

6. Bond and Bannerman, St John's, Nfld. The corner shop in the housing block: always neglected in suburbia. Here is a human focus just around the corner.

6

It is hoped that these photographs will inspire local societies and amateur enthusiasts to document the buildings that we have found important. Ours was not a superficial survey, but we make no claim to have covered the field. A tremendous amount of work by photography, measured drawing and documentation remained to be done.

While the Canada Council grant was given to me as the director of the survey, too much praise cannot be given to my colleague, Professor James Acland, whose artistry as a photographer is evident in every illustration. Together, we followed a chequered trail from Saint John to St John's, noting streets and buildings that would be photographed later when Professor Acland retraced our steps. We had little leisure but every day was a new experience, both aesthetic and gastronomic. From the occupants of fishermen's cottages to vice-regal mansions, we met with the utmost in hospitality and kindness.

It may be of interest to those who see the result of our study that we seem to have shown that no eastern province has a monopoly of natural beauty, or of architecture in the field that interested us particularly — an urban architecture that grew out of the needs of the ordinary citizens on what was once regarded as the quite ordinary street. That some of them hide behind their decent fronts a slum that all of us would condemn does not detract from the fact that the basic concept was a sound one with an honourable and humane tradition behind it.

7. Lancaster Street, Lancaster, NB. 19th century frame housing. Use of Cape Breton bituminous coal for heating led to the use of dark reds, browns, and greens as a defence against the inevitable staining. With the change to Welsh anthracite and oil heating the colour range is moving towards bright pastels.

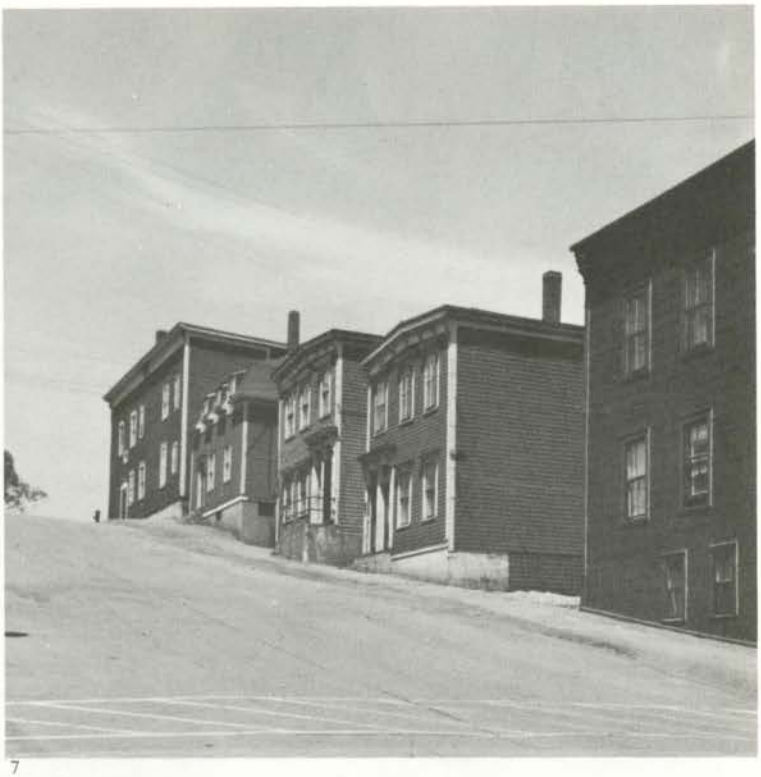
8. Old Covenanter Church (1790), Grand Pré, NS. A severe monument to John Knox. It contains the original box pews and pulpit. A combination of New England 'salt box' and Ulster rigour.

9. Kent Street, Charlottetown, PEI. Victorian urbanity in the house — the continued use of elements of the Maritime vernacular to achieve the opulent status symbol.

10. The Battery, St John's, Nfld. The cubical geometry of frame houses stepping up the hillside; a viable tradition by the sea. While these are squatters shacks and are the first to go during redevelopment they remain a sociologist's horror but an artist's delight.

11. Uniacke House, NS. The austere rigour of delicate trim and the clapboard wall reflects the puritanical precision of the salt box.

12. Great George Street, Charlottetown, PEI. An elegant 19th century version of the disciplined street facade. Simplicity of wall surface, order in the fenestration, and a rejection of architectural 'tricks' make these houses an invaluable focus for the urban scene.



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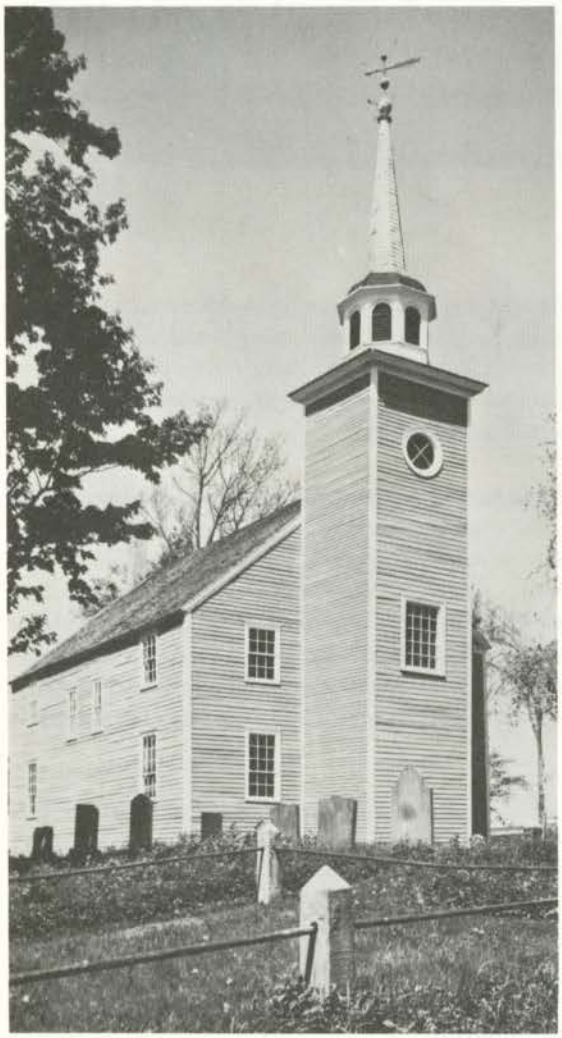

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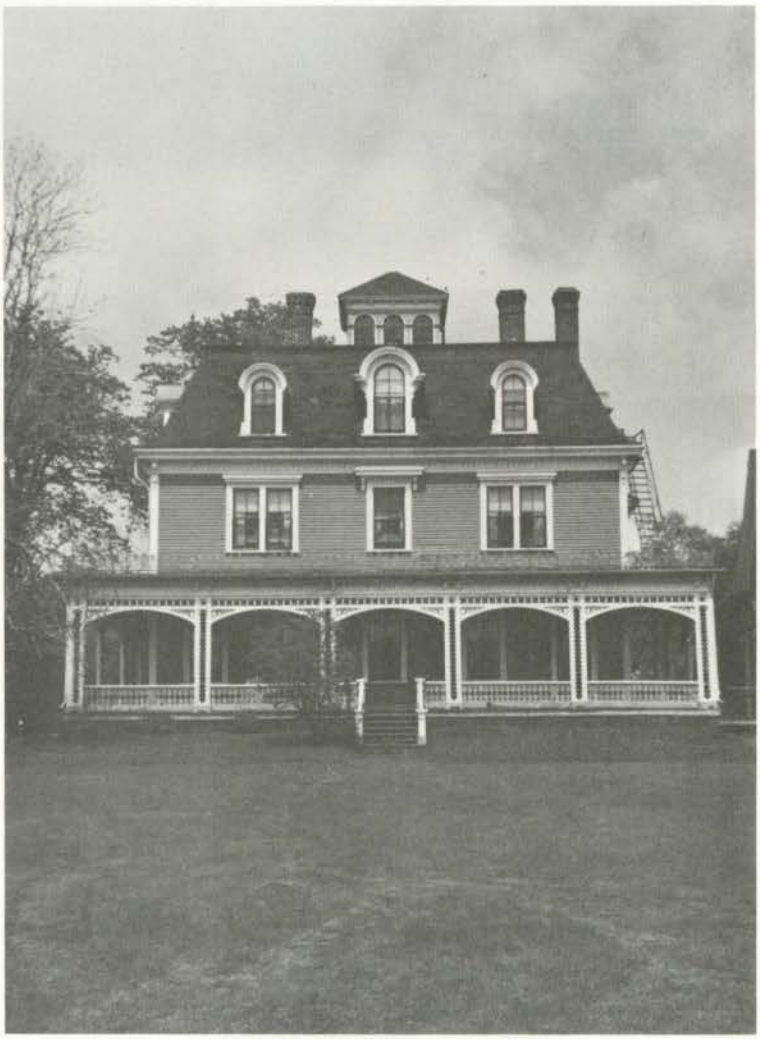

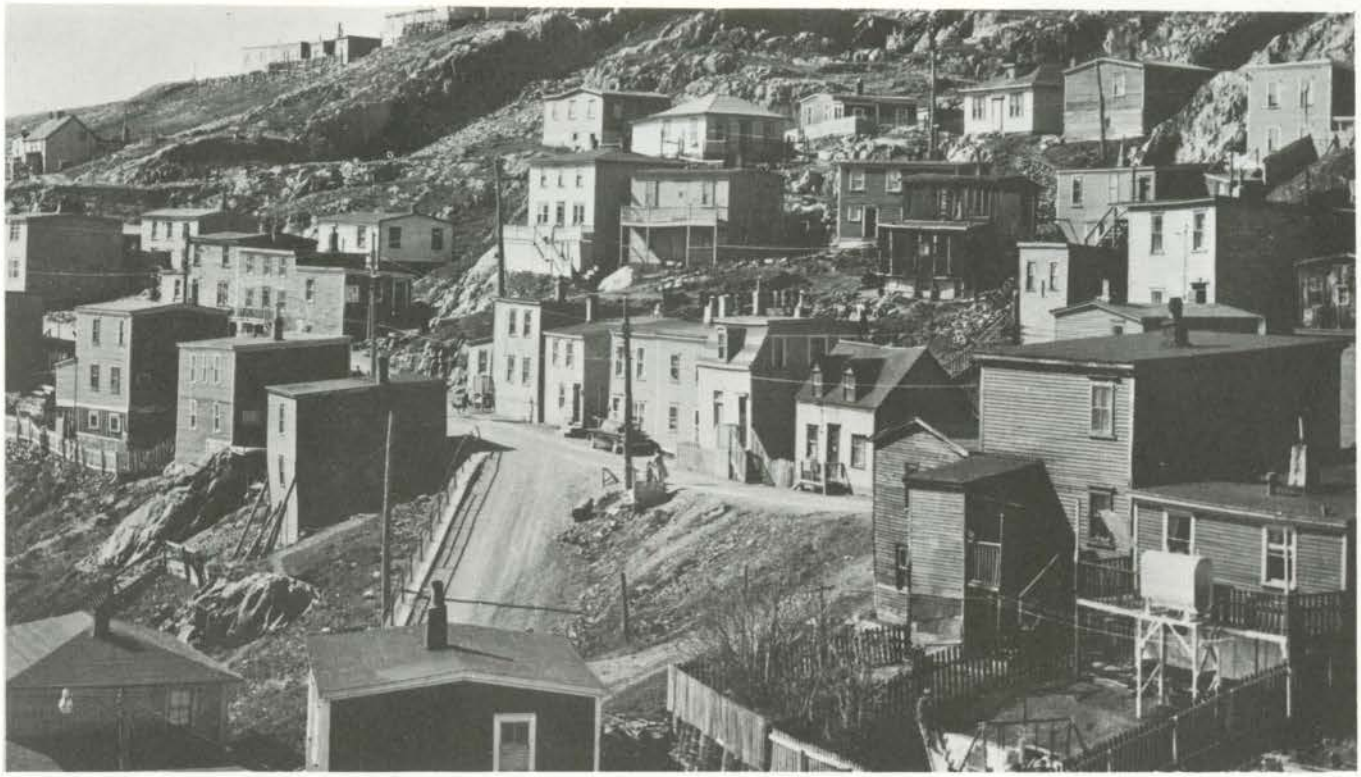

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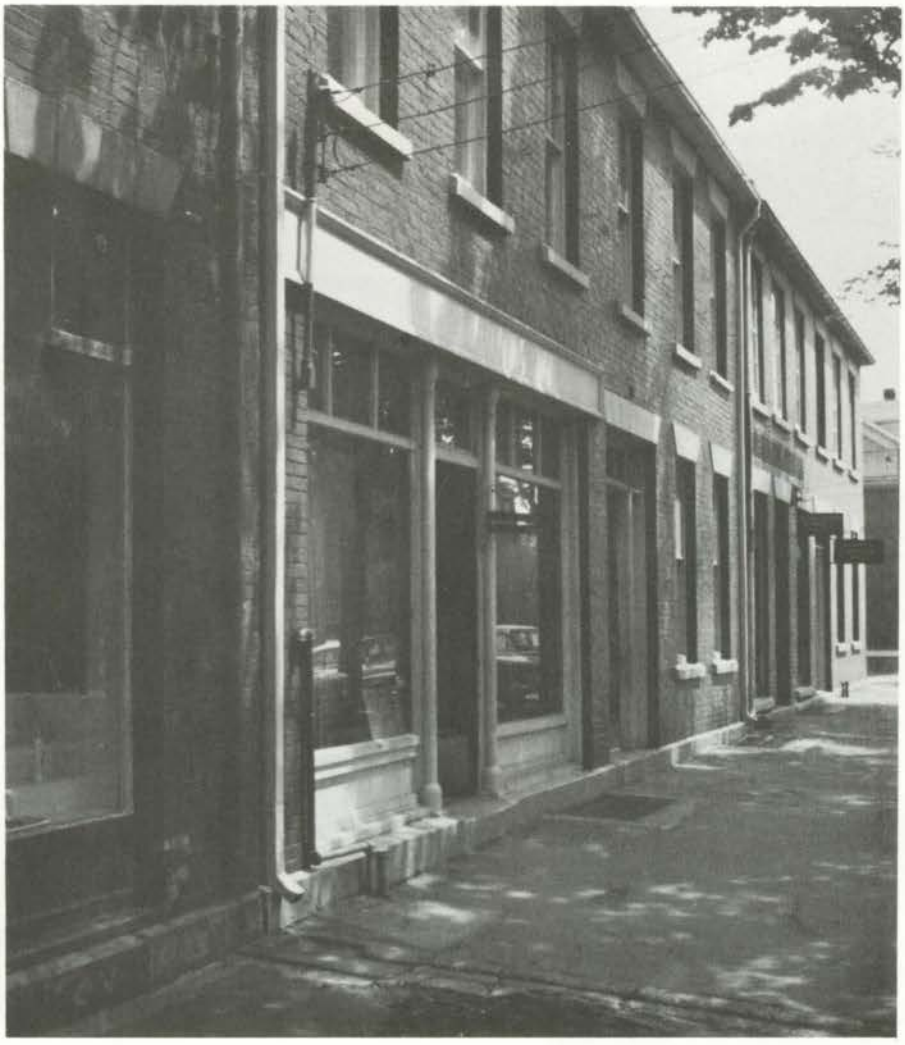

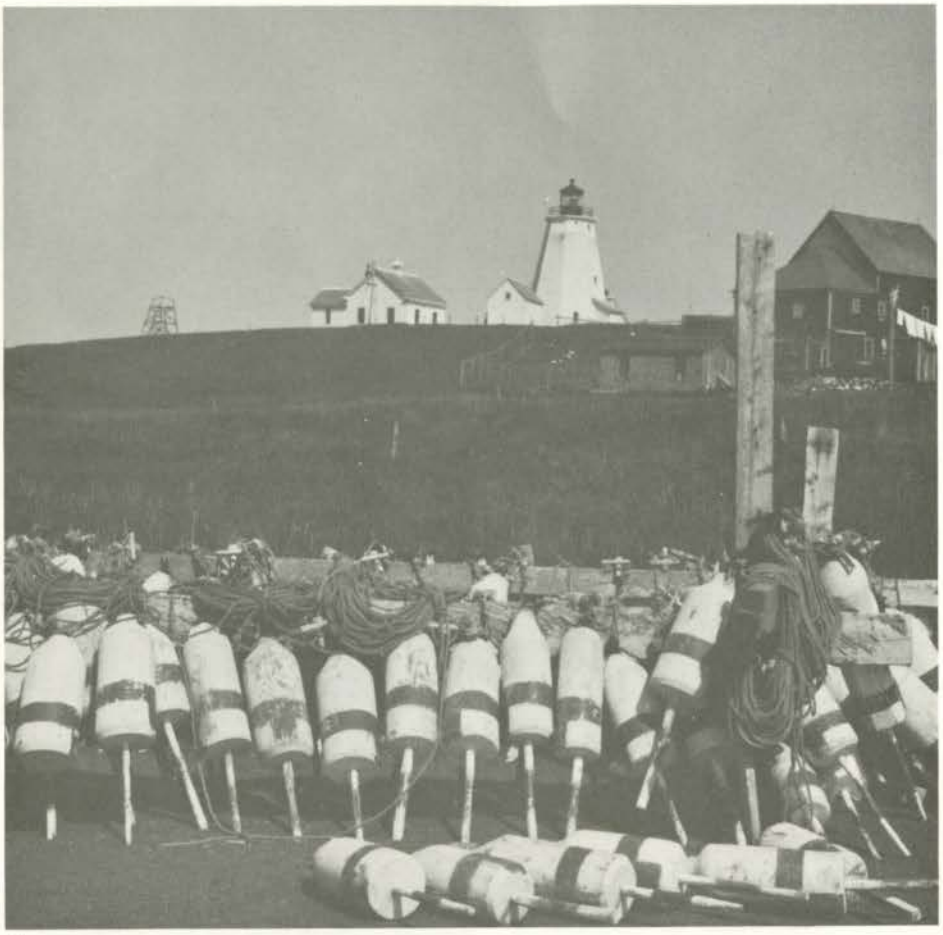

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13. Sea Captain's House, Saint John, NB. A bowsprit figure-head in strong carving and rich colour recalling the link with the sea.

14. Cape St Mary, NS. The cubist mass of the lighthouse stands stark against the sky while the floats are simply designed for immediate visibility in fog or rain.

15. Lunenburg, NS. Each artifact in the scene is logically designed for utility and economy; the boat shed is rectilinear, the boat, curvilinear. Each is suited to the functional use of wood in its own context.

16. Court House stair, Saint John, NB. The subtle harmony of the winding stair, again, is a master craftsman's logical, yet dynamic use of material.

17. Salmon River, NS. A typical late 19th century farmhouse in the builders vernacular of the time, to be distinguished from the Ontario farm house of similar design by the lack of planting and growth around the building. Typically Celtic in the rejection of wind screens and shade trees, but a sensible response to continuing fog and rain.

16

THE MARITIMES BY JAMES ACLAND

The geographic and ethnic particularism of Canada comes to a focus in the Maritime provinces. Here is no homogenized bland uniformity of pattern and outlook, but rather, a wildly divergent series of communities split by geographic, ethnic, religious, and social variations into a richly stratified complex. Lack of enonomic pressure and geographic isolation combined with a proper pride in local achievement have ensured that the melting pot of the North American system should not reach fusion temperature in these lands by the sea.

17

This diversity and variety in the Canadian scene which horrifies the politician or reformer in search of a national identity can prove to be, in the long run, Canada's greatest strength. Just as in biology the pure bred species achieves specialization at the cost of the variant genes which can ensure adaptation to new conditions, so in society the monolithic mass group, which is unified at the sacrifice of all local variants, rejects flexibility for unity. For too long in Canada have we assumed that our only hope for the future was to be found in a blind copying of the American ethos. In spite of the phenomenal success of the American experiment which has reshaped generation after generation of immigrants into a surprisingly uniform mould by the imposition of a new political and social credo, I would suspect that Canada's future lies in the cultivation of regional differences. The richness of the historic record is not something to be cast aside idly in a desperate search for novelty and the latest trick or gadget. Too often in our cities we find historic monuments and viable enclaves of building destroyed overnight to make way for hastily contrived and inefficiently organized paper schemes. Truly creative work in architecture and in planning has always found its sure root and proper source in a sensitive and discriminating use of the record of the past. We need only turn to the record of achievement of le Corbusier to find that the driving impulse behind his work stems from the vernacular building tradition of the Mediterranean. And on our continent Frank Lloyd Wright recombined the elements of the villa, the farmhouse, and the barn of his native Wisconsin to achieve a new statement of texture and form in architecture.

The physical form of the town in the Maritime provinces faithfully reflects the changing phases of occupation of this continent. Wharves and piers date from a period when overseas trade in tar, turps, tall trees, tobacco, cod, shingles, and barrel staves dominated the economy. With the cutting of the first forest stand, roads penetrating to the interior settlements radiated from the port. Between these radial arteries, a gridded pattern of streets stepping up the hillside above the harbour attests to an early effort to achieve some order in the town.

REGIONAL VARIANTS IN NEWFOUNDLAND

Newfoundland, discovered by John Cabot in 1497 whilst in the service of Henry VII, remained a summer fishing station until the first permanent settlements were made about 1610. As the British turned from the dream of expansion on the continent of Europe to overseas conquest and colonization Newfoundland tended to be bypassed as a base for settlement. For over a century, from 1610 to 1713, The Lords of the Admiralty, allied with the West of England merchant adventurers, restricted all entry and settlement. At the same time French naval power secured bases on the south coast at Placentia in 1660. Harrassed by French raids, the constant pressure of Norman, Breton, and Portuguese fishermen, pillaged in attacks by corsairs from the Mediterranean, and unsupported by their own government, the marvel is that these dogged fishermen, hiding in their tiny inlets, were able to maintain a foothold on the island. From 1713 Newfoundland ceased to be a mere fishing station and was at last recognized as a colony under naval government. Shiploads of Scots-Irish emigrants from Ulster flooded into the island and by 1763 the population numbered 13,000, but it was not until 1813 that houses could be erected without written permission of the governor. A final wave of Celtic immigrants swept into the island in 1848-54 in the years of the Irish potato famine. Today the island is predominantly Catholic and Celtic with strains of Huguenot, Breton and Norman French, with Ulster Protestants mingling with West country elements, and with the old guard of the garrison population of English merchant adventurers and administrators left over from the nineteenth century.

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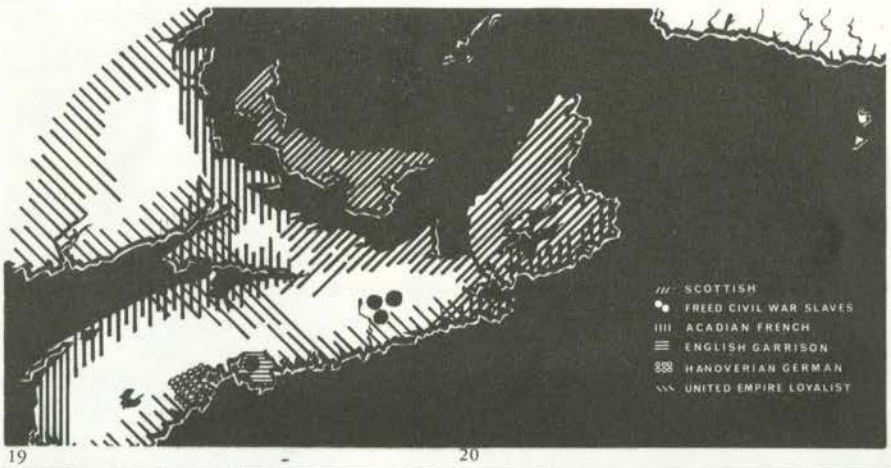

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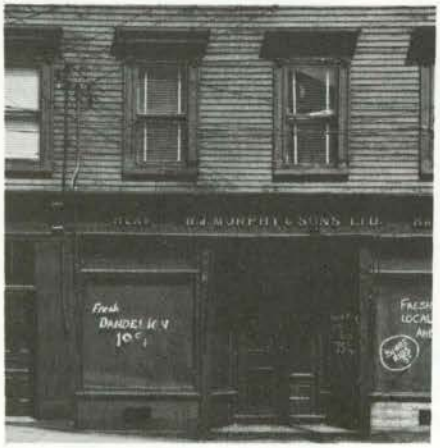

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PETTY HARBOUR

On the Avalon Peninsula, Petty Harbour, the name corrupted from Petit Havre, exhibits a type of an early fishing port. The sinuous track following the shore of the narrow bay is flanked, on the uphill side, by detached frame houses stepping up the hillside while to the water a spreading complex of jetties and wharves encroaches on the harbour area. The cod drying racks or 'flakes' reach ever further into the shallow water area until they assume the quality of a floating island interlaced with narrow access waterways. The incessant cutting of the forest cover to provide the structure and the fir bough sheathing for these 'flakes' has resulted in a barren rocky foreshore in which the buildings stand out as prismatic, sharp, artificial objects set against the landscape.

GRAND BANK

At Grand Bank on the Burin Peninsula, an important base for the fisheries, a later phase of development emerges. Here small scale fishing gives way to a more advanced technology with a packing plant on reclaimed land in the harbour. In the place of the individual fishing 'flakes' competitively encroaching on the harborage, masonry wharfage provides anchorage for larger trawlers. The colourful curving line of chandlers' shops, warehouses, and shipwrights' sheds makes a clear demarkation between the business of the port and the loose organic or empirical siting of the housing beyond. Here in embryo is the pattern for the Maritime port: enclosed harbour, wharfage, warehouses, and utilitarian industry, with water, street and housing in a graded sequence stepping away from the waterfront.

24

18. Map illustrating settlements of ethnic groups.

19-22, 24. Prescott Street, St John's, Nfld. The 19th century street, in temporary disrepair, and without the status of the suburbs, still provides a rich and full urban environment.

23. Colliers, Nfld. The ship, shed, and horse cart, each in their way, follow a traditional use of wood.

25. Petty Harbour, Nfld.

26. Grand Banks, Nfld.

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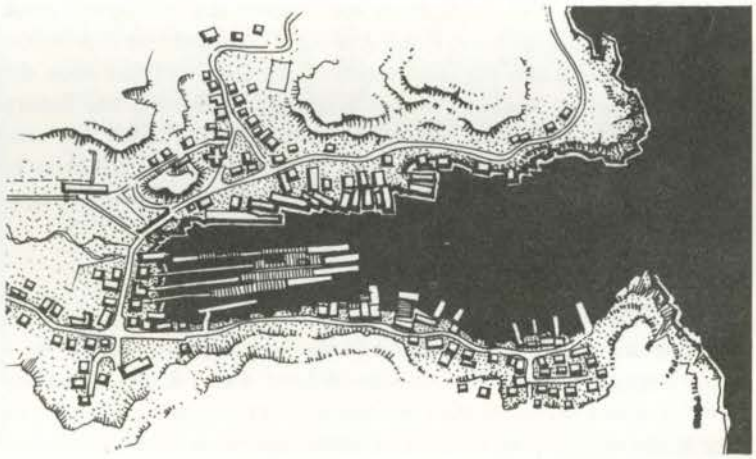

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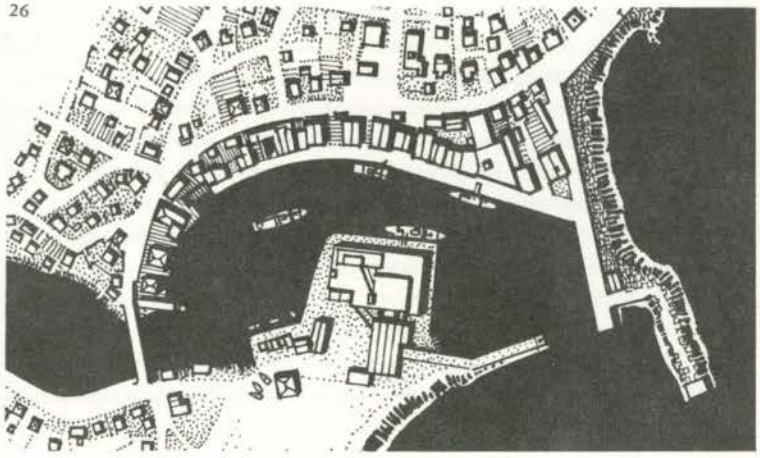

27. Louisburg, NS. This famed bastion of French Maritime power is a classic instance of the town without economic base devised purely as an instrument of war.

28. Petty Harbour, Nfld. Clapboard sheathing on frame with props.

29. Lancaster, NB. The 19th century industrial scene setting a new scale for the Maritime town. Aside from being economically necessary, the brutally dominant, massive forms of the grain elevators add interest and variety to the skyline.

30. Charlotte Street, Saint John, NB. The flat roof, cubical mass, projecting dormer, and colour variation of these houses stand in defiance of the cozy prettiness of the suburban villa.

31. Lunenburg, NS. Chandlers' shops and packing plants make a colourful screen between the activity of the port and the residential area of the town. The brilliant use of saturated colour derives from the fisherman's use, in dory and float, of strong colour for visibility.

Nova Scotia exhibits more diversity of type than Newfoundland. With a milder climate, a secure agricultural base, and a long history of permanent settlement, regional variants become more specific and more noticeable in this peninsula. At Port Royal, south of the Bay of Fundy, New France was born in the first permanent settlement of North America, founded by Pierre du Guast, Sieur de Monts. Although sacked and destroyed by the English under Samuel Argall in 1614, the fortification was rebuilt and became the base for expansion by the Acadian French. Along the Bay of Fundy through the rich lands of the Annapolis Valley to Grand Pré and up through the Chignecto Peninsula to Shediac and Buctouche on the Northumberland Straight runs a coastal arc of French influence curiously remote from the French Canadian culture of Quebec.

LOUISBURG THE FORTRESS TOWN

After the cession of Nova Scotia to Britain by the treaty of Utrecht in 1713, Cape Breton Island became the stronghold of French power. At Havre-aux-Anglais the fortress town of Louisburg was designed as a military and naval base to secure the approaches to North America. To this end over 20,000,000 francs were poured into the construction of the enceinte based upon the military theories of Vauban. Vaulted magazines, earthworks and battery positions surrounded a town laid out in strict rectilinear order. The residence of the intendant, the hospital, the parade square, and the barracks are sited in a disciplined orderly layout in complete contrast to the accidental or empirical planning of the minor fishing ports.

HALIFAX THE GARRISON TOWN

The use of Chebucto Bay as a rendezvous for French squadrons attacking the New England coast led to a demand by the Massachusetts colonists for a strong English base on the south coast of Nova Scotia. Under Cornwallis 2,576 emigrants landed on the peninsula in 1749. Using a rectilinear grid plan, blocks were laid out in 120 ft. x 320 ft. sizes with spaces reserved for churches, the government house, warehouses and barracks. Surrounded at first by a timber palisade with blockhouses as protection against Indian attack, the hilltop on the peninsula became the focus of the army and the naval base started in 1759 set limits to the civilian expansion of the town. During the nineteenth century a continued expansion of waterfront marine activity led to the building of Water Street. As it stands today this is an extraordinarily handsome assemblage of warehouses and shops executed in a virile masculine idiom well worth preservation. Around the port area waves of immigrants, Hanoverian Germans to the north of the early town, Highland Scots, Scots-Irish from Ulster and Irish fleeing the potato famine in the nineteenth century developed segments of the town which still today maintain their own special character and quality. The opulent frame residences along South Park St reflect the order and prosperity of the officer caste of the British garrison.

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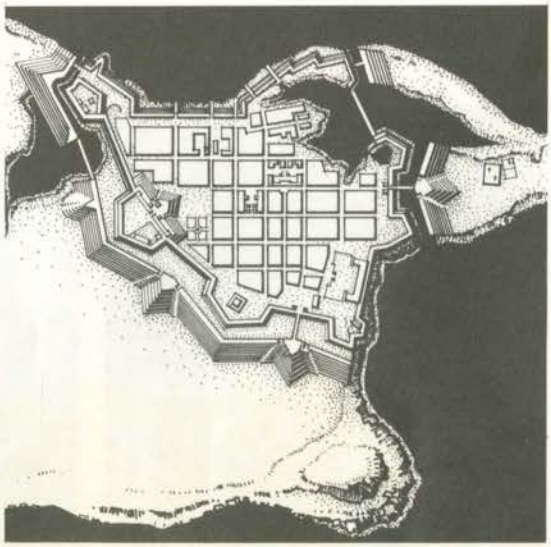

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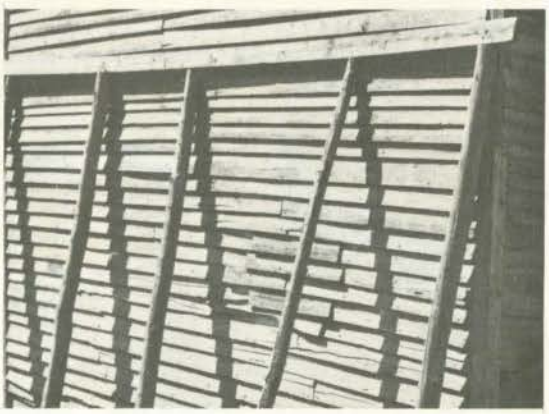

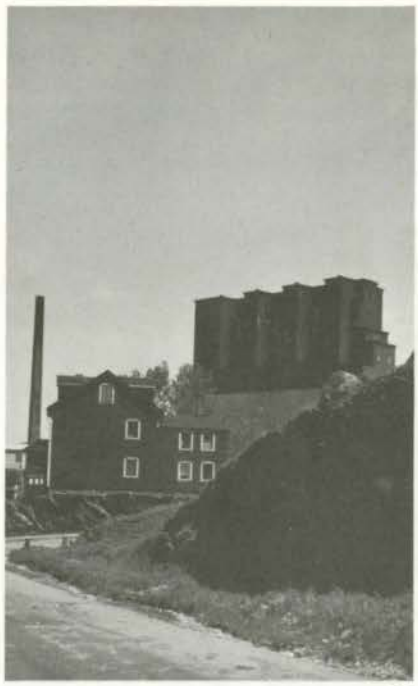

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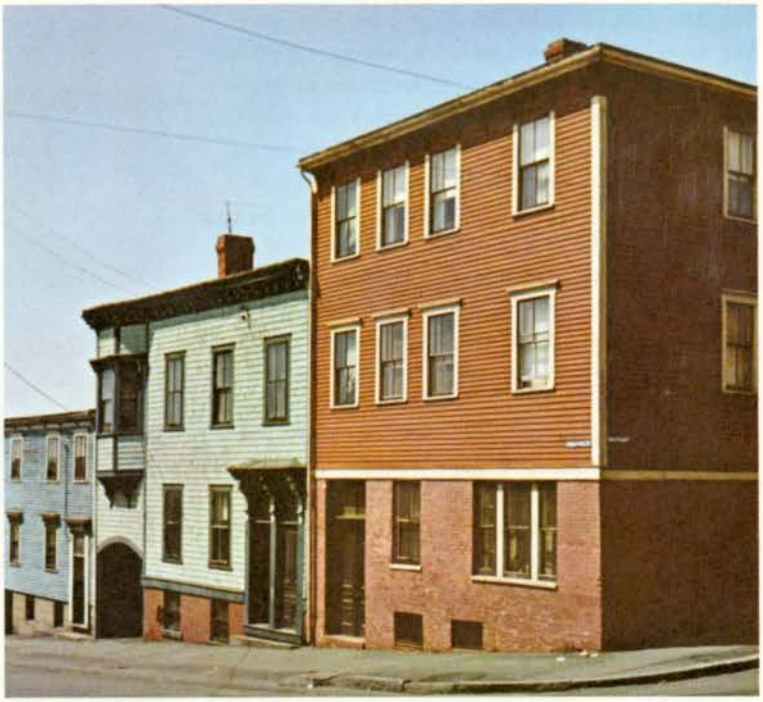

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NINETEENTH CENTURY HOUSING

The entire eastern seaboard of North America suffers from a condition of anaemia. The continuing westerly movement of people and capital for over two centuries has drained the coastal cities of the more adventurous, the more progressive and the more alert elements of the population. Brooklyn, Boston, Charleston and Halifax all in their various ways show the effect of this attrition.

Yet there is a peculiar and special quality to much of this building. Whether in the high density frame structures of St John's, Nfld shouldering up the hillside, or the more substantial brick cubes of Saint John, NB, these three and four storey walkups, tenements and row houses vividly recall the nineteenth century. Popular lithographs of the post Civil War era in the States echo the curiously harsh and bleak aspect of this phase. In a cubist landscape stripped of all vegetation, uncompromising rectilinear boxes of brick stride in serried rows into this denuded urban fringe. A haunting nostalgia lies over these streets. Though emptied of the turbulent life of the great migrations of the nineteenth century a subtle aroma of boiled cabbage hangs in the air and the lace curtains twitch as the planners, the architects and the civic officials stride through the dust. And how horrified the residents are when the camera is turned to their houses. Badgered by the TV screen and the daily paper into the belief that the only worthwhile life is to be found in a new subdivision miles from the city and that proper status can only be achieved when behind the wheel of large and glittering Chevy or Oldsmobile, these people feel a very deep shame at being caught residing in a city centre.

These colorful row houses presenting their rippling facades to the street, the dignified mass of the brick walls simply pierced for light and air are superb urban forms. Granted that many of the buildings require renovation — but remember that a lick of paint and a touch of plaster can quite revitalize a building, and given one building in the street as exemplar — an entire neighbourhood can be saved.

The Maritime cities, by and large, have been spared the more dreadful ravages of sprawling suburbia; peripheral developments tend to be minor in impact and in many cases so blighted that they are ripe for demolition. The outskirts of Saint John, NB, for example, could stand as an exemplar for a special type of subtopian nightmare in which squalid 'eateries' jostle cheek by jowl with auto graveyards and are surrounded by a desperate confusion of wirescape and industrial 'junk'. And yet this city, which has been so much maligned, possesses in its core urban squares and terrace houses which could provide the frame for a superb essay in urban renewal. The pilot restoration and cleaning up of one segment of the older town could go far to counter the flight from the city. Above all else, the loan agencies, the banks, the insurance companies, and behind them the CMHC, must liberalize the credit instruments for renovation.

Largely due to the lack of economic opportunity during the last hundred years, the Atlantic cities have escaped the worst blunders of suburban expansion. Their structure and functional pattern still reflect a coherent order which can be adapted to contemporary needs. It would be tragic were these towns to follow blindly the errors of central Canada. To substitute, in place of the very real character and quality of these cities by the sea, a pale imitation of the anonymous commercial architecture and the endless trivia of suburbia would be a national loss for Canada.

32

32. Water Street, Halifax, NS. Strong, clear, simple forms result in the dignified commercial architecture of the 19th century boom years.

33. Merritt House, Saint John, NB. Where the building has particular grace and elegance in design or historic significance, as in this colonial structure recalling the sparse grammar of the classic revival in New England, every effort must be made not only to preserve the building, but to key it in with surrounding rehabilitation.

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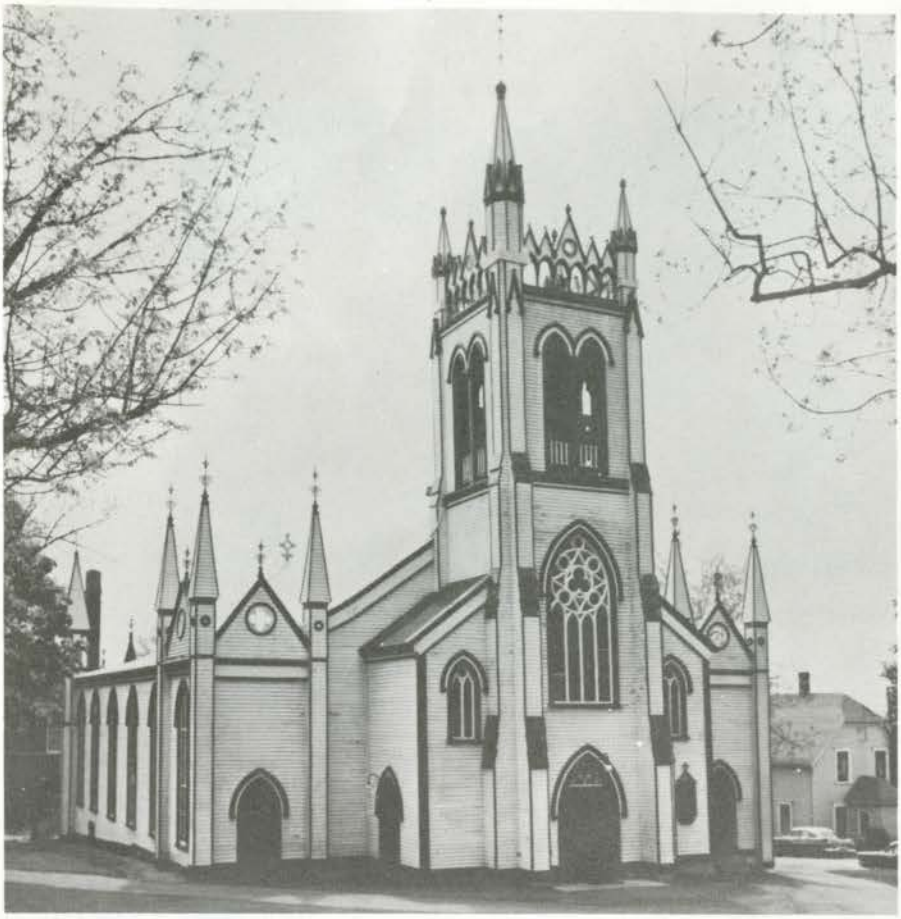

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34, 35. St John's Anglican Church, Lunenburg, NS. Initially built (in 1754) as a simple colonial frame box, the church was enlarged in the 19th century, in the fashionable Gothic revival idiom. It is characteristic of the robust Hanoverian architectural vocabulary in the town.

36. Queen Street, Charlottetown, PEI. Throughout the Maritimes street after street reflects, even in the simplest structure, this very real heritage from the past.

37. Saint John, NB. A three storey walk-up — superb modelling of the facade with the simplest materials.

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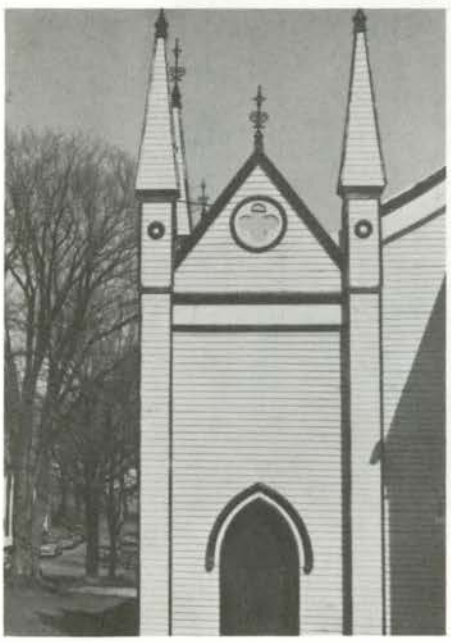

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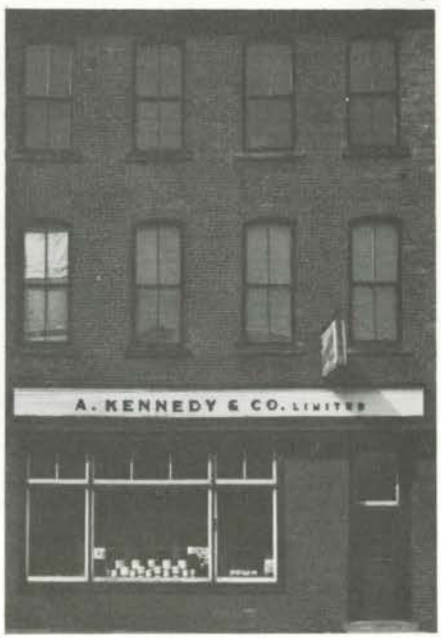


In 1947 Pilkington Glass Limited established their travelling scholarship and architectural award which enables one graduate student a year to do research work abroad. Each school of architecture is entitled to nominate two candidates.

The award is valued at $2500 plus travelling expenses to the port of embarkation with second and third prizes of $200 and $100 respectively. Winners are required to spend six months in Britain and for two months are free to travel wherever desired.

This year judging took place at the Ontario College of Art, Toronto. Chairman of the jury was George Gibson (F) and representing each school of architecture were: Paul O. Trepanier, l'Ecole d'Architecture de Montreal; Gordon S. Adamson (F), McGill; Gerald Robinson, University of Toronto; Dennis Carter, University of Manitoba; Duncan McNab, University of British Columbia.

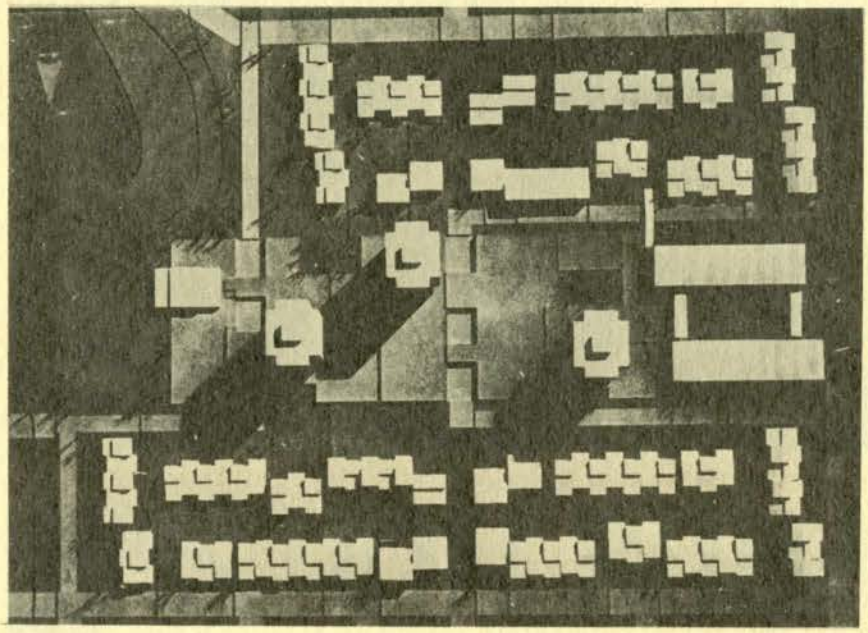
PILKINGTON SCHOLARSHIP 1963

"The jury wishes to congratulate the schools and the entrants on the high standard of the work submitted. It is felt that there has been a steady increase in quality over the past fifteen years and that there is no doubt the continuing interest and generosity of the sponsor have played a considerable part in this apparent improvement which must, in the long run, reflect itself in better architecture in all the areas of this country that are crying for it.

The pleasurable task of the jury was not an easy one, but after thorough inspection and animated discussion a unanimous decision on the awards was made.

On behalf of the entire profession in Canada the jury expresses its appreciation to Pilkington Glass Limited for providing the stimulus for these exciting competitions." George Gibson

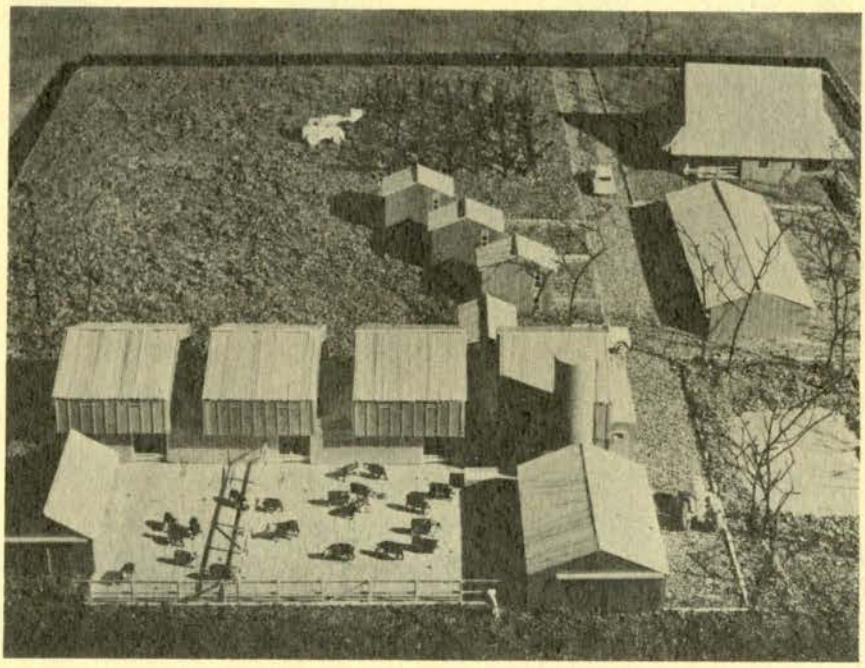
Second Prize • Pierre S. Guertin • McGill
RESIDENTIAL REDEVELOPMENT



A graduate of McGill University, the author of this thesis is from Hull, Quebec and chose for his subject, **A Residential Redevelopment For Hull.** In this section of the city, in accordance with new zoning proposals, present buildings are to be removed and replaced with new residential structures.

"The subject of this thesis is of current concern in all the urban centres of the country and the proposed solution was most competently handled. The jury was impressed with the orderliness and thoroughness of the scheme and the high quality of draughtsmanship. Excellence and economy of planning combined with a careful consideration for optional privacy or social gathering give this project a quality that is all too rarely met in actuality."

Third Prize • Michael M. Fieldman • McGill
DAIRY AND POULTRY FARMSTEAD



Also from McGill University, the third prize winner is a resident of Westmount, Quebec. His thesis was titled **Dairy and Poultry Farmstead Study.** In his introduction Mr. Fieldman commented that with specialization and mechanization playing an increasingly important role in Canadian agriculture, the time has arrived when the farmer with an economically sound enterprise can profitably engage an architect.

"This unusual subject was handled with great sensitivity and complete simplicity. While the jury was not qualified to assess the practical merit of the planning, the report gave them the impression that the author had given the subject considerable study. Mr. Fieldman is to be congratulated for his daring in selecting an area of study that has been virtually devoid of architectural attention, at least in this country, and for showing that such unassuming buildings can have dignity and beauty."

Maison d'Appartements

SAVOY PLAZA · WESTMOUNT · PQ

ARCHITECTES — IAN MARTIN & VICTOR PRUS · INGENIEURS CONSEIL: STRUCTURE — B. A. ESKENAZI · MECANIQUE — S. LEVINE · ELECTRICITE — S. KLEIN

PRESENTATION PAR JEAN GAREAU

The staggered plan gives a scale for the pedestrian. The shapes provide protection and privacy for the balconies set within the recesses and break-up the resonance of the heavy traffic along Sherbrooke Street. The quiet colours of the building recall the tone of the neighbouring Gothic Revival church and city hall. Ed.

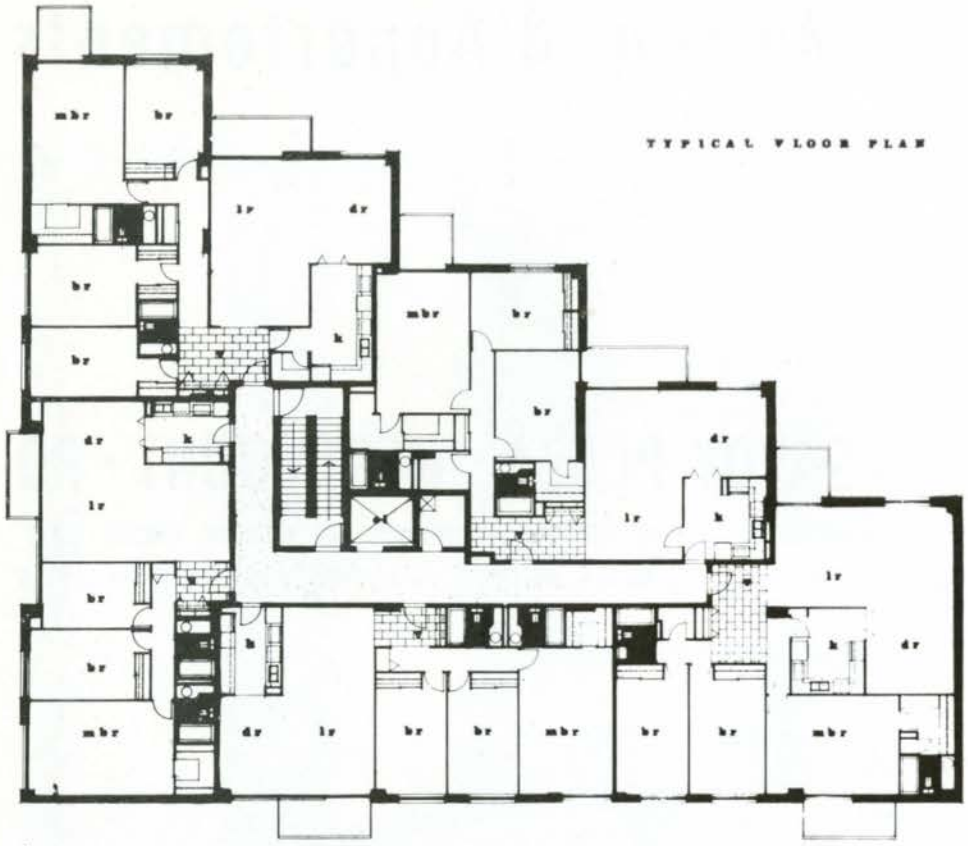
Cette maison de rapport est sise avenue Clarke, à l'angle de la rue Sherbrooke dont l'axe s'incline à ce carrefour pour faire place au parc qui dégage la vue sur l'hôtel-de-ville de Westmount. Les deux façades principales sont ouvertes sur le sud et l'ouest.

L'immeuble, limité à 6 étages sur rez-de-chaussée et sous-sol par les règlements de Westmount, groupe une conciergerie et 36 appartements comprenant une salle de séjour, de 2 à 4 chambres à coucher et des services très développés. Un garage pour 30 voitures est aménagé au sous-sol. L'immeuble dispose d'un ascenseur-monte-charges. La chaufferie est en appentis. Le chauffage central est assuré par plinthe radiante. Les dégagements sont pressurisés. Chaque appartement dispose d'un système de climatisation autonome.

La structure en béton armé (colonnes, dalles simples et poutres de rive) est soulignée extérieurement par un enduit de ciment peint blanc. Le revêtement extérieur est de brique vernissée gris-beige. La face des balcons est formée d'une dalle de béton à galets apparents préfabriquée. Les portes-fenêtres et fenêtres de type Pella sont de dimensions exceptionnelles.

Le dallage de marbre du hall principal est prolongé à l'extérieur en pierre sciée. Les halls des appartements sont dallés de marbre, les cuisines et les salles de bains revêtues de mosaïques de verre. Les plans de travail sont de plastique stratifié.

Les architectes ont voulu alléger la masse de l'immeuble et lui donner une échelle qui soit en rapport avec le volume des habitations individuelles du quartier, en articulant le plan de façon à présenter (en particulier de la rue Sherbrooke) un groupe de fines tours. Les ouvertures (portes-fenêtres et fenêtres sur allège sombre et en retrait) soulignent le mouvement vertical de ce parti. Il en résulte une intimité accrue entre les balcons d'un même étage. Le choix de la brique vernissée gris-beige rappelle la pierre calcaire et le grès de l'église et de l'hôtel-de-ville voisins de style renouveau gothique comme le parti plastique en évoque le mouvement vertical.



TYPICAL FLOOR PLAN

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PHOTOS BY MARCEL CORBEAU

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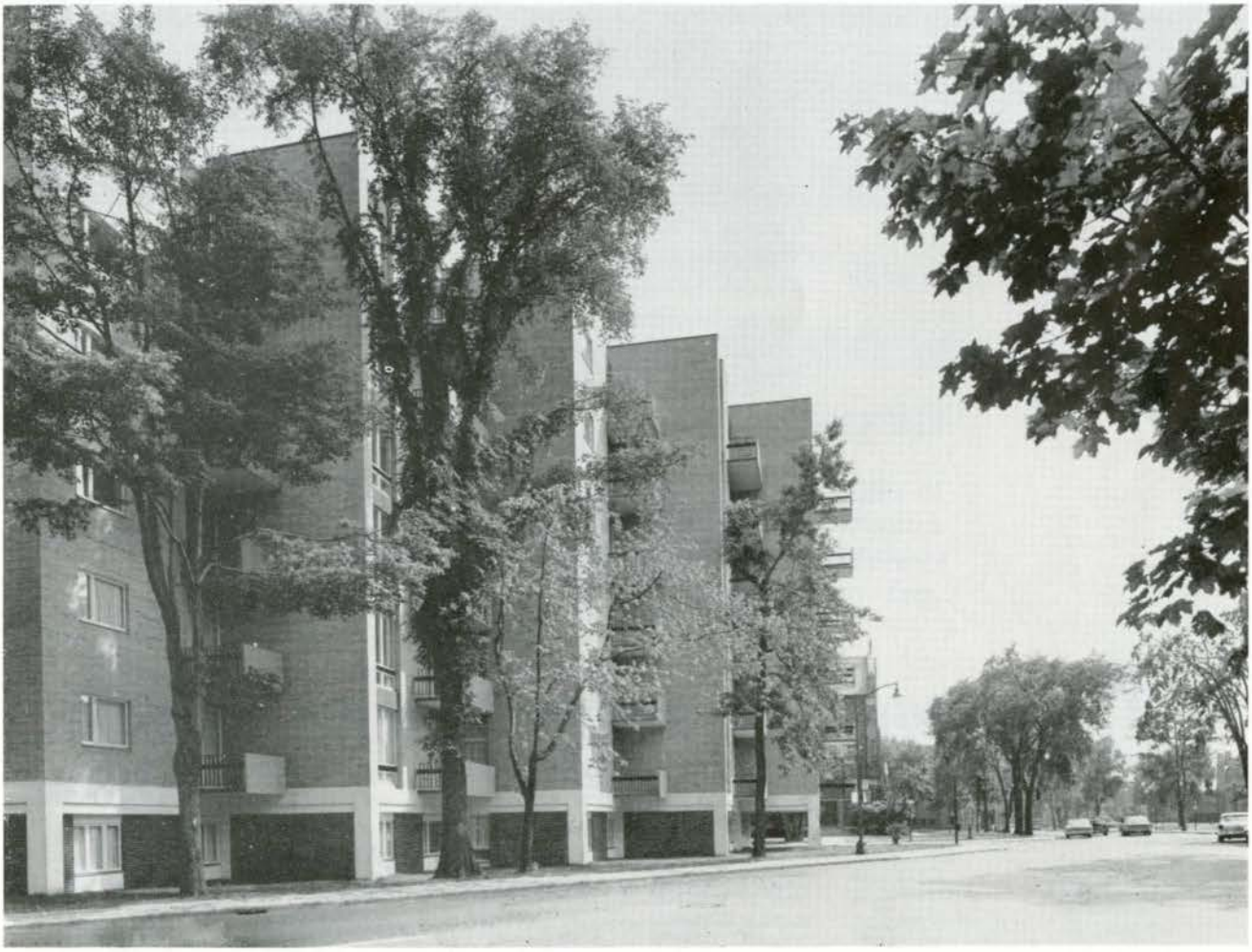


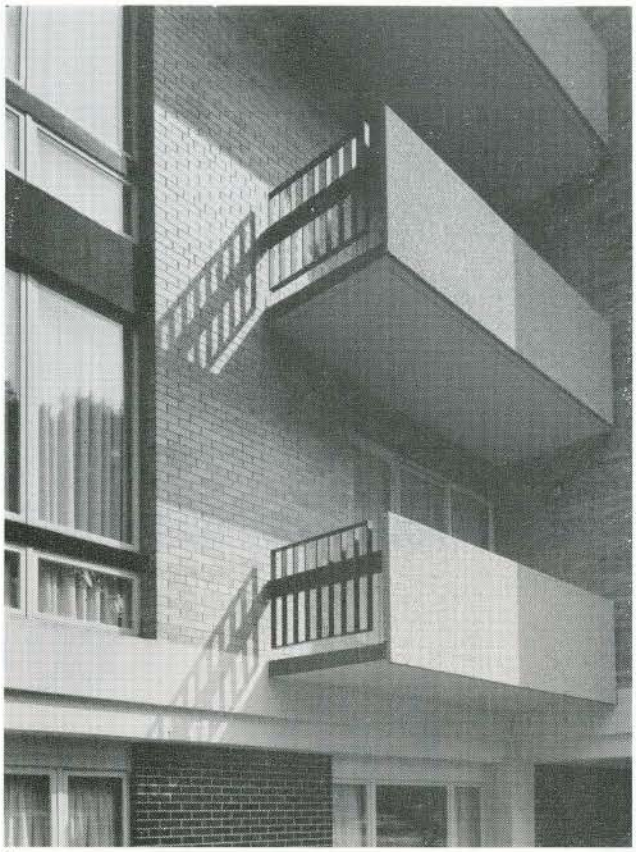
1. Plan d'étage type. A typical floor plan.

2. Le jeu des tours. The staggered towers.

3. Les pleins et les vides. Solids and voids.

4. Détail de la façade, rue Sherbrooke. Detail of the Sherbrooke Street elevation.

5. Détail, angle sud-ouest. Detail of the southwest corner.



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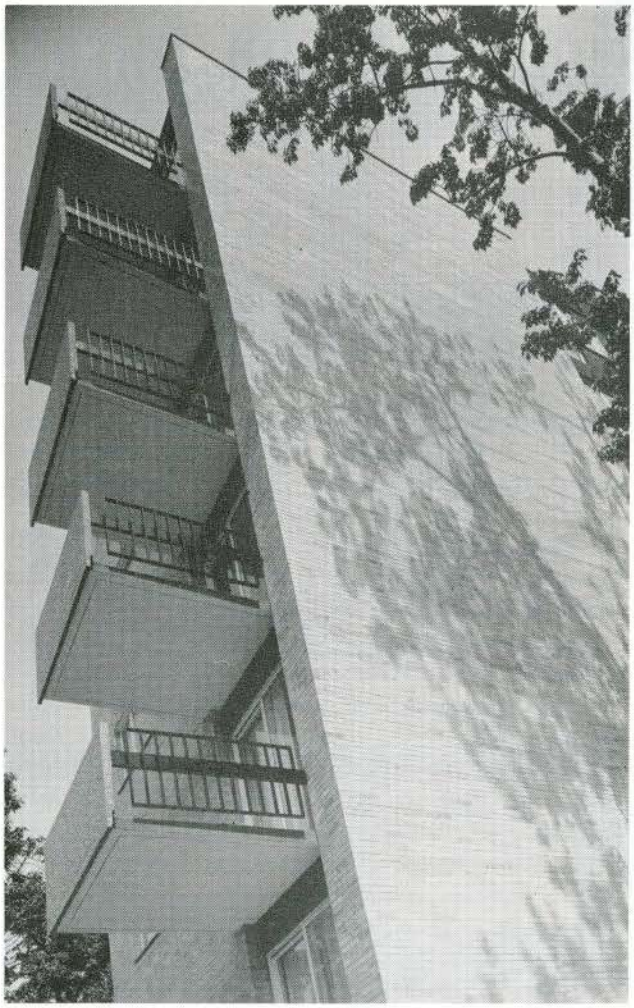

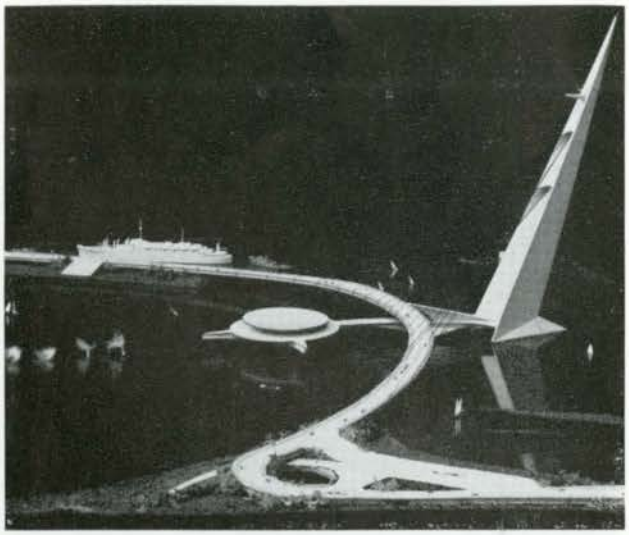

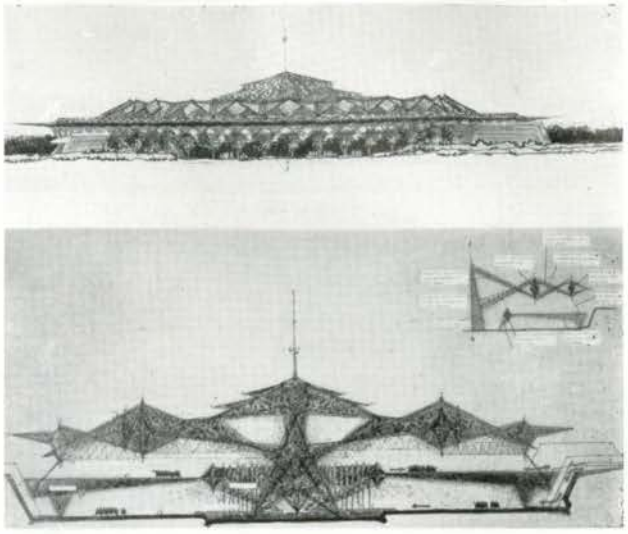

POINT DE MIRE ET CHAINON

Soumis par Roger D'Astous & Jean Paul Pothier, Montréal

Ce projet présente un immense pont suspendu aux lignes toutes nouvelles, qui relierait Montréal à l'île. Il comprend aussi un restaurant surplombant l'eau et une partie centrale avec terrasses et autres éléments rentables.

A FOCAL POINT AND LINK

Submitted by Roger D'Astous & Jean Paul Pothier, Montreal

This design proposes a great suspended bridge of novel design between the mainland and the island site. It incorporates a restaurant over the water, a central feature containing viewing platforms and other revenue producing components.

PAVILLON-HALL PERMANENT POUR REUNIONS

Soumis par Thompson, Berwick et Pratt, de Vancouver

Cette conception d'un immense pavillon d'exposition qui servirait également de salle de réunions a l'avantage d'offrir à la Métropole, même après l'Exposition, un immeuble dont l'absence se faisait sentir.

Très original et presque oriental d'aspect, ce pavillon ne perd rien pour autant de ses qualités pratiques. Il peut loger des stands industriels ou nationaux, grâce à sa superficie utile de 200,000 pieds carrés dont la presque totalité est destinée aux étalages. Il contient un théâtre, un restaurant et des bureaux d'administration.

A PERMANENT EXHIBITION AND ASSEMBLY BUILDING

Submitted by Thompson, Berwick & Pratt, Vancouver

This design proposes a large exhibition and assembly building which might remain for permanent use after 1967 — thus providing Montreal with a feature which has hitherto been lacking in the metropolis.

Though striking and almost Oriental in aspect, the design is nevertheless functional. Intended to house industrial or national exhibits, it would provide a total of 200,000 sq. ft. of usable space, of which most would be for general display purposes. A theatre, a restaurant and administration offices are included.

NOUVELLES DU QUEBEC

PAR JEAN GAREAU

The Steel Industries Advisory Council commissioned architects to design two major structures for the World's Fair. These designs are intended to bring out possibilities for the treatment of structures of great span and height — which might find use as a focal point or exhibition space. The SAIC is to be congratulated for taking this initial step and providing the incentive to bring the World's Fair into proper focus and raise the level of interest above argumentive discussions. Ed.

L'attente de la confirmation du choix du site de l'Exposition Internationale n'a peut-être pas émoussé l'intérêt de tout le monde. Le Conseil Consultatif de la Sidérurgie, organisme permanent chargé d'orienter et de coordonner la production des aciéries canadiennes a voulu illustrer, à l'occasion de l'Exposition Internationale, les possibilités architecturales de ce matériau, sa rapidité de montage et ses propriétés structurales en tension comme en compression. Le Conseil Consultatif de la Sidérurgie créera un comité technique pour assister de ses conseils tout responsable de construction dans le cadre de l'Exposition Internationale. Cet organisme qui groupe 65 entreprises de transformation de l'acier — dont 22 sont établies au Québec — demandait récemment aux architectes Thompson, Berwick et Pratt, de Vancouver, d'étudier un pavillon type et aux architectes D'Astous et Pothier, de Montréal, d'étudier un signal. Le programme préparé par le professeur Eric Arthur, de Toronto, aviseur du Conseil, proposait un élément vertical comprenant plateforme d'observation et restaurant qui pourraient être à des niveaux différents.

Le choix du site n'étant pas déterminé au moment de l'étude, MM. D'Astous et Pothier ont voulu consilier les points de vue selon lesquels le site urbain (Pointe Saint-Charles) devrait être en contact avec le fleuve, élément dominant de la géographie de la métropole, ou devrait faire état avant tout du fleuve en étant amarrée en rade de Montréal. Advenant le choix de la pointe Saint-Charles, le contact avec le parc naturel de l'île Sainte-Hélène s'imposerait, advenant celui d'une île, les accès insuffisants exigeraient un nouveau pont. D'où le signal utile.

C'est le pilier de 1000 pieds d'un pont suspendu dont le tablier décrit entre la pointe MacKay et l'île Sainte-Hélène prolongé en amont un arc dont la corde 2 1800 pieds. Le pilier en compression, incliné et formant un V en plan serait composé de plaques d'acier boulonnées et soudées. Deux jeux de cables d'acier retiendraient le tablier prolongeant la tension des cables. Au centre du pont et dans le sens du courant, les auteurs du projet proposent un restaurant en porte-à-faux accessible par une passerelle légère. Le plateforme d'observation serait aménagée à la cote 800.

L'initiative du Conseil Consultatif de la Sidérurgie et l'intérêt de l'étude proposée devraient à leur tour servir de signal.

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TECHNICAL COLUMN

EDITED BY DOUGLAS H. LEE

Few aspects of architectural practice have received less publicity in architectural journals than 'Material Inspection and Testing'. Yet, in this country, hardly a building project is executed which does not require some form of this activity. In recent years the importance of inspection and testing to architecture has been further emphasized by the increasing demand for material specifications based upon required standards of quality and performance and the resulting need for methods whereby these standards may be measured or proved.

Architects are generally aware of the value of testing and inspection programs to their work; however, it is not every architect who is fully conversant with the mechanics of setting up testing and inspection programs, who is cognizant of the scope and limitations of test information derived, or who is prepared for the consequences of inadequate or otherwise unsatisfactory investigations.

The following article by Mr A. Goldes, Toronto consulting engineer, is a much needed and welcome clarification of the subject. Mr Goldes is frank in his comments but puts forward many constructive suggestions which he believes will help overcome some of the shortcomings of current inspection and testing practice as he sees them.

The Journal is pleased to publish this important paper by Mr Goldes. *D.H.L.*

USES AND ABUSES OF INSPECTION AND TESTING IN BUILDING CONSTRUCTION

BY A. A. GOLDES

There are few aspects of a building contract more in need of improvement than the inspection and testing. Current practice includes several undesirable procedures that lessen the value of these essential services and make them more expensive to the owner than they should be. The major participants in a construction venture (owner, architect, consulting engineer, and contractor) need to take a searching look at the present situation to determine where and how matters may be improved.

The component phases of inspection need to be identified and the responsibility for each clarified. In particular a clear dividing line must be drawn between the inspection functions of the designer and those of the inspection and testing company (ITC, for short). Testing is to be differentiated, contractually, from proving and the responsibility for each assigned. Designers are at fault in not being sufficiently selective about who actually does the testing. All too often these professional services are retained on the basis of price alone, a dangerous index for skill and reliability. Competent testing is not possible when it is bound by the subtle fetters forged by a denial of true independence. But these factors, serious as they are, cannot excuse the sort of testing that is so often encountered. The inspection profession has much to do in improving the general quality of work done and in regulating practice of the profession. All who are striving for higher construction standards need to take counsel with one another to determine the most effective measures to improve the conditions under which ITCs are expected to operate. Therein lies the solution to the problem of securing top grade inspection. More enlightened policies are long overdue.

WHO IS SUPPOSED TO INSPECT

The owner pays his prime design consultant (architect or engineer) to inspect construction to ensure that the materials specified are supplied and the intent of the design is adhered to. The degree of inspection required by the owner may vary from project to project. Inspection may even be deleted entirely, but it is a foolhardy owner who attempts to economize thus.

Much difference of opinion centres around what constitutes inspection, the extent to which inspection is to be construed as supervision of construction, and indeed whether any acceptance of responsibility at all is implied for the construction methods of the contractor. This controversy, important though it is, need not detain us now since we are here more interested in and concerned with a limited aspect of the term as it relates to the verification of the quality of building materials, rather than the way in which these materials are combined to produce finished building products or how these products are installed in the building.

RESPECTIVE ROLES OF THE ITC AND THE DESIGNER

Those familiar with building construction in Canada will at once recognize the fact that the ITC often exercises functions which one would reasonably expect to be the responsibility of the designer or his design consultants. Steel erection, welding, and high tensile bolting, for example, are commonly inspected today by the ITC and not the designer. In some respects this transfer of responsibility can be condoned for sound and practical reasons. Unfortunately a trend is being set, resulting in more and more inspection being sloughed off onto the ITC for reasons which reflect but little credit on the designer. When this occurs, the owner is paying twice over for this service since he is already paying his prime consultant for inspection. What makes this even more distressing is the fact that inspection for conformity with the design can be done more effectively by the man who did the design and is familiar with the assumptions and limitations inherent in his design. This is not to imply that the blame is entirely that of the designer. He, too, is being required to do more and more for less and less and in order to survive, camouflaged stratagems and evasions of responsibility are being grafted into contracts to lessen the burden on his shoulders.

Increasingly the consulting engineer is being denied the opportunity to inspect the work he has designed. The architect, generally incapable of executing this inspection, welcomes the advent of the ITC, to whom larger and larger segments of inspection are entrusted without detriment to the architect's fee. With a tendency towards increasingly complex structures and the need to design ever more economically, this relegation of inspection to a person other than the designer is a dangerous course to follow. The consequences can be, and often are, calamitous as evidenced by the failures, total and partial, which crop up with embarrassing persistence.

DIVIDING LINE BETWEEN ROLES OF THE ITC AND THE DESIGNER

Where then is the dividing line between inspection work to be done by the ITC and the designer? Before answering this question it is well to establish what an ITC is and what it is not. An ITC does not design though it may be called upon to check on the performance of something built according to someone else's design. An ITC does not specify though it may be asked to check on the compliance of supplied materials with the specified characteristics. An ITC is, or should be, an autonomous group of technical and scientific specialists without control by outside industrial firms. It should be an assembly of objective professionals required, by the very nature of their work, to call the shots as they see them, without fear or favour. An ITC will ordinarily comprise many different specialists — engineers, physicists, chemists, metallurgists, etc. It has a considerable investment in plant, test equipment, and facilities and in this respect differs radically from the design consultant. By virtue of its laboratories, the ITC is equipped to conduct objective, scientific investigations and tests quite beyond the scope of most design consultants. The ITC also offers the highly specialized skill and experience of its staff to perform field functions which a design office is not equipped to provide. For example, the inspection of steel work erection, particularly while it is under way, is an assignment to be entrusted only to experienced men capable of standing up to the hazardous nature of this work. Anyone who has seen a multi-storey steel-framed building under erection in winter knows why this is so. Also, while an engineer may be able to design a weld, he would be a very exceptional man if he could inspect it and recognize the less obvious imperfections caused by faulty welding technique.

Other areas where the ITC has taken over are soil investigation, caisson proving, fill compaction control, concrete testing, pile driving inspection, radiography, and ultrasonic testing. Most engineering and architectural firms are not equipped and staffed for these testing functions. The capital cost required to fulfil these roles is quite beyond their capability, particularly when viewed against the demand in any one firm. There are in addition other less specialized areas where the designer has surrendered his role, notably in inspection of fabrication at the plant. This is particularly so in the structural steel and precast concrete industries. Why this has happened is not clear since we are here concerned mainly with the implementation of design and the checking of fabrication against shop details previously scrutinized and approved by the designer. There is no doubt that the designer is better fitted to do this work than the ITC whose familiarity with the requirements is considerably less than that of the designer. The reason may be that this work is time consuming and cannot equitably be borne on present fee schedules. Perhaps the solution is to reimburse the designer for this work on a time basis, thus reducing the incidence of unwelcome surprises at the construction site when the material is being fitted together. Broadly then, and apart from the noted exclusions, the ITC checks on the chemical and physical properties of building materials. The designer checks on the manner in which these materials are marshalled in the field to comply with the intent of the design. Each bears professional responsibility for his work. The designer has, from time to time, been made painfully conscious of his responsibility, but the same cannot be said of the ITC. Shoddy inspection is too widely prevalent, yet it is very rarely that ITCs have been called to account for defective work.

INTERRELATIONSHIP

The interrelationship of owner, architect, engineer, testing company, and contractor is beset with much misunderstanding and a few words of clarification are necessary. The wise owner does not intervene directly in construction work once the tender has been let. He delegates all superintendence to his agent, the prime consultant who, in building construction, is generally the architect. Sometimes the architect elects to execute all construction superintendence by his own forces and he then attempts to entrust as much of it as he can, without being too blatant about it, to the ITC. This occurs invariably when the architect is labouring under the burden of an unrealistic fee. Whatever the cause, the responsibility of the engineering consultant under these circumstances terminates with his design. Except for very simple projects and for architects sufficiently experienced in the complexities of engineering work, this latter arrangement is a wide open invitation for trouble as any one familiar

CANADIAN
BUILDING DIGEST

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SOIL TESTING

by W. J. Eden

UDC 624.131.31

It is the purpose of this Digest to describe engineering soil tests commonly used in site investigations and to indicate their potential use and limitations. It may be regarded as a sequel to CBD 29, "Engineering Site Investigations."

Soil testing is based on the premise that the behaviour of soil masses under imposed conditions can be predicted if certain soil properties can be measured. Because soil is a natural material that is much more variable than man-made building materials, and because it is a multi-phase system composed of solid particles with their intervening void spaces filled with either water or air or a combination of both, the results of soil tests must be interpreted in the light of past experience, climate, and the geology of the site.

One of the most important requirements is that soil tests be conducted on samples that are truly representative of the soil at the site. To be successful, soil sampling, testing and test interpretation must be conducted under the guidance of specially trained and experienced personnel. Proper soil testing has proved to be a reliable basis for the design of foundations and has permitted the design of many notable structures on difficult sites.

The various tests may be divided into four categories: classification or indicator tests, used to identify and describe soils so that they may be compared with other soils of known behaviour; strength, density and compressibility tests which have direct application in determining the bearing capacity of a soil and are used to forecast the probable magnitude of settlement; control tests used in constructing earth structures to ensure that backfill and road bases meet the required specifications for grading and density; and special purpose tests, which include measurement of the swelling or shrinking potential of a clay and determination of the possible corrosivity of a soil.

Classification or Indicator Tests

The first requirement of any soil testing program is the adequate identification and description of soils to supplement the brief visual description supplied by the drilling crew. A number of relatively simple tests are used for this purpose and are outlined below. They provide accurate classification and permit comparison with other soils where behaviour is better known. They are also used as a basis for selecting samples for the more expensive strength tests.

Cohesive or fine-grained soils (clays) and cohesionless or coarse-grained soils (sands) require different tests to assess their probable behaviour. For cohesionless soils the density and grain size distribution or grading are most indicative of behaviour. On the other hand, plasticity gives a better appraisal of the behaviour of cohesive soils. Natural water content is also of vital interest. It is measured by weighing a small sample of soil in its natural state, drying it in an oven at 105°C, and weighing the dried sample. The loss of water upon drying is expressed as a percentage of the weight of dry soil. The natural water content is of most significance when compared with the "Atterberg Limits" or plasticity characteristics of a soil.

Depending on the amount of water present, cohesive soil can exist in three states: as a liquid slurry, a plastic substance or a solid. The tests for Atterberg Limits were developed as a means of distinguishing them. The "liquid limit" is the relatively high water content at which the soil changes from a liquid to a plastic state, and the "plastic limit" designates the relatively low water content at which soil

changes from a plastic to a solid state. The procedures for determining the liquid and plastic limits are well established and are described in detail in publications of the American Society for Testing and Materials and of the British Standards Institution.

The difference in water content between the liquid and plastic limits is defined as the "plasticity index" of the soil. It follows that the greater the plasticity index, the more plastic and compressible and the greater the volume change characteristics of the soil. The plasticity index has proven to be one of the most useful of all soil indices and is essential to the description of a cohesive soil.

As a convenience for comparing a variety of soils, Dr. A. Casagrande devised a plasticity chart (Figure 1), in which an empirical boundary known as the "A" line separates inorganic clays from silty and organic soils. Soils of the same geological origin usually plot on the plasticity chart as straight lines parallel to the A line. The larger the plasticity index the greater will be the volume change characteristics. "Fat" or plastic clays plot above the line. Organic soils, silts and clays containing a large portion of "rock flour" (finely ground non-clay minerals) plot below it.

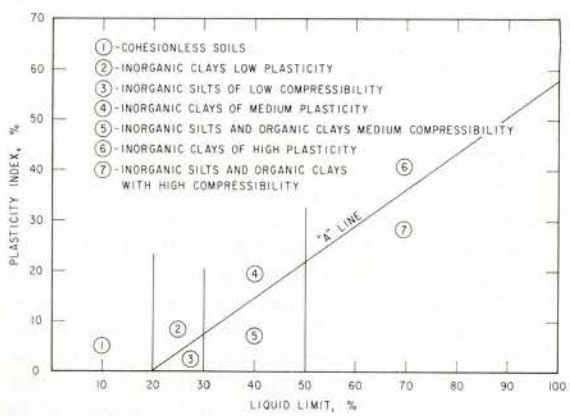


Figure 1 — Plasticity chart (after A. Casagrande)

The relation of the natural water content to the liquid and plastic limits is indicative of soil behaviour. If the natural water content is above or close to the liquid limit, the soil may be "sensitive", in which case it suffers a great loss of strength when disturbed. Sensitive soils have a honeycomb or card house structure and overstressing them can lead to disastrous failures. This sensitivity complicates sampling and testing and special procedures often have to be adopted.

Grain size tests are made not only to determine the size of the individual grains in a soil, but also to determine the relative distribution of the sizes. In cohesionless soils the grain size distribution is determined by passing a dried sample of soil through successively smaller sieves down to the 200 sieve. The grain size of fine-grained cohesive soils must be determined by more elaborate methods. One such test, the hydrometer test, involves the measurement of the specific gravity of a soil-water suspension at fixed time intervals. The grain size is calculated using Stokes' Law, which forecasts the terminal velocity of a spherical body falling through a fluid medium. With the hydrometer method it is possible to estimate the grain size of particles ranging from the 200 sieve to colloidal size particles (approximately 0.0005 mm).

The grain size distribution curve indicates the range of the size of particles present in a soil. Its shape can be used in conjunction with boring information to indicate density. A uniform soil, one consisting of particles with a very narrow range in sizes, is liable to be loose. A well graded soil, on the other hand, tends to be dense and can be compacted even more with mechanical equipment. The grain size curve may also be used to determine whether soil is susceptible to frost action, and whether sands and gravels meet specifications for concrete aggregates and road base materials.

Other indicator tests that may be carried out are the determination of the specific gravity of soil particles, the shrinkage limit and the amount of organic matter in a soil. The specific gravity of the soil particles assists in calculations of other more elaborate tests such as consolidation. The amount of organic matter will frequently determine whether or not a soil may be used as road base or backfill.

Strength-Density Tests

Cohesionless soils mobilize their strength in direct proportion to the loads applied to them, and thus depend upon their confinement and the internal friction or interaction of the individual grains for their strength. The greater the density of a soil, the more internal friction can be mobilized and the greater the bearing capacity. Hence, if the density of a cohesionless soil can be measured, the bearing capacity can be inferred. Unfortunately, a direct measure of density of cohesionless soils is difficult to accomplish. Most sampling methods cause sufficient disturbance to make density measurements on the samples of questionable accuracy. The most common method of assessing density is a penetration test conducted in the field by driving a cone or a split tube sampler into the soil. The number of blows

required to drive it one foot has been correlated with the density of the soil. This test must be carried out in accordance with fixed procedures such as those adopted by the Canadian Standards Association. If soils prove to be dense, they provide a competent bearing medium, whereas loose cohesionless soils may require special precautions to guard against settlement under certain loading conditions.

Cohesive soils, which are generally less competent in bearing, lend themselves to more direct measurement of strength and compressibility properties. Their strength is usually determined by axial loading of "undisturbed" samples of cylindrical shape obtained from carefully trimmed blocks or from thin-walled tube samples taken in accordance with the Code of the Canadian Standards Association. The compressive strength of a cylinder of soil may be determined by an unconfined compression test or an undrained triaxial test. The unconfined compression test is conducted in the same manner as the test of a concrete test cylinder. In the undrained triaxial test, the specimen is isolated by a thin rubber membrane and fluid pressures, in addition to the axial stress, are applied to the sample. This allows the test specimen to be subjected to stress conditions simulating those existing in the soil mass.

Although the unconfined compression and the undrained triaxial tests yield the same result, the undrained triaxial test must be used in special circumstances such as for fissured clays. With the triaxial test it is possible to allow the test specimen to change volume under load or to measure the water pressure within the pores generated within the sample at constant volume. This provides a more fundamental understanding of the strength characteristics of the soil and makes possible the forecast of long-term stability conditions where the imposed loads are likely to cause an appreciable change in the water content and hence in the strength of the soil. For bearing capacity computations it is usual to take the shear strength as one half of compressive strengths. Such measurements must be representative of the entire mass of soil affected by the structure — not of a few tests conducted near the foundation level.

For soft clays, the shear strength may be determined *in situ* by means of devices such as the field vane. This is a four bladed vane that is thrust into the soil and the shear strength derived from the torque required to rotate it. This test is more economical than laboratory tests, but its use should be restricted to soft clays.

With highly plastic clay soils it is possible to have an adequate bearing capacity against a sudden shear failure, and yet to have an unsatisfactory foundation because of the large deformations that develop with time from volume changes in the soil. Compressibility characteristics can be predicted within acceptable limits by means of the consolidation or oedometer test, in which an undisturbed sample is confined in a tight fitting metal ring. The top and bottom faces of the sample are covered with porous stones, the sample is subjected to a vertical load, and the time rate of compression measured. A series of such load increments is applied during the test and the time rate of compression measured for each. The following factors may be determined: preconsolidation pressure, compression index, and coefficient of consolidation. From these the amount and rate of settlement under a given load can be predicted. The preconsolidation pressure represents the maximum load to which the soil has been subjected in its geological history and this generally is a safe bearing pressure.

The strength-density-compressibility test results have direct application to design. To treat such results with confidence there must be a background of knowledge of the soil conditions to ensure that the test results are indeed representative of the soil mass affected by the structure.

Control Tests

When specially selected soils are used for bases under slabs on grade, for roads or for backfill against structures, they become an integral part of the structure and must behave in a predictable fashion. To ensure that the earth material meets the required specifications the construction must be controlled by soil tests. The material available should be tested to ensure that it meets the desired grading specifications, and must be placed and compacted in such a manner that the specified density is achieved. CBD 3, "Soil and Buildings," describes the unique relationship between water content and density under a given compactive effort for any soil. Usually it is necessary that the water content be near the "optimum" to achieve the desired density, which is usually specified as 100 per cent Proctor density or 95 per cent of "Modified Proctor." The Proctor test is a method of determining the optimum water content for a soil under a given compactive effort and is described by the American Society for Testing and Materials and other standards organizations.

To ensure that desired densities are achieved field density tests are conducted on the site, the choice of method being dictated by the type of soil involved. All test methods attempt to determine the weight of a known volume of

soil, and include the "sand-cone," the "water balloon," or if the soil is cohesive, the direct measurement of a sample of soil. In recent years a radioactive method has been used which, in certain circumstances, offers considerable savings in time.

Another type, which might be considered a control test, is an investigation, such as the loading of piles, undertaken to provide a complete foundation report. Because knowledge of the soil is so important in the interpretation of such tests it is essential to have detailed information of its type and condition in each case.

Special Tests

There are many soil tests that may be carried out to determine a single characteristic of a soil, depending upon its intended use. It is proposed to discuss briefly three types of tests here:

Corrosion potential. The problem of soil corrosion is extremely complex. Certain soils may contain chemical constituents that are very aggressive to concrete or steel in contact with them. Ground water also can be aggressive. One of the more common types of corrosion is the deterioration of concrete owing to the presence of soluble sulphate salts in the soil. The problem is acute in semi-arid climates where there is insufficient rainfall to carry away soluble salts, which often cause the rapid disintegration of ordinary concrete. Their presence can in some instances be detected visually or, more conclusively, by a chemical analysis of the soil. If such salts are present, concrete structures may be protected by the use of sulphate resistant cement.

Ground that has been filled with rubbish or industrial wastes, or soil containing appreciable organic matter can present potentially aggressive conditions. Ground waters percolating from such areas may also be potentially corrosive. Again it is necessary to conduct chemical analyses of the soil and ground water to determine the extent of the problem.

The corrosion of steel and other metals in soil is an electro-chemical process. Frequently a small area of the metal may be attacked severely, leaving other parts of the structure unscathed. There are no simple methods of evaluating the potential corrosiveness of a site, but the worst conditions are indicated by the presence of stray electrical currents such as exist near electrified railways or other large direct-current sources, low soil resistivities, and large amounts of dissolved salts in the ground water. Besides chemical analysis on soil samples, indirect methods such as probing with "corrosion sounders" can be used on the site. Expert assistance will always be required in corrosion investigations.

Swelling. Highly plastic soils have the ability to swell if given access to water. The amount of swelling will depend upon the clay minerals present and the initial water content of the clay, but swelling pressures can be high enough to cause serious damage to a structure founded on them. The most serious swelling problems occur in semi-arid climates because the natural water content of the clays may be fairly low. A building stops natural evaporation from the surface and allows water to accumulate under the foundation, thus causing the soil to heave. Tests on swelling soils cannot give definite design criteria, but they serve to point up the potential seriousness of the problem and indicate methods of overcoming it. Soil tests should include the determination of the natural water content, Atterberg Limits and the shrinkage limit. Potential swelling pressure can be measured in a consolidation test where swelling rather than settlement is observed.

Permeability. Because soil is a porous system, water will move through it under hydraulic gradient. Permeability may be defined as the ability of a soil to pass water, and the coefficient of permeability is a measure of the soil's perviousness under a given hydraulic gradient. There are several methods of measuring the coefficient of permeability, all of which measure the quantity of water that flows through the soil sample in a fixed interval of time under known hydraulic pressures. The choice of the test method will depend on the porosity of the soil. Knowledge of the permeability of soils is a vital factor in the design of earth dams and dykes, and is important also in the design of drainage systems.

Conclusions

In this Digest, the various tests that may be used to determine the properties of soil have been discussed. The results of these tests will indicate the suitability of a site and the various design alternatives for a foundation. It is still necessary, however, to evaluate the test results, for the properties of soil are influenced by both the geological and climatic conditions on the site.

with the general standard of field construction can readily testify.

The prudent architect takes care that he receives a realistic fee for his services and then delegates engineering superintendence to his engineering consultant, also for a realistic fee. In either event responsibility for testing and such inspection as is assigned then devolves on the inspection and testing company, who is directly responsible to the owner's prime consultant for the accuracy of its work. Since it is patently impossible for the architect or his consultants to check the physical and chemical properties measured by the ITC, the latter bears the heavy responsibility of ensuring the accuracy thereof. All interpretative conclusions and decisions as to acceptability depend on these results. If the ITC records the crushing strength of a concrete cylinder as 3240 psi, he cannot be gainsaid by the architect or the engineer since they do not possess the equipment to make their own check.

The role of the architect or engineer in testing is basically limited to indicating what is to be tested, when and how often such testing is to be performed, and assessing the extent to which the measured qualities are acceptable in relation to those specified. This administration of testing by architects and engineers, combined with the scrutiny of testing reports, correspondence, and invoices, amounts to a surprisingly large expenditure of time, particularly when load tests and evaluation tests of suspectedly defective material are involved. Many contractors mistakenly believe that they have recourse against a testing company if testing fails to discover defects in materials before they are built into the structure, or if delayed testing or late reports cause them to be subject to extra expense in the rectification of defects. The general contractor is required under the terms of the contract to furnish the completed project of specified materials. Shortcomings in meeting the specified materials and requirements are entirely his responsibility except where he has been authorized by the owner or his agent to substitute alternative materials. The ITC's responsibility to the owner runs parallel to that of the contractor and the recourse of the owner, in respect of defective testing, is limited to the damage sustained by the owner as a consequence thereof.

PROVING AND TESTING

It is an important principle in building that it is incumbent on the contractor to produce proof, by testing, that the materials he proposes to use comply with specified requirements. All testing work required in proving quality is the responsibility of the contractor and such testing is not chargeable to the owner on the provisional sums or allowances set aside for testing. Many specifications err in not requiring independent test verification of the claimed quality of the materials to be used by the contractor. They are content to accept manufacturer's test reports at face value. This procedure does not always serve the best interests of the owner since such reports may be deficient in essential information without actually misrepresenting test results. The testing ordered by the owner is an extra and voluntary precaution taken by him to check on compliance with the specifications. While it is not incumbent on the owner to do any testing on his own account or to provide adequate testing, it would nevertheless be foolhardy of him to omit to take these precautions. Equally, it is not sound practice for the contractor to rely solely on the owner's testing. Unsatisfactory materials and workmanship can be rejected by the owner at any time up to final acceptance of a building. The more deeply a material is embedded into a structure by following construction, the more expensive it is to make corrections. It will thus be seen that two different ranges of testing are customarily called for in an equitably phased contract — proving by the contractor, and testing by the owner. To avoid conflict of interest it is advisable that these phases be handled by separate ITC's.

ESTABLISHING BONA FIDES OF AN ITC

Before a consultant is retained, his capacity to do the work is closely examined. His training, experience, and recognition within his own profession come under searching scrutiny and it is well that this is so. To design and to build are only portions of the process of creating a structure. It is no less necessary to ensure that the basic components of the structure have the physical and chemical properties on which the design is based. Mysteriously, though, the same qualification is not applied when the ITC is appointed. How many ITCs in Canada publish a list of their personnel showing the qualifications and experience they have to offer in doing the vital task entrusted to them? How often does it happen that the inspectors are interviewed by the architect or engineer to determine their capability before being assigned to a project? How often does the inspector hide behind concealing initials and leave it to some office co-ordinator to sign his report? How often is an inspector's report blindly accepted without even an enquiry as to his identity, qualifications, or capability to render the report? How often does it happen that prefabricated materials, after having received a clean bill of health from the inspector, arrive on site with defects that cause costly delay and necessitate expensive impromptu field rectification? Only too frequently are the engineering consultant and the architect left to handle the illegitimate off-spring of the ITC's ineptitude. If the ITC wishes to be treated on a professional level, it needs to upgrade its standards of performance and conform to professional norms.

CAPABILITY OF INSPECTORS

No contractor or fabricator should object to the presence, on site or in his workshops, of ITC inspectors. The contractor has a right to expect that they are competent and reasonable. Inspectors must realize that their duties are limited to ensuring that the work is furnished and performed as shown on the design and shop drawings, and as called for in the specification and referenced standards and codes of practice. It is not their functon to design the work, or to add requirements which were not in the original contract. The contractor has a right to demand that his fabrication processes will not be unduly delayed, that reports will be rendered promptly, fully, and unambiguously, and that handling costs are not increased to accommodate arbitrary requirements.

Slowing up of production runs and unforeseen additional handling of material are items that can seriously upset the fabricator's costs. Inspection is not to be construed as an operation that

commences when the unit under fabrication has been completed. It is a process which starts at the same time as fabrication and continues all the way to completion. Deviations can thus be intercepted when their correction is not too costly. For efficient exercise of their duty, inspectors must examine carefully and be fully familiar with the design drawings, the shop and detail drawings, and that much neglected document, the specification. The percentage of jobs on which the inspector does not even see the contract specification, let alone the drawings, must be shockingly high. While the responsibility of this state of affairs is usually not the ITC's, it is all too often quite prepared to tag along with this blessed state of unknowingness. The ITC must be provided with a complete set of contract documents and endorsed, approved shop drawings as of right. It must not be put in the position of having to plead for that which is an essential requirement for the diligent performance of its task. If it is not securing co-operation in the supply of the above documents, it has a duty to let the architect know about this without delay.

PAYMENT FOR INSPECTION AND TESTING

In the matter of fees there is much room for clarity and improvement. Specification writers do not know enough about the cost of the many individual tests done by ITCs. If there were greater foreknowledge, the provisional sums included in contracts would be more realistic and unnecessary friction and embarrassment would be avoided. ITCs need to supply specification writers with comprehensive cost data for testing work and to guide specification writers in the determination of testing requirements at the time contract documents are drawn up. At present, fixing testing allowances is largely a matter of hit and miss. It is particularly annoying when initial diligence and zeal use up the testing allowances too early in a project and leave an insufficient amount available for important work later. It all too often happens that the ITC reads the specifications only to determine the size of the inspection allowances and then proceeds to consume these sums as rapidly as possible to ensure that nothing is left unspent. The expenditure of testing funds is a matter of professional responsibility for the ITC and it is the ITC's duty to keep the owner and the designer progressively informed of the accumulated testing expenditure. This can assist in spreading the available money judiciously over the entire project and not only over the initial stages. Even when the ITC is directly retained by the owner such notification will be advisable since the owner will certainly wish to be assured that this money is spread, to the best advantage, over the entire project. In either event, it is the duty of the architect to keep a running check on the testing expenditure and to vary the rate and amount of testing to ensure that the total sum allowed or budgeted for is not exceeded, that it provides control throughout building operations, and that structurally important elements receive special test control. This is not a phase of the work to be awarded and then forgotten about.

By specifying a provisional sum for testing and by appointing the ITC, the architect has not done all that he can do to create the proper context within which the ITC is to operate. Payment for testing from contract allowances is customarily made by the contractor. This places a powerful form of persuasion in the hands of the contractor. The ITC must not in any way be dependent on the good graces of the contractor. If the ITC is not receiving prompt payment for services rendered, this fact should be reported without delay to the architect who has at his disposal equally powerful modes of persuading intractable contractors.

It is an inescapable truism that, while one may get what one pays for, it is very seldom that one gets more than what one has paid for. This applies to design and construction as well as testing. Top notch inspection depends on the calibre of the inspector. High calibre inspectors are experienced, skilled men and quite rightly they demand a fair remuneration. Inspection fees should not be determined on the basis of fee cutting, beating down, or tendering. The gross investment in inspection on the average project is small compared to the value of the material inspected and still smaller when measured against the losses resulting from a failure. The Association of Canadian Commercial Testing Laboratories & Consultants (ACCTLC) can serve the construction industry well by enforcing a common stable fee schedule on its members. Specification writers can assist further by requiring that membership in the ACCTLC be a necessary requirement for appointment of an ITC to a project.

DIRECT ENGAGEMENT OF THE ITC BY THE OWNER

Requirement of the ITC that it function professionally implies an equal obligation on the client to treat the ITC as any other professional and that the ITC not be subjected to conditions that imperil its scientific objectivity.

The average building contract calls for appointment of the ITC to be made by the architect and for payment for inspection and testing services to be made out of provisional sums built into the contract price. In actual practice this often means that both the selection and the payment of the ITC are made by the contractor. A more pernicious state of affairs can scarcely be devised. This procedure projects the ITC into a conflict of interest between serving the owner, whose interests should be paramount, and serving the contractor who does the selecting and paying for inspection services. The American Council of Independent Laboratories has enlisted the support of the major architectural, engineering, and contracting organizations in the U.S.A. to correct this grievous situation. The principle has been accepted that it is in the very best interest of the owner to have full control over the ITC on a construction project; furthermore, that the ITC be selected by the owner on the recommendation of his design consultants and that payment be made directly by the owner.

It is trite but necessary to add that an ITC should not be retained on the basis of competitive bidding, but by virtue of capacity, reputation, and experience. The sum expended thus is small compared to the increased certainty that up-to-grade materials are being incorporated in the structure. As in everything else, one gets what one pays for. A bad job may be done for a good fee, but a good job assuredly cannot be done for a bad fee. Following this course of action will improve ITC services and eliminate a major source of poor construction and indifferent control. This principle has already been established in respect of soil investigation, albeit with much difficulty.

"So you're looking for an undercover job, eh NO-CO-RODE? Got any qualifications?"

"You bet! I'm tough, flexible, won't crack under the strain. And I've earned a nationwide reputation for pulling off some big efficient drainage jobs. In Montreal, on the Canadian Imperial Bank of Commerce Head Office job, the problem of the CNE Stadium in Toronto and of course, the Winnipeg City Hall thing, to name a few."

"All equipped for the job?"

"You can count on NO-CO-RODE, Chief—I come with a complete line of fittings and adaptors, can take care of the toughest job."

"Recommendations?"

"The best. I've been getting the OK from architects and drainage experts for years."

"You're on, NO-CO-RODE! Hardly modest—but who needs a shrinking violet on an assignment as tough as yours? Just wish I could find a sewer pipe with your talents."

"Gimme the phone. I'll call my brother."

Today few will venture to question the advisability of this arrangement. What is required now is an extension to cover other test specialties no less important than soil investigation. The duty of educating the client to accept this devolves in large measure on the architect.

The professions of the architect and the engineer are dedicated to the interest of their client, the owner, but without compromising their professional obligation to be scrupulously fair to the contractor and all other parties. They have long sought to raise professional standards, establish fair fees for themselves, and eliminate bidding for professional services. In striving for justice for others, they will be strengthening their own claim to just treatment. In ensuring that the owner gets his money's worth in material, the ITC can play an important role, but only if it is in a position to make test reports without bias or external pressure, and to give prime allegiance to the ultimate client, the owner.

The practical and legal responsibilities of architect, engineer, and ITC are tightly bound up and it is to the advantage of all that each operates with minimum impediment to the ethical exercise of his profession. All this will cost the owner not one cent extra, and often less. Also he will get better value for his money. In short, the word independent, as applied to inspection and testing, must be made to mean just what it implies. When the ITC is engaged directly, it is well to include in the contract specification a statement to the effect that the ITC's selection and/or engagement by the owner or his representative in no way relieves the contractor of his responsibility for the satisfactory performance of the work in full conformity with the requirements of the contract. Inspection and testing are to be regarded as an additional check by the owner and in no way amend or limit the contractual responsibility of the contractor to meet specified contract requirements. Also, the contractor should be required to cooperate with, and make available to the ITC such facilities and material samples as may be necessary for the efficient and complete performance of all inspection and testing as ordered by the owner or his representative.

CENTRAL CONTROL OF INSPECTION AND TESTING

The central organization for ITCs in Canada is the Association of Canadian Commercial Testing Laboratories & Consultants. The ACCTLC is federally chartered and among its objectives are the raising of the scientific standards of commercial laboratories, encouragement of research and development, protection of the public by insistence on minimum standards of performance and competence, advising the public as to equitable fees, and maintenance of a code of ethics. These laudable aims are in the best interests of the construction industry and the ACCTLC deserves its active support in their realization. Unhappily the ITCs suffer from the same malady as other professionals. There is too much competition in the wrong fields and too little co-operation in those matters of common concern. This narrows (or even erases) economic working margins, leading to a depression of work standards and increasing jeopardy to the public. Not all ITC's are at present affiliated with the parent organization and the application of some gentle pressure seems to be necessary. The existence of a central disciplinary body is essential, but its discipline can only be exerted if its membership is all encompassing. Assistance can be lent by requiring membership in the ACCTLC to be a necessary qualification for appointment.

The most urgent task facing the controlling body of ITCs is the standardization of test report forms as to content and format. This can be done without detriment to the element of beneficial competitiveness among ITCs. Testing is required to conform to clearly defined standards and apart from giving a measured property to three decimal places instead of two, there is not much that can vary between the reports of two different companies. One ITC can employ better technicians or be more prompt but those elements wherein competition should be encouraged are not directly evident on the report form. Architectural and engineering offices are inundated during the construction season with reports from a multiplicity of ITCs and the rapid processing of these reports demands standardization.

The concrete cylinder test report form is unusual in that the procedures and data recorded thereon involve both site construction personnel and the ITC, particularly for distant jobs where the contractor's personnel often make and ship the cylinders. Their work is closely interdependent for proper quality control. The vast task of educating site personnel in the taking, handling, and shipment of cylinders remains virtually untouched. This is an area where an authoritative well supported organization like the ACCTLC can play a useful, educative role in concert with other interested organizations.

INADEQUACIES IN INSPECTION

The inadequacy of current testing practices for concrete and reinforcing steel is so widespread that it is not possible to do the subject justice within the confines of this article. Much friction has been generated in the past between ready mix producers, contractors, architects, engineers, and clients through shortcomings in concreting operations. The ITC has not been entirely blameless in this regard and it is significant that the Ready Mixed Concrete Association of Ontario has set up a committee to press for the mandatory observance of testing and handling standards used in quality control of their product. The RMCAO has requested the Canadian Standards Association to prepare a certification scheme for concrete technicians. The ready mix manufacturers maintain that their reputation is in the hands of men they have no control over (which is as it should be) and that they are therefore entitled to be assured of the competence of the individuals testing their product.

For the supplier of ready mixed concrete it is imperative that the data obtained from quality tests of concrete be absolutely reliable and representative of the quality of the concrete *as delivered*. All too frequently low compression strengths have been the result of poor technique in the taking, handling, and testing of cylinders, rather than because of inferior concrete quality. To assure the dependability of test results, it is essential that every cylinder be cast, handled, and tested in strict accordance with an accepted standard by certified competent personnel. No variables outside the material must be allowed to influence the results of the tests. The intrinsic quality of the concrete must alone be the determinant. To protect the ready mix supplier, the acceptability of ready mixed concrete must be proved at the same time that the concrete is delivered to the site and as it emerges from the chute. The maltreatment inflicted, by the contractor, on concrete at the site should not be allowed to cause damage to the ready mix supplier. Concrete acceptance testing, as opposed to testing of concrete in the forms, should be done so as to differentiate between concrete as delivered to the site and concrete in its final position in the forms. In this way the responsibility for defective placement, segregation, watering, vibration, protection, and improper curing can be determined. This will require a distinction to be made between field delivery and field form cylinders.

To mark the dividing line between the ready mix suppliers responsibility for delivering concrete of the specified strength and the general contractor's responsibility for concrete of specified strength in the finished structure, the concept of field-delivery (FD) and field-form (FF) cylinders is suggested. FD cylinders are taken at the delivery point, the bottom of the chute. FF cylinders are taken at the final position in the form. When both sets of cylinders are taken they should both be taken at the same time and from the same truck delivery. This will permit monitoring of concrete quality from delivery to placement right through the period of travail during which the concrete is cajoled into its final position. With a clear saw-off like this, ready mix suppliers will be spared the harassment they are presently subjected to whenever a failure occurs. Also, the contractor, with one less supplier to whom he can pass the buck, will become most painfully aware of the fact that he is strictly on his own from the delivery point. An improvement in placement, curing and protection techniques must follow.

This suggested procedure will of course entail some additional concrete testing. The owner is not so much interested in the quality of the *delivered* concrete as in its quality in its final resting place in the structure. It is thus not equitable to expect the owner to bear the cost of the FD cylinders. These cylinders are primarily taken to safeguard the concrete suppliers, and the cost of testing should be borne by him. The frequency of these cylinders should be entirely at his discretion but when they are taken they must coincide with matching FF cylinders. If he so wishes, he may entirely dispense with these cylinders. There should be no increase in the cost of concrete due to this procedure since nuisance claims for damages and the expensive maintenance of supervisory personnel on site will be avoided. Ideally this supplementary testing should not be done by the ITC handling the regular FF cylinders. For practical reasons this is an unworkable arrangement. The solution would be to have both sets of cylinders tested by the owner's ITC. The cost of FD cylinders would be billed directly to the concrete supplier and that for FF cylinders would be charged to the owner. Having a single ITC do both series of cylinders has a major advantage in that the same "zero" errors occur in the two sets of test results, thus facilitating comparison. In this situation the ITC must be immune from all forms of control by the second interested party, the general contractor.

STANDARDIZED REPORT FORMS

Inspection reports differ from one another, in bewildering fashion, as to the information they contain and the way it is set out. Those engineers who have attempted to surmount this difficulty by specifying what has to appear on test reports, have found this a most frustrating experience. The RMCAO has done the concrete construction industry an immense service by proposing a comprehensive standard report form. At present this form is being discussed by a special committee comprising representatives from the RMCAO, the cement industry, the consulting structural engineers, specification writers, architects, and the ACCTLC. Each contributing organization will be requested to make the adoption of this form a contract requirement. This will not be a beneficial change unless compliance is mercilessly enforced and payment refused for all testing and reporting not meeting specified requirements. Uniform action along these lines, by all architects and engineers, can, within a short space of time, induce a radical improvement. The widespread indifferent attitude on site towards sound construction is a contributing factor to the

professional liability problem faced by every architect and engineer. It is thus in their very real interest to upgrade standards of performance in construction at every level and few areas are more important than control of the quality of the component materials that go into the making of a building.

QUALITY OF REPORTING

There is a common misconception among some ITCs that as long as a material has been tested and a report is rendered, payment therefor is obligatory. This is not so and if this principle were brought home to these ITCs more frequently, there would be less shoddy testing. A report can be utterly valueless if it is not complete or if it is rendered too late to permit prompt remedial action. A concrete test report not pin-pointing the location of the parent concrete in the structure or containing unmeasured hearsay information (eg. slump) is of negligible value to an engineer who has to take immediate action to rectify shortcomings. A reinforcing steel test report that identifies a piece of steel as intermediate grade is of no value unless the report states what the purported grade is and whether the steel sample is in respect of a column or beam and also in which column tier or floor these members occur. Defective testing should be penalized in exactly the same way as defective design and defective construction.

TEST REPORT INTERPRETATION

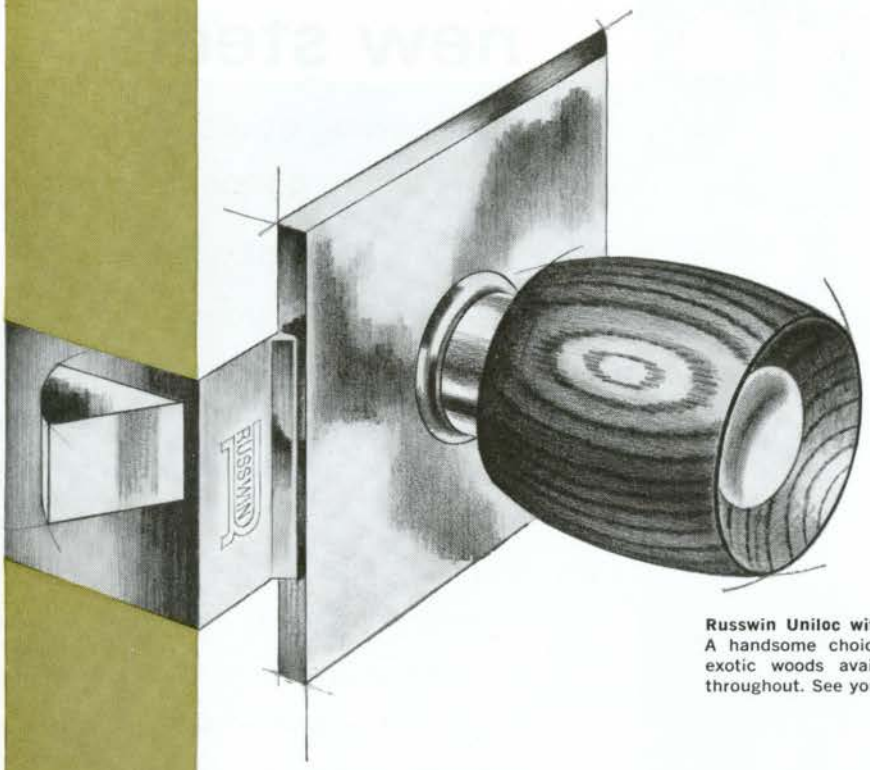
Some testing companies are under the impression that it is their role to report test results only without a verdict as to whether the material complies with specification requirements and without giving some indication (especially in the testing of concrete cylinders) as to the probable reasons for a defective result. Having fought many battles to accustom owners to the idea of having a soil investigation conducted before land is purchased or before design work is started, the writer is amazed that there are still soil investigation specialists who confine their reports to a wordy reiteration of the soil profile and the recording of standard penetration resistance without venturing to recommend safe bearing pressures or drawing attention to soil peculiarities that may influence design and construction. How often has it happened that soil reports have forecast a serious ground water condition with consequent expensive design provisions therefor only for it to be found on opening up the excavation that the expected water is conspicuous by its absence? Holding oneself out to the public to be a professional expert carries with the prestige a liability for the dependability of the work done. Payment for testing work should not be automatic.

TESTING BY PUBLIC BODIES

With all due respect to the competence of the testing personnel of governmental testing laboratories, it is suggested that testing work on public projects located over fifty miles away from governmental laboratories be entrusted to local commercial laboratories. If concrete cylinders have to make cross-country trips in order to be tested, it is little wonder that seven day test results are received at 28 days and 28 day results arrive after 56 days. If the testing is done locally, the results can be rendered promptly (even by telephone in emergencies) and certainly in good time to correct a developing bad materials situation before it goes too far. Soil investigation by a central remote laboratory also involves delay in the rendition of reports which are so necessary in the early stages of a project to aid in resolving siting and foundation problems. Besides this, there is the fact that local testing companies have built up a history and an experience record on conditions in the area in which they operate. The whole truth about soil conditions on a site is not wrapped up in the soil borings. The application of local knowledge is a vital ingredient in appraising the conditions and making recommendations. Information rendered too late and untempered by local experience is too often worse than no testing at all. A commercial laboratory guilty of such performance would meet with very short shrift and a replacement would be appointed without delay. The use of local commercial testing facilities on governmental projects would be a beneficial step. And in any event, why should commercial testing companies be expected to sustain their competitors with the taxes they pay?

Construction is becoming increasingly complex as new materials and methods are introduced in response to the ever pressing drive towards economy and because of each designer's striving to show his own uniqueness and stake his claim to distinction. This new sophistication in design requires corresponding advances in construction ability, site inspection, and reliability in testing. Defective materials do not become invested with an easily recognizable iridescent glow before they fail. In the main, they are very innocent looking and quite content to be hidden among their stouter luckless fellow components in the structure. Skill is required to ferret them out. The ITC, along with its architectural and engineering colleagues, carries a heavy burden of responsibility to the public to save us from needless damage and loss.

A. A. Goldes, P.Eng., B.Sc., B.Sc.Eng., MEIC, AMICE, AMIStructE. Mr. Goldes received his science degree at the University of South Africa, his Civil Engineering degree at Witwatersrand University, also in South Africa, and for the past twenty-two years has practised engineering in South Africa, England and Canada. He has made the state of the building industry his personal concern and thus has worked on Tendering Practices, Equitable Specification Writing, a general upgrading of the construction industry and the education of construction personnel. He is a registered professional engineer in Ontario, a member of the Engineering Institute of Canada, an associate member of the Institution of Civil Engineers, and an associate member of the Institution of Structural Engineers. Mr. Goldes now has his own consulting structural engineers firm in Toronto.



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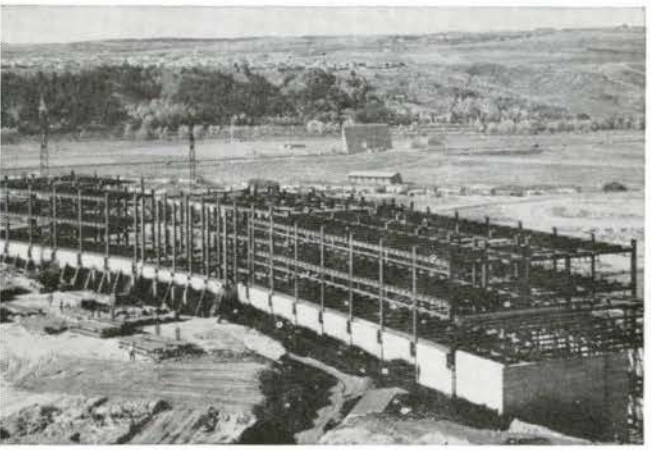
in schools

High strength steel and the application of the plastic design theory produced a highly efficient frame for this university extension. The ductility of steel has allowed the designer to take into accurate account the full strength of this structure. The result is clear usable space, architectural freedom, and low cost.

Building: Engineering Building—University of Saskatchewan, Saskatoon.
Architects: Webster, Forrester, Scott & Associates—Saskatoon.
Consultants: Douglas, Micholenko & Dupuis.



in hospitals

6,000 tons of steel are going into this hospital in Calgary. By selecting steel for the frame the owners will have a flexibility of layout that comes from large floor areas free of roof supports. Inexpensive floor reinforcing to permit the installation of presently unplanned heavy medical equipment is also a special advantage of steel. The need for this frequently occurs long after construction is complete and with steel the cost can be reasonable.

Building: Foothills Provincial General Hospital—Calgary.
Architects and Consultants:
Department of Public Works—Government of Alberta.

in bridges

By assembling the box girder sections on the ground and lifting them into place in large units, this bridge was erected over a busy canal without the use of falsework. Shop fabrication also permits close quality control. You can do this sort of thing with steel.

Bridge: Homer Bridge over the Welland Canal—St. Catharines, Ontario.
Consultants: Foundation of Canada Engineering Corporation Ltd.

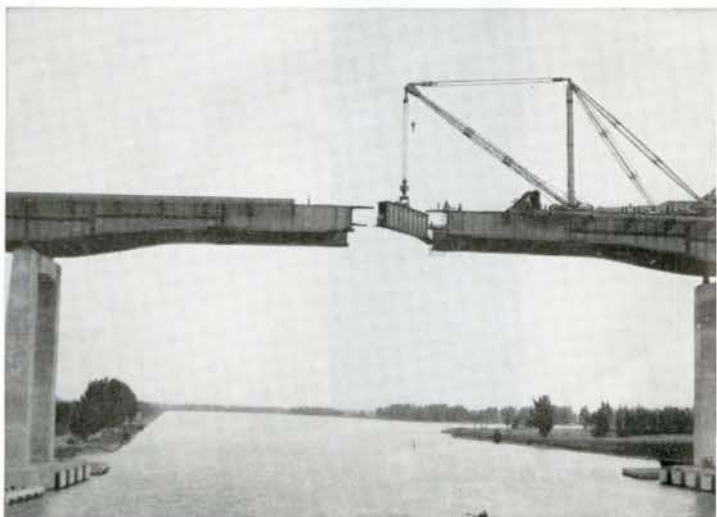
new steels

are opening doors to new design concepts

New steels with their high yield points have given designers fresh scope in the use of structural steel as a construction material. Sizes and weights are down affording new architectural treatment and reduced in-place costs. This brief selection of a few D.B. contracts in different parts of the country shows how the advantages of steel are being used in a variety of applications. Dominion Bridge maintain design fabrication and erection facilities in most of the major cities. Their sales and engineering departments are always available for discussion and to assist in any way they can.

139

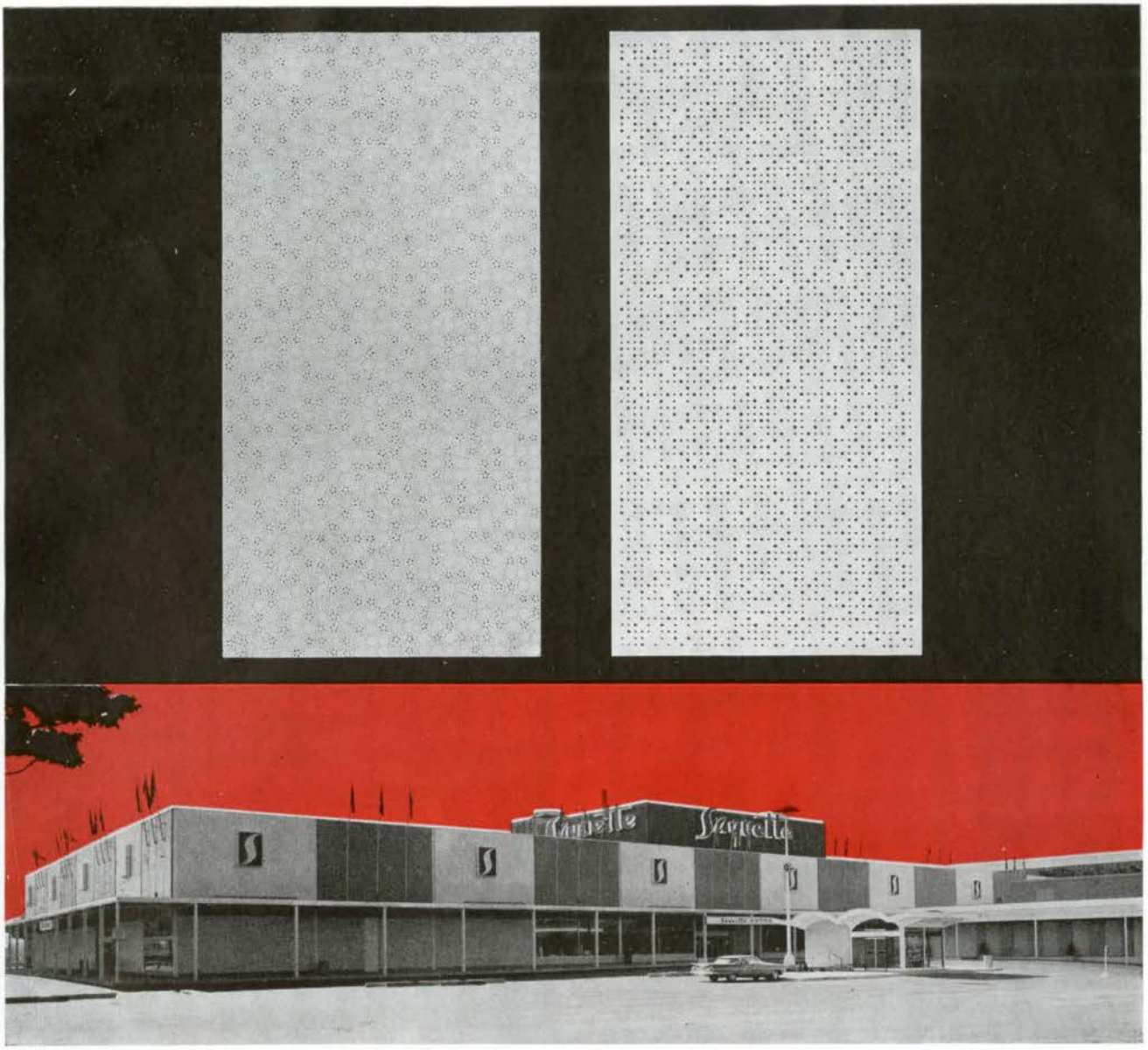
STRUCTURAL DIVISION
DOMINION BRIDGE
SIXTEEN PLANTS COAST TO COAST



in churches

Exposed steel gives a pleasing modern interpretation of the traditional cathedral roof. Steel has produced an enduring structure which displays slender appearance and design freedom. Structural steel was selected as the most economical material to achieve the design concept.

Building: St. Paul's Lutheran Church—Saskatoon.
Architects and Consultants:
Webster, Forrester, Scott & Associates—Saskatoon.



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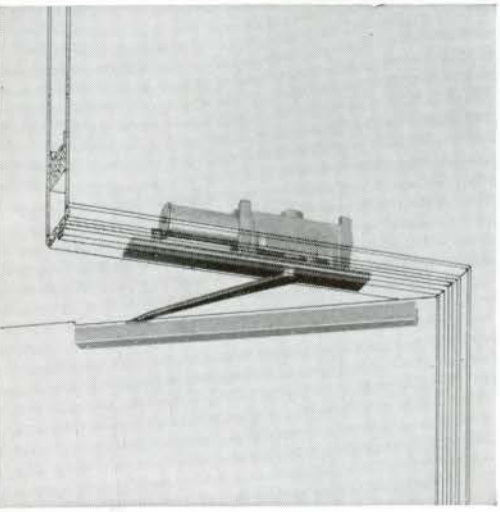

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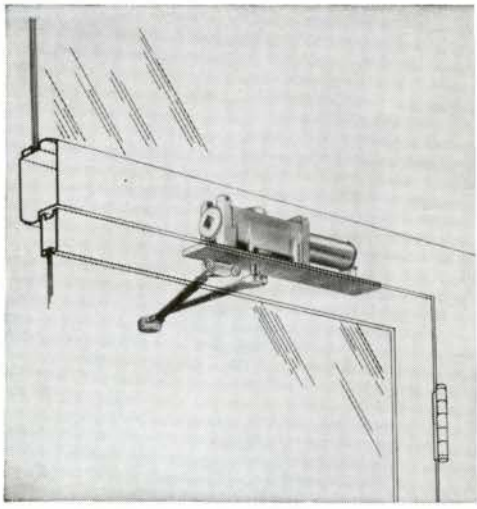

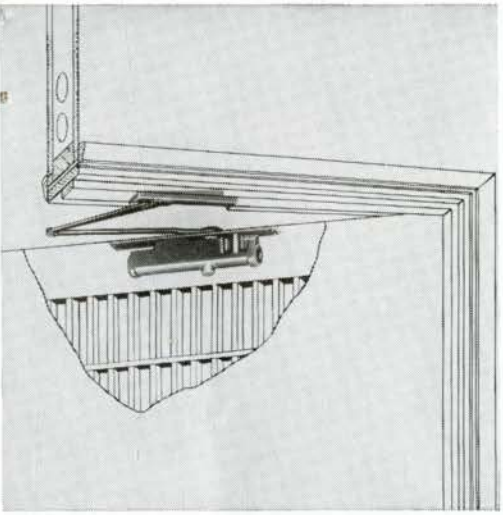

- **Closer Concealed in Door.** Single Acting, for Interior Doors Hung on Butts. This closer available in two basic sizes, for wood or metal doors. Provides largely concealed control at little more than the cost of an exposed closer. Widely used in offices, schools, hospitals, religious and industrial buildings. (Series 300)

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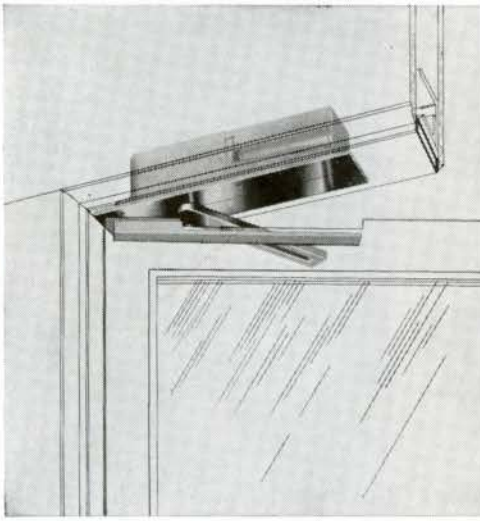

- **"Smoothee" Surface Applied Closers.** For interior or exterior doors from 2′2″ to 5′0″ wide. Features include non-tamper regulation screw, variable latching power, shoe adaptable to uneven trim conditions. Special closers available, such as telephone booth, delayed action, etc. Supplied in tan lacquer for painting to match door and frame, or standard paint finish if desired. (Series 4000).

- **Closers Concealed in Floor.** Single Acting. This LCN floor closer efficiently controls interior or exterior doors. Closer may be adjusted or repaired without putting door out of service. Weight of door not borne on closer shaft. Available for use with or without threshold, and for doors butt hung, center or offset pivotted. (Numbers 2, 4, 6.)

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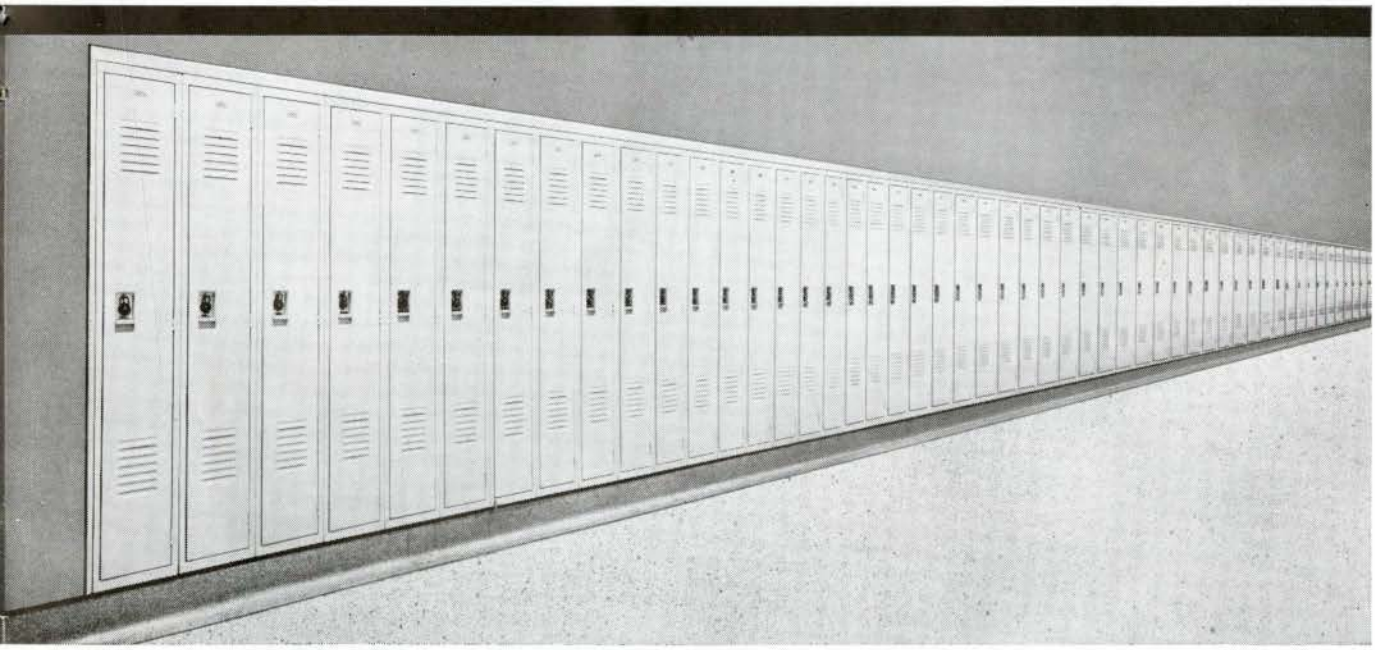

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