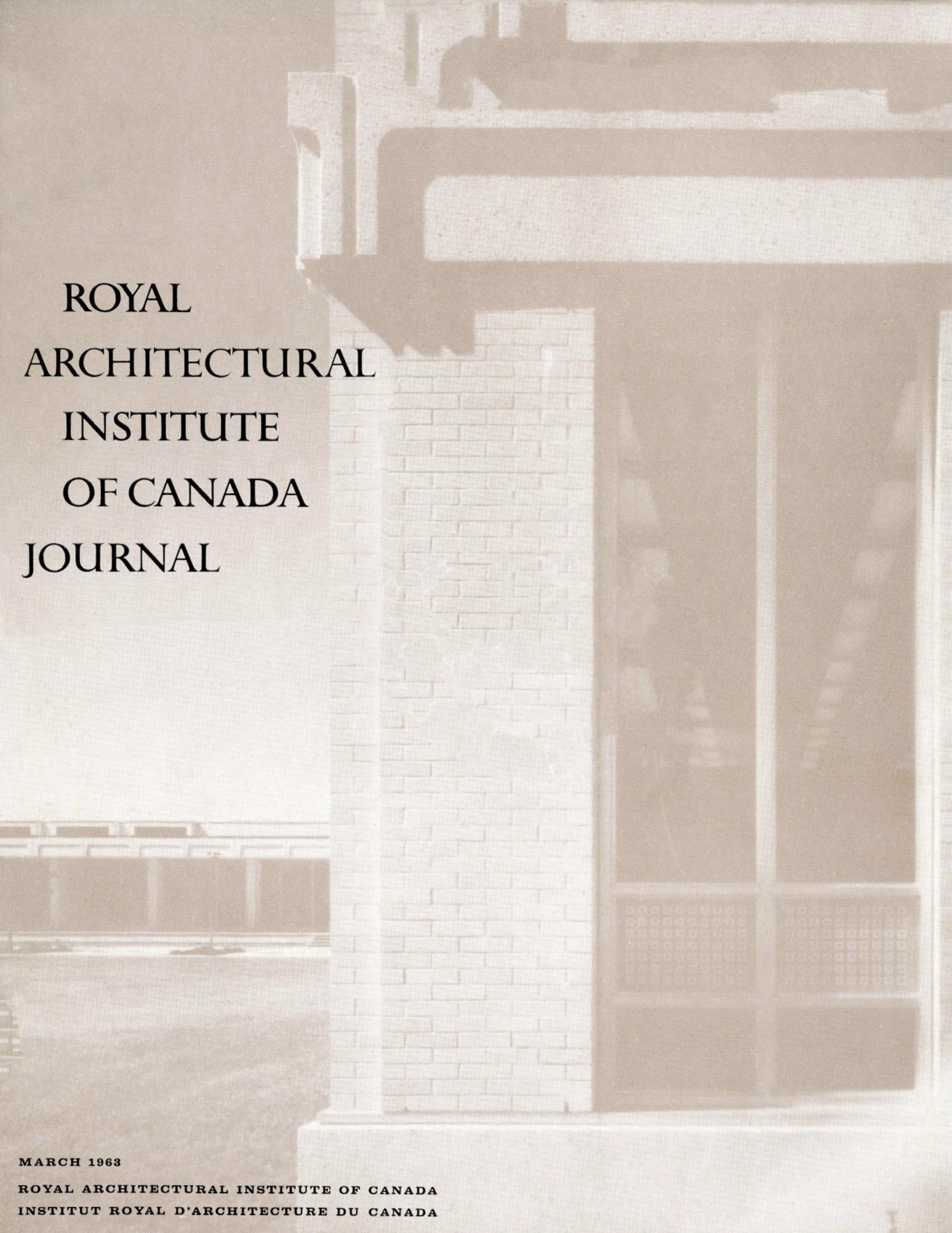

# ROYAL ARCHITECTURAL INSTITUTE OF CANADA JOURNAL

MARCH 1963

ROYAL ARCHITECTURAL INSTITUTE OF CANADA
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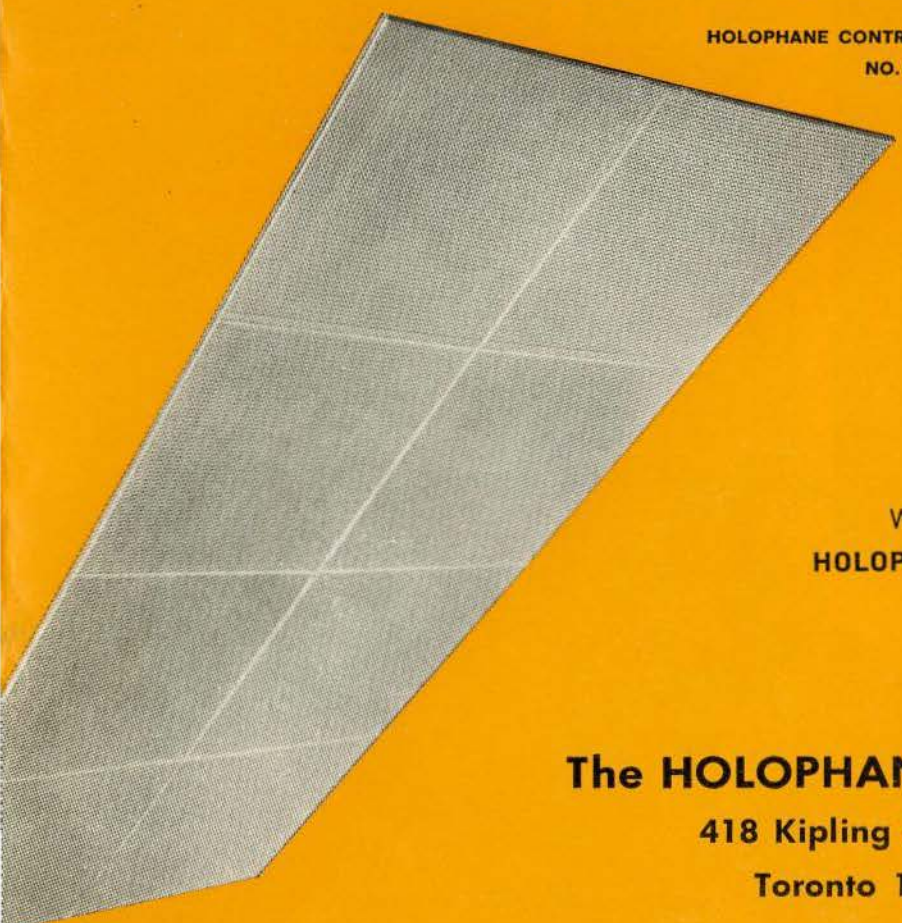

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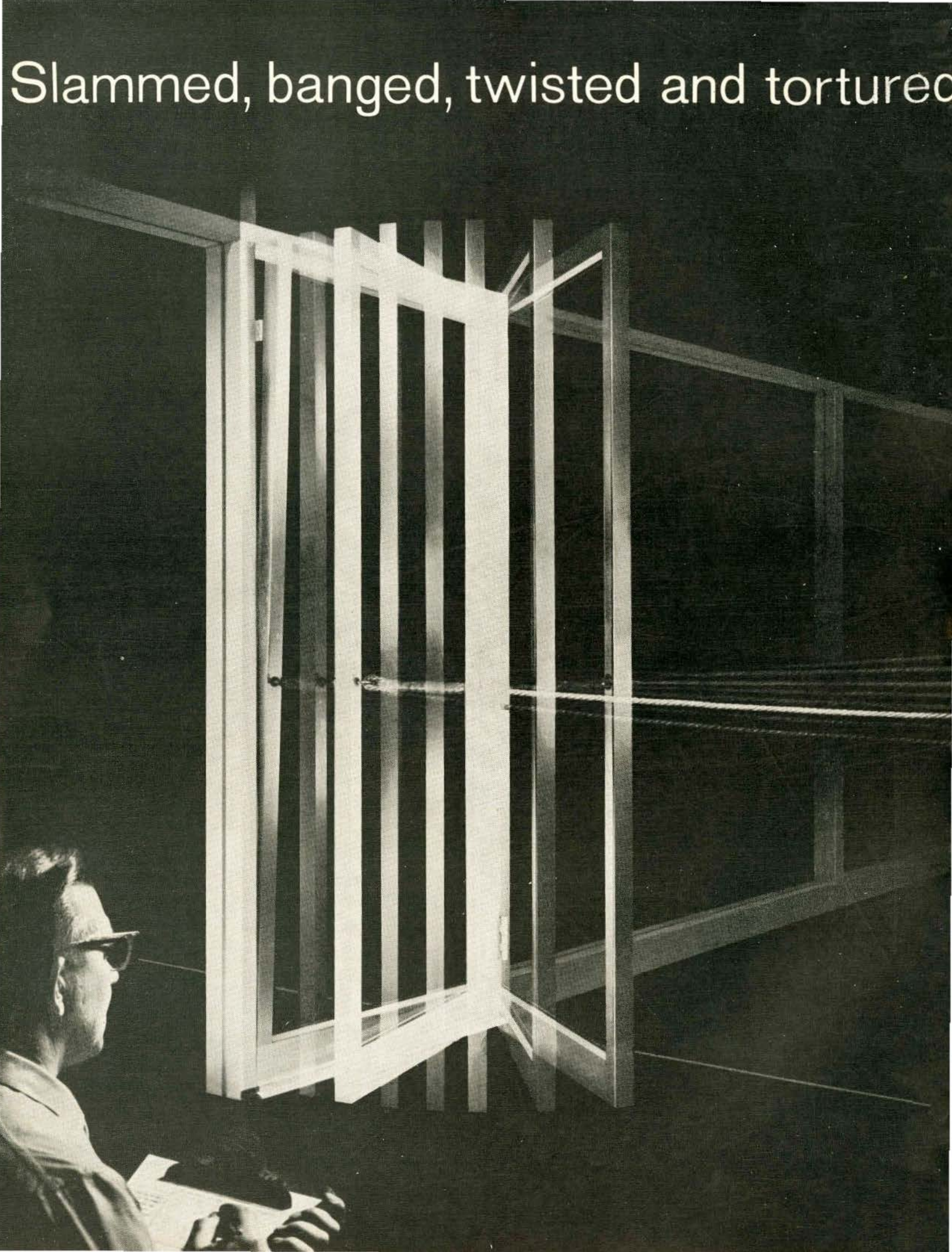

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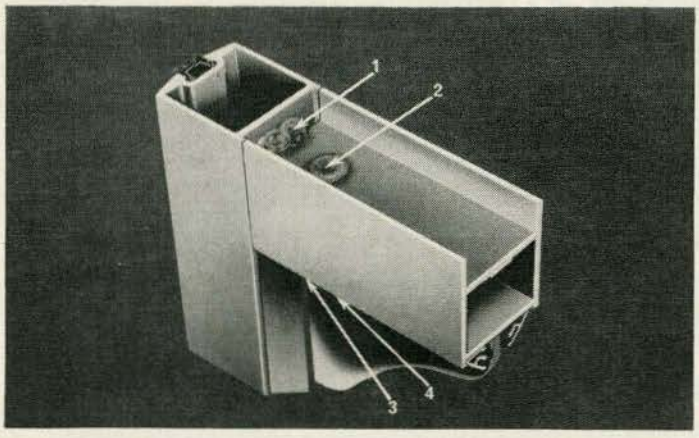


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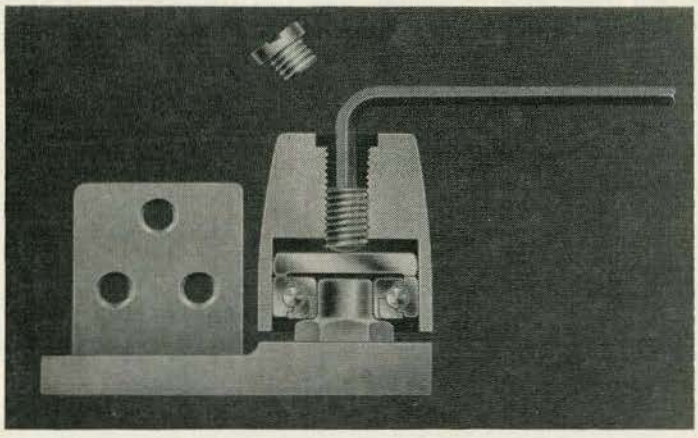

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Serial 451 Volume 40
Number 3

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MARCH 1963





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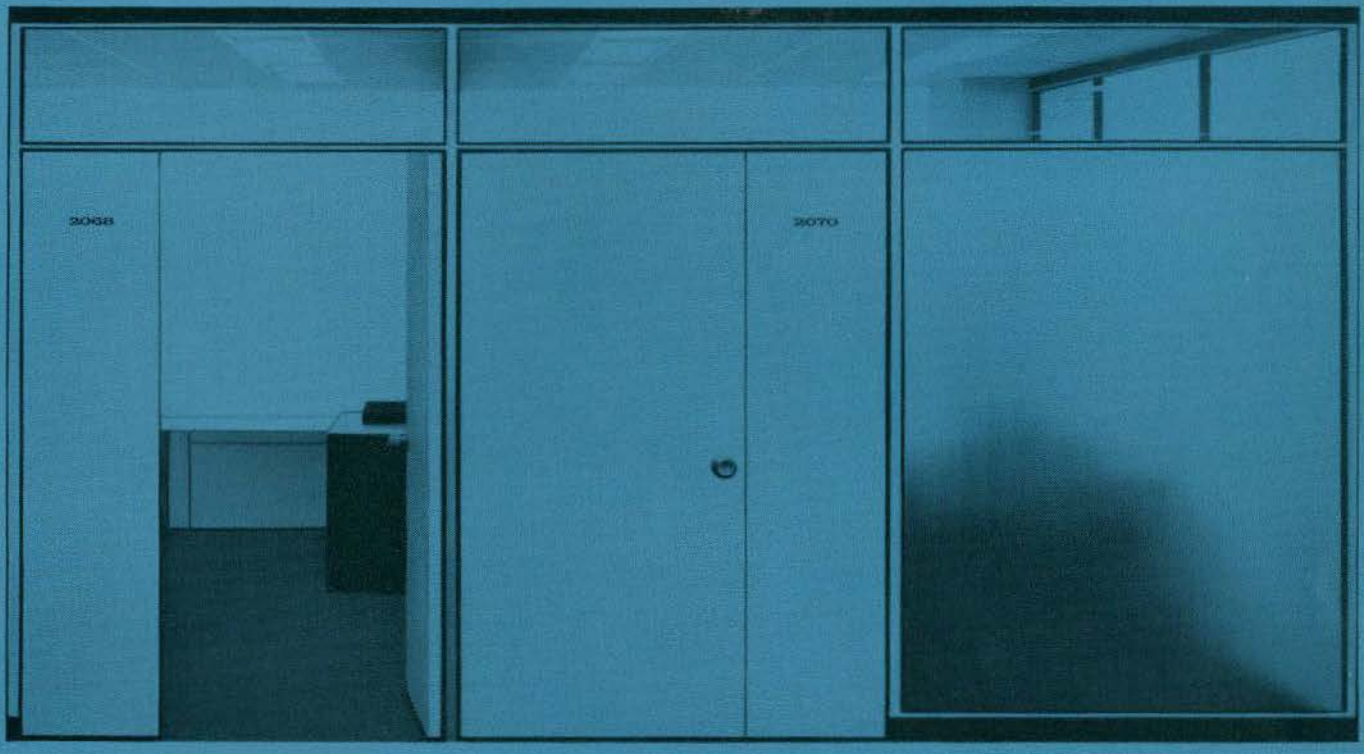


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## BOOK REVIEWS

### THE SPACE-STRUCK ARCHAEOLOGIST

*By Peter Collins*

**THE GREAT AGES OF WORLD ARCHITECTURE, by various authors. George Braziller (New York 1962), distributed in Canada by Ambassador Books Ltd. $5.95 each.**

THIS LATEST SERIES OF architectural monographs to be published by George Braziller contains such titles as "Greek Architecture", "Roman Architecture", "Mediaeval Architecture", "Renaissance Architecture", "Modern Architecture", and so on; titles which will doubtlessly cause all the more *avant-garde* architectural educationalists to shudder with embarrassment, but which will probably seem quite sensible to the vast majority of architects, less intolerant towards the traditional divisions of Western architectural history, and still convinced of the usefulness of studying its evolution as a means of understanding current architectural thought. However, as a consolation to those who follow a rigid Bauhaus party line, and show interest only in the histories of remote and exotic architectures, there are also a number of more appealing titles such as "Islamic Architecture", "Chinese and Indian Architecture", and "Pre-Columbian Architecture". Doubtlessly there will eventually be a volume dealing with the architecture of old Japan.

It would be impossible, without taking up an enormous amount of space and time, to review adequately all the volumes so far published. But it can at least be said of them all that they have three great virtues in common. Firstly, every volume has been written by a competent authority – in some cases by the recognized authority on the topic. Secondly, every volume has a gratifyingly short text (seldom more than forty pages) so that the series can be used as a useful "refresher" course by those architects who have forgotten their history, or who studied it so long ago that their knowledge has become obsolete, or who (like one successful architect in Montreal) proudly boast that they never wasted their time studying the history of architecture at university, but took courses in accounting instead. Thirdly, every volume is extremely thoroughly illustrated, often with special pictures unobtainable in standard text-books. The impression is given that the greatest care has been taken to select only those photographs and drawings which will best illustrate the text, using the facilities of a vast photographic library for the purpose.

The only really disappointing volume of the series is "Roman Architecture", by Frank E. Brown. The author is resident archaeologist at the American Academy in Rome and a professor of classics at Yale, so one might have expected him to produce an especially fine book. Moreover his failure to do so is particularly disappointing in that there is as yet no other up to date general monograph on Roman architecture available, pending the publication of the relevant volume of the "Penguin History of Art".

Yet Professor Brown's failure is of immense significance since it was clearly not due to lack of scholarly knowledge or literary talent, but was a result of his being overawed by the current mania for interpreting every architectural phenomenon in terms of "space". In this book, space-mania is so obtrusively insistent that all other architectural values and historical realities are lost sight of completely, and any resemblance between this study of Roman architecture and those of its numerous distinguished precursors is purely fortuitous.

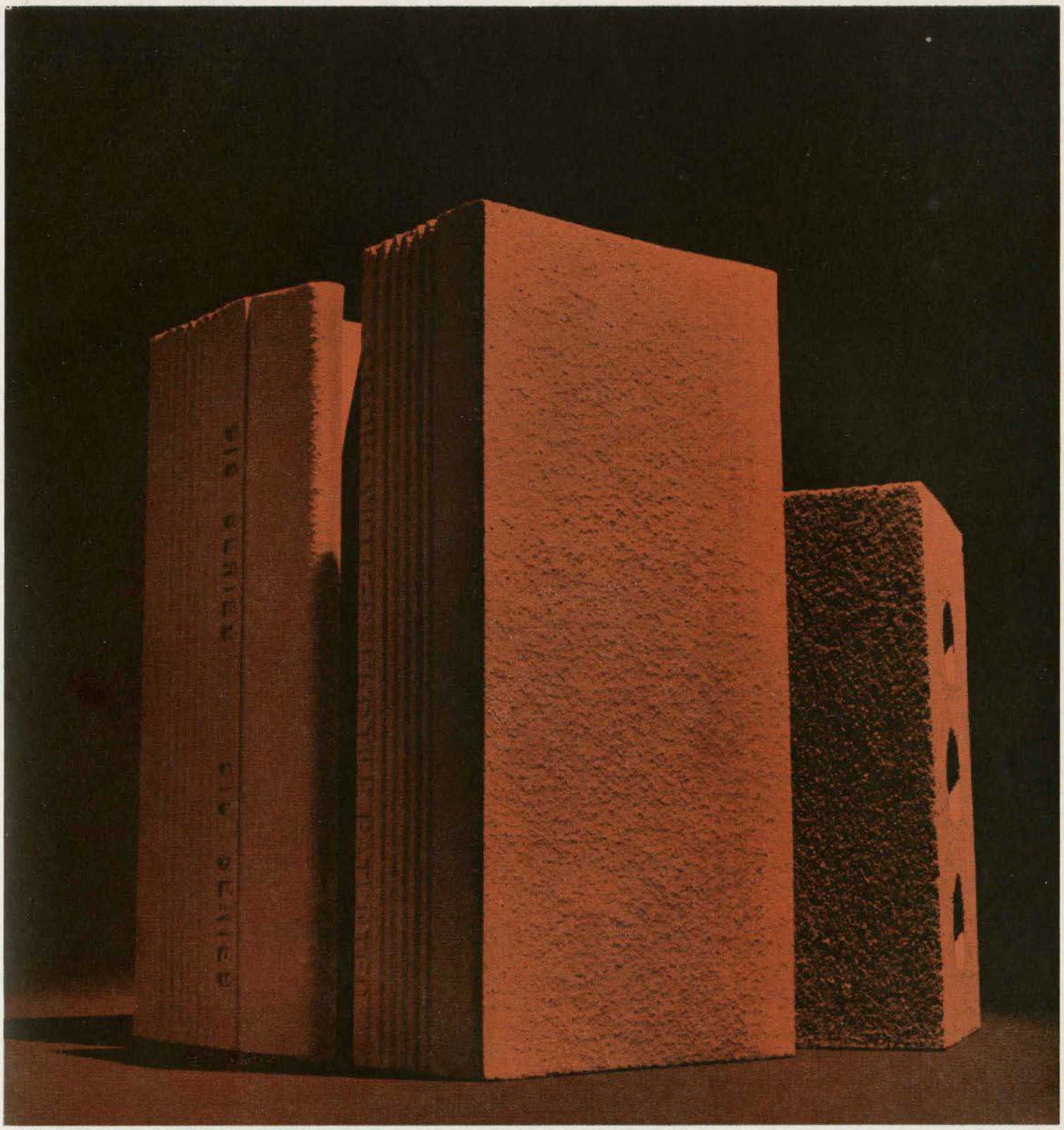
The author begins by telling us that "the architecture of the Romans was, from first to last, an art of shaping space around ritual", and he then proceeds, for the next eight pages (i.e., a fifth of the text) to tell us all about the "spaces" which constituted Roman architecture between 800 B.C. and 200 B.C. – i.e., during a period in which the remains of buildings are virtually non-existent, and in which there is literally nothing but space to be seen on the sites the buildings once occupied.

Throughout the book all sorts of recondite space-expressions are used. We are told that "the significant conformation was precipitated out of undifferentiated space", and that "a particular sequence of space became a capsule"; we are told of "space hewn out of the wilderness of phenomena", of "the disparity between envisioned space and its embodiment in structure", of "the shaping of space by polarization", of "the visible poles or the shells of space", of "formulaic spaces", of "cups and bowls and troughs of space", of "the core of space", and of "a deep semicone of space"; we are told that "the spaces, though variform, were serenely bubblelike", and – richest of all – of "spatial preciosity"; a term which very well summarizes the whole book. On page ten, the word "space", in various forms, occurs a dozen times.

No one would deny that, as Louis Kahn put it (paraphrasing Perret's *l'architecture est l'art d'organiser l'espace):* "architecture is the thoughtful making of spaces". Nor can it be denied that earlier histories of Roman architecture often laid too much emphasis on the decoration or structure of Roman buildings to the detriment of a fuller indication of the subtleties of the volumes thus adorned, or the enclosures thus constructed. But these very failings of earlier publications, caused as they were by the current fashions in architectural theory, should have warned Professor Brown that there is a limit to the extent to which one is justified in interpreting the past in terms of the present. What is needed in architectural history is the ability to give a skeleton of archaeological facts the life it originally possessed, not the ability to rejuvenate it, or give it the air of being excitingly modern. It is enough to show that the ancient Romans were in advance of the ancient Greeks, without trying to prove that they were motivated by the same ideals which motivate architects today.

"Roman Architecture" is thus a striking example of the folly of interpreting past events in terms which have no scholarly archaeological justification but are based on fashions which, to judge by the most recently admired current buildings, are already beginning to change. But it is worth noting that this is the only volume of the series to commit this error, for the volume entitled "Modern Architecture" tends, if anything, to err in the opposite direction, in that several of Frank Lloyd Wright's ideas are explained with reference to the beliefs of prehistoric Greeks.

*(Continued on page 12)*



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## SUBTOPIAN CHAOS

*By Jonas Lehrman*

**MAN-MADE AMERICA, by Christopher Tunnard and Boris Pushkarev. xii + 479 pp, illus. Yale University Press, 1963, distributed in Canada by McGill University Press, $15.00.**

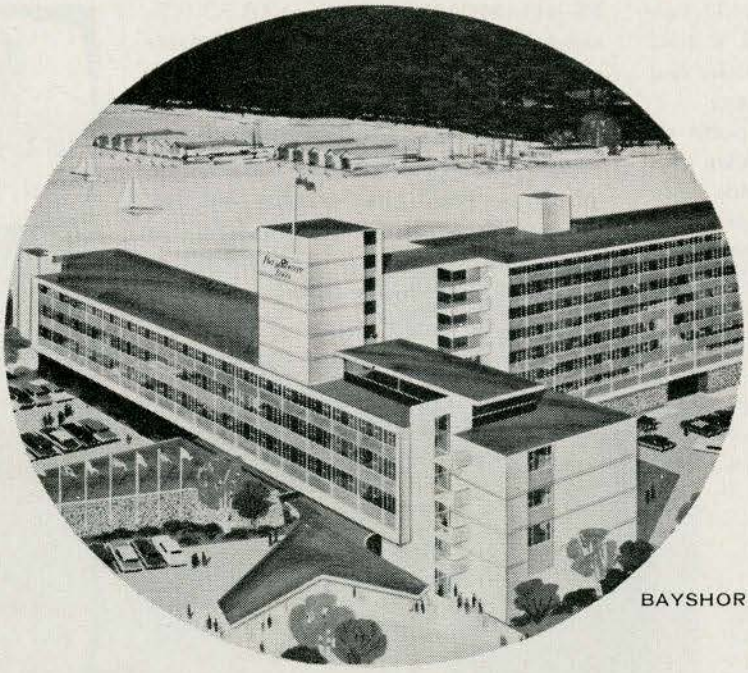
THIS BOOK SETS out to focus attention on what the *Architectural Review* has called subtopian chaos in the fringe areas of our cities, and is a detailed study of "the position of man-made objects in space and in the values of scale in the landscape." Chapters deal with the *inter alia,* the visual problems of the urbanized landscape, the dwelling group, the freeway, monuments of technology and outlines of open space, and throughout the book, a clear text is supported by many well-chosen photographs, plans, and diagrams. One may regret only that there are no cartoons by the master satirist on this theme, Saul Steinberg.

Although the authors state that they are "not concerned here with particular styles of architecture, or with the merits and deficiencies of aluminum siding or clapboards" (in other words, with details), this is not strictly the case, and the minor pattern-making of house setbacks and roof shapes, and the design of road signs are soon found to be just as much their concern as more general artefacts. It is perhaps when one notices such dramatic illustrations as the telephone relay tower (p 299) with its emerging new concept of form and structure compared with the "tall tree seen against a low building" treatment, one begins to feel that, rather than being so concerned with the more efficient performance of a status quo, more attention should have been focussed on the definition of objectives, new frontiers, and possible directions.

Should we not really be more concerned with the framework in which man may again be master of his environment, with his fundamental attitude towards nature, with the achievement of an integrated culture and collective conscience, expressed through architecture and planning by a clear organization of the whole urban landscape structure, rather than with a tidying up of our present incomplete technology-based civilization with its ever-growing emptiness with respect to the life of the major part of the population? A study of possible directions, of *significant* housing patterns, of the problems of renewal and transcience would surely be more fundamental than a study based on the acceptance of traditional aesthetic values and fixed relationships, such as the modification of the individual house (with its in-built obsolescence) on its individual lot; with all the comparatively irrelevant, short-term adjustments and refinements that this approach entails.

Whether created consciously or not, the man-made landscape is a reflection of a given society's will to form, and only from a full *analysis* of this picture can the significance of what appears to be a disoriented, haphazard, irresponsible, *laissez-faire* environment, be perceived, and conclusions drawn. Admittedly this is an ambitious project; but here it is hardly attempted. The

*(Continued on page 14)*



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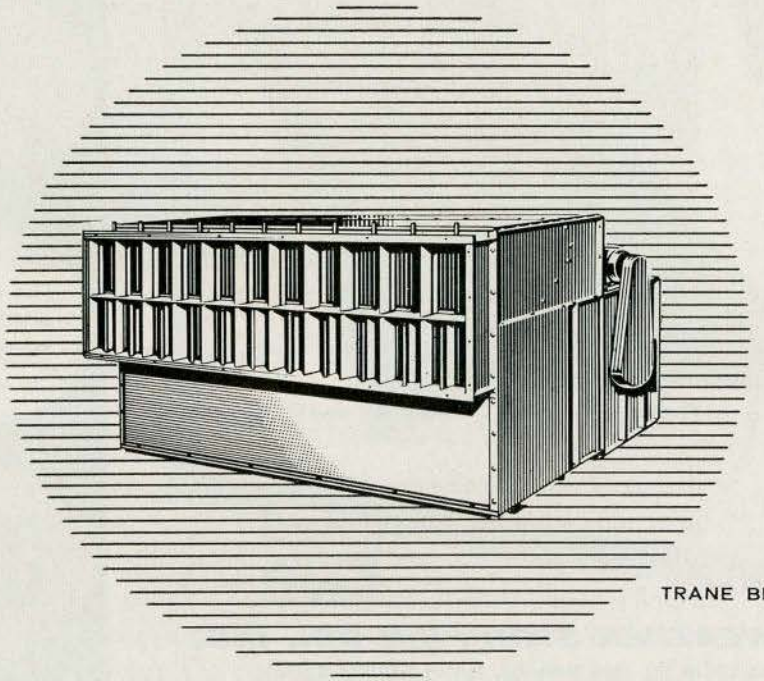

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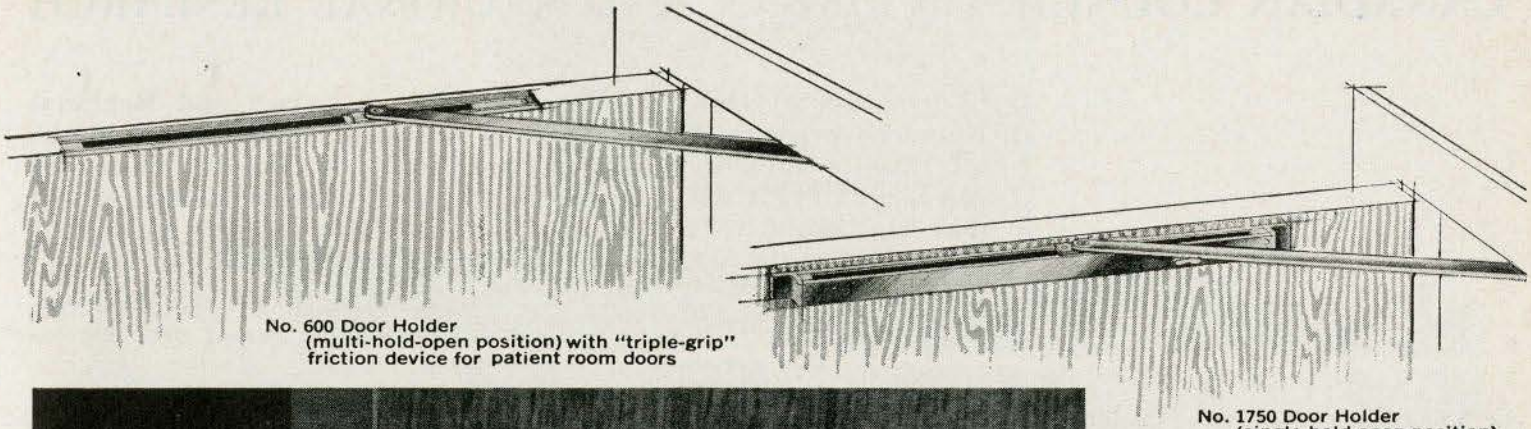
section entitled "Shaping the Urban Region," occupying four and a half pages (exactly one per cent) at the end of the book, is surely insufficient.

But from a more limited point of view, this is a good book. The idea that man-made America should not only work but be in all its aspects well designed too, has often been casually ignored, and without doubt we should look at these details. "Do not accept life as men offer it to you," wrote André Gide in *Les Nouvelles Nourritures*. "Rather ceaselessly persuade yourself that your life and that of others might be more beautiful."

FUNDAMENTALS OF ACOUSTICS, second edition, by Lawrence E. Kinsler and Austin R. Frey. John Wiley & Sons Inc. 524 pages. $10.75.

This edition (the first was published in 1950) includes an added chapter on ultrasonic and sonar transducers; expanded treatment or new material on underwater acoustics, sound absorption in fluids, sound transmission between fluids; MKS system of units substituted for CGS system to simplify and modernize the treatment of electro-acoustical devices. Answers are supplied for all problems.



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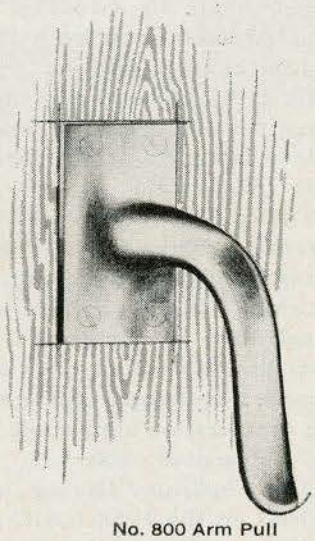

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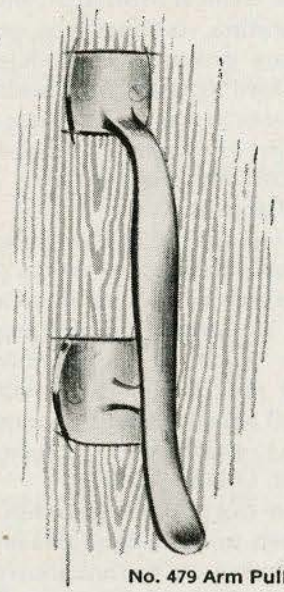

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# CANADIAN COUNCIL ON URBAN AND REGIONAL RESEARCH

**"Formation of the Canadian Council on Urban and Regional Research provides Canada with a research nucleus available to all those who wish to do research work within the terms of reference to CCURR. I trust that the architectural profession will take the initiative in proposing to CCURR research programs pertinent to the solution of our many problems of urban and regional growth."**

*Peter Dobush, FRAIC, AMTPIC, Chairman, Board of Directors*

OBJECTIVES OF THE Canadian Council on Urban and Regional Research are to encourage and promote research wherever it can be carried out most effectively.

Final details, setting up the CCURR constitution, were formulated at Ottawa last spring, after more than two years' negotiation.

The council aims to solve the many complex problems created by growth, change, and investments. Intercommunication, among professional, educational, and administrative organizations, has been hampered by inadequate recorded experience and lack of a central organization to promote a continuing exchange of ideas.

*The Challenge:* During the keynote address, at the 1958 RAIC Assembly, Mr Stewart Bates, Hon FRAIC, President of Central Mortgage and Housing Corporation, outlined the seriousness of many problems engendered in the haphazard growth of mushrooming urban centres and adjacent rural communities. He suggested this was a pressing national problem that architects should consider.

Acting on his challenge, the RAIC appointed three architects to serve on a Committee of Inquiry into the Design of the Residential Environment.

The report of the committee, presented in June, 1960, stated that CMHC should hold a conference regarding a permanent Canadian Institute of Urban Studies:

"The Corporation need not . . . commit itself in advance to this instrument. It should invite representatives of . . . governments, universities, national corporations, and other research bodies that have already made significant contributions in Canadian urban studies."

*Initial Steps:* Though the CCURR concept may be said to have crystallized in 1960, following the release of the RAIC report – together with representation by the Canadian Federation of Mayors and Municipalities – its background interlaces ideas and aspirations from many sources, dating back over many years.

In February, 1961, a meeting was held in Ottawa, under CMHC auspices, to study the problem and prepare a proposal. To expedite matters, a three-man steering committee was set up: Stewart Bates, of CMHC; Eric Beecroft, of the Canadian Federation of Mayors and Municipalities; and Peter Dobush, of the RAIC.

This committee asked 14 Canadian specialists in planning, sociology, and geography to outline what they thought should be done.

After a thorough study of the replies, the committee prepared a draft proposal, which was sent to 40 other persons across Canada. These included representatives of universities, town planners, engineers, architects, municipal, provincial, and federal governments, and various groups concerned with problems of urban and regional development. The committee invited them to study the proposals, then to meet in Ottawa and set up a founding committee.

In October, 1961, this larger group met in Ottawa. After extensive discussion, they constituted themselves as a founding committee and named an action committee, with Peter Dobush (chairman); Eric Beecroft and Humphrey Carver.

The action committee was instructed to arrange for a founding conference to prepare groundwork for legally establishing the council and to draft a research program suggesting the basis of council operation.

*Founding Conference:* On March 15-17, 1962, some 200 delegates attended a founding conference in Ottawa. Group representation, by percentages, was: universities, 20; municipal and provincial governments, 15; planners, 15; federal agencies, 14; private enterprise, 12; professional bodies, 8; special groups, 16.

Delegates agreed that the council should be a consultative and co-ordinating body to define basic research objectives: *a Canadian clearing house of ideas on urban and regional research and their implementation.* It would not duplicate the work of universities or other existing institutions, but strengthen the work done by these organizations, public and private.

On March 17, the founding conference announced the following decisions:

- The original 41-man founding committee became the first Canadian Council on Urban and Regional Research.
- A seven-man board of directors was formed: Peter Dobush, chairman; Eric Beecroft, vice-chairman; Humphrey Carver, CMHC, chairman of advisory group; Lorne R. Cumming, QC, Ontario Deputy Minister of Municipal Affairs; Gavin Henderson, executive director, Conservation Council of Ontario; J. M. Martin, director general, Division of Superior Education, Quebec Ministry of Youth; James B. Milner, law faculty, Toronto University.
- A 14-man interim advisory committee was announced with Gavin Henderson, Toronto, chairman.
- Proceedings of the conference were to be published. (Available from CCURR headquarters, 56 Sparks St, Ottawa, $2.50.)

*Objectives:* The council aims to:

- encourage and facilitate training of persons in research and urban affairs;
- aid understanding of urban and regional problems among administrators, practitioners, and general public;

*(Continued on page 18)*

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## The 56th Annual Assembly of the Royal Architectural Institute of Canada

## Sheraton-Connaught Hotel, Hamilton

## May 15-18 1963

• facilitate and assist all Canadian efforts to gather, analyze, co-ordinate, and distribute available knowledge (and to undertake these efforts directly, whenever it deems it necessary to fill gaps in research, or to supplement and assist the work of existing bodies);

• make regular provisions, whereby local, regional, provincial, and national groups, as well as individual specialists, may review together all of the above objectives and the means of attaining them;

• assist all such groups and individuals to find support for their research programs.

*Organization:* The council is composed of 60 members—40 elected, 20 appointed by governments as follows: not more than five persons employed in the federal government; one from each provincial government, namely, the deputy minister (or his nominee) responsible for urban or regional affairs; not more than five persons employed by municipal associations to be appointed by CFMM.

*Financing:* The Canadian government has made a $78,000 grant from National Housing Act Funds to cover the council's operating expenses until December, 1963. The Ford Foundation's $500,000 grant will be used by the council to assist in Canadian research work.

These grants, it is anticipated, will be increasingly supplemented by donations from other public and private sources.

*Activities:* The council is an incorporated body with all the powers necessary to act as a custodian of funds and to assume responsibility for seeking financial support for activities and for allocating whatever funds are placed in its trusteeship for these purposes.

The council will examine the need for, and provide: bibliography, research data, technical information, educational aid, publications. . . .

Last December, Alan N. Armstrong was appointed executive officer of the CCURR. (*Journal*, January, 1963, page 11.) Currently, he is working with the CCURR's advisory research committee, arranging a program of research grants.

WARREN REYNOLDS RESIDENCE, MINNEAPOLIS, MINN. ARCHITECT: NEWTON E. GRIFFITH

Pella®

# WOOD SLIDING GLASS DOORS

PELLA ALSO MAKES QUALITY WOOD CASEMENT AND MULTI-PURPOSE WINDOWS, WOOD FOLDING DOORS AND PARTITIONS AND ROLSCREENS

## The big difference begins where the glass ends

PELLA SLIDING GLASS DOORS with frames of real WOOD say *home* to your clients. And, wood frames can be finished or painted to go with any decorative schemes—inside and outside. Wood frames eliminate condensation, too. Stainless steel and wool pile weather stripping combine to provide exceptional weathertightness. *Screens close automatically*. Removable muntin bars are available in regular or diamond shapes to add the traditional touch. o, ox, xo, oxo and oxxo combinations in 33″, 45″ and 57″ glass widths. Custom sizes, too. Ask your PELLA representative to show you a sectional sample of wood frames with steel "T" reinforcement. Consult your classified telephone directory or the Canadian distributor list which appears at the left.

ROLSCREEN COMPANY • PELLA, IOWA

**INSIDE STORY AT PLACE VILLE MARIE**

# How Steel Helped Main Objectives of Webb & Knapp (Canada) Limited

## More Rentable Area.

## More Floors For Same Height.

## Larger Unobstructed Space.

## Solve Difficult Site Conditions.

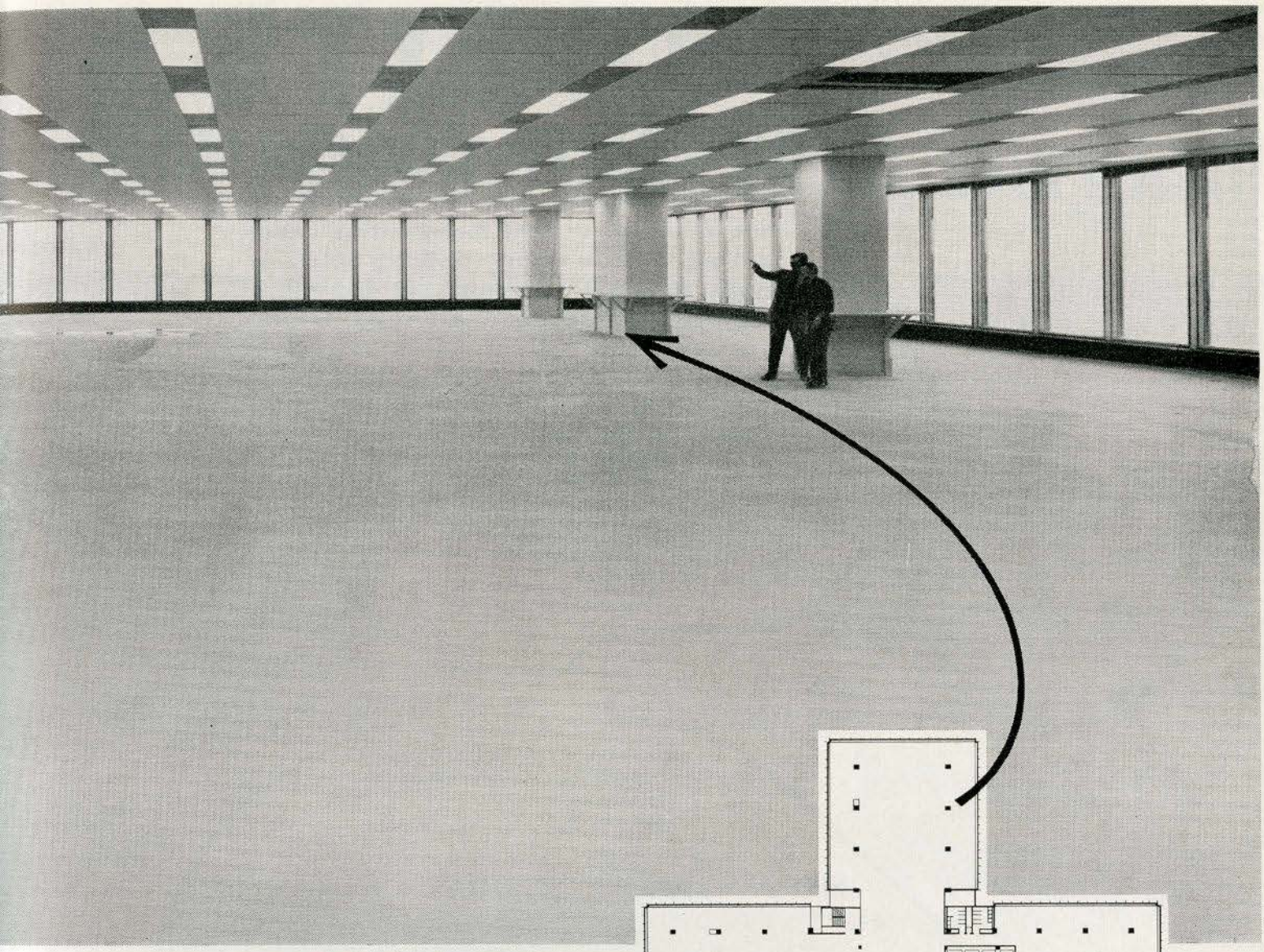
The glistening curtain walls of Place Ville Marie hide an imaginative steel design — one which has resulted in a building with 4 huge wings, each 42 storeys high. Each wing contains only six slender interior columns, supporting cantilever beams. The design has resulted in large unobstructed areas and an extremely flexible office layout. Only steel could have produced this overall result.

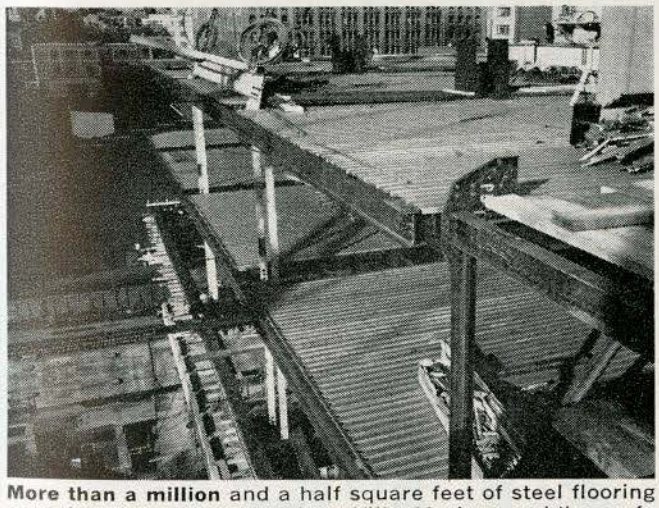
The steel columns take relatively little space in spite of the enormous loads which they carry. The cantilever beams and the steel decks above occupy a minimum depth, so that more floors can be accommodated for the same overall height. Space is also saved, as pipes and ducts for services pass through the beams instead of beneath or around them.

Directly below the building, railway trains run on 16 tracks, passing beneath a system of trusses and girders which support the enormous bulk towering above. This feature successfully overcame the most difficult of the site conditions — and the steel over the operating tracks was erected in just two weekends!

**More than 1¼ million** high strength steel bolts joined the components of Place Ville Marie's steel frame. This method ensured fast and quiet erection.

# You save all along the line when





**More than a million** and a half square feet of steel flooring went into the 42-storey Place Ville Marie, providing safe working decks as the building grew.

**Key to the huge unobstructed areas** of Place Ville Marie's ''wings'' are these slender columns, with their cantilever beams—main support for the office floors. The columns are placed in pairs 50 feet apart and 15 feet from the outside wall. Only 24 of these supporting columns were needed.

# main components are of STEEL

ISSUED BY: THE CANADIAN INSTITUTE OF STEEL CONSTRUCTION

# Celwood for '63

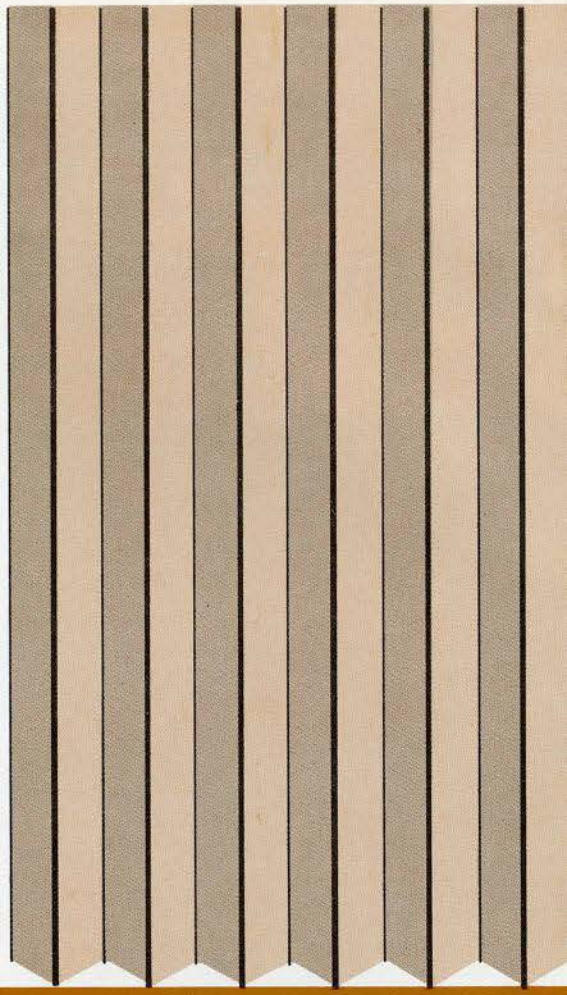
## Exciting news for every room, every home!

*From CELWOOD's versatile new Maple-Line collection: Italian Provincial kitchen cabinets in elegant walnut finish.*

**CELWOOD INDUSTRIES LIMITED**

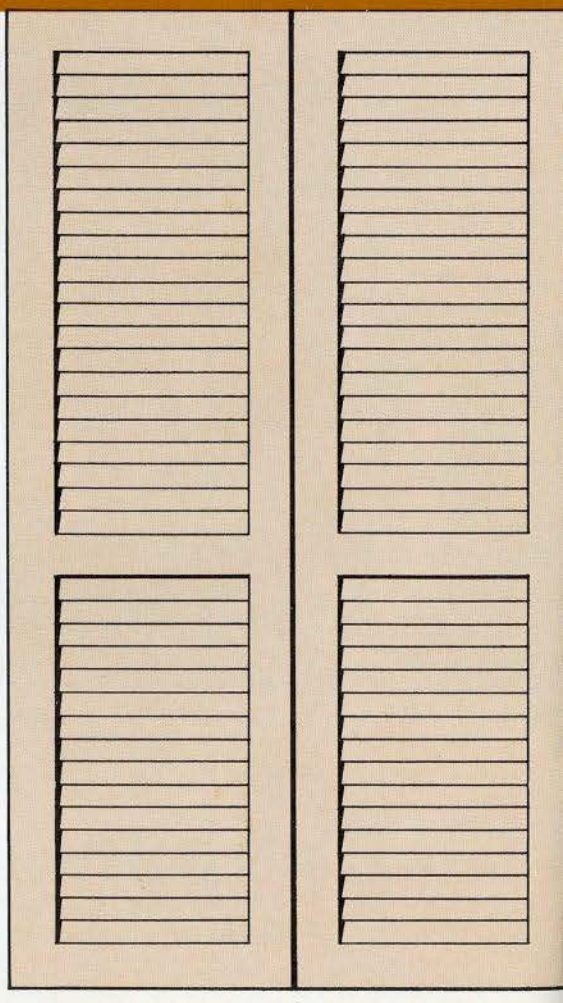
Abbotsford, B.C. 550-98th Ave., S.W., Calgary, Alberta 60 Belfield Road, Rexdale, Ontario

# Celwood for '63



## FOLDING DOORS

**Space problems? Building or remodelling,** here's the beautiful solution. CELWOOD Folding Doors give homeowners the "extra rooms" they need – right at their fingertips. Plus the warmth and character of rich, select Philippine mahogany, Sitka spruce, Western red cedar or California redwood. Engineered and built for lasting satisfaction, CELWOOD Folding Doors feature durable hardware, tough "Lifetime" vinyl hinges – won't warp, don't drag, can't creep.



## BI-FOLD LOUVRED DOORS

**With their timeless elegance,** CELWOOD Louvred Doors blend beautifully with any decor, contemporary or traditional . . . add grace and distinction to any room. On the practical side, they create space where it's wanted most . . . in closets, adjoining rooms, entrance halls, alcoves. Solidly built from clear, stain grade Hemlock, CELWOOD Louvred Doors are designed to open and close easily, silently, enduringly. Two-and Four-panel units are available in three different heights, six opening widths, complete with sturdy, easy-to-install hardware. Both natural and primed finishes are sanded at the factory, ready for varnishing or painting.

**CELWOOD INDUSTRIES LIMITED**

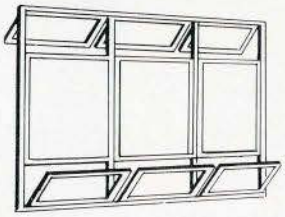
# Celwood for '63

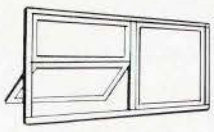
## PIERSON WINDOWS

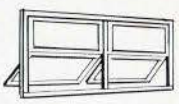
**The original sashless windows,** PIERSONS still lead the way in design and construction. Slim, trim PIERSON styling matches today's trends in home design. Patented, two-way PIERSON locks open to prowler-proof night lock as well as centre lock. But, above all, PIERSON means *quality*. Sturdy tenon joints – precise dimensional accuracy – premium-grade materials: these are the PIERSON pluses that turn window shoppers into window *buyers!*

## "CEDAR-LINE" AWNING WINDOWS

**Adaptable to all modern window installations,** "Cedar-Line" Windows by CELWOOD offer a series of basic single-sash and two-sash units designed and styled to add smart appearance and functional utility in homes, commercial and public buildings. Built with naturally weather-resistant Western Red Cedar, CELWOOD "Cedar-Line" Windows provide permanent beauty and distinction, whether painted or finished naturally. All units are fully weather-stripped and offer a choice of operating hardware to meet every requirement. Units may be used singly or in combination as awning windows, hopper units, outswinging casements or fixed units.





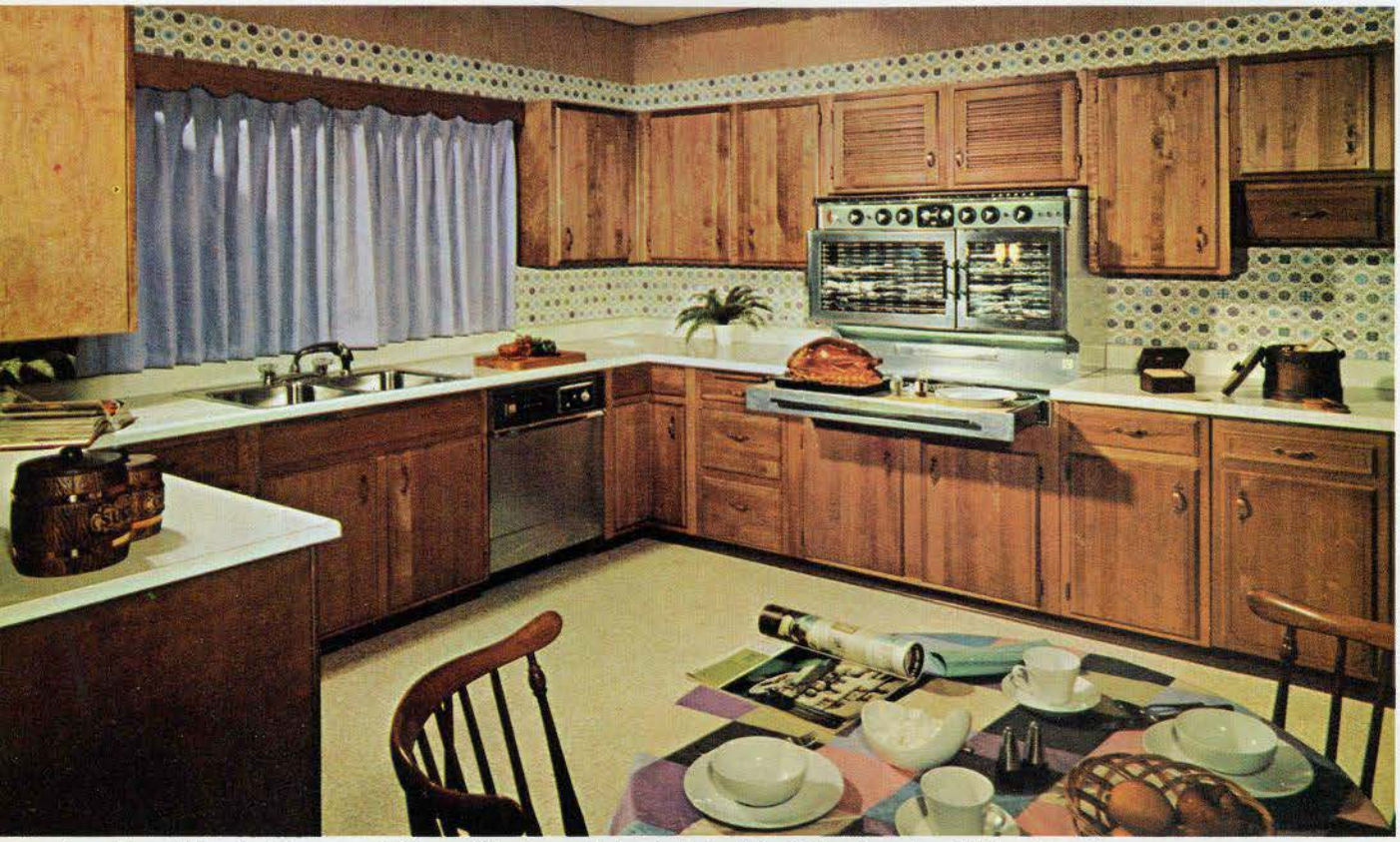


CELWOOD INDUSTRIES LIMITED

# Celwood for '63

# Maple-Line kitchen cabinets...

## Custom Quality, Custom Versatility — At a cost for every kitchen!



*Another Maple-Line variation: Custom Colonial-finished in glowing "Rosetone".*

To the precision and economy of modern factory production, Maple-Line adds the warmth and distinction of classic maple craftsmanship . . . plus *custom versatility!* Unlimited variations in layout and style match any plan, any decor. The secret? Maple-Line's exclusive "Varipanel". Easily interchangeable cabinet face panels provide a wide choice of patterns, colors and materials – using the same basic units.

Designed in three-inch modules to fit any layout, over 100 Maple-Line units may be mixed and matched. Meticulous craftsmanship, using selected and seasoned maple hardwood frames and faces, ensures the inner quality of each unit – while special furniture grade finishes add a handsome, durable lustre to cabinet exteriors.

### OPTIONAL ACCESSORIES

- Mixmaster Swingaway Shelf
- Cutlery Drawer
- Lazy Susan
- Towel Rack

**Exclusive Maple-Line Varipanels:**

Italian Provincial

Dark Amber Glass

Decorative Screen

Regency

Calorex Spring Green Glass

Louvred

**Maple-Line Solid Colors and Tones:**

Glacier Green

Wedgwood Blue

Rosetone

Hazeltone

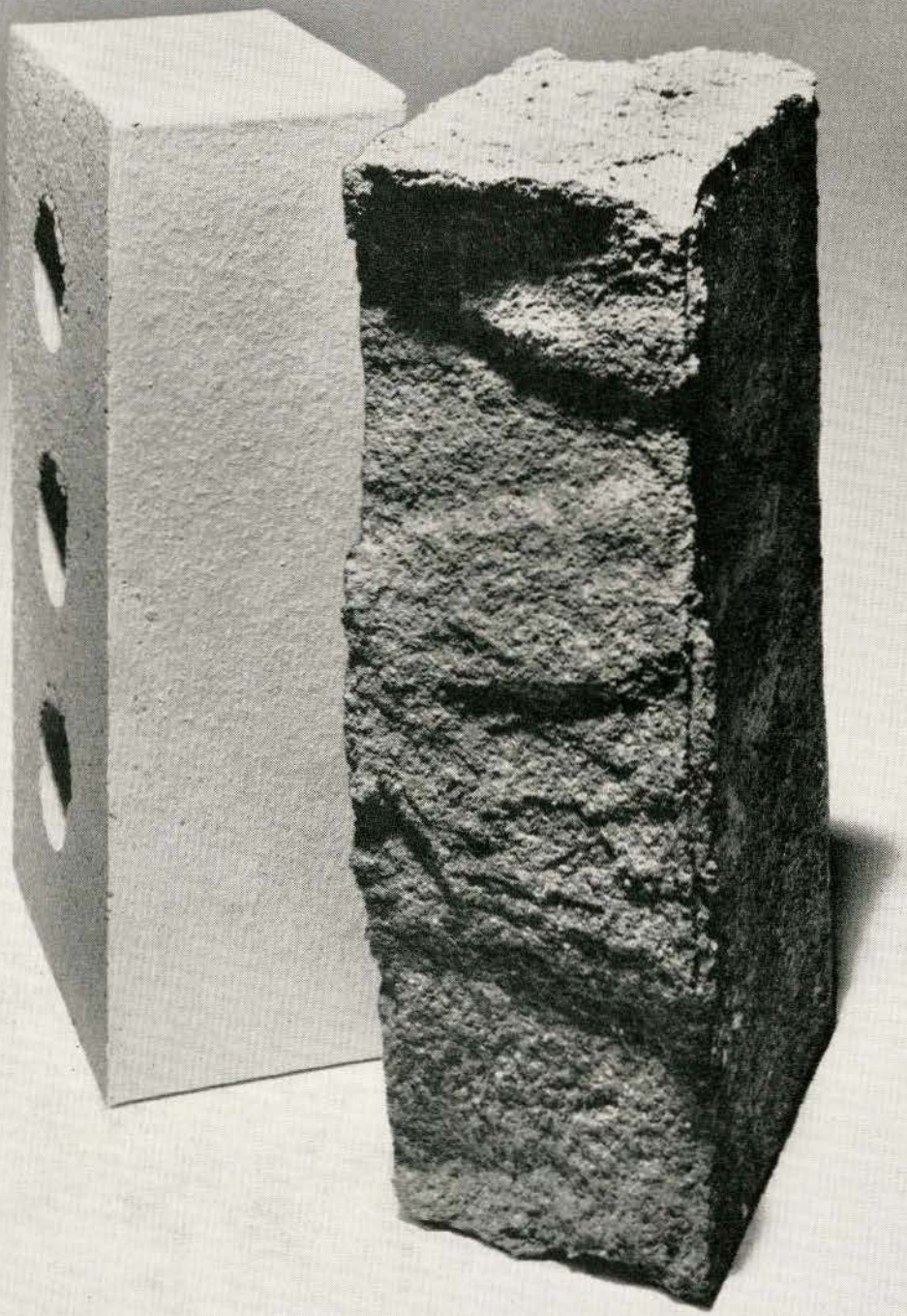
Goldentone

Walnut

Also in Arctic White

*"MY, YOU HAVE AN INTERESTING FACE."*

"You're just an old smoothie."



These bricks have character.
They're Cooksville-Laprairie brick, a product of

**DOMTAR** Construction Materials Ltd.

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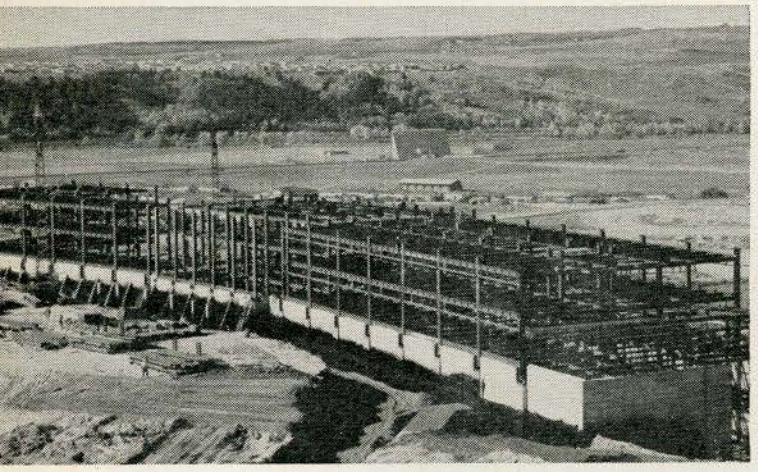
## in schools

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.*

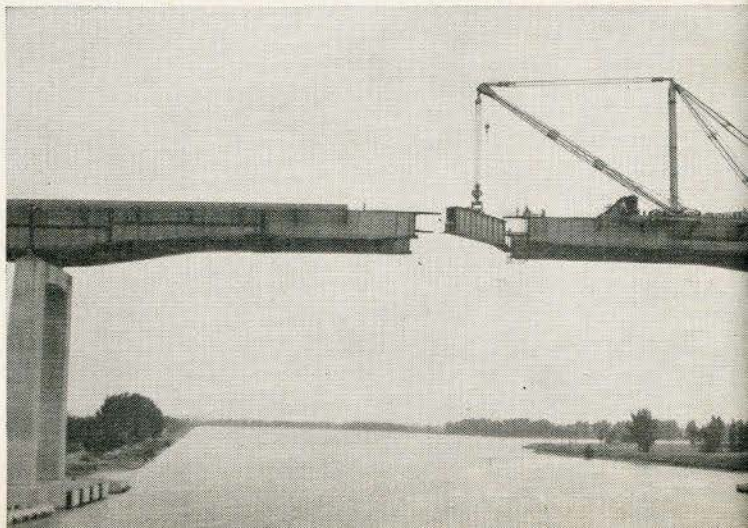
# new steels

## 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.*

# CAUTION

## Not all double glazed units are *Thermopane... be sure to use the proven product.

*Preparation of Dry Air Space in Thermopane Unit*

1. **A BONDERMETIC SEAL**
   A strip of metal, separating the two sheets of glass is bonded to the inside surface of each sheet.
2. **AIR SPACE**
   The space between the sheets of glass is filled with a blanket of dry air and permanently sealed.
3. **FACTORY TESTED**
   Every Thermopane Insulating Window Unit is thoroughly tested before it leaves the Pilkington Thermopane plant.
4. **THE PILKINGTON GUARANTEE**
   Clients have the assurance of the Thermopane 5-year guarantee against leakage; backed by the Pilkington organization.
5. **PROOF OF PERFORMANCE**
   Thousands of Thermopane Insulating Units have proven themselves over more than a decade of trouble-free use.
6. **FINEST PILKINGTON GLASS**
   The glass in every Thermopane unit is made by Pilkington.

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DD4212
WT 16#


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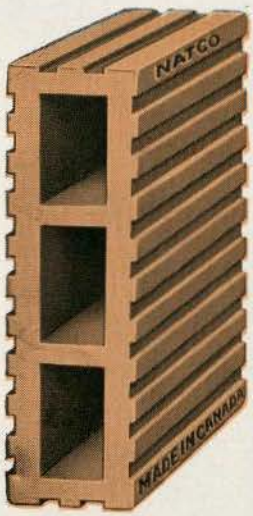
Partition Tile
Code No. DD5212
WT 20#

6″ x 12″ x 12″
Partition Tile
Code No. 6212
WT 22#



10″ x 12″ x 12″
Partition Tile
Code No. DD10212 WT 36#




3″ x 12″ x 12″
Partition Tile
Code No. DD3212
WT 14#


2″ x 12″ x 12″
Partition Tile
Code No.
DD2212
WT 14#

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## STRUCTURAL SCORED PARTITION TILE

**Made of shale burnt to maturity, which produces a lightweight, unshrinkable and fire proof building unit.**

**ADVANTAGES — Unshrinkable, Fire proof, True to size, Rodent proof — Has high Insurance rating — High resistance to passage of sound and heat.**

**CONSTRUCTION NOTE — When plastering, wood or steel channel bucks at door openings should be 1½″ wider than thickness of the tiles to act as grounds for plaster.**


8″ x 12″ x 12″
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TORONTO, ONTARIO
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OF STRUCTURAL CLAY TILE

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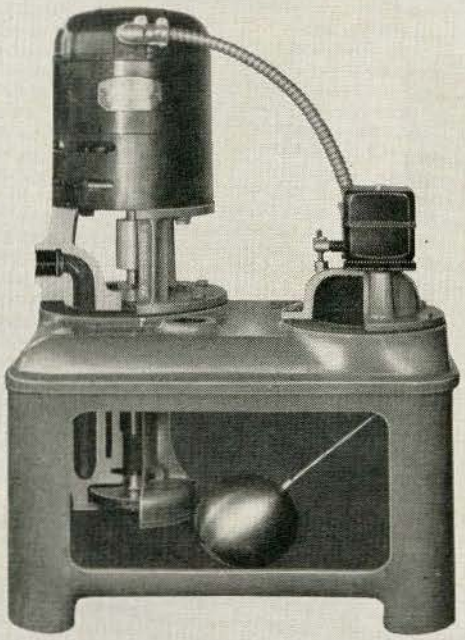
# INCREASED CAPACITIES...

# HIGHER DISCHARGE PRESSURES...

That's the good news about the greatly increased range of Darling "Unicon" Condensation Pump and Receiver units. Darling Brothers now offer you "Unicon" units for capacities up to 40,000 sq. ft. E.D.R. and discharge pressures to 40 p.s.i. in both singlex and duplex models. Designed for long and dependable service, easy installation and low maintenance costs — reasons why Darling "Unicon" units are so often specified for domestic and industrial applications. "Unicon" pump and receiver units are backed by over 70 years of Darling experience and service.

Write for Bulletin No. 100-49B.


Duplex Unit with Mechanical Alternator
Sizes: 10UD25 and larger.



Cutaway view of
Singlex Unit with Float Switch
Sizes: 3U20, 6U20 and 10U20.

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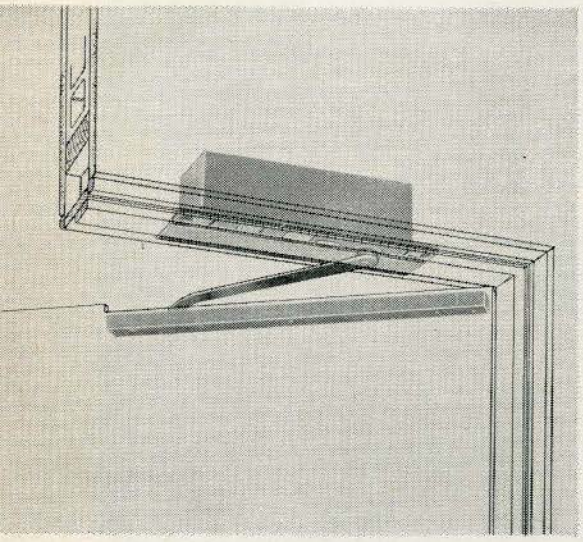
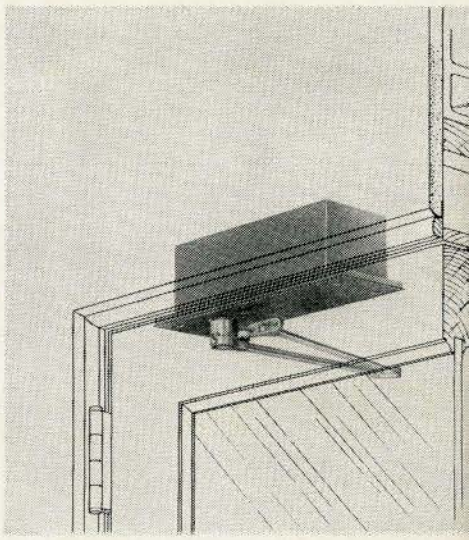
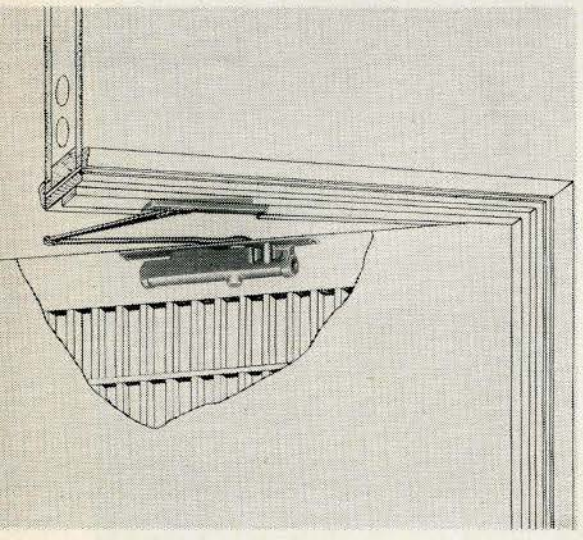


● **Overhead Concealed Closer.** Single Acting, for Butt Hung, Center or Offset Pivotted Doors. The basic overhead concealed closer. Mechanism installed in head frame and top of door. Lever arm disappears into recess in door stop upon closing. Used with exterior or interior doors of wood or metal, 1¾" thick or more. Door opening of 180° possible. (Series 200)

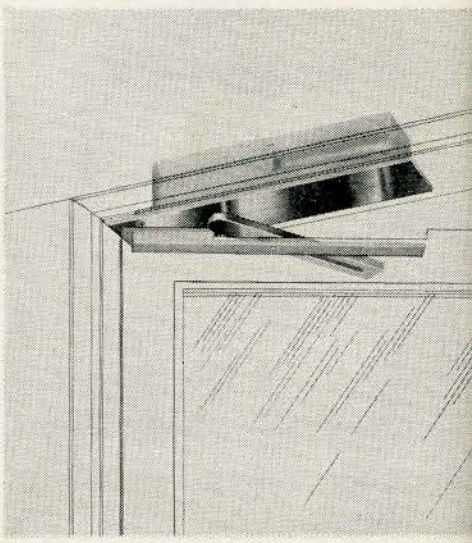
● **Overhead Concealed Closer.** Single Acting, Surface Applied Arm, for Butt Hung, Centre, or Offset Pivotted Doors. Mechanism installed in head frame and top of door, but with exposed double lever arm for extra closing capacity. Door may open 180°, jamb permitting. Available with regular, hold-open or Underwriters approved fusible link arms. (Series 500)

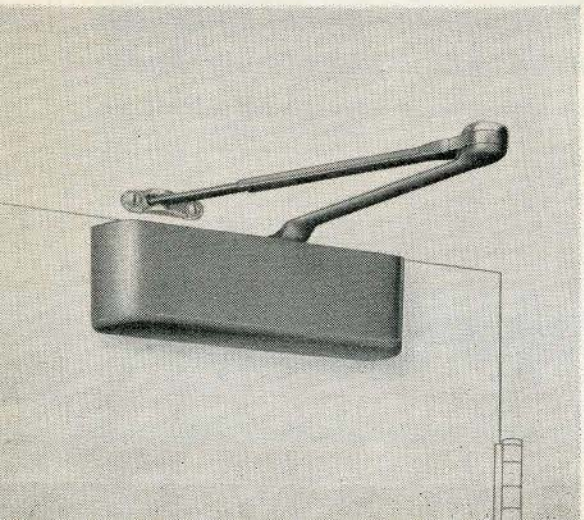




● **Closer Concealed in Door.** Single Acting, for Interior Doors Hung on Butts. This closer available in two basic sizes, for wood or metal doors. Provides largely concealed control at little more than the cost of an exposed closer. Widely used in offices, schools, hospitals, religious and industrial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

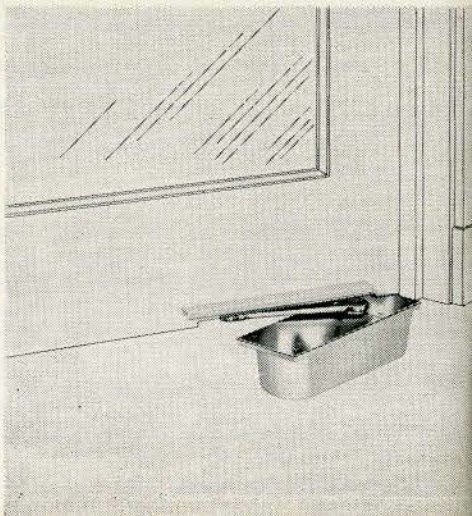
● **Overhead Concealed Closers.** Double Acting. Powerful closers, built to furnish complete rack-and-pinion control of any double-acting door, interior or exterior. Especially suitable for restaurants or hospitals, where frequent scrubbing subjects closers in floor to heavy abuse. (Series 600)

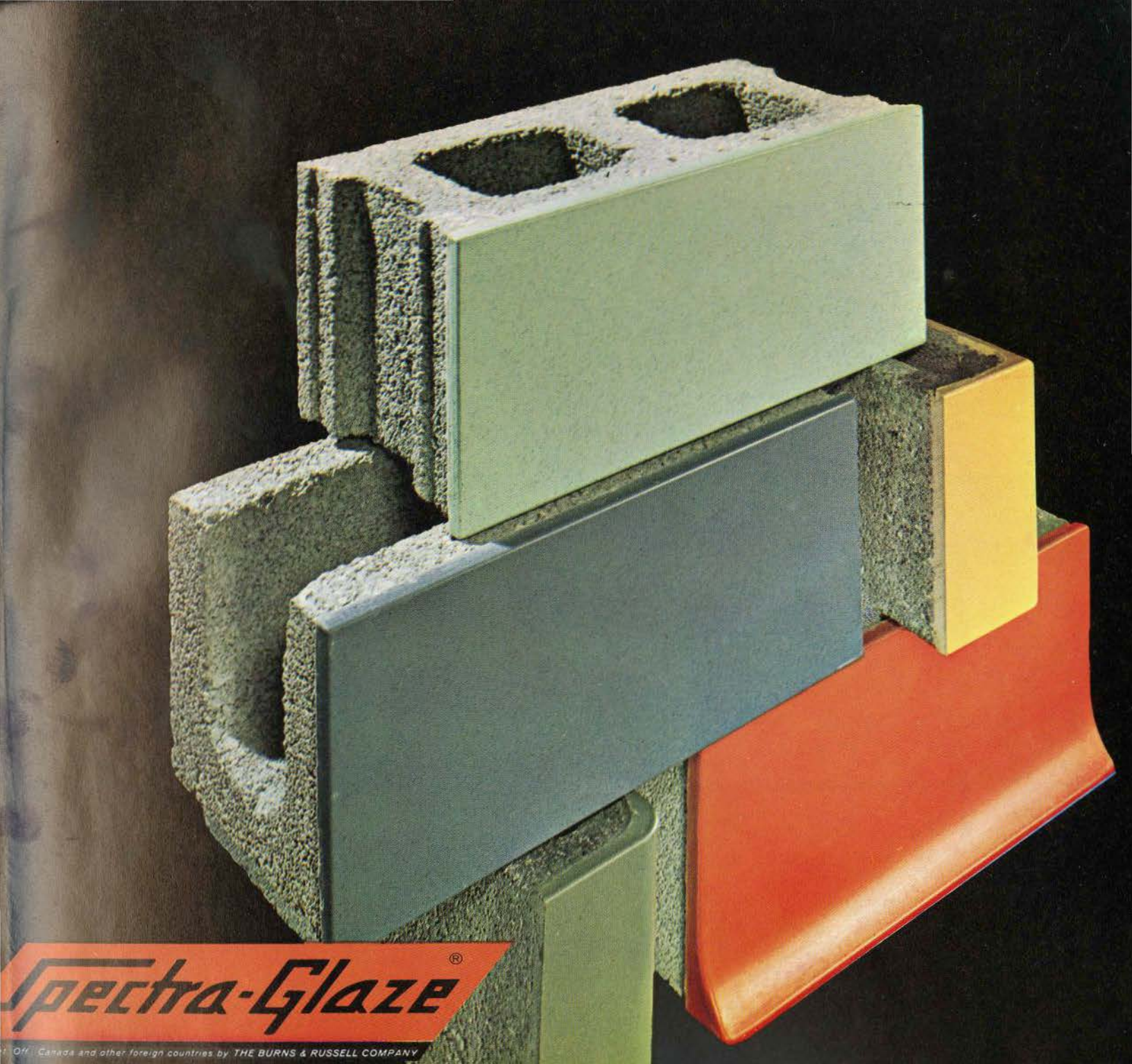




● **"Smoothee" Surface Applied Closers.** For interior or exterior doors from 2'2" to 5'0" wide. Features include non-tamper regulation screw, variable latching power, shoe adaptable to uneven trim conditions. Special closers available, such as telephone booth, delayed action, etc. Supplied in tan lacquer 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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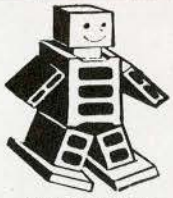
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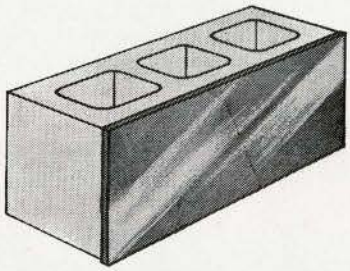

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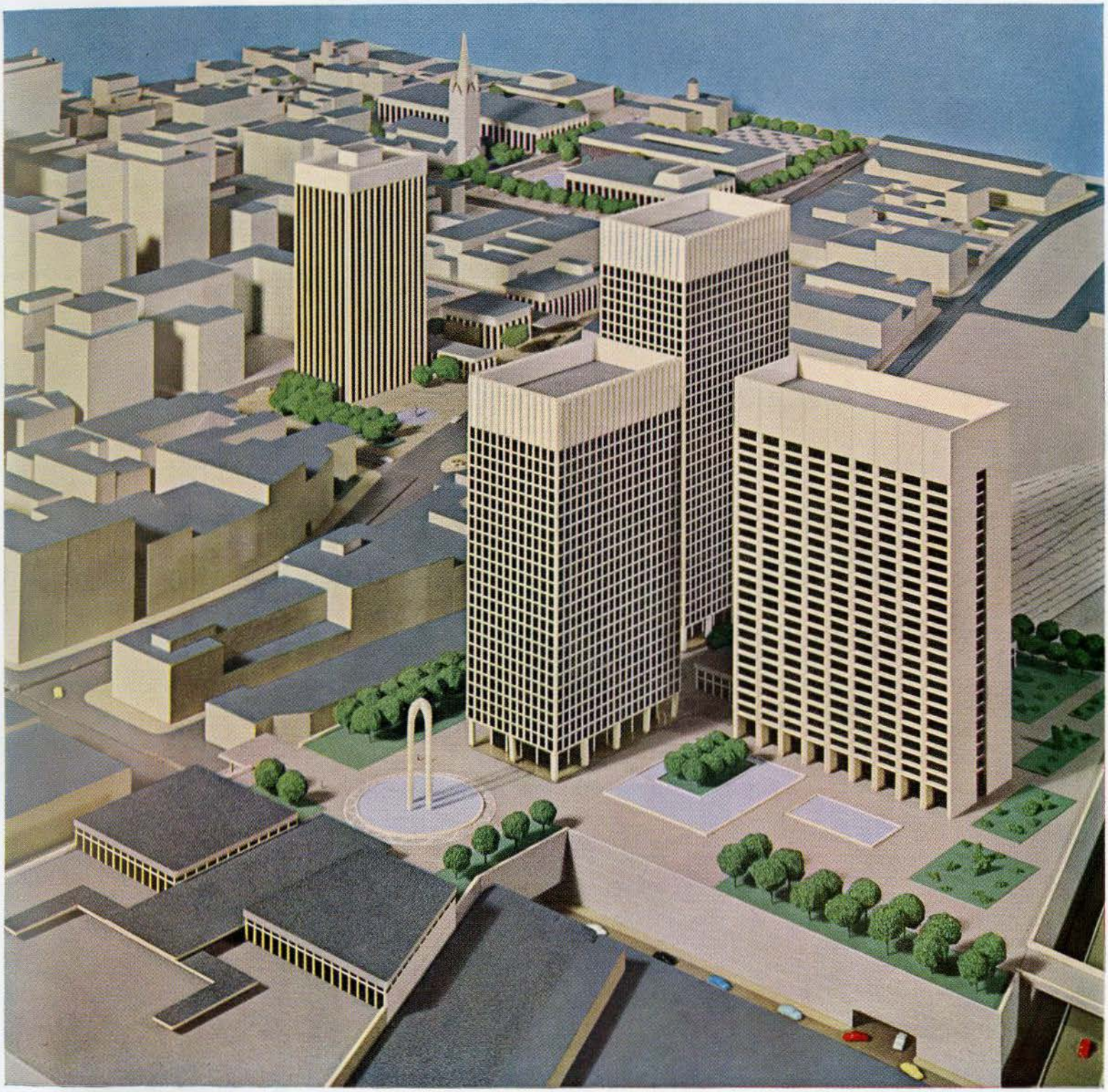
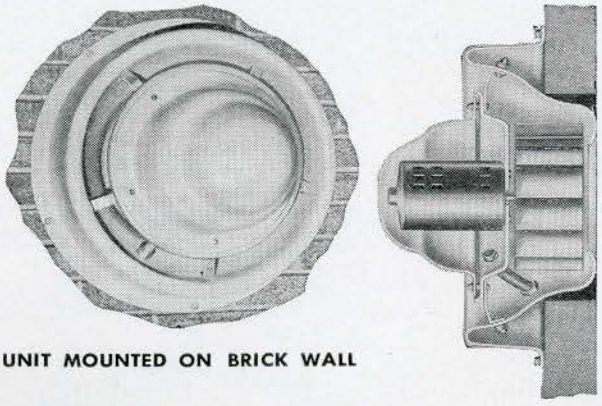


Model: City of Toronto Planning Board  Photo: George Hunter

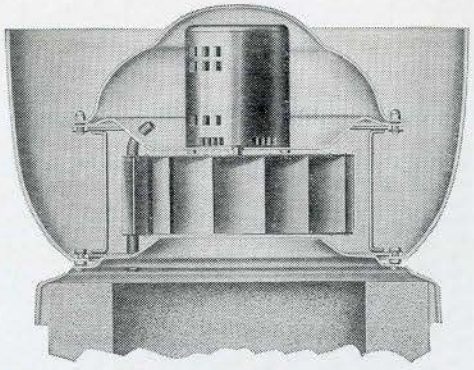
**TORONTO** *proposes to present to some future visitor, hovering over her harbour front, this eye-catching northeastern prospect. He will observe here an integrated Arts Centre with attendant commercial development in a conveniently central but now deteriorated area. By looking further afield he will note that this is but one local element in a dynamic city-wide conception of the future kept continuously under development and review by the City of Toronto Planning Board. Whether or not the future produces this exact picture, the vital fact remains that trained and interested intelligence is being brought to bear on the future of our cities now paying the price in ugliness and inconvenience of previous decades of indifference and "laisser-faire". Otis looks forward with interest to playing its full part in this brighter, better era by providing better-than-ever vertical transportation.*

### FIBER-AIRE CENTRIFUGAL WALL VENTILATOR

This Fiberglas* unit with its new molded-in fawn tan colour blends perfectly with most brick and other external wall colours — exhausts fumes away from the building — attractive, quiet and rugged. The perfect unit for restaurants and hotel kitchens. From 235 to 2,415 C.F.M. capacities.



UNIT MOUNTED ON BRICK WALL



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Especially designed for restaurants and commercial kitchens — exhausts greasy fumes up and away from the roof. Moulded-in Sky Blue Fiberglas* housing is fire-resistant. In case of duct fire will not melt or drop motor through the duct into deep fat friers or cooking ranges as other ventilators could. From 370 to 2,350 C.F.M. capacities.

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**The combination of SWARTWOUT design and ROSCO manufacture brings you the finest in gravity and powered ventilation equipment.**

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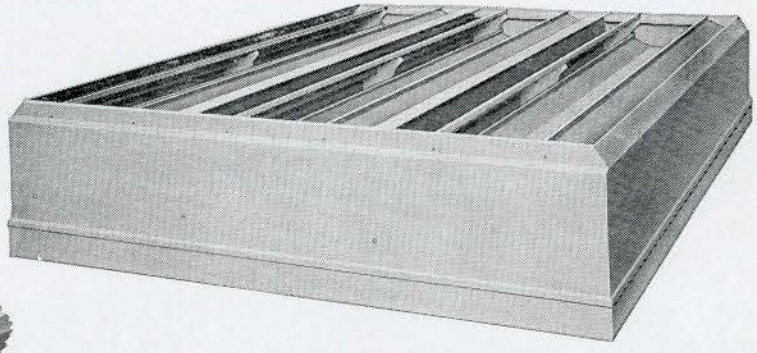

**LITE-'n-AIRE HEAT VALVE**

Combine ventilation with skylighting to save money, time and space. Available in two different models; Lite-'n-Aire Airmover and Lite-'n-Aire Heat Valve. Both styles available with either molded Fiberglas* or metal dampers and gutters.

*TM — Owens Corning Fiberglas Corporation.*

*Write for brochures and information to your nearest Rosco office.*

## ROSCO METAL PRODUCTS LTD.

**TORONTO • MONTREAL • OTTAWA • LONDON • QUEBEC • HALIFAX**
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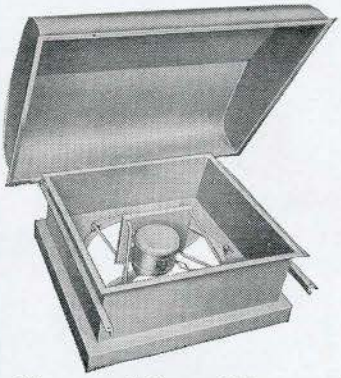
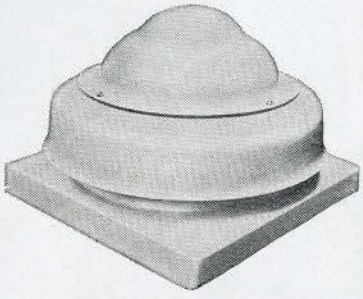
***An All-Canadian Organization***



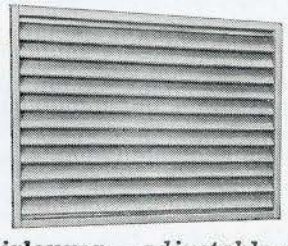
**Powered Low-Line** *and* **Low-Line Relief.** *Economical low contour ventilators.*

**Sky-Lite Pyrojector** — *this unit which features emergency relief plus skylighting opens automatically in case of fire or explosion.*



**Fiber-Aire** — *indestructible molded-in Sky Blue Fiberglas* housing is virtually impervious to weather, salt spray, chemicals and fumes. Direct drive, belt drive and axial units available.*

**Insta-Curb** —*high quality prefabricated roof curb for fast installation — no sharp corners to tear roofing materials — wood top with all welded steel construction.*



**Airlouver** — *adjustable or fixed in any size single units or multiple assemblies — weather proof.*

# FRANKI FACTS

CLIENT:
Webb & Knapp (Canada) Limited

LOCATION:
Lougheed Highway at Willingdon Ave., Burnaby, B.C.

TYPE OF STRUCTURE:
Brentwood Shopping Centre

ARCHITECTS:
John Graham Associates, Seattle, Wash.

CONSULTING ENGINEERS:
P. T. Mikluchin & Associates, Toronto, Ont.

CONTRACTORS:
Industrial Leaseholds Construction Limited

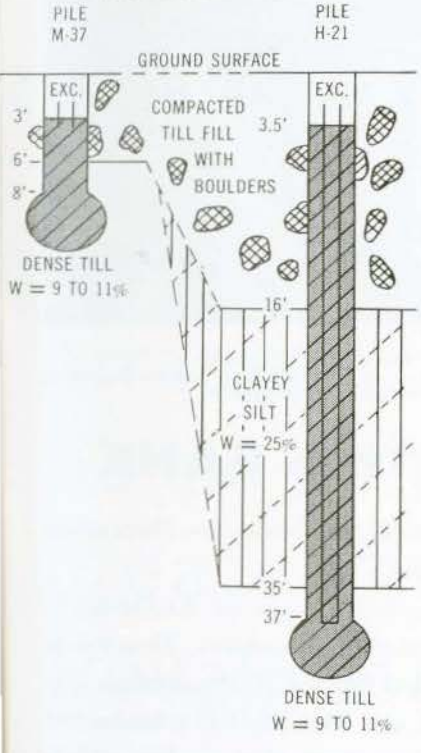
NUMBER OF FRANKI UNITS:
292

DESIGN LOADS:
Up to 130 tons

DEPTH OF CAISSONS:
Varying between 8 ft. and 37 ft.

## *Franki Foundation Units Replace Hand-Dug Caissons in Dense Boulderous Fill*

TYPICAL SOIL PROFILE




### *Problem:*

This site represents a cut-and-fill area. The fill had been compacted to 95% standard proctor density, but was partly underlain by post-glacial lake deposits of low-bearing value. It was feared that footings founded on the fill, would result in differential settlement between the columns.

The fill, a boulderous glacial till soil, was believed to be impenetrable to conventional piles. Hand-dug caissons were at first considered as best suited, but their cost would have been excessive and above the estimates of what the clients were prepared to pay.

### *Solution:*

The contract was awarded to Franki when their engineers, using the wide experience gained by previous penetration problems met their challenge by proving in test-driving that hammer blows of up to 200,000 ft. lbs. permitted the installation of Franki units that displaced or crushed the boulders.

Short Displacement Caissons, (also called Pressure Injected Footings) with as little as 5-ft. shaft length, and longer units with up to 34 ft. reinforced concrete shafts, are now supporting the columns of this centre in its fill area. All Franki bases are rammed into sound, dense, glacial till at depth, with a moisture content varying between 9 and 11%.

Franki always guarantees the safety of its foundations. The experience and ability of the Franki engineering staff to solve intricate foundation problems enables clients to benefit from a discussion of the various difficulties they may expect to encounter in their projects.


**Literature** - This series of job highlights, as well as other descriptive literature, will be sent to you upon request to Franki of Canada Ltd., 187 Graham Blvd., Montreal 16, P.Q.

# FRANKI
## OF CANADA LIMITED

Head Office: 187 GRAHAM BLVD., MONTREAL 16, P.Q.
QUEBEC OTTAWA TORONTO EDMONTON VANCOUVER

THE ROYAL BANK OF CANADA, OTTAWA, ONT.

*Architect:* E. P. Warren, MRAIC, ARIBA
*Consulting Engineer:* E. J. Gilbert, Bank Premises Departmen
*General Contractor:* Angus Robertson Ltd.

# SILENCE IS MORE THAN GOLDEN IN THIS BANK

A clean-lined atmosphere of tranquility for both employees and clients was one of the main specifications for the Royal Bank of Canada building in Ottawa.

Sound control makes an important contribution to that tranquility — provided by Acousti-Celotex *Celotone* mineral tile. Uniform artificial light transmission is provided by Cepco translucent panels. Both of these significant elements were provided and installed by Canada's foremost acoustical applicators — Dominion Sound Equipments Limited.

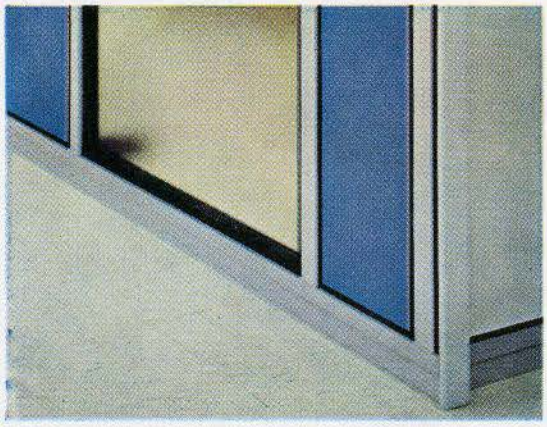
In addition to a complete range of ACOUSTI-CELOTEX sound conditioning products, Dominion Sound also provides NESLO CLIP-GRIP partition systems . . . "ACOUSTI-LUX and POLRIZED translucent ceilings. All of these products have that *quality* which architects have learned to associate with Dominion Sound, Canada's foremost acoustical applicators.

**Dominion Sound**
**EQUIPMENTS LIMITED**

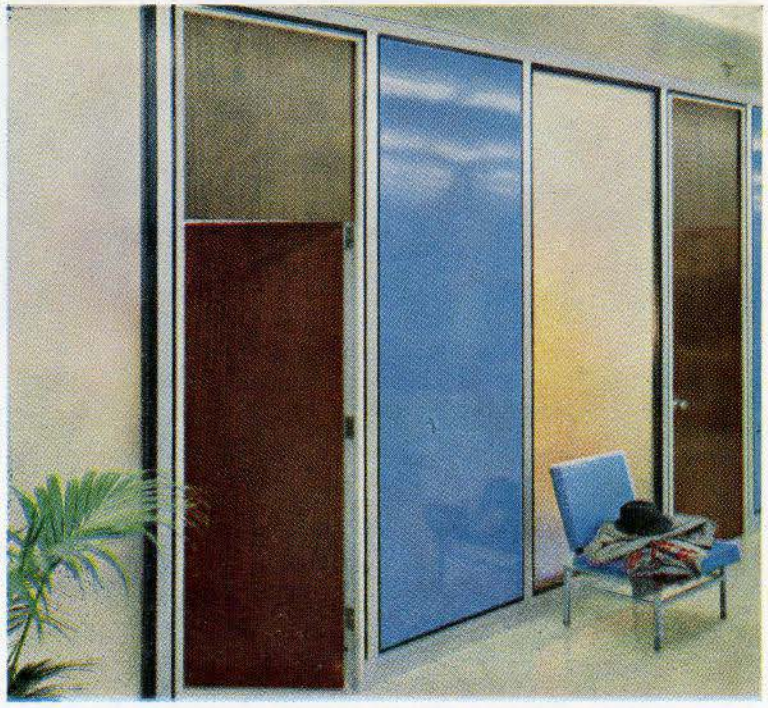
**HEAD OFFICE:** 4040 St. Catherine Street West, Montreal • **BRANCHES:** Halifax, Saint John, Montreal, Ottawa, Toronto, Hamilton, London, North Bay, Winnipeg, Regina, Saskatoon, Calgary, Edmonton, Vancouver

This is the IMAGE Partitioning Line ☐ That features a recessed "Shadow" design ☐

That stands on a base of aluminum fine, ☐ That's anodized to withstand grime ☐ That "floats" the panels of glass, wood or steel ☐



That key together ☐ That are quick to change ☐ That rearrange ☐ That need no posts ☐ ☐ That create the IMAGE Royalmetal built ☐



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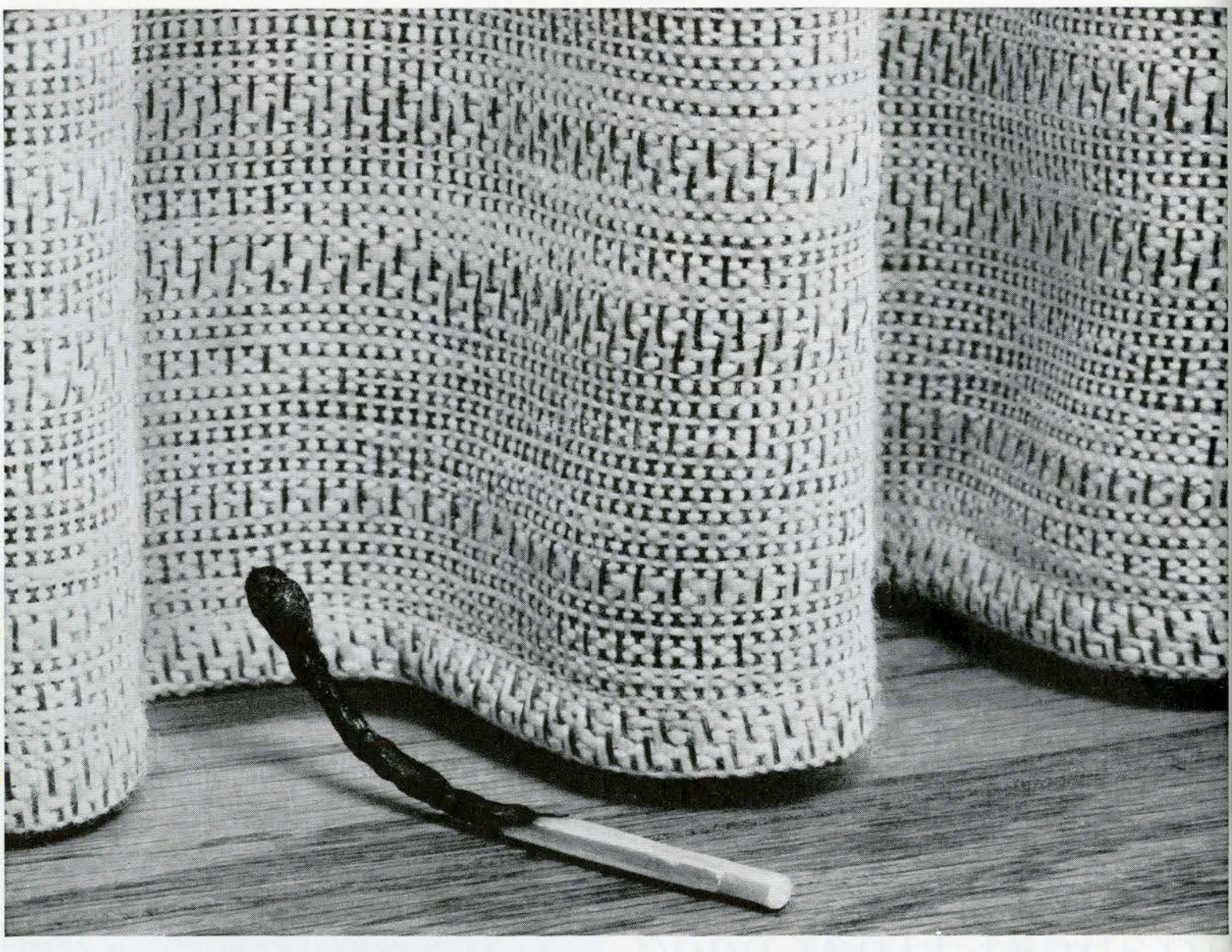

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*Only draperies with Rovana as the warp offer so many tangible advantages—for long life—beauty—economy.*

**THESE ARE THE ADVANTAGES:** ■ permanently flame resistant ■ resistant to cracking, scratching or splintering ■ hand or machine washable ■ dry cleanable ■ colour fast ■ variety in patterns ■ resistant to solvents and chemicals ■ mildew proof ■ odourless ■ non-allergenic ■ weathers well ■ moderate in cost

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*Please send me a Fact File on Rovana*
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DR-293

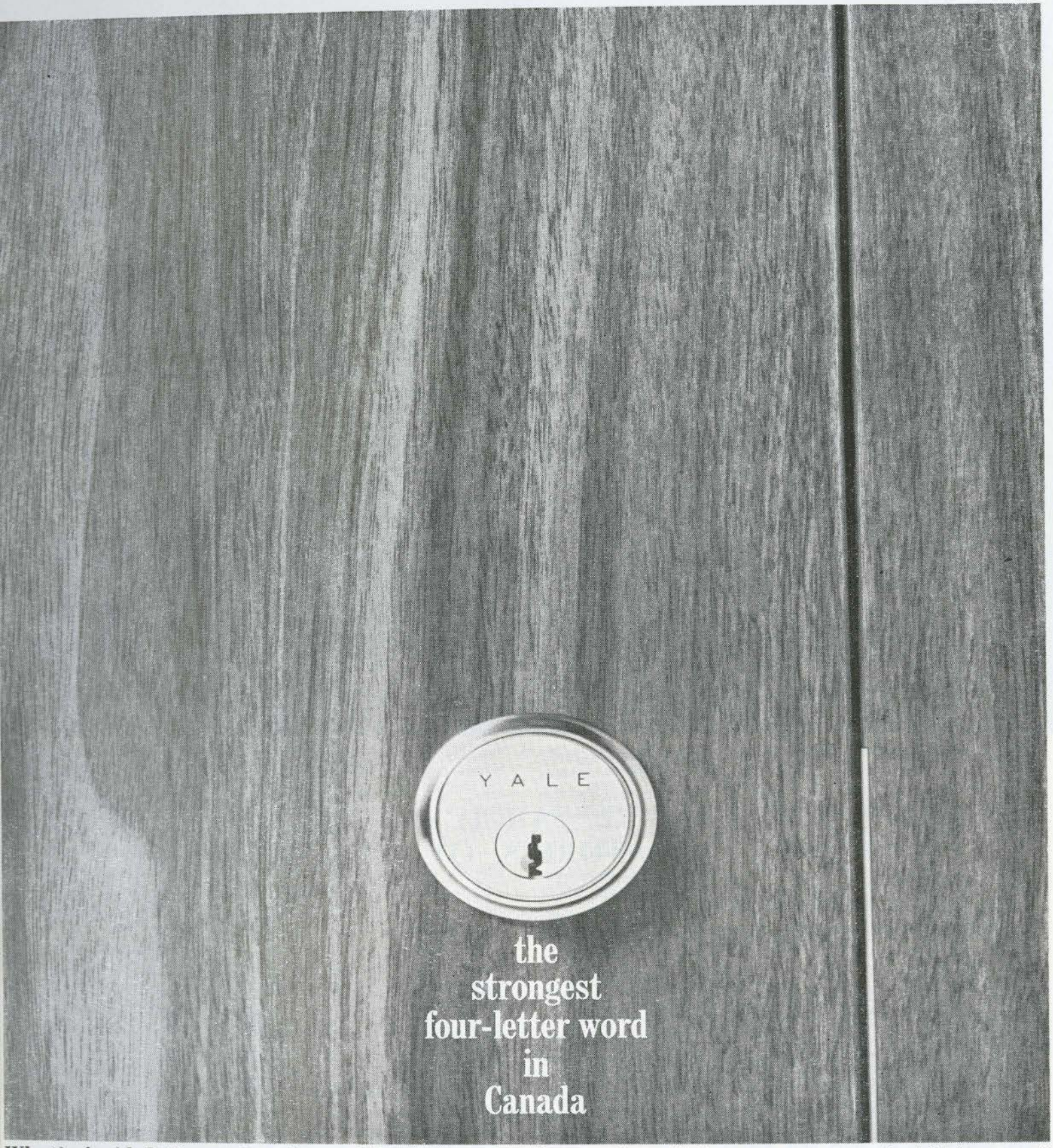
**Sound reasoning** made I·XL 'château grey' face brick the aesthetic choice for the important new Northern Electric Company Limited Research and Development Laboratories* in Ottawa. This research-developed clay brick is endowed with a sense of rightness . . . of fitness . . . of belonging in almost any area of intellectual life. Here then is the reasoned choice for research centres, universities and colleges. From the viewpoint of structural and economic benefits, I·XL 'château grey' is a genuine burned clay face brick . . . need more be said?

*Architects: Bland/Lemoyne/Edwards and Charles Elliott Trudeau, Montreal • Consulting Architect: Watson Balharrie, Ottawa
General Contractor: Doran Construction Company (1960) Limited, Ottawa • Masonry Contractor: Patterson-Alexander Limited, Ottawa

'I Excel' - Mark of Excellence

# I·XL BRICK & TILE

MEDICINE HAT BRICK AND TILE COMPANY, LIMITED AND ASSOCIATES • HEAD OFFICE: MEDICINE HAT, ALBERTA




What's inside? We won't tell you. We can't even tell you where it is, except to say that it is one of the most tightly guarded doors in the world. Security today is a vital commodity, and the best way to obtain it is to lock the door and tell everybody to keep out. But you've got to do it quietly and firmly. That's why this door has no sign on it but one. Only four letters but, then, who needs any more?

**YALE & TOWNE**

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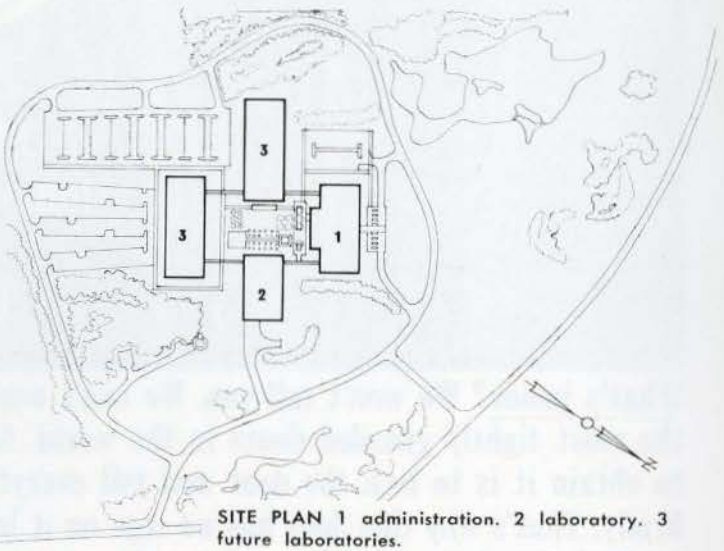
PHOTOS BY PANDA UNLESS OTHERWISE NOTED

# NORTHERN ELECTRIC RESEARCH AND DEVELOPMENT LABORATORIES, OTTAWA

## Architects: Bland/LeMoyne/Edwards and Charles Elliott Trudeau




SITE PLAN 1 administration. 2 laboratory. 3 future laboratories.

Consulting architect: Watson Balharrie. Landscape architects: Project Planning Associates Limited. Consulting engineers: structural, de Stein and Associates; mechanical and electrical, owner's staff. General contractor: Doran Construction Company Limited (1960). Landscape contractor: MacLean-Peister Limited.

# Appraisal

## by Hart Massey

THESE BUILDINGS ARE THE FIRST stage of an eventual four building group arranged formally around a court on an open, rolling site in Ottawa's green belt. The geometry of the grouping is of course not yet complete and since no exterior space is created by the two elements already built, it is not easy to judge the success of the idea. It does seem, however, that from the highway or the approach road the raison d'être of the grouping will not be readily apparent. Even inside the front entrance of the administration building the visitor will not be able to see through to the court beyond. It will in fact be only through the covered links between the buildings that the closed space of the court will flow into the open space of the parkland. Under many conditions, and particularly more urban ones, it is often a most desirable quality that buildings should be inward facing, but on this particular site one wonders whether a more open disposition of the buildings would not lead to a more easily apprehended and more relaxed relationship to the natural surroundings. It is only fair to add however, that landscaping can have a considerable effect on one's own reactions and in time, with more and larger trees in the vicinity of the building, the situation may be much improved.

As a continuation of this general comment it is necessary to say something about massing and, in particular, about the water tower which is a dominant element in the building group. Try as one may, it is impossible to look at these buildings without being aware of it. The main point here is that the architects have either chosen, or more likely, been required to place this utility so close to the buildings that, willy nilly, it becomes architecturally significant. This would indicate that its location should have been carefully studied from a massing point of view and possibly related more closely to the buildings by the use of materials. This does not appear to have been done and economics may be the reason for some of it. The fact remains that the water tower is there but does not seem to belong.

The administration building is now and probably always will be the focal element in the scheme although the smallest building in bulk. It has been conceived as a pavilion raised on a podium at the north end of the future court. It is an excellent example of what a building serving such a purpose should be and has been designed with the restraint that one has come to expect from this firm of architects and wishes were more common in our environment.

In scale the administration building is sufficiently bold to "read" even from the highway, which is some distance away. In this sense the administration building is far more successful than the laboratory building which, with its busier fenestration and relatively flat facade, has a rather negative appearance. In the case of the laboratory particularly the choice of materials — buff brick and off-white precast concrete — contributes an impression of the building lacking strength. A greater tonal contrast in materials would have helped to overcome this. It is perhaps not a major point and, in the case of the administration building, an unimportant one since there is little brick on the exterior.

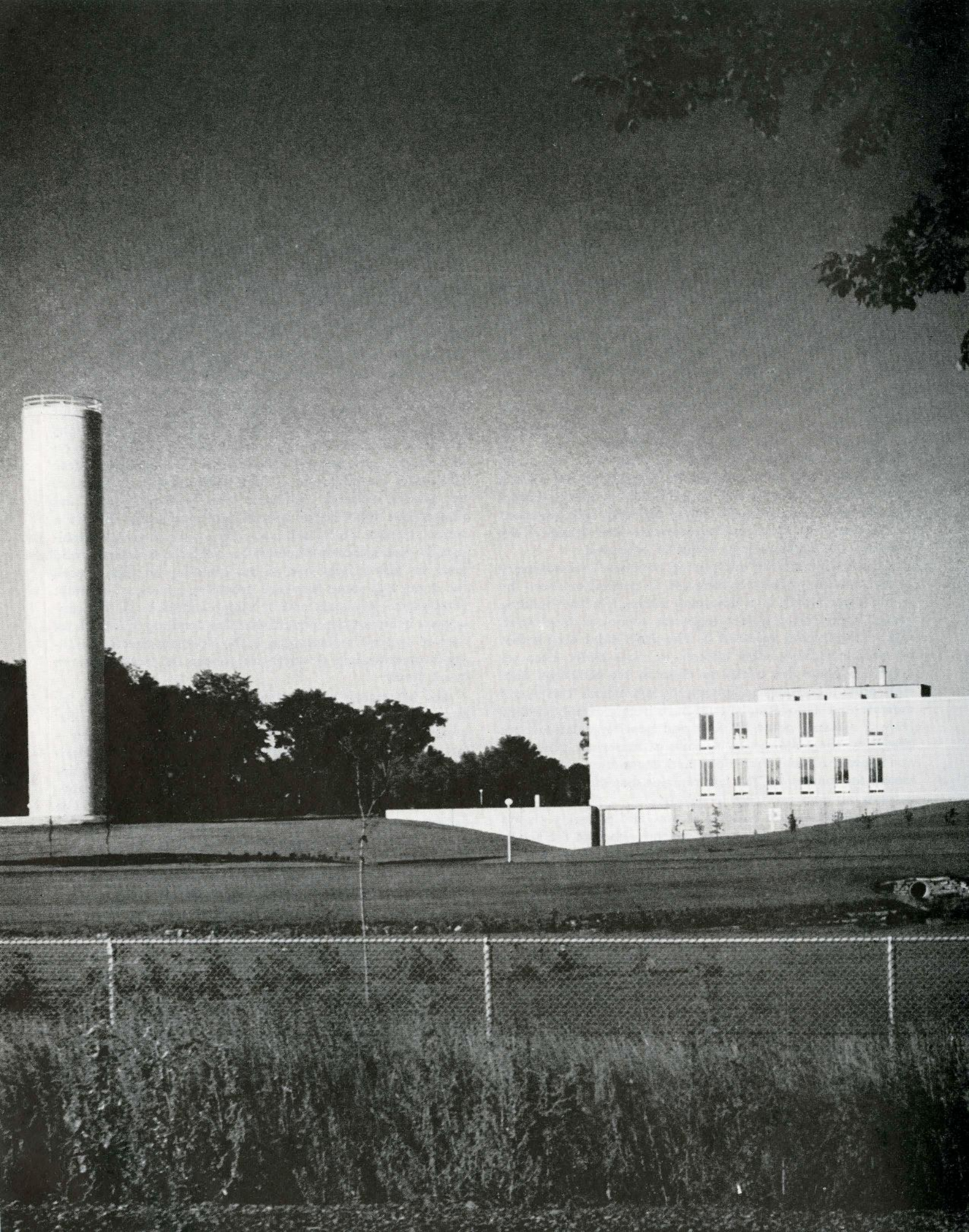
On the whole the administration building is highly successful. Sitting proudly at the top of rising ground with strong sheltering roof and clerestory above to break the horizontality, this building has the necessary "presence" and strength to fill its role as the front door of an industrial research development. More than this it is also welcoming to the visitor — an important quality particularly on an open site in an Ottawa winter.

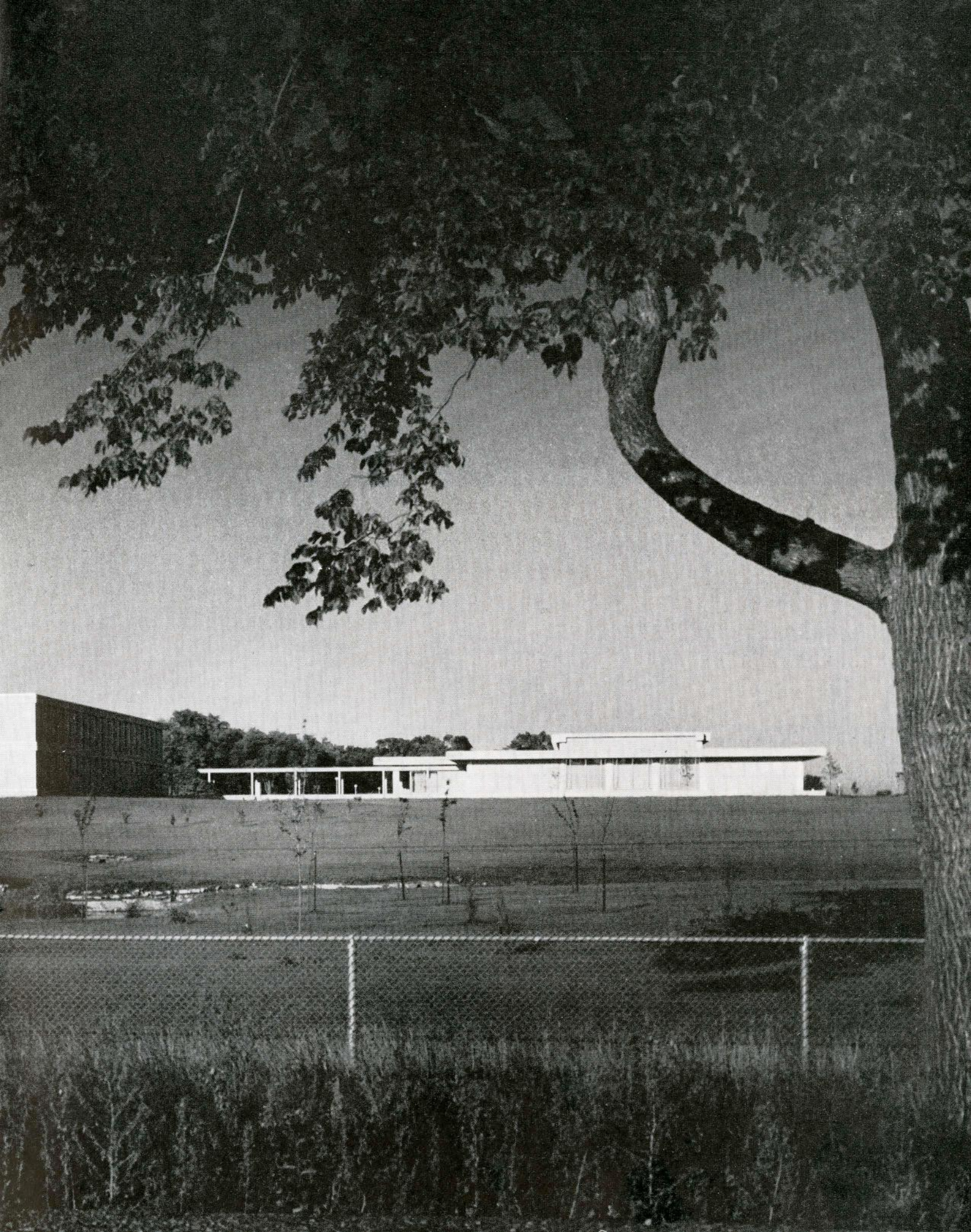
The large areas of glass in the exterior wall seem to promise some transparency in the building itself and, as already mentioned, it is somewhat of a surprise to find that from the entrance lobby one cannot see through to what will be the enclosed court on the far side. But if there is no transparency there is space and light due largely to the generous ceiling height and the use of glass in the corridor partitions which borrow light from the outside. The materials used on the exterior are repeated inside and it is interesting to note that under the mellower artificial light these materials take on quite a different character. What appeared faint and washed out under harsh natural light now seems to have a subtle richness which has been ably exploited by the architects in their selection of colors for adjacent surfaces. Wood does not play a large part in this building but teak is used for doors and some furniture providing necessary warmth. Detailing is consistent and of a high standard. In this connection it should also be said that fine detailing is sometimes marred by poor maintenance. In the Northern Electric building the maintenance is superb and for this the owners deserve much credit.

The laboratory building, because of its function, is far more utilitarian in its treatment and has been designed for utmost flexibility. The concept is a straightforward one — laboratories in a central core with offices around the perimeter. The steel structural frame is exposed so that equipment may be suspended from it; partitions are largely movable and the laboratory services are brought down from the ceiling as required. While there is an appearance of disorder in the laboratories they apparently work well and it is a tribute to the architects that their clients seem well satisfied. It is understood that in the expansion of this development the future laboratory buildings will continue the basic planning concept of the present one with only minor modifications.

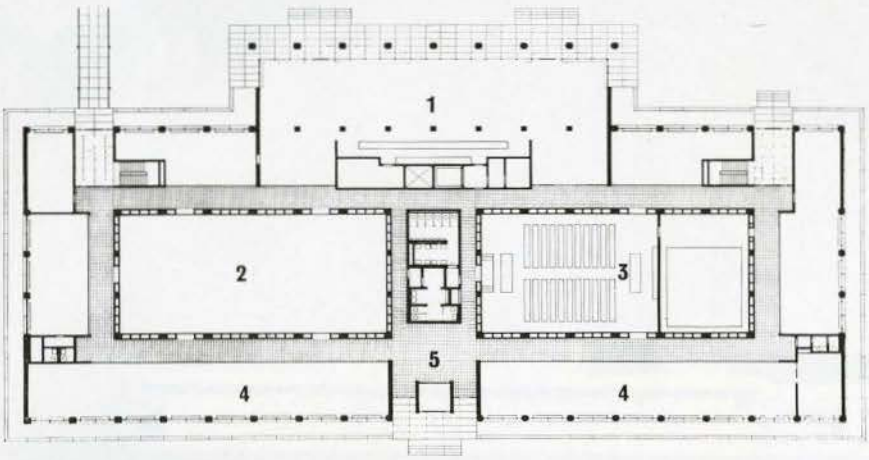
Before finishing this brief comment on the Northern Electric building something needs to be said about structure. Both buildings express their structure — the administration building boldly — the laboratory less directly. One building is concrete framed, the other in steel — so far so good. The question being raised here is whether the observer interprets what he sees correctly. The motif used on the fascias of both buildings would lead one to suspect that some type of precast structure was used until one becomes aware that the same motif is used on all sides of the building, which denies the existence of this form of structure since precast concrete structural elements are usually linear and span from support

*(continued on p. 50)*





*The Administration Building*
*Left: The main entrance.*
*Right: view along the north side.*
*Below: the entrance elevation.*




ADMINISTRATION BUILDING — GROUND FLOOR PLAN 1 cafeteria. 2 library. 3 auditorium. 4 offices. 5 entry.

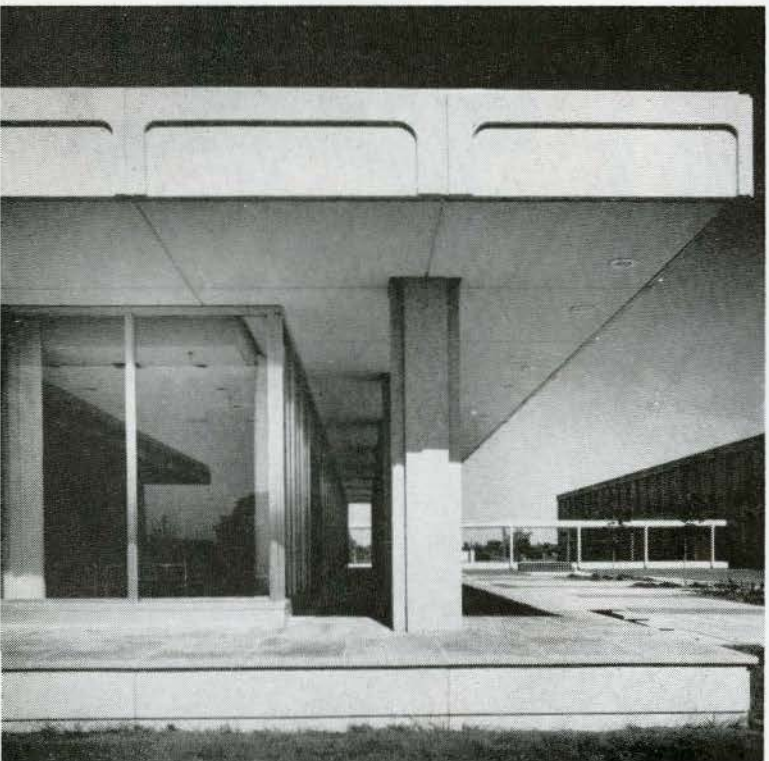
## Northern Electric

*(continued from p. 47)*

to support. The only assumption left, if the motif is to have meaning, is that it symbolizes some kind of coffered slab structure. When finally this is found to be not so, one is left wondering why some other purely decorative motif was not used—a motif in other words which did not have structural associations.

Finally it should be said that if there is a note of criticism in some of these comments it is only because these are good buildings that they can be considered seriously and, if necessary, critically. If these had been anything but good buildings, designed by serious and conscientious architects, it would be really not worthwhile discussing them in this way. As it is the buildings can survive any such comment because they are fundamentally good and, as a result, will always remain an embellishment to the Ottawa green belt.

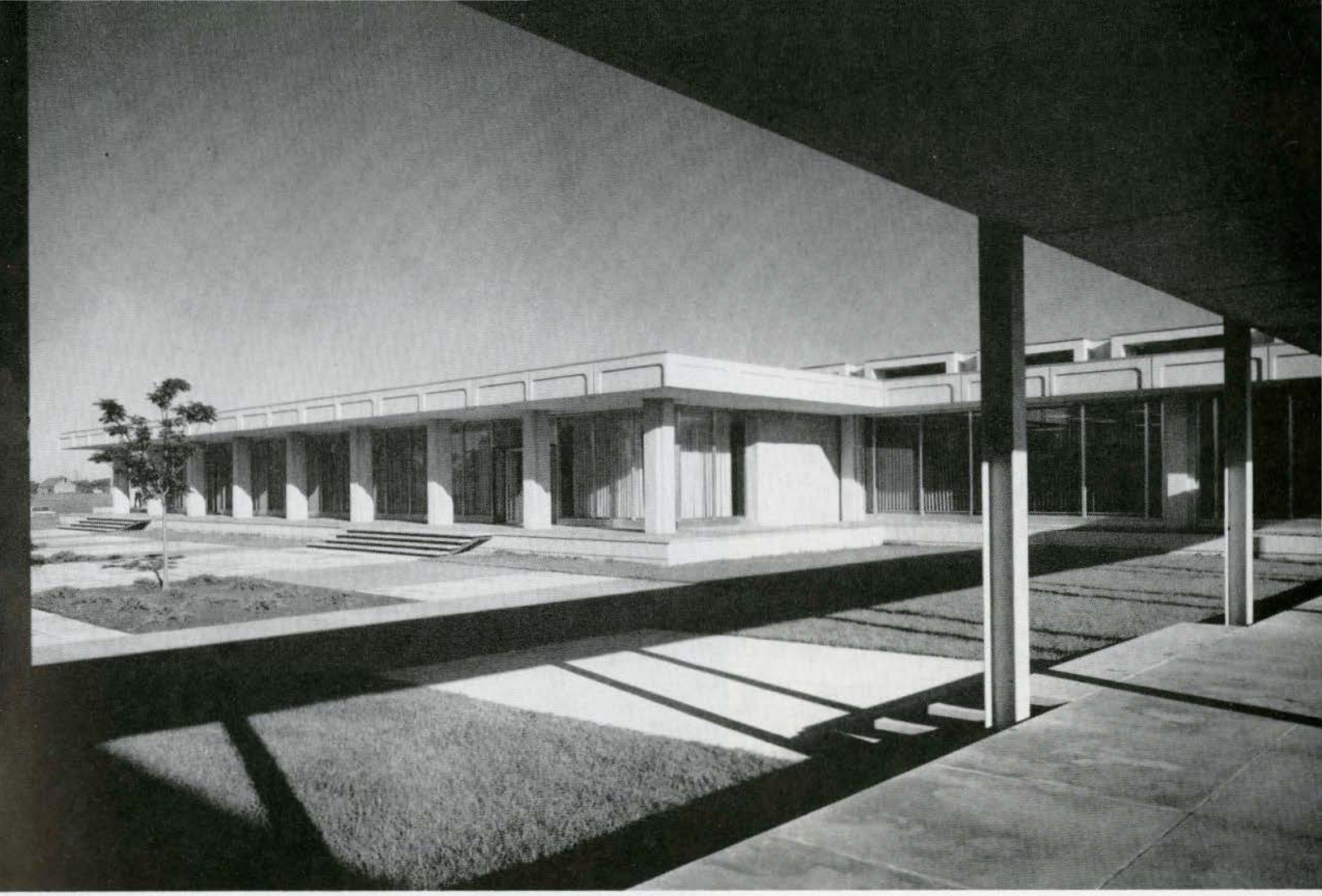
*Above: a general view from the south.*
*Below: detail of the administration building from the west.*



## THE CLIENT'S REQUIREMENTS

In 1957 Northern Electric decided to establish a research and development organization to study (with particular concern for the Canadian market and economy) the problems of communication services and power transmission. As a basic requirement it was considered desirable to separate the proposed laboratories from the production plants in Ontario and Quebec and provide accommodation in a separate location. While the site had to be removed from competitive research establishments it was to be in close proximity to a scientific community of sufficient size and quality.

The choice of a site in the green belt outside Ottawa near Crystal Bay became an obvious one with the National Research Council, the Defence Research Board, Ottawa and Carleton Universities, and major federal government agencies all located in or around the capital city. It was required to maintain a certain isolation from vibration and



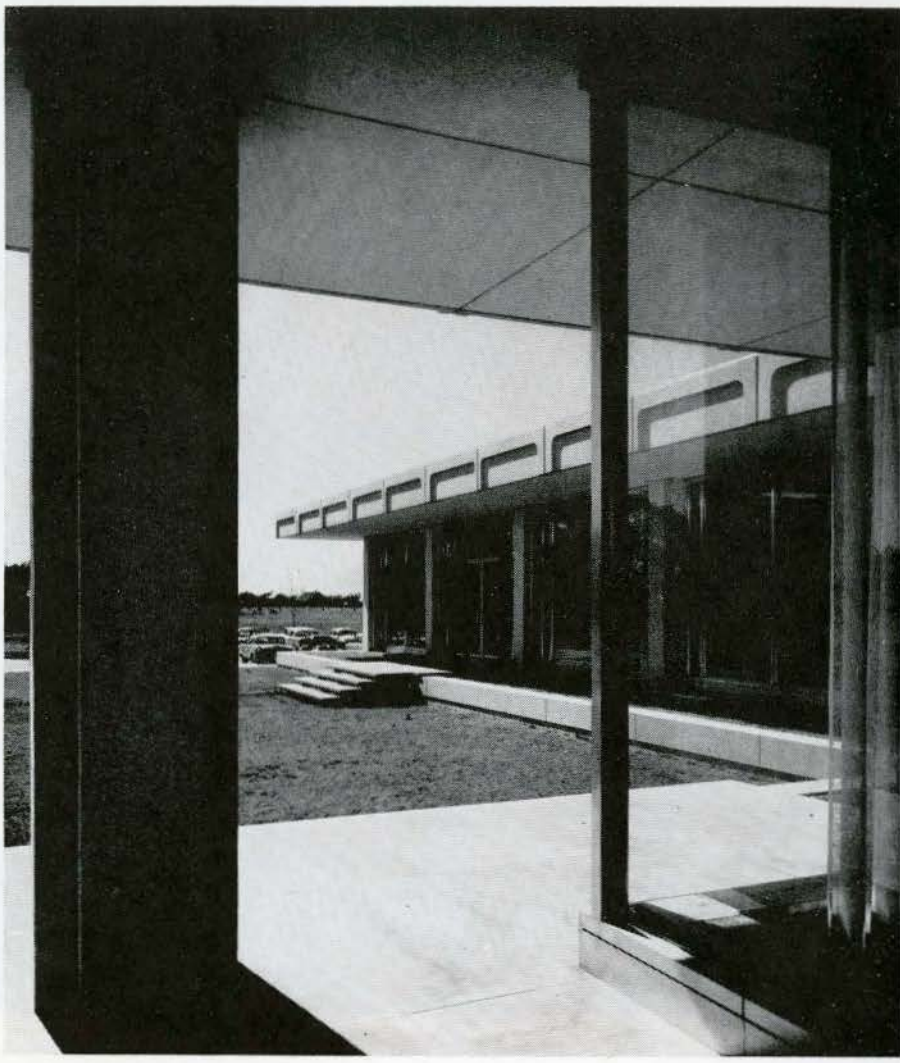
*Above: a view of the administration building from a covered walkway.*

## Northern Electric

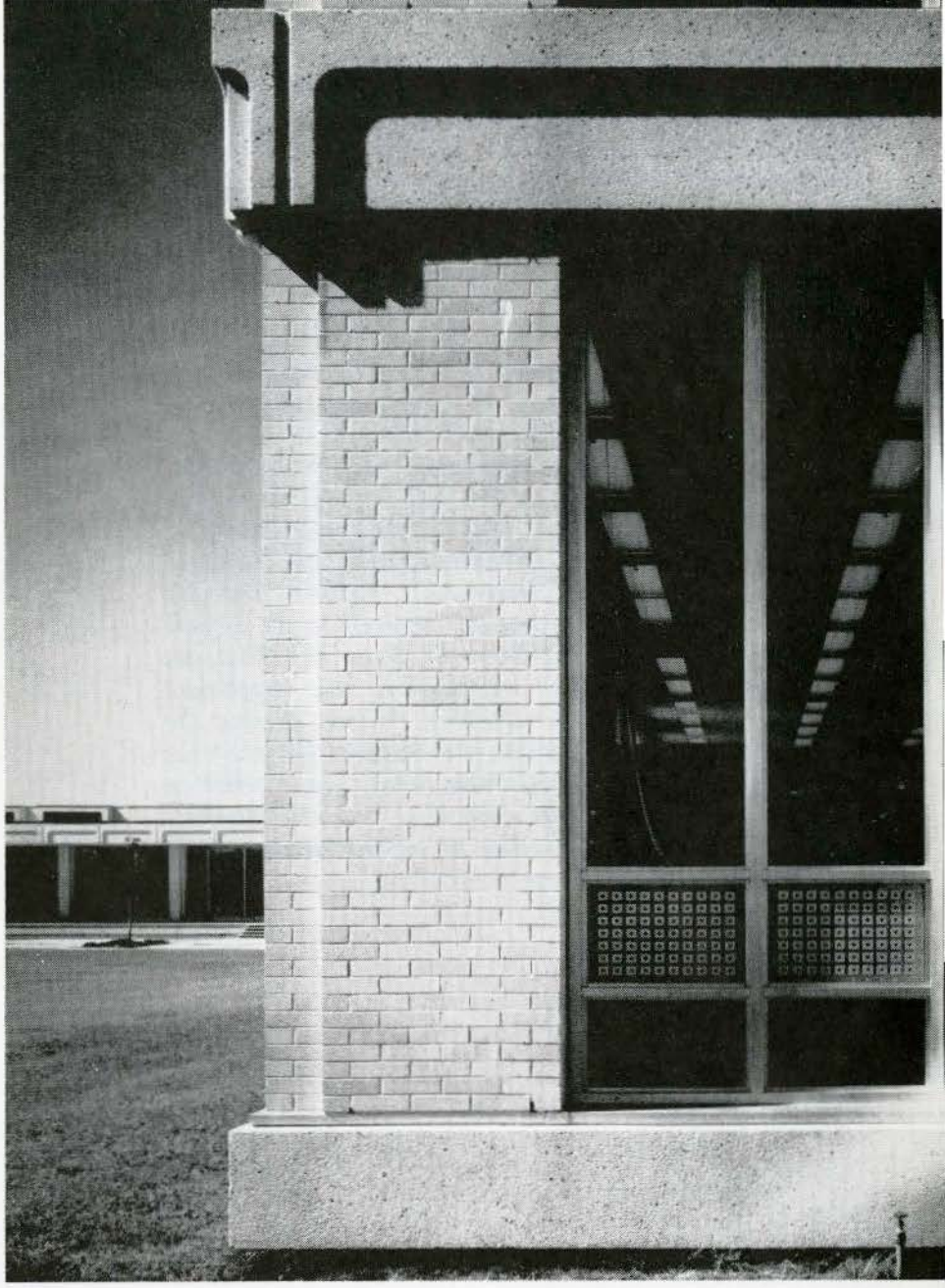
other forms of disturbance that might affect laboratory work. This particular site proved suitable and also offered the requisite setting for a campus like atmosphere in a carefully considered landscape, reasonably close to residential areas having the necessary schools, shops, and cultural and recreational centres.

Northern Electric prepared its construction program in two phases, based on space requirements for immediate accommodation and ultimate expansion of facilities within a few years. The initial staff was estimated to be about 400 scientists with technicians and supporting staff requiring approximately 100,000 square feet. In time enough space for about 1,000 persons would be required demanding about double the area of the first phase. The facilities were divided into an administration building and three laboratories. Only the administration building and one laboratory were included in the first phase of construction. Among the usual administration functions were an auditorium and an anechoic chamber where there would be no reverberation of sound and no sound entering from without. For the laboratory building maximum flexibility to meet the changing requirements of the scientific work carried on by the company was considered essential; a design that could be repeated with eventual expansion of the premises would be practical.

One other basic requirement established by Northern Electric was to use, as much as possible with only minor exceptions, construction materials obtained from Canadian sources. The full program demanded a close co-ordination of requirements and design techniques appropriate to the conditions prevailing at present and in the forseeable future, and was evolved after numerous planning meetings between the client and the architects.



*Above right: a corner detail from the cafeteria portico. Below: the library.*



*Right: wall and window detail of the south-west corner of the laboratory building with the administration building in the background. Below: interior of the laboratory building before partitioning. Below right: the south side of the laboratory building.*

GUENTER KARKUTT

IN THIS ISSUE *the Journal presents its annual section devoted to one of the Canadian Schools of Architecture, this year, the University of Toronto. The twelve-page section, prepared by the staff of the School of Architecture, begins with an introduction by the Director, Dr Thomas Howarth.*

*Instruction in architecture was first given at the University of Toronto in 1890, when a Department of Architecture was established in the School of Practical Science, later the Faculty of Applied Science and Engineering. The course was four years in length and the degree, Bachelor of Applied Science. In 1922 the degree was changed to Bachelor of Architecture, and six years later the course was extended to five years. In 1931 the Department became a school and in 1948 was separated from the Faculty of Applied Science and Engineering and became an independent department — virtually a faculty — with its own Council reporting directly to the Senate of the University. The Division of Town and Regional Planning of the School of Architecture was established in 1951, with a one year Diploma course. During the present term the School has an enrolment of 200 students in architecture and 25 in planning. There are in addition five candidates for master's degrees. The staff consists of 16 full time and six part time in architecture and three full time and two part time in planning.*

# SCHOOL OF ARCHITECTURE UNIVERSITY OF TORONTO

# SCHOOL OF ARCHITECTURE UNIVERSITY OF TORONTO

POLICY

The policy of the school is to provide a comprehensive education for the undergraduate, an education that will prepare him for leadership in the profession, give him an interest in and knowledge of architectural research and scholarship, and lay the foundation for a professional life of service to the community.

THE COURSE

The course is of five years' duration, each academic year being of approximately seven months (September to March). There is a limited enrollment of sixty in the first year and a recently developed selection system is working well.

Each student is required to have had at least twelve months practical experience in architects' offices and on construction work before graduation. The Ontario Association of Architects accepts the B.Arch. degree with three years of practical experience after graduation, and certain professional requirements, as qualification for practice in Ontario. Provincial registration automatically carries membership in the Royal Architectural Institute of Canada. Graduates of the school are granted exemption from all final examinations of The Royal Institute of British Architects except professional practice.

CURRICULUM

The curriculum of the school is carefully designed to provide a balance between the three essential and equally important elements in an architect's education — creative design, technology, and the humanities. During the whole of his undergraduate career the student will find that subjects such as aesthetics, world history, and economics are inseparable from professional studies, and combine to give him the broad knowledge of world affairs that will enable him to contribute more effectively to the development of his own society and profession.

The curriculum is under constant review to meet the needs of the profession and, indeed, important changes in the teaching of architectural technology and building science have been made in the past year with the introduction of the well equipped construction laboratory and model workshop.

Members of the architectural and allied professions give generously of their time and experience to design juries, seminars, and lectures. Courses in professional practice, the economics of building, and the functional requirements of buildings have been revised and strengthened considerably by such participation.

In addition to lectures and studio work, the school offers important extra mural activities. Students spend the first two weeks of the fall term in a lakeshore sketch camp where they devote their time to field studies, evening seminars, and informal discussions, with camp concerts and canoe trips.

The proximity of the school to the great cities of the eastern U.S.A. makes possible instructive visits to such places as Chicago and Detroit, Washington and Philadelphia; New York is visited annually by the first year.

The school also extends its activities to refresher and lecture courses and television programs for the professional and lay public. In the session 1962-63, courses on the appreciation of architecture and on modular construction have been offered. Recent visitors have included Sir Hugh Casson, Sir Basil Spence, Alfred Roth, Jose Sert, Pietro Belluschi, Paul Rudolph and Ralph Erskine.

GRADUATE WORK

At graduate level a Master of Architecture degree is offered and candidates may conduct research in a wide range of subjects including, for example, history, theory, housing, and architectural technology. In addition to individual research, two major group projects are being conducted at present in the school — one on housing and urban renewal in Canada and the other on the performance of buildings; both should provide information of considerable value to the profession.

A one year diploma course in Town and Regional Planning has attracted many students over the past eleven years and a two year Master of Science degree course in planning is in preparation.

EXHIBITIONS

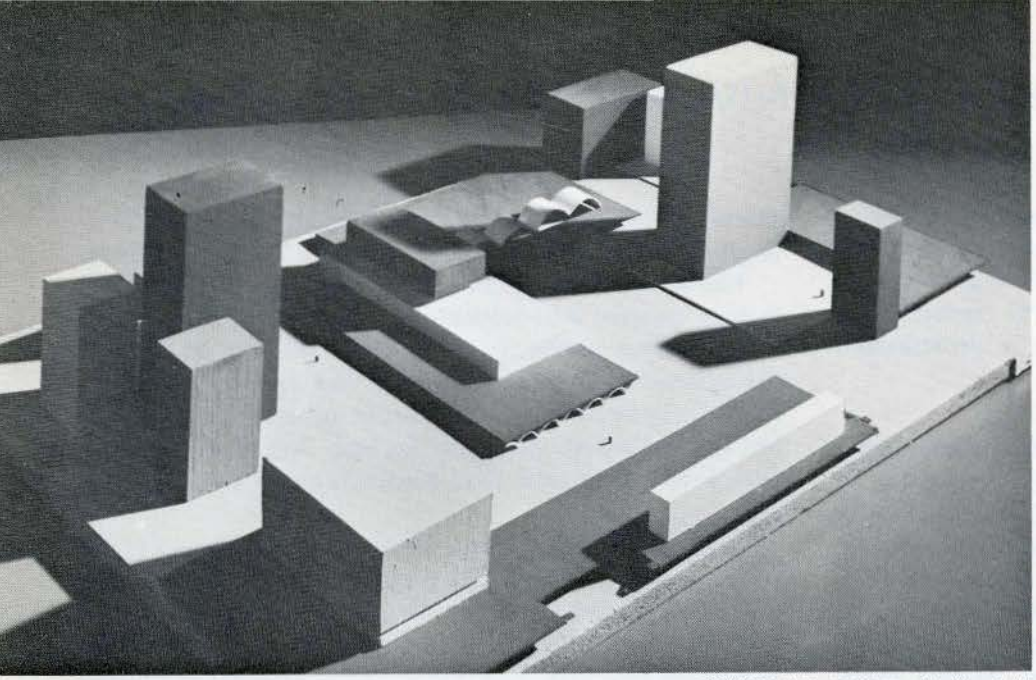
The program of exhibitions has attracted considerable public attention, the 1962-63 shows including original drawings by Frank Lloyd Wright, Canadian Housing, and the RIBA Exhibition of "Four Centuries of Architectural Drawings." Work by local architects and artists alternates with that of internationally famous figures.

A former operating theatre has been converted into a fine studio and this year it is being used by a sculptor; next year it is hoped to have a painter, and subsequently, craftsmen. In this way a student will have personal contact with a variety of artists during his five year course.

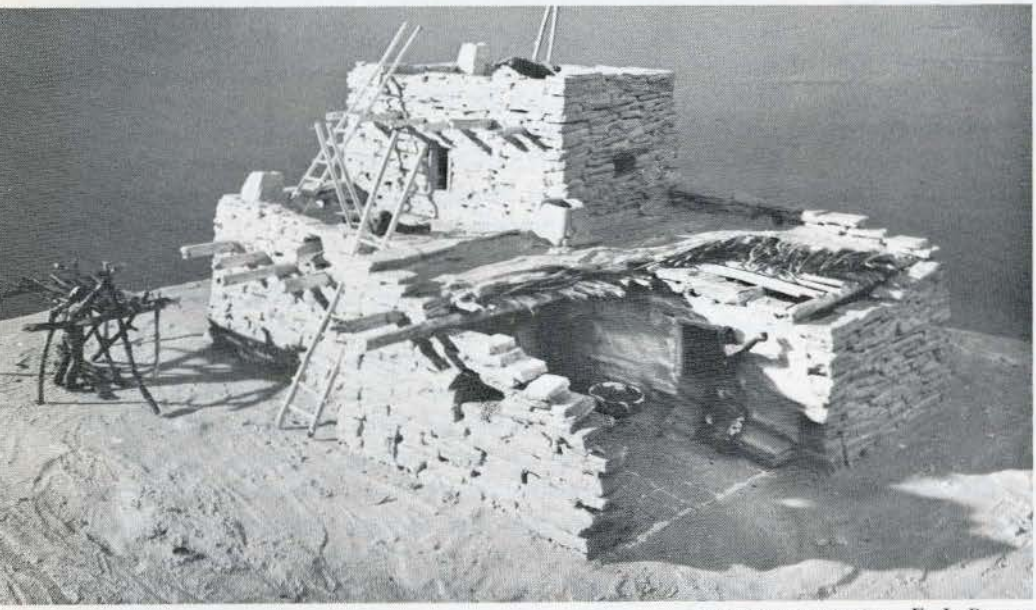
Students are encouraged to take part in the many cultural and physical activities that are the strength of a great university and over the past two years the school has carried off two important athletic trophies, most notably the interfaculty championship. In 1961-62 ten teams were put into the field, and the school obtained the highest aggregate of points in the University.

A School of Architecture, then, should not be thought of solely as an institution for training practitioners, but as a vital and not insignificant member of the university community, contributing to the corpus of academic research and scholarship, and to the cultural life of a city and region. At the University of Toronto exchange programs with schools in Britain, the US and Europe, and active participation in educational and professional affairs at home and abroad continue to strengthen the School's position in the international field.

*Thomas Howarth, Director*



TOWNSCAPE DESIGN *B. Randall*



PRIMITIVE SHELTER *E. LeBreton*

HUGH ROBERTSON, PANDA

STRUCTURAL MODEL *R. Kuris*

**FIRST YEAR**

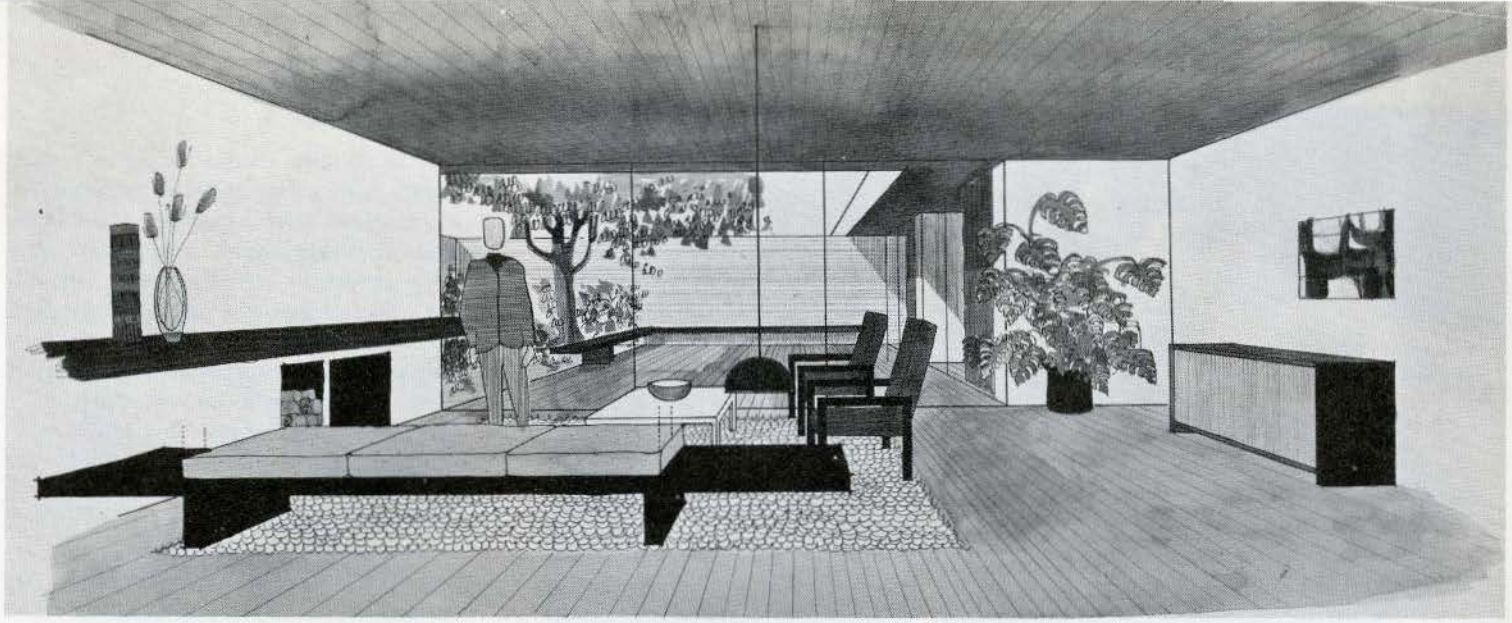
Studio instruction in the first year has two main objectives: to give the student an opportunity of learning practical design skills and techniques; to provide a series of problems that by solving, can develop his aesthetic judgment and creative ability. Techniques include line drawing, color, lettering, free-hand sketching, isometric and perspective projection, and model building. Design problems begin with two and three dimensional exercises in composition. In some cases the conditioning factor of color is emphasized. Aesthetic and structural properties of a variety of materials are explored.

At the beginning of the year a good deal of time is spent interpreting and recording exterior and interior spaces by free-hand sketching. Some of this work is done on the campus and some during the traditional visit to New York City, which is one of the highlights of the course. It is made as inexpensive as possible by careful staff planning — the minimum cost is now about $85 including transportation. This experience is a stimulating one for the students, especially for those from foreign countries or remote towns and villages in Canada. Each student is assigned a particular subject for study, and is required to present a verbal and visual report to the class on his return.

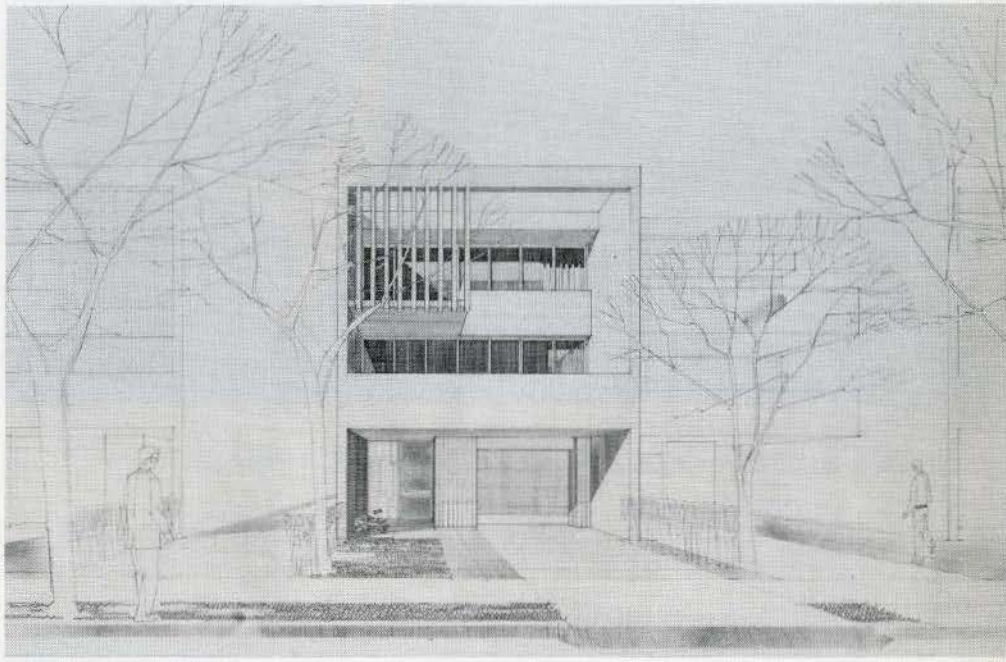
Ability to observe, analyze, and record is tested further in two kinds of problems. First, in a study of "townscape," where the designer works at a small scale to organize a series of related volumes and spaces. Second, in the choice of a particular type of primitive dwelling, which involves library research, a report, and a presentation in model form.

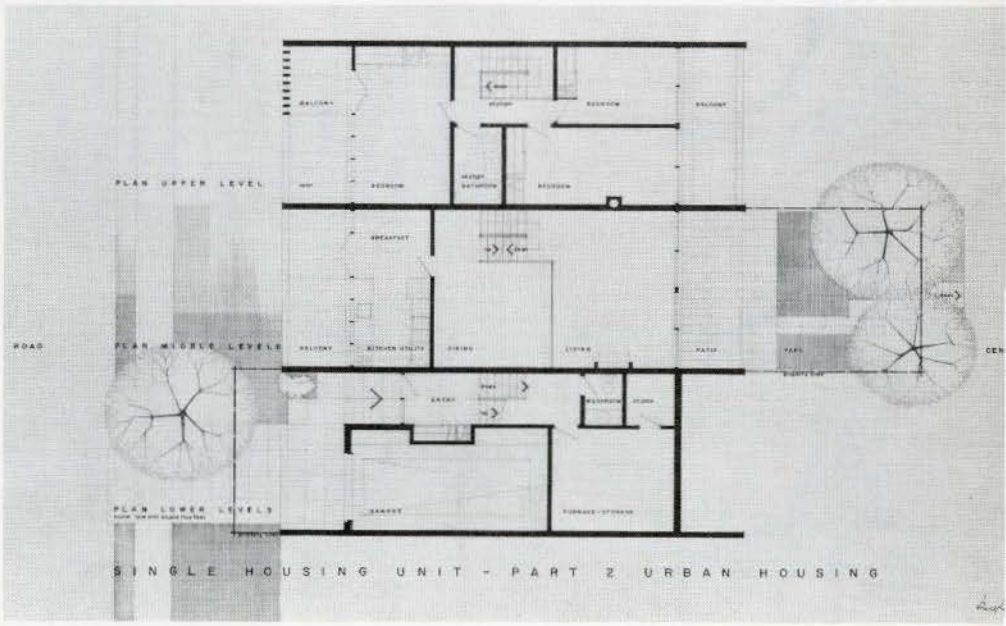
Specific building types assigned as design problems in the first year usually begin, for example, with a park shelter, followed by the interior design and furnishing of a given room, and end with a small house or cottage which may be carried through to presentation and working drawings, a structural framing model, and perspectives. Such problems are meant to identify architecture as shelter disciplined by form and function.

During the first year, an attempt is made to relate studio work and design problems to the parallel lecture courses and labs in theory, descriptive geometry, and technology.



URBAN HOUSING, INTERIOR *R. Wilcox*



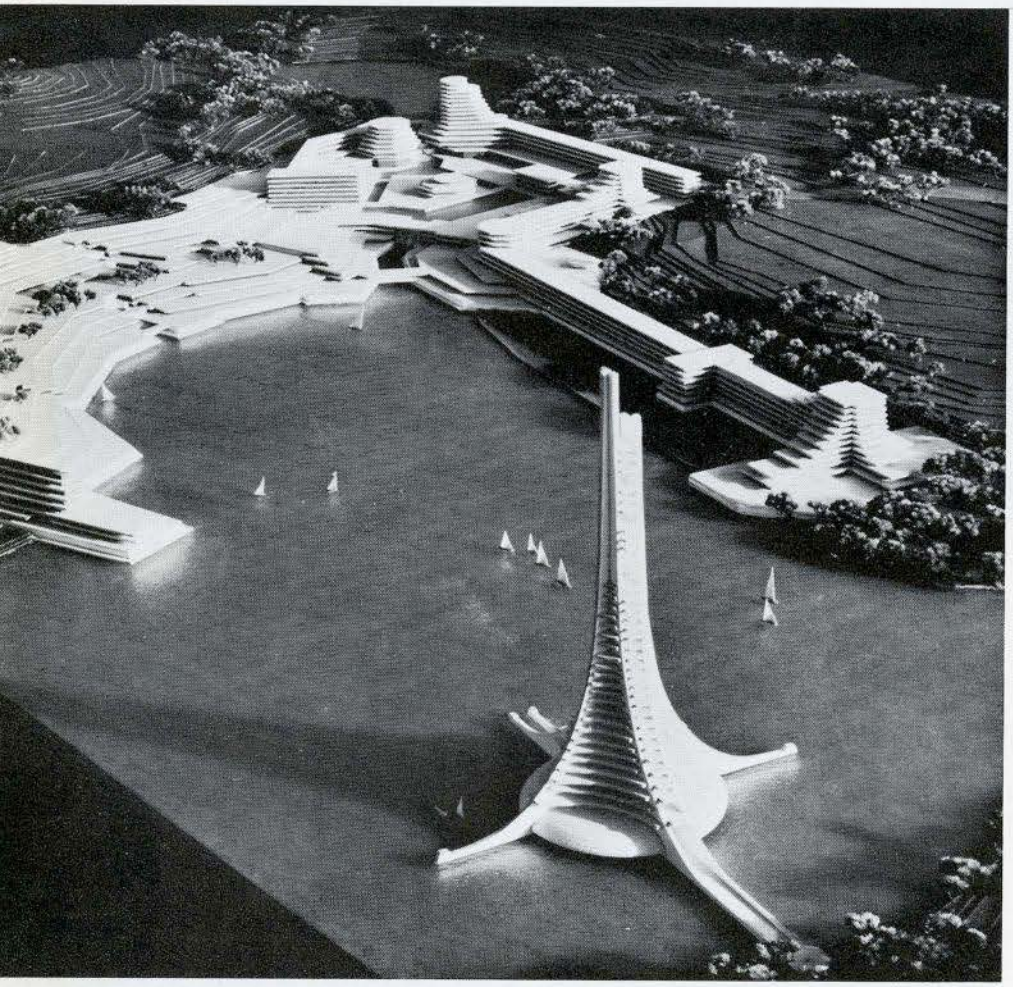



URBAN HOUSING *J. Pacek*

**SECOND YEAR**

Objectives of the second year course may be summarized as follows: to promote a consistent method of design based on a thorough analysis of the program; to encourage the student always to consider a building in relation to its environment — programs are devised to ensure the consideration of site and building as one and individual exercises are assigned to study the relationship between interior and exterior space, the space between and around buildings, land forms, and vegetation; to develop drawing techniques and model making as design tools. Free-hand sketches and the building of study models are encouraged, while (in addition to plans, sections, and elevations) precise, accurately constructed, undistorted perspective drawings in color are required for final presentation. These drawings should avoid ambiguity and inform both student and critic of the true character and appearance of the design proposal. A well composed presentation is considered to be a natural refinement of the design proposal. Presentation however, is stressed as a means to an end and not an end in itself.

Subjects studied in the second year range from the individual house and group of houses to an elementary school or a branch library.



HUGH ROBERTSON, PANDA

AN ONTARIO RESORT TOWN, 2000 AD

*W. Bennett, W. Cunningham, Z. Mazurkiewicz, G. Ridgely, J. Vanstone*

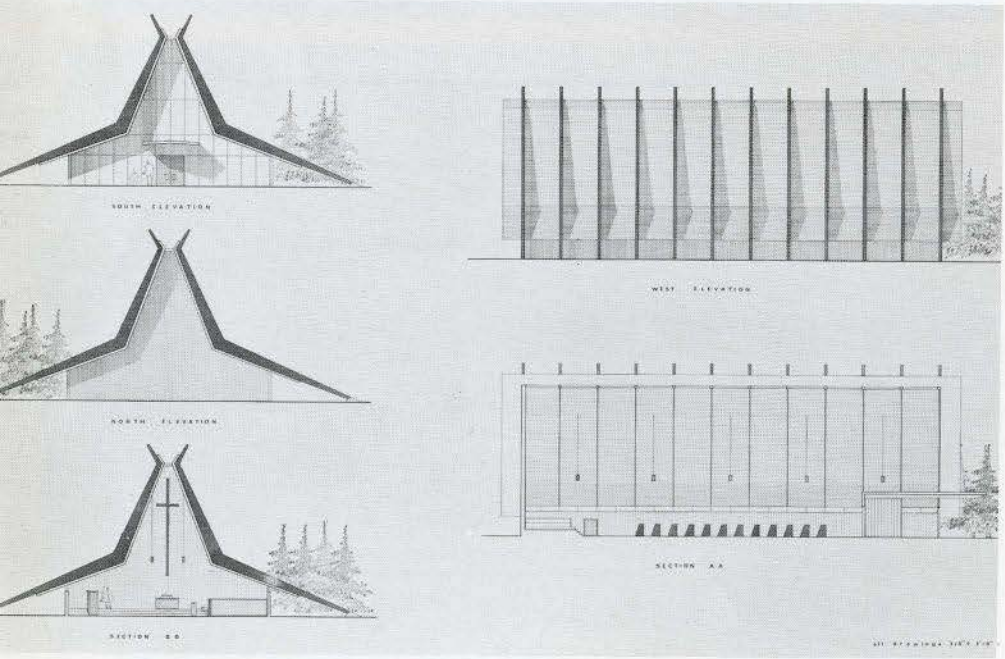
## THIRD YEAR

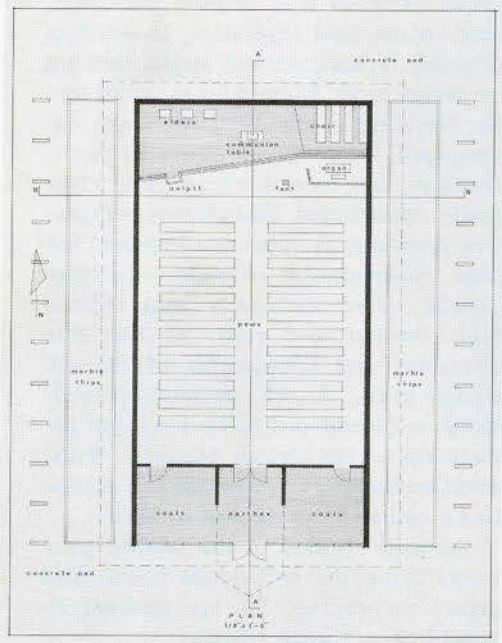
The third year studio program usually begins with a detailed study of an existing Ontario town or village and its possible redevelopment. From the planning proposals which emerge, specific sites are chosen for subsequent architectural problems (such as a factory, a town hall, housing development, etc.). This year, the subject was changed to "A New Town for the Year 2000 AD." Students were offered the choice of several different themes — a university town, an industrial town, a resort town — and a choice of site. Preliminary research established a broad base of information on physical planning, which was followed by theoretical studies to clarify basic assumptions and planning concepts. After about four weeks of study and class presentations, nine design teams applied their theories to solving the problem.

The example illustrated here shows one of the resort towns.

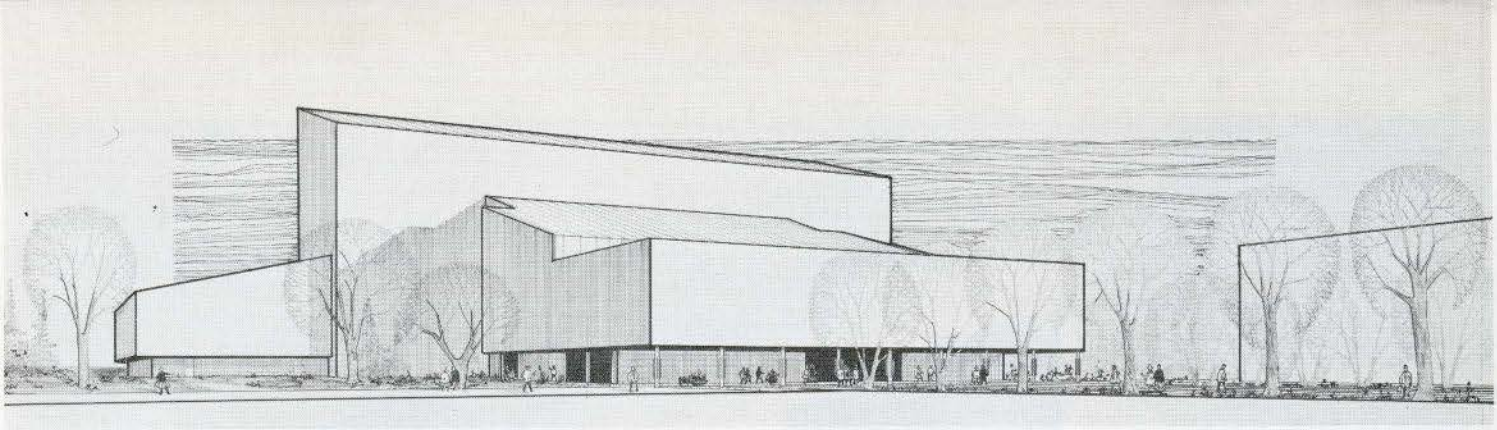
In sharp contrast to the foregoing, the design of a small industrial building which follows is a practical problem, based on actual requirements and closely related to the lecture courses on building construction. Half the time devoted to this program is spent on working drawings.

The major problem of the second term is usually a town hall or a building of similar size and complexity. Problems of lighting and acoustics are given special attention in the final design.





A UNITED CHURCH CHAPEL *J. Kennedy*



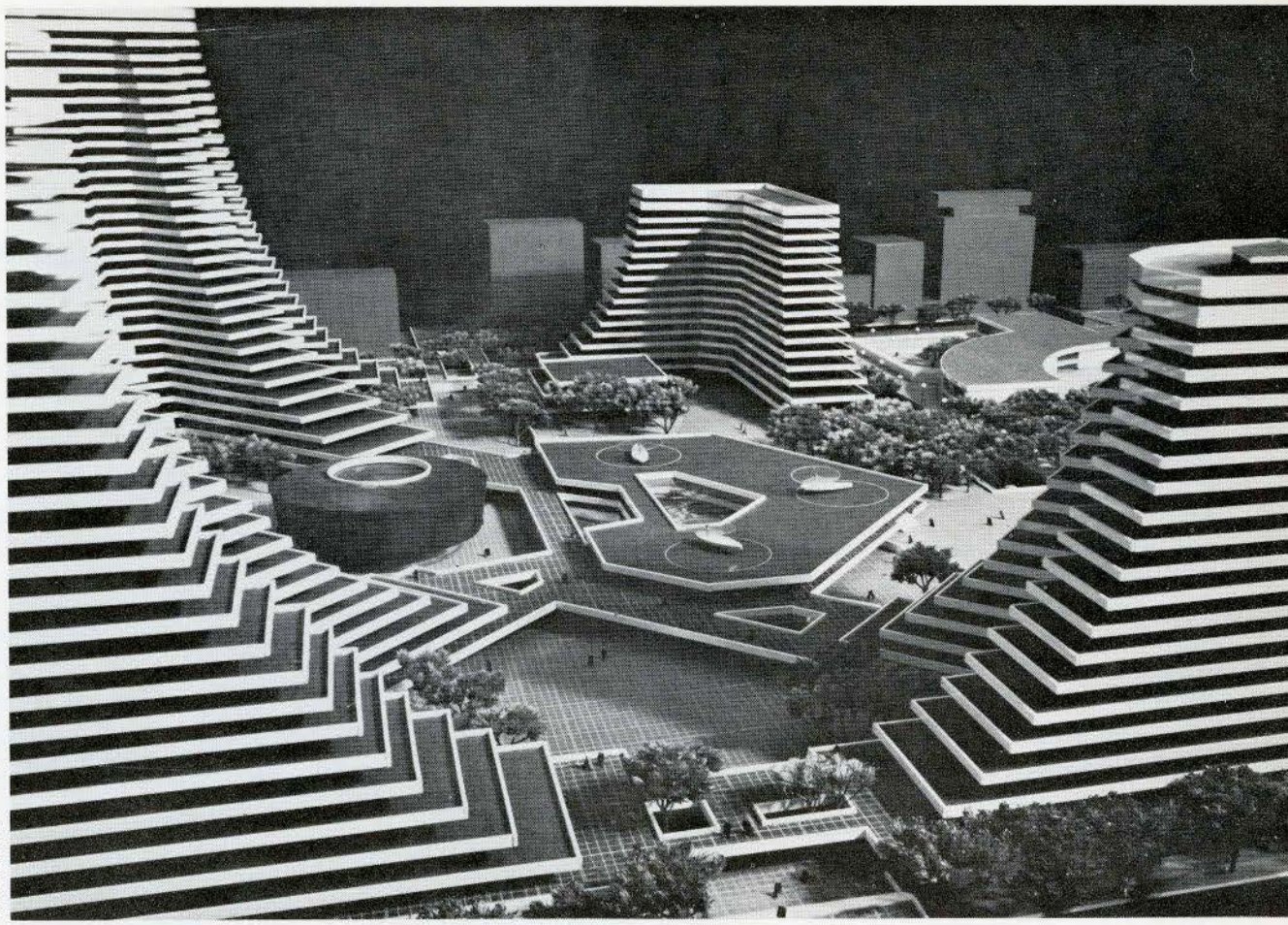
OPERA HOUSE *P. Hamilton*

**FOURTH YEAR**

After a short first problem of a city building — for example, a club on a restricted site with narrow street frontage — the fourth year students tackle a group exercise in civic design, usually the redevelopment of a downtown area in Toronto. Last year an important site, immediately to the south of Revell's new City Hall, was selected for development as a cultural centre with opera house theatres, restaurants, etc. This year a contiguous area to the south was studied as a new financial centre with a stock exchange at its core. As in the third year, a new element in the problem was the requirement that the solution should be projected to suit the needs of the city in the year 2000 AD.

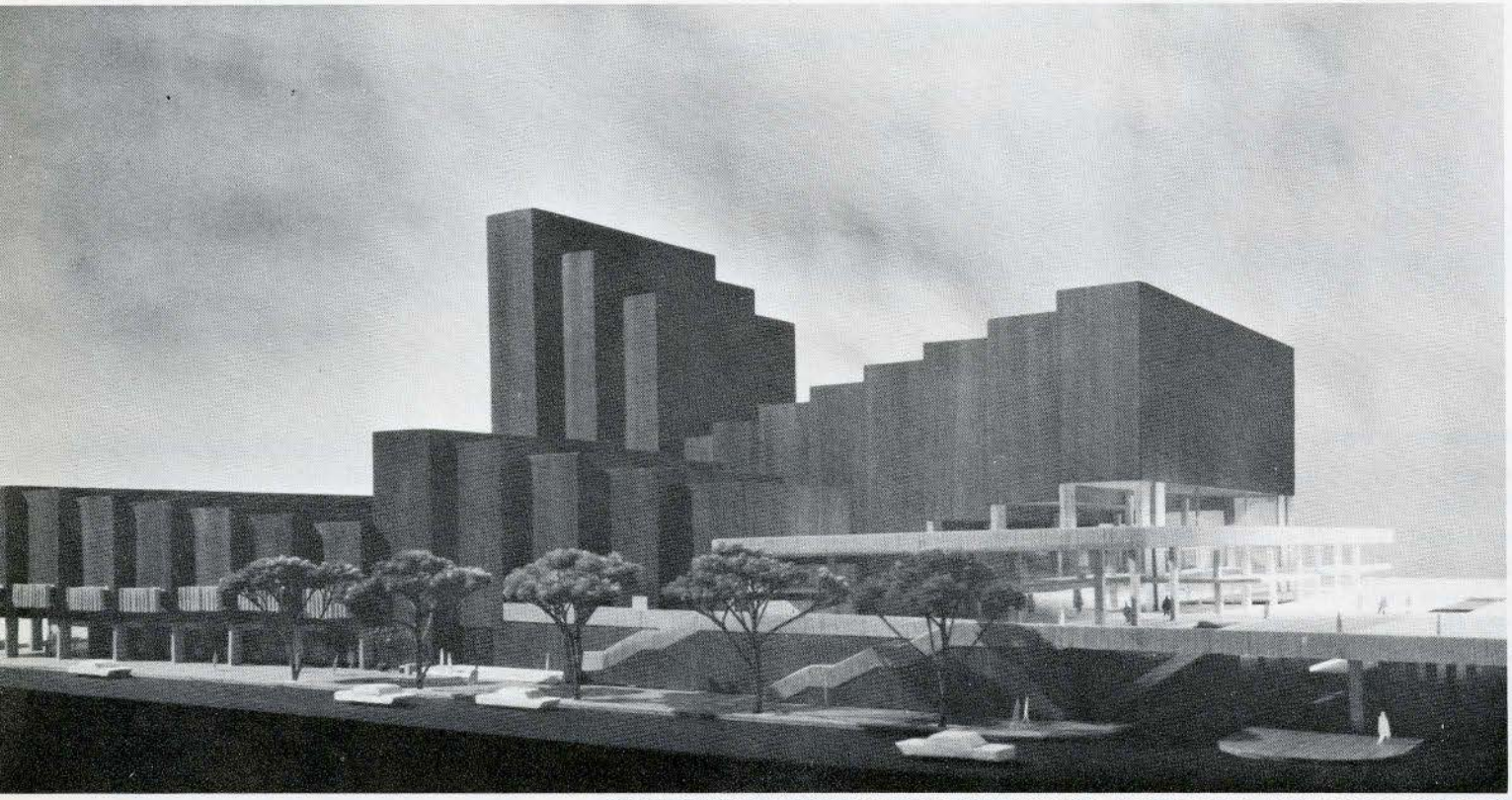
The illustration shows that one team at least succeeded in integrating rather successfully the cultural centre of 1962 with the financial centre of 2000 AD without interference from surface roads. In both schemes the lateral boundaries were a principal thoroughfare — Bay Street and a main artery, University Avenue. The main structures comprise office buildings and a hotel with restaurants and shopping facilities at lower levels. Motor cars enter the area, but below ground level; the needs of the silent, vertical take-off aeroplane of 2000 AD are provided for by lofty landing platforms.

During the second term a specific building in the group is carried through the design, to the working drawing stage by each student. The building illustrated here is an opera house from last year's cultural centre.



NELSON PAU

FINANCIAL CENTRE FOR TORONTO, 2000 AD *F. Carter, J. Kennedy, H. Lennard, M. Thom, A. Viska*



GEORGE WILSON

PILKINGTON TRAVELLING SCHOLARSHIP AWARD 1961, TORONTO CIVIC OPERA HOUSE *E. Kayari*

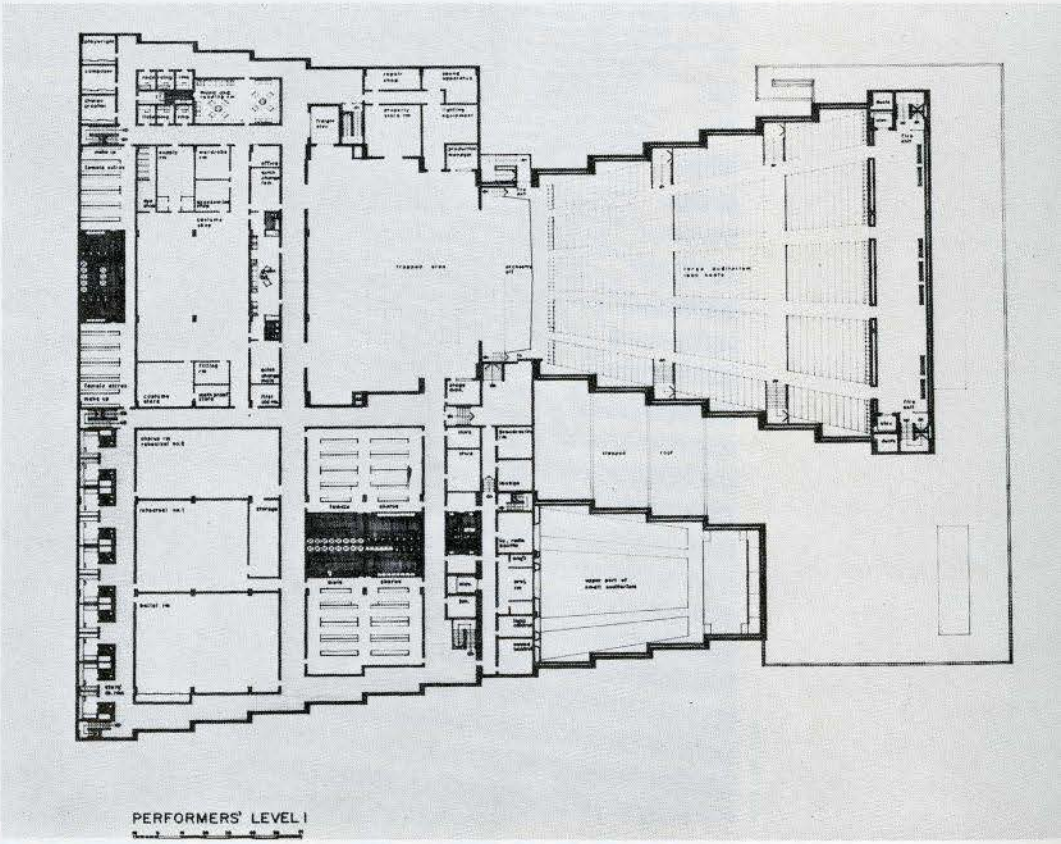
**FIFTH YEAR**

The major project in the fifth year is the design thesis. The subject is selected by the student at the end of the fourth year. Program requirements are determined and site studies made in the summer vacation; an illustrated report is presented at the beginning of term. Subjects range from small buildings such as a library or church (in which case the student must produce evidence of detailed study) to monumental designs — an opera house or cathedral. Work proceeds with regular check points for criticism throughout the term. Each student has a "tutor" who may be a staff member from any year; each member of staff has at least one fifth year student for whom he is responsible.

At certain critical stages in the development of the thesis, design, structural, mechanical, acoustic, and illumination specialists are called on, and individual consultations are arranged with students and their tutors.

The final presentation of design and technical drawings, model and report, is reviewed by a series of juries which include practising architects, experienced in the specific building types presented, with usually one or more critics from another school of architecture.

The last program (six weeks) in the fifth year is prepared and carried out in collaboration with the Division of Town and Regional Planning.



MUSEUM STUDY *F. Carter*

## HISTORY

The history of architecture has traditionally assumed an important place in the curriculum at Toronto. Today it extends over four years with the history of town planning in the fifth year. In all years the essay is considered an essential aid to the writing of good English, and research work in the library is encouraged.

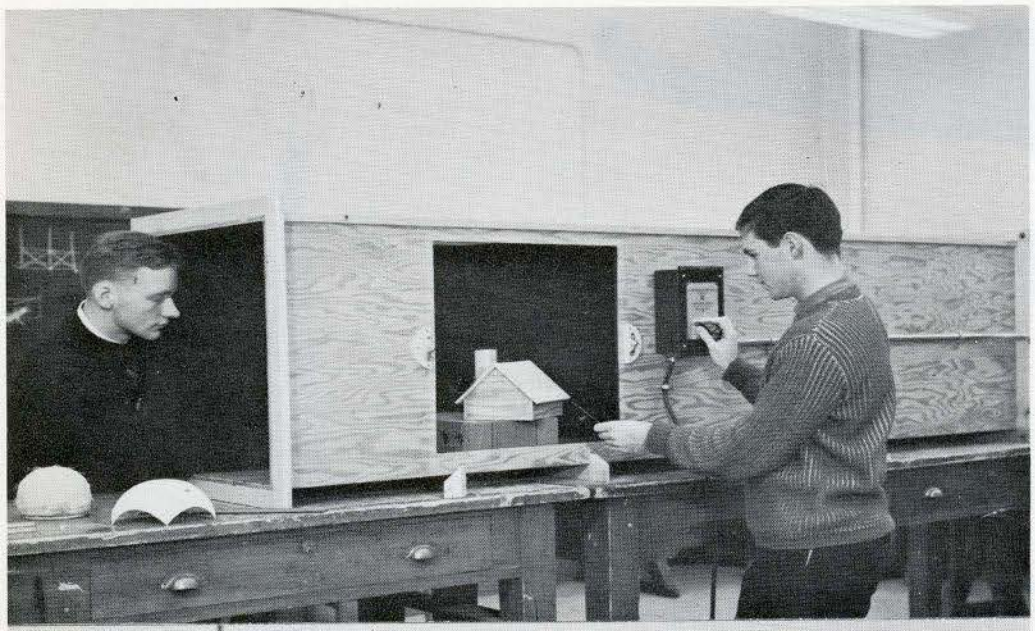
Courses are designed to trace the development of architecture from ancient to modern times in its cultural, social, and economic context, and to demonstrate, for example: the aesthetic disciplines of the monuments of antiquity; the structural basis of much Medieval building; the spatial organization of Renaissance architecture; the influence of new materials and techniques in modern times; the unsophisticated charm of the vernacular styles, including those of Canada. Understanding of history provides the student with a sound basis for the development of personal standards of design and aesthetic values.

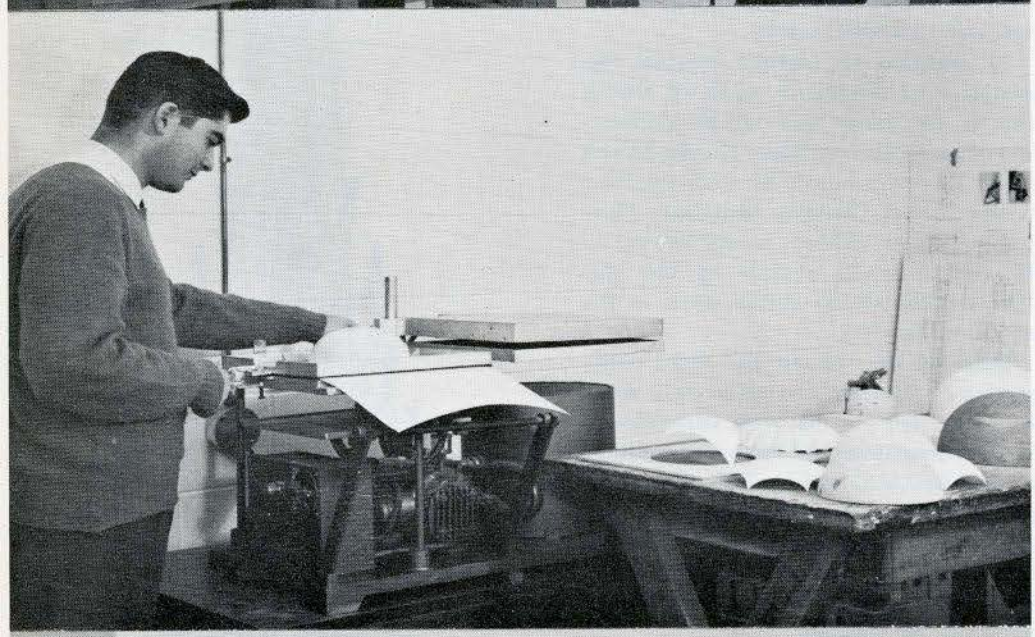
In addition to lecture courses the second year devotes a week of studio time to the study and careful delineation of an historic artifact chosen by the student from a wealth of such material in the Royal Ontario Museum. Normally such an artifact would belong to the period under review by the student, giving added significance to his academic studies.

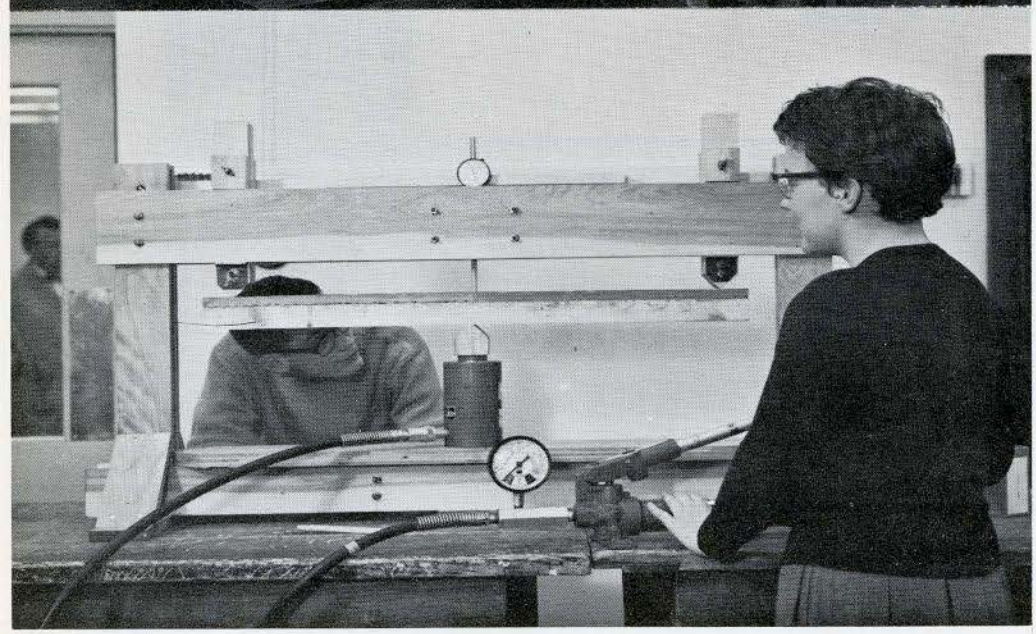
Between the second and third years groups of students are taken on a week long field trip, under staff supervision, for the measuring of historic buildings of architectural merit. They are thus given a very real appreciation of the vernacular styles of the region. Selected drawings that emerge from the study are presented annually to the National Archives of Canada.



MEASURED DRAWING *D. Voisey*







NELSON PAU

## BUILDING TECHNOLOGY

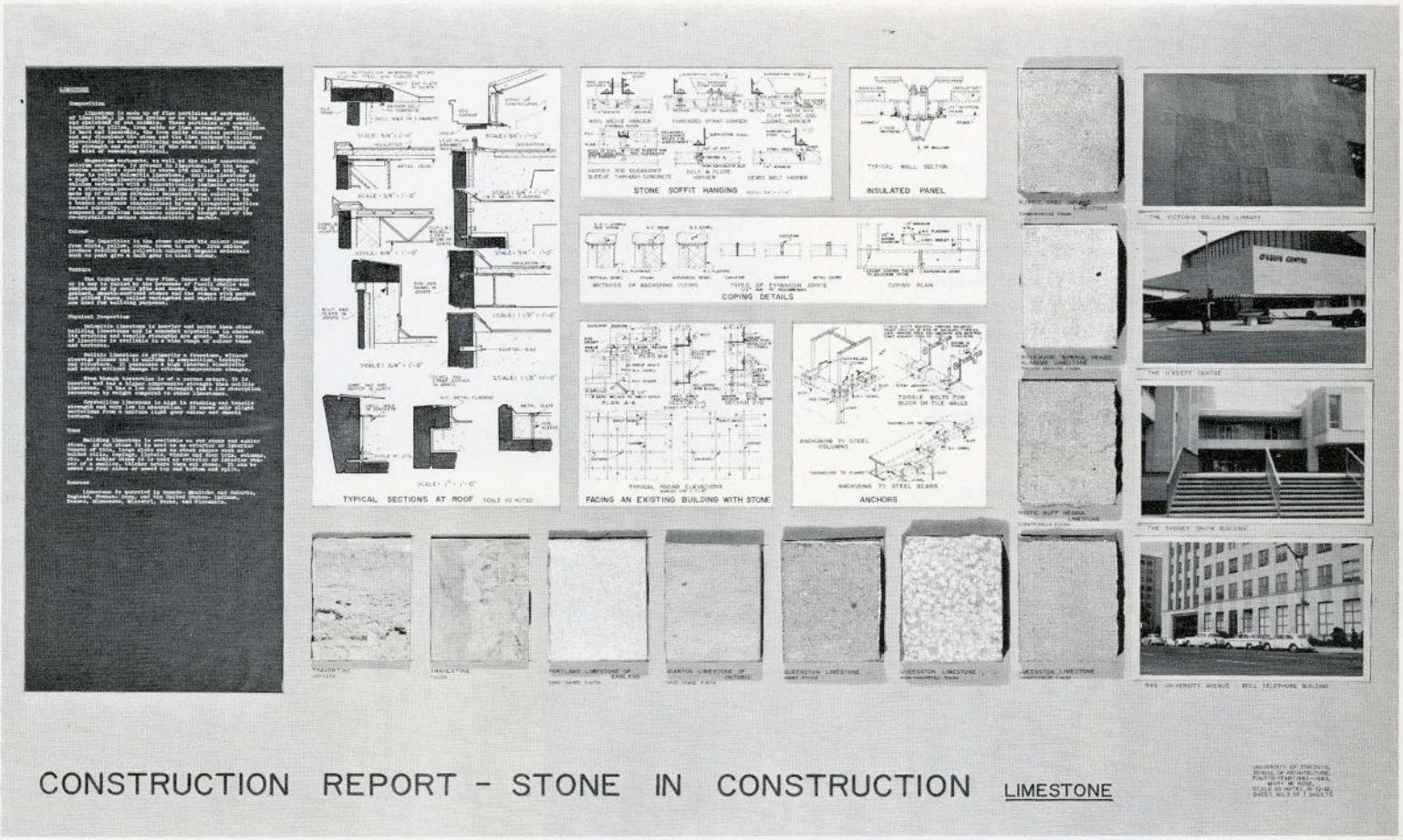
The foundations of technological study for all architectural schools are the lecture courses in materials and methods of construction, specifications, structural design, and building services, with such applications of these to laboratory study as are appropriate.

At least one problem in each of the five years is brought forward to working drawings — a term that perhaps requires definition. Repetitive work required in drawings of $\frac{1}{8}$ in. or $\frac{1}{4}$ in. scale is not disregarded, but emphasis is placed on detailing to $\frac{1}{2}$ in. and $\frac{3}{4}$ in. because of its greater instructional value and obvious importance to the design process. These studies vary with the competence and experience of the student and are most advanced in the drawings required for the fifth year thesis.

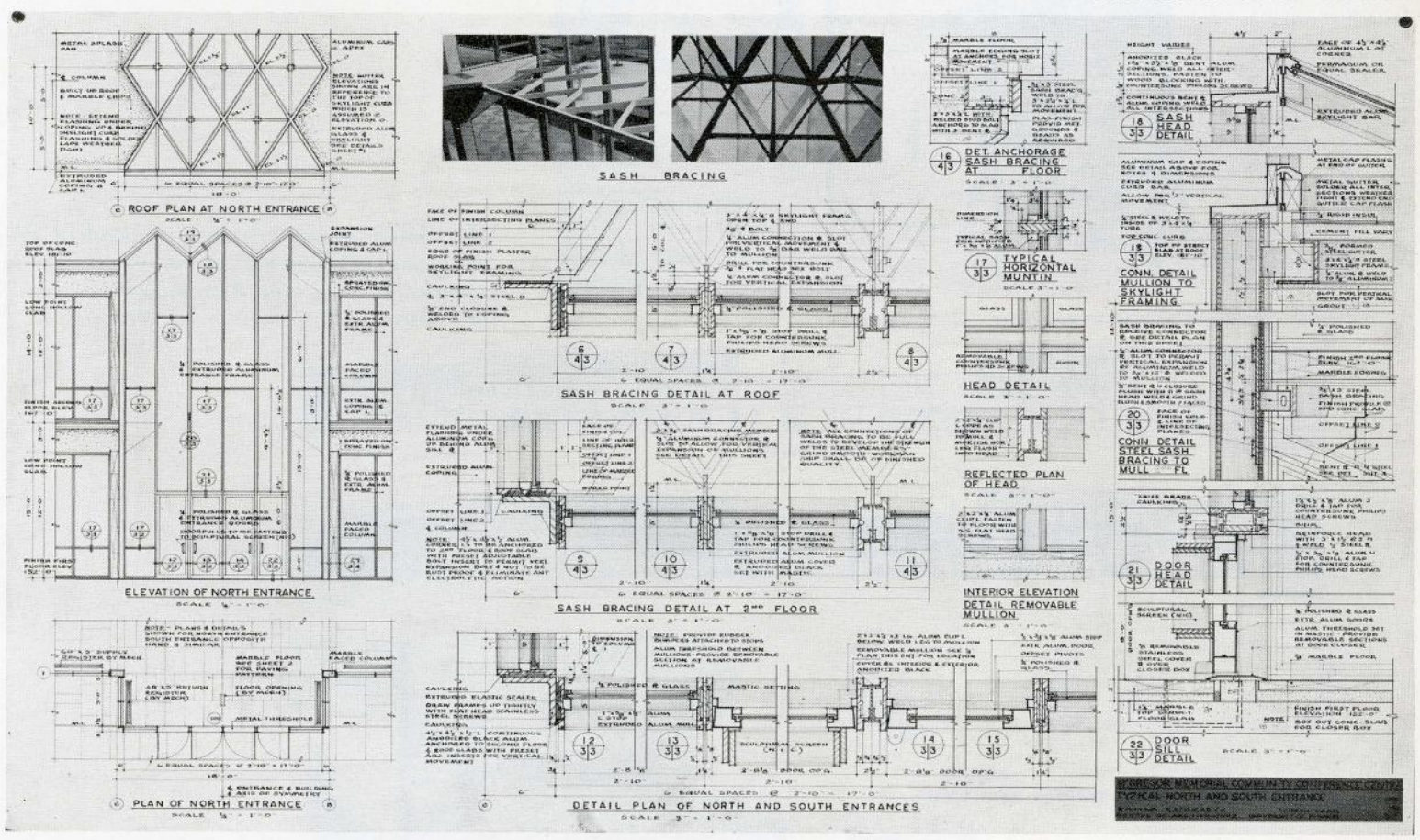
The shortness of the university year and the need to employ some part of the period between school sessions has led to the presentation, by the incoming second and fourth year students, of a *construction report* on operations in the field, a detail of construction, or a study of a building material or component. The new construction laboratory now makes possible, for the junior years, experiments in the behaviour of simple structures, giving meaning to lectures on materials and methods, and mechanics of materials. More advanced projects are under consideration and a small, recently constructed wind tunnel is used to demonstrate the effects of wind currents on building forms. A vacuum forming machine for making plastic shells enables the students to study architectural shapes in their relation to loading; this is also a useful aid to model building.

The incoming fifth year prepares a study of specifications techniques and standards during the summer; each student investigates intensively a building trade as a basis for discussion.

A study of factors contributing to the cost of building design has been inaugurated with the help of outside experts. Invaluable assistance is given by members of the applied science and engineering staff who contribute lecture, laboratory, and drafting room courses in structural design, mechanical and electrical services, acoustics, and illumination.




CONSTRUCTION REPORT *M. Rose*

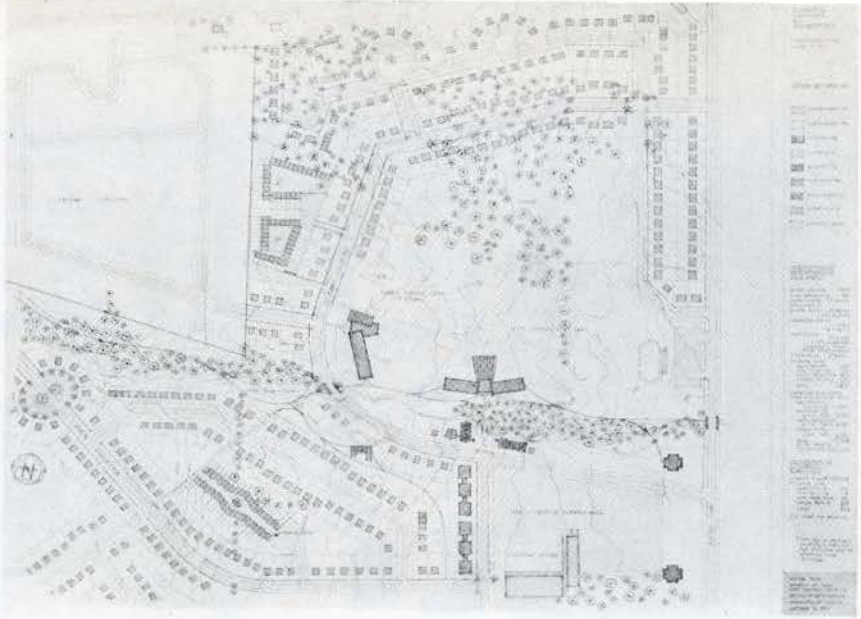



CONSTRUCTION REPORT *W. Kachmaryk*

# DIVISION OF TOWN AND REGIONAL PLANNING

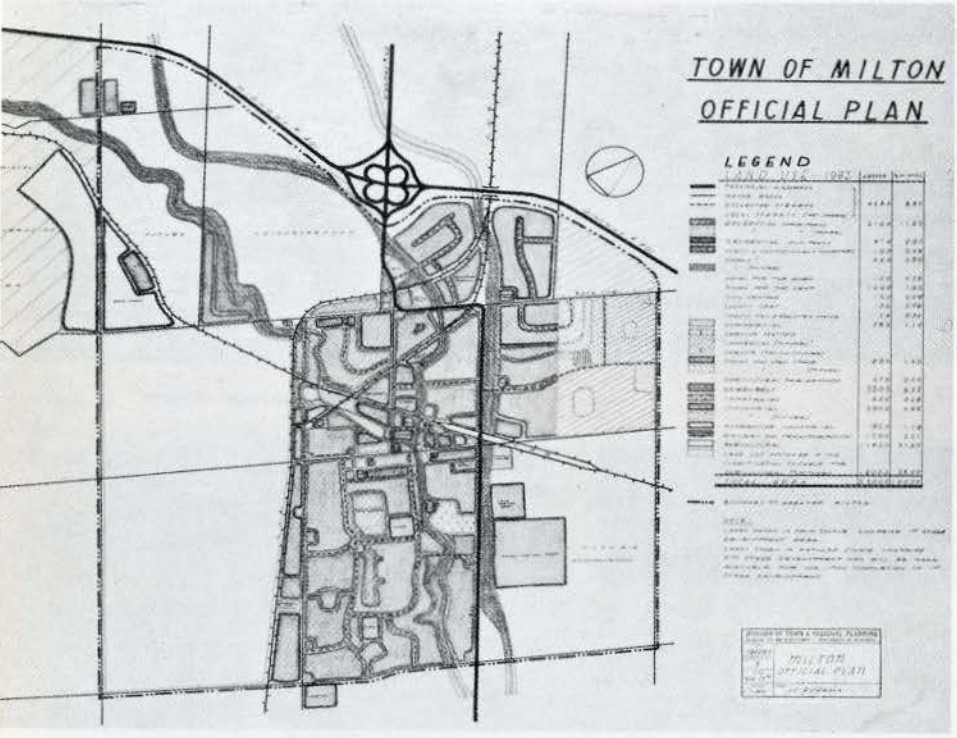
## URBAN PLANNING

The post-graduate course in Town and Regional Planning leads to a diploma permitting associate membership in the Town Planning Institute of Canada, after appropriate planning experience. Students who are drawn from a wide range of disciplines attend courses and carry out projects in urban and regional aspects of planning.



SUBDIVISION *Darryl Lane*

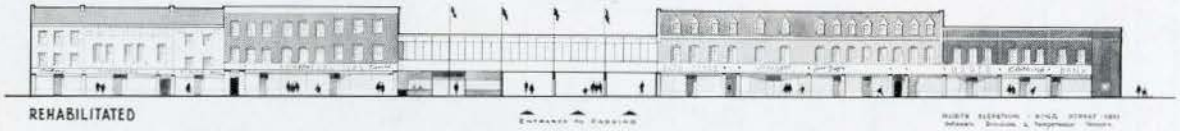
OFFICIAL PLAN, MILTON, ONT. *H. Petschar*




*Each student prepares proposals for an official plan as an individual project. Milton, Ont.*

RENEWAL PROPOSALS, BOWMANVILLE, ONT. *W. S. Salter*

*The student group prepares a complete official plan complying with the provisions of the Ontario Planning Act. Renewal proposals for the central area, Bowmanville, Ontario.*



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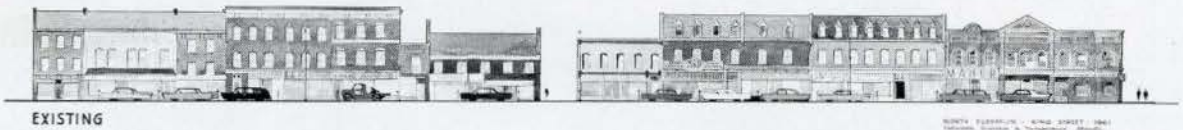
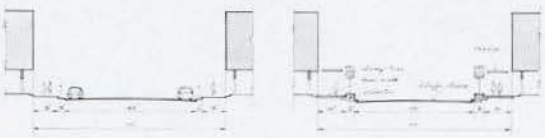
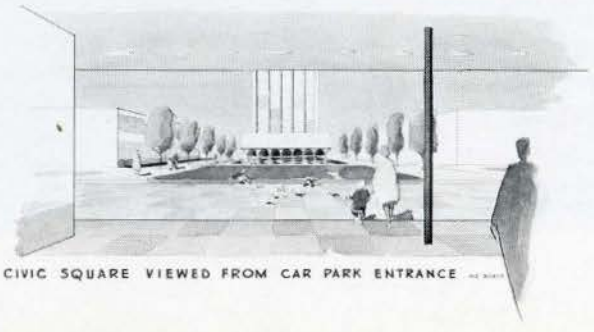


EXISTING

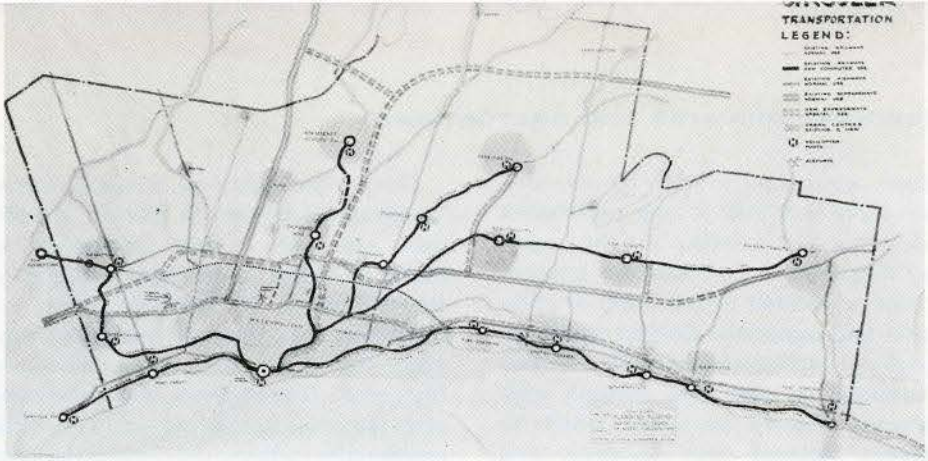



TYPICAL CROSS SECTION THROUGH KING STREET

PROPOSAL FOR CAR PARKING



CIVIC SQUARE VIEWED FROM CAR PARK ENTRANCE




TRANSPORTATION PROPOSALS, TORONTO REGION

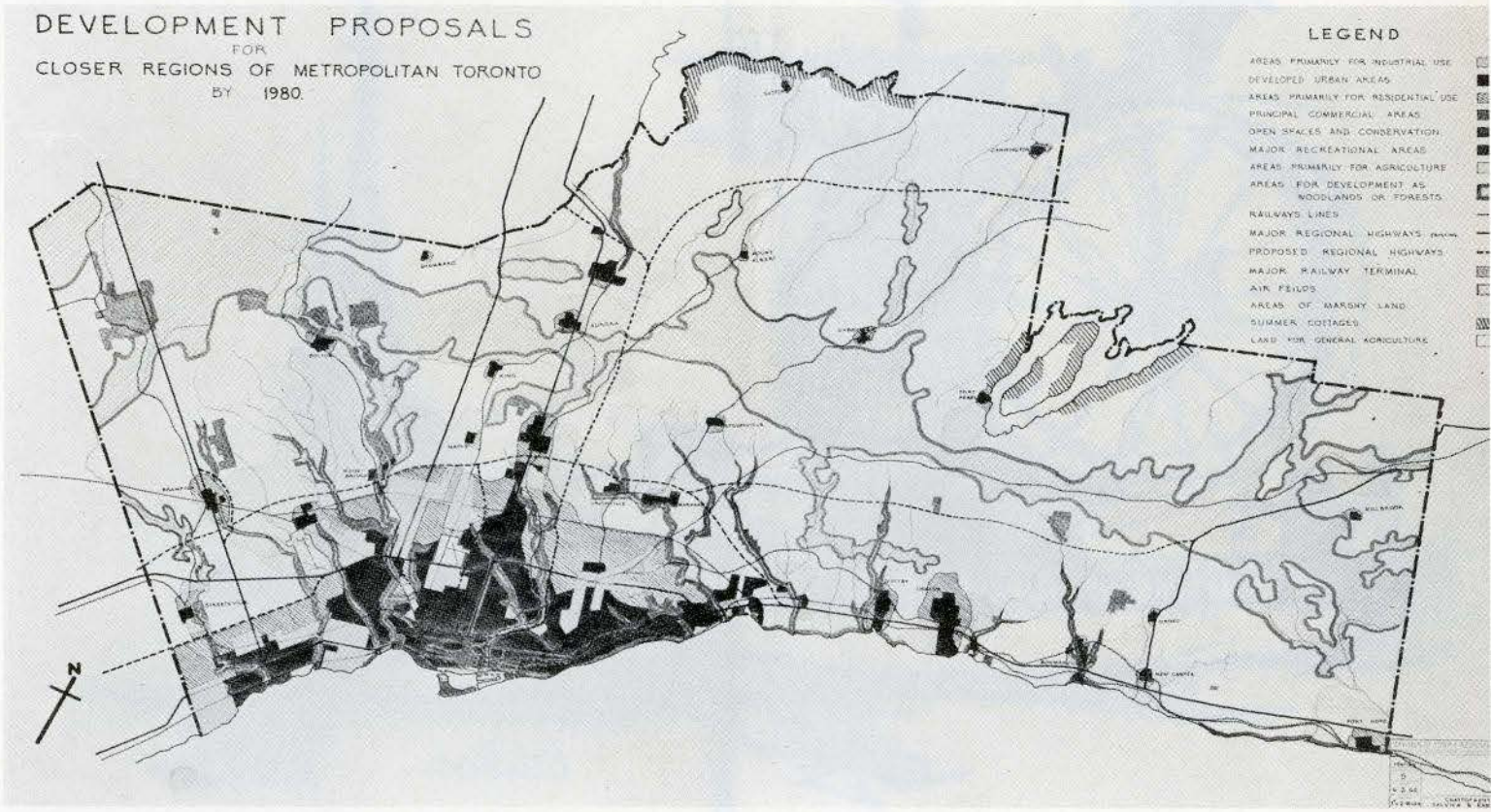
*J. Simon, W. S. Salter, Mrs. S. Thorson*

## REGIONAL PLANNING

There is an increasing awareness of the importance of regional planning. The second half of the course concentrates on regional, inter-regional, and provincial problems, touching on national planning. This part of the course is of particular interest to students from overseas.

The regional project deals with an area of the developed part of Ontario approximating to an economic region. The students are divided into groups to assemble, analyse, and present the data of the region. In the second stage of the project student groups are asked to make advisory proposals for the future growth of the region in terms of the future distribution of the population, land use, and communications.


ADVISORY PLANNING PROPOSALS, TORONTO REGION *B. C. Chattopadhyay*



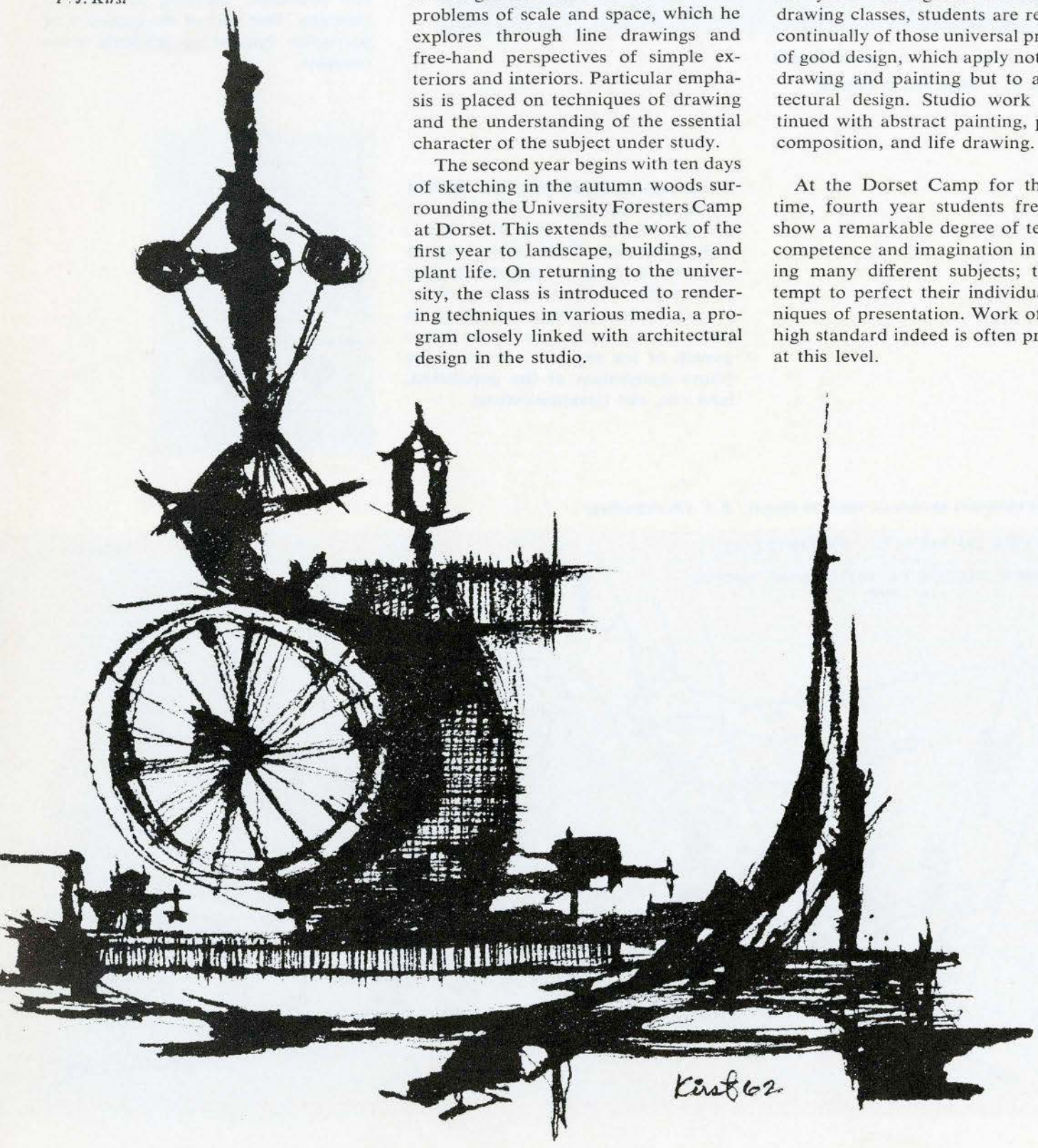
Before admission to the school, students have had little if any experience in drawing and painting. At the beginning therefore, a considerable amount of time is devoted to the study of techniques and materials. Subject matter is essentially architectural and the student is brought at once into contact with problems of scale and space, which he explores through line drawings and free-hand perspectives of simple exteriors and interiors. Particular emphasis is placed on techniques of drawing and the understanding of the essential character of the subject under study.

The second year begins with ten days of sketching in the autumn woods surrounding the University Foresters Camp at Dorset. This extends the work of the first year to landscape, buildings, and plant life. On returning to the university, the class is introduced to rendering techniques in various media, a program closely linked with architectural design in the studio.

During the third year, besides normal landscape sketching at Dorset, expeditions are made to local settlements in order to study "townscape". Later, at the university, the lessons learned are applied to the village development program that forms the major subject of the year. Throughout the free-hand drawing classes, students are reminded continually of those universal principles of good design, which apply not only to drawing and painting but to architectectural design. Studio work is continued with abstract painting, pictorial composition, and life drawing.

At the Dorset Camp for the third time, fourth year students frequently show a remarkable degree of technical competence and imagination in exploring many different subjects; they attempt to perfect their individual techniques of presentation. Work of a very high standard indeed is often produced at this level.

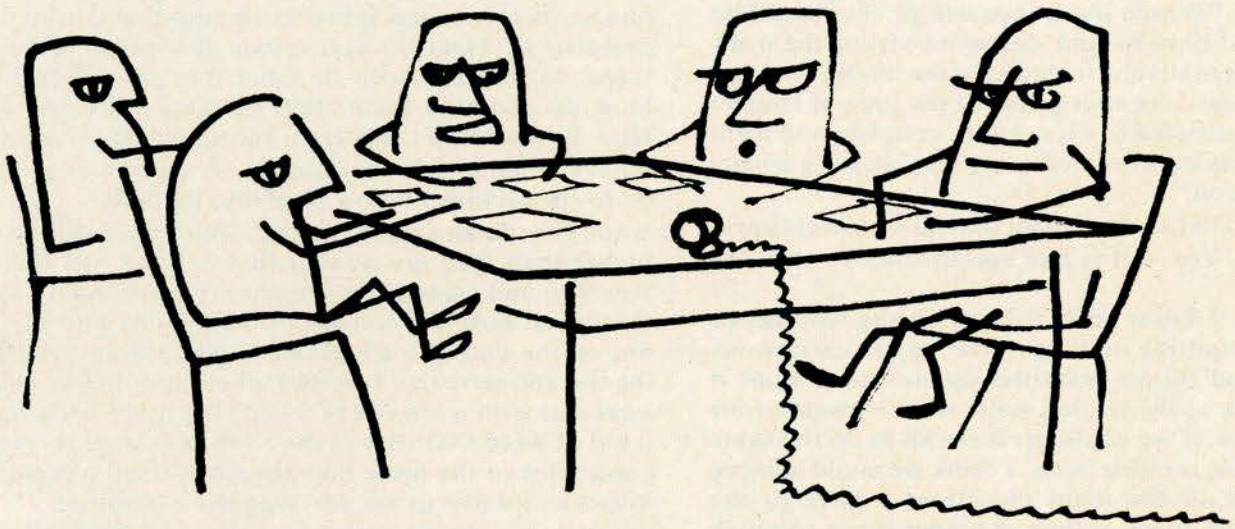
*F. J. Kirst*



# Tendering Practices

## Architects-Contractors

*The Journal invited four Toronto contractors and three architects to discuss, candidly, mutual problems. Contractors were: N. A. Richards, Hughes-Richards Ltd; T. A. Sommerville, E. G. M. Cape Ltd; C. R. Williams, Dickie Construction; Charles Waggett, Taylor-Woodrow. Architects: P. M. Keenleyside, John G. Spence, and C. F. T. Rounthwaite. Mr Keenleyside acted as moderator and prepared the following summary from the tape recording. — W. B. B.*



*The contractors advised the architects that current tendering practices had a number of troubles architects could alleviate.*

*(a) That far too much detailed information is requested at the time of submitting a lump sum tender.*

*(b) That this tendency has not decreased despite the agreement reached between the RAIC and the CCA and published as a suggested guide to Bidding Procedures and the OAA and OGCA agreement on the same matter.*

*(c) That government agencies, universities, and organizations of this calibre are top offenders.*

*(d) That deposit cheques are held for an unnecessary length of time.*

*(e) That there is little uniformity in tendering requirements.*

WAGGETT: I don't think that architects sufficiently appreciate the jack-pot they put the general contractor in, when they ask him to put his bid in, with all the other information at a given time. Some contractors don't get them until the last half hour, and then we are in the onerous position of having to add all those amounts, sometimes millions of dollars, without time to check at all.

KEENLEYSIDE: You wouldn't object to putting the name of your sub-contractors on your tender form?

WAGGETT: No, no, I think that all the extraneous information that is asked for should be submitted to the architect after the bid itself.

ROUNTHWAITE: As an appendix we might call Schedule B.

WAGGETT: We haven't time to check or get confirmation by the post before we are already committed and committed with a deposit cheque too.

KEENLEYSIDE: Have you any comments as to what should be in Schedule B?

WAGGETT: Well, as I say, all the extraneous information that's asked for at the moment — such as all the unit prices. We are asked for more and more every job we do.

ROUNTHWAITE: I thought that the OAA-OGCA agreed that unit prices in the initial base bid should be kept at a minimum, that is to say, other than for road work, mass excavation, concrete, etc., where you do have an area of unknown quantities.

WAGGETT: We get bids in the last half hour. Then we have to fill out a list of the sub-contractors we're carrying. We've also got to fill out a list of unit rates, which are pertinent to those sub-contract prices, and we don't know the unit rate we can use until we know who the sub-contractors are, and this is all within the last half hour of a bid of anything from a million to five million dollars. When we speak to the Architect's Association about it, we are told you only can advise your membership — you can't insist they follow a certain rigid set of rules in tendering.

ROUNTHWAITE: I think if you look at the type of job you

are quoting on and the type of client the architect has, you will find that when it is a big corporation – where there's an engineering department and even an architectural department – these requests become more and more complex.

WAGGETT: Yes, but that could be eradicated. I can see no reason why the owner should engage an architect and then tell him what he's going to do.

ROUNTHWAITE: Neither do I.

WAGGETT: I think we can solve the problem ourselves. If we can get it written into the standard Canadian forms that this is the list of unit rates that are going to be asked for in the tendering stage, then this is all they're going to get.

ROUNTHWAITE: Well, if you read paragraph 9 OAA-OGCA, it says, "Where used, separate prices should be asked for as 'additions to' and 'deductions from' the work as shown, or alternatively, included in the tender amount. Ordinarily, requests for unit prices at the time of tendering should be restricted to excavation, concrete and form work and reinforcing steel, necessary for adjusting underground foundation."

KEENLEYSIDE: That's a document that all architects have.

ROUNTHWAITE: Yes – it is like specifications – no one reads them.

SOMMERVILLE: I know several large clients who adopt the system of requiring nothing in the way of extraneous information, and others want the moon. Some want it at the same time as the tender, some want it twenty-four hours later. Now, if we could get them all to do the same thing on a simple, sensible basis, I think we could achieve something. One of the main objections I have to the formation of unit prices at time of tender is not so much the confusion it creates – that's plenty – but they are not realistic, because in doing them in this confused state, they aren't given the thought they deserve. If the information was produced twenty-four hours later, it would be realistic, as opposed to being very often unrealistic.

WAGGETT: Whether it's a company like Ford, or whether it's a bank or another job, I've never found any pattern at all as to the number and complexity of unit rates requested. There is one thing that's creeping in on unit rates that should be hit on the head as soon as we can hit it – that is the question of this one line unit rate business. Instead of having unit rates for additions and unit rates for deletions, it's getting more and more the practice now that we've only one rate for deletions or additions. It puts the general contractor in the odious position of deciding, before he tenders, whether there are going to be additions or deletions, because they're invariably all encompassing unit rates. And if he put a profit on it, and it's a deletion, he shows an actual loss on it although he hasn't done it. You said you didn't think it was within the realm of possibility to get contractors and sub-contractors to abide by certain rules, and we have trouble getting all architects, not to call tenders on Monday. Well, how do you get people to do things they just don't seem to give a damn about?

*The contractors advised the architects that troubles within their own industry cause problems.*

*(a) Sub-trade bids are submitted in a chaotic fashion –*

*1) By phone in the last few hours.*

*2) By phone in the last few minutes, revising previous bids.*

*(b) That sub-trades hold their bids until the last possible moment to avoid a leak.*

*(c) That leaks or peddling do occur; this augments the chaos.*

*(d) That written confirmation is frequently not in the hands of the general contractor until the next day.*

WAGGETT: We get bids by telephone that could be from a man who had just walked into a telephone booth and said $50,000.

SOMMERVILLE: In the bid depository for mechanical and electrical, the policing is done by the trade itself with a little supervision. But in the trade coming in on the telephone, there's no discipline at all, and that is where your problem is. How do you create discipline within that trade, so that they will do what they are asked to do? How do you stop them from phoning back and forth? How do you stop them from trying to get information?

ROUNTHWAITE: It's very simple. A carbon copy should go to the architect who's receiving the bids.

WAGGETT: I can assure you that your prices will be much higher than they are now, if that is done. We bid a job recently, and such is the situation in a contractor's office that when bids are coming in, everybody and his uncle are on the end of a telephone. I was taking the bids on the tile and terrazzo. I started off an hour before the bids were due with a low bid of $488,000, and I wind up with a bid of $416,000. But at the $488,000 stage, every subcontractor in the trade had already quoted a figure.

SPENCE: I'd like to ask Mr Waggett a question.

SPENCE: It's always amazed me why you general contractors can't control the time that the sub-bids come in to you. As I see it, it's by your own choice that bids come in to you within a minute of the time that you rush into ———.

WAGGETT: No, that's not true, not our own choice. You can't say to the guy on the telephone "You musn't phone me."

SPENCE: No, but I take it you request bids from responsible people. Now surely the Association of General Contractors can issue a statement and abide by it, that they will not accept telephone bids, and that all sub-contractors bids must be in twenty-four hours before the tender date.

WAGGETT: You wouldn't get a single bid on the basis of the way contracts are written today.

SPENCE: Why? This is what I don't understand.

SOMMERVILLE: We're in an industry where there is over capacity and in a very highly competitive one. We could require that, and there would always be one or two that would break the deal and by so doing could either put you into a job or out of a job, and with competition the way it is you can't afford to impose.

SPENCE: But why is competition so much more vigorous on one day than any other day?

WAGGETT: It isn't.

SOMMERVILLE: It's every day, every bid it's the same way.

WAGGETT: This is true . . . but I think it could be solved by being written into documents that sub-trade prices

have to be in writing at a specific time.

SPENCE: Are you suggesting that this should go on the contract documents prepared by the architects?

WAGGETT: Yes.

SPENCE: Well, I'd suggest that this is no concern of the architect, but is the concern of the general contractor.

WAGGETT: Well, I think that anything that happens in the building industries is the concern of everybody that's involved in it. I don't think any of us can shut ourselves up in tight little pockets.

KEENLEYSIDE: There is a danger of the architect's stepping into the sphere of the general contractor.

WILLIAMS: Mr Chairman, I think we're laying a great deal of store in the architect's responsibility for this. It is, I think, the responsibility of our own industry. I have been a lifetime in this industry, but I feel that it's in the most deplorable state it has ever been in. There's a lack of trust among the sub-contractors with the result that they call up five minutes before the tender is supposed to be at the architect's office and sometimes call up two or three times. I've known of instances where the bid has been changed two or three times. In other words, somebody in a general contractor's office has leaked the price. I don't know what the answer is, I don't think putting it into a Contract Document means a damn thing. It's something in our own industry.

Now there's been a lot of feeling, which ran very high in our industry, about the bid depository, but I would say that for the present situation – with the lack of trust that seems to go right through the industry, general contractors and subs – the only answer is a bid depository. At least for the time being. Otherwise, we're just going to struggle along. If you have a breakdown of trust between people who are operating in a business, I don't think that anything you write will ever correct it.

WILLIAMS: Gentlemen, tendering is like a contract. A contract drawn between honest people means very little trouble in the law courts. If people wish to be dishonest, I don't see how anything you write in a resolution or contract documents or anything else will save the day.

ROUNTHWAITE: Supposing a number of generals are tendering on a job, and you said we will receive sub prices until such and such a time. Your agents will be there to receive from the sub-contractors bids that will be considered final.

WAGGETT: Well, that's literally creating a bid depository.

ROUNTHWAITE: No. As architects, we do not wish to become involved in an extension of the bid depository. You, as contractors, could receive tenders at, say, 1104 Bay St, until 12 noon, and that would be it.

WILLIAMS: Mr Chairman, a principal of one large firm told me that they have made it a rule that the tenders must be in writing, in their office, by noon of the day a tender closes at three o'clock, otherwise they won't consider it.

I would like to tell you of an odd instance – a very prominent sub-trade told me of a terrible situation. He had given all contractors his tender and was done out of the work. He named the firm who peddled the bid, so I said, "Well, I guess the only answer is a bid depository for your trade." "Oh, my God, no!" he said "We don't want that. I get lots of jobs handed to me at the other fellow's figure." So it all depends on who is gored.

The contracting industry today has undergone changes. In the past decades, more and more work is carried out by sub-trades and less by the general contractors forces. This tendency started with shop fabrication and has been accelerated by labor regulations and the development of the sub-contracting firms.

WILLIAMS: Not too many years ago, we could make up a tender the day before and sleep on it.

ROUNTHWAITE: I think there is an answer: you should have more and more of the sub-trades as direct components. In the past, the general contractor employed at least fifty per cent of all the subs, whether they happened to be masonry, lathers, plasterers, carpenters, etc. Now, the general contractors are so far into the field of specialization, they are no longer able to estimate some of these trades. If you return to the status of being what the word general suggests, this conglomeration of subs making their own estimates would not be a problem. The contractor would make his own estimates.

WAGGETT: I take part exception. Terrazzo, for instance, is a specialized trade – you just can't pick men up off the street.

WILLIAMS: Once a contractor does that, he becomes a general contractor in the true sense of the word. He controls the mechanical, the electrical firms. He does his own brick, etc., but he cuts himself off forever from getting competitive figures. Nobody will give him a price, so he has to stand on his own ingenuity and his own capabilities and efficiency. Sometimes it doesn't work out too well. It was a disturbing thing a few years ago to see the passing of brickwork and stonework into the hands of a sub-contractor and form work. But I think a lot of general contractors still take off quantities; I know we do.

SOMMERVILLE: This has come about through evolution. It's been slow, in coming – the arrival of sub-contractor firms to take over specialty trades that were once done by the general contractor. But I think that on the normal run of building, these specialty trades do produce a less expensive job than would have been done by the system

thirty or forty years ago. The search for lower costs — for less expensive products — is part of the evolution. And with the search and the evolution, we have to put up with some disadvantages. It may very well be that we will get to the point where the worm may turn the other way, but with everybody wanting to run his own business, or wanting to get into some kind of little business, this specialty game is getting more intense, and it is this that has brought about the confusion. Now the bid depository, the naming of sub-contractors, and some of the other things are attempts to tidy up some untidy situations and whether you would solve the problem by a complete bid depository or not, I don't know. It takes two to tangle, and the general contractors are guilty of certain things and so are the sub-contractors. How we get them to work in harmony, I don't know.

RICHARDS: There is one area we haven't discussed in your proposition, Fred, and to follow along on yours, Tom, and that is in this evolution, the trade — the labor movement played quite a big part.

Twenty-five years ago, most general contracting firms had quite a crew of steady men, men who were semi-skilled such as laborers who were also good rod men and laborers who were also good cement finishers — needed the year round. They got a little higher rate of pay than the average fellow, but they were highly competent and skilled at these various jobs. With the labor movement, however, these fellows have gradually become integrated into labor unions and now demand much more pay per hour than you can afford throughout the year. Many of us do not have the continuity to maintain these people on our payroll. They go off and form little companies of their own and work for ten general contractors to keep their men busy. This is the process of evolution. I don't subscribe to it 100%, but it's something we have got to live with.

ROUNTHWAITE: You mention that these little companies are growing. Each one is presumably making a profit that, in a sense, is lost to the general contractor.

RICHARDS: That's right, but he can maintain the continuity while we can't.

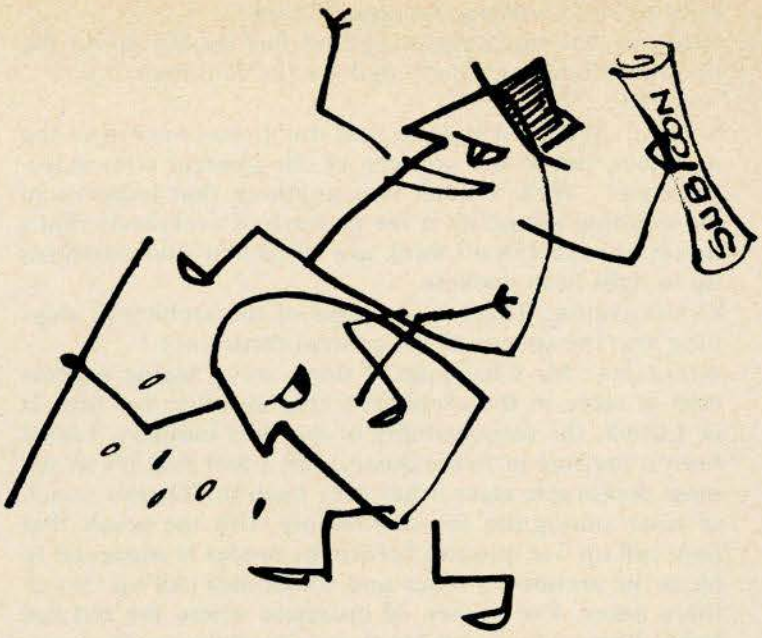
ROUNTHWAITE: But I have wondered this. How much money has your association spent on research in the last ten years looking into this problem? You are being forced practically out of the general contracting field.

SOMMERVILLE: It started originally with shop fabrication, which automatically took a lot of men off the job.

WAGGETT: To a large extent, the quality of work is subject to the quality of supervision you have on the job. You may be able to pick up workmen off the street, but you can't pick good supervision off the street. You have got to keep them on a yearly basis.

SPENCE: It is surprising to me what a deep discussion we get into once you start to talk about a simple thing like tendering procedure. It goes right back to the basic philosophy of what are we trying to do.

Last night a quotation occurred to me, and I looked it up, and then when I learned the subject of this discussion, I thought I had wasted my time, because it has nothing to do with it, and suddenly I find that this is right at the heart of the matter. Here is what Robert Theobald,




a public administration consultant, said of our culture, and it doesn't exclude architects or general contractors — in my estimation it applies to us all. "We live in a time of change, and we will survive only if we recognize that we must alter our institution to meet this change."

I don't think that anything truer could have been said of the whole general contracting situation. I think that with proper intelligence brought to bear on the subject by the General Contractors Association, there is no reason at all that there should be a diminishing of the position of the general contractor. He will diminish only if he doesn't do anything about it to meet their need and to rectify it. The ultimate thing that occurs to me, and this is a little factor: if all trades go on the bid depository system, then the architect becomes the general contractor — a ridiculous situation.

WAGGETT: That's what happened in Switzerland — there are no general contractors.

SPENCE: I don't think that we at all wish to become contractors, but with the tremendous industrial specialization that exists, this only, in my estimation, brings to the fore the need of a different kind of specialization on your part. It isn't at all a less responsible position; it's even more important, because of the specialization. But it must somehow be faced — a new kind of general contractor — specialist, if you like, possibly more administrative. To neglect the situation is just to let the anarchy get worse. I am not holding ourselves up as any kind of people who are free of criticism. You could criticize architects on different grounds — we are all human beings — but . . .

*The conclusion to the meeting is summed up with two notable quotes.*

ROUNTHWAITE: The only time our stock in trade is high is right after we have presented sketches and a colored perspective. If only we could quit then!

RICHARD: The only time the general is a hero is when he is the low bidder — about the time we are signing the contracts. If we, too, could quit then, we'd be ahead!

# Technical Section

**Edited by Douglas H. Lee**

*This month's technical article is by Eric W. Hounsom, who, over the past twenty-five years, has contributed a number of papers to the Journal on a variety of subjects, including "Designing the Canadian Moving Picture Theatre," "Romanticism and Protestant Church Architecture," and "The Early Builders of Toronto." In private architectural practice for many years, Mr Hounsom specialized in the design of moving picture theatres and radio stations and has been responsible for the design of over sixty new theatres and alterations. He is at present in the Design Group of the Ontario Department of Public Works.*
*D.H.L.*

## AUDITORIUM FLOOR FALL

**by Eric W. Hounsom**

MUCH HAS BEEN WRITTEN for the architect about auditoriums and theatres. Very little is usually said about the floor fall, so that it can be assumed to be of minor importance. If the acoustics are faulty, or if the auditorium is poorly lighted or heated, the fact is noted. It is not always discerned, however, that the vision could be better, or that the building could cost less, if more consideration had been given to this floor fall factor.

So the purpose of this discussion, with the accompanying sections, is to call attention to this floor fall factor, and how it affects the vision and also the cost of auditoriums. It will give no formulae, but rather will attempt to assist the designer in selecting the basic form of a large auditorium. It will also assist in securing the best vision in theatres, concert halls, and school auditoriums – at minimum cost.

With the invention of the incandescent lamp, the commercial theatre in America (and there was scarcely any other) retreated behind the proscenium wall. The faces of the actors, for the first time could be seen as in real life, and a large forestage became unnecessary.

The fall of the floor could now be designed for the eye to view a smaller fixed location. As the theatre was commercial and operated to return a profit on the investment, the number of seats that could be secured on an expensive downtown lot was the major consideration in planning. The floor fall and the pitch of the balcony gave the greatest number of patrons the best possible view of the stage, consistent with economy. It did not necessarily give all patrons a perfect view.

Moving pictures were first shown in vaudeville theatres with satisfactory results visually. For even the poorest seats permitted excellent vision to the bottom of the screen, which was at least two feet above the stage floor, and the centre of the screen was much higher than any stage action. When theatres were built for moving pictures only, a perfect floor fall for this type of theatre was evolved. It was no longer necessary to show the stage floor to the audience. The auditorium floor sloped down from the stage, before it rose in a curved ramp to the rear of the auditorium.

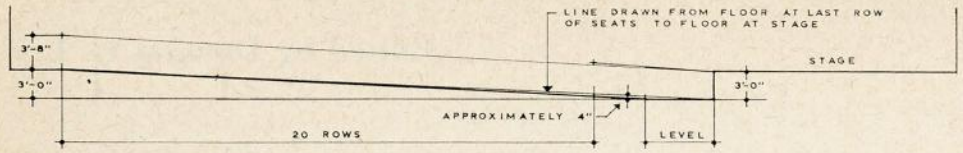
All patrons had a perfect view of a complete screen, although some side seats, which the architect was forced to include, had distorted vision. Such a floor, falling down before it sloped up, permitted the balcony to be lower, thus reducing the ceiling height and the projection angle.

Stadium seating for picture theatres was also introduced, permitting the maximum number of seats on the lot, with a low ceiling height. Even with a balcony, adequate sight lines could be secured with a balcony pitch less than that of conventional theatres.

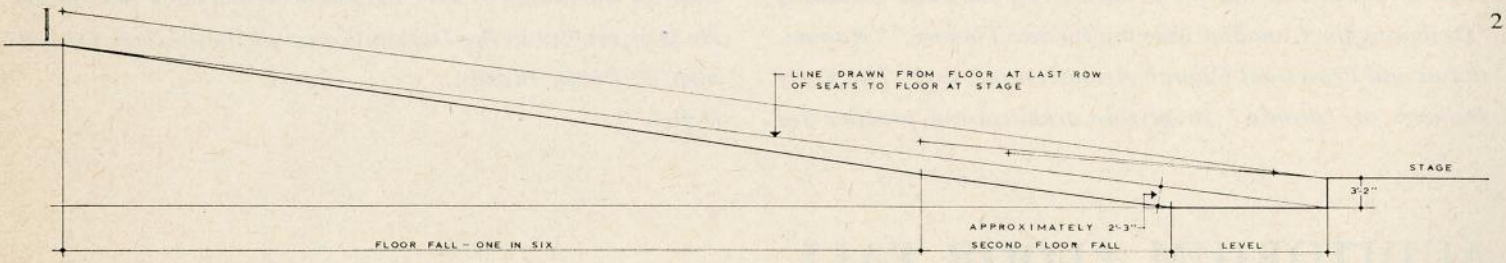
With the advent of talking pictures, such theatres retained their basic economy, for the mechanized sound could emanate from many sources, and the acoustical problem could be solved with a minimum of wall splay and segments of the ceiling at calculated angles. These acoustical correctives did not necessarily increase the height of the auditorium. Although the two-fold objective of the curved ramp floor in all theatres of this era was good vision, consistent with economy, an additional benefit was gained in moving picture theatres – for the centre of focus was eight to ten feet above the "stage." The patron was unaware of the large audience around him.

With the recent use of screens up to fifty feet in width, four or five rows of seats in front have been removed in existing theatres to provide an eye coverage, the equivalent of the smaller screen. In moving picture theatres now being constructed for large screens, however, the slope up to the stage has been eliminated, for there can be no seating in this area.

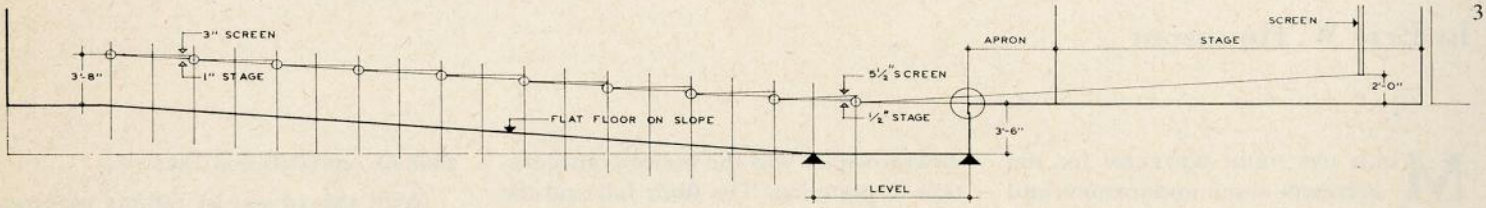
Coincident with television and the subsequent decline in the number of moving picture theatre patrons, there has been an unprecedented growth of the non-commercial theatre and of concert halls built for communities, colleges, and semi-commercial drama


LINE DRAWN FROM FLOOR AT LAST ROW OF SEATS TO FLOOR AT STAGE
3'-8"
3'-0"
STAGE
3'-0"
APPROXIMATELY 4"
20 ROWS
LEVEL

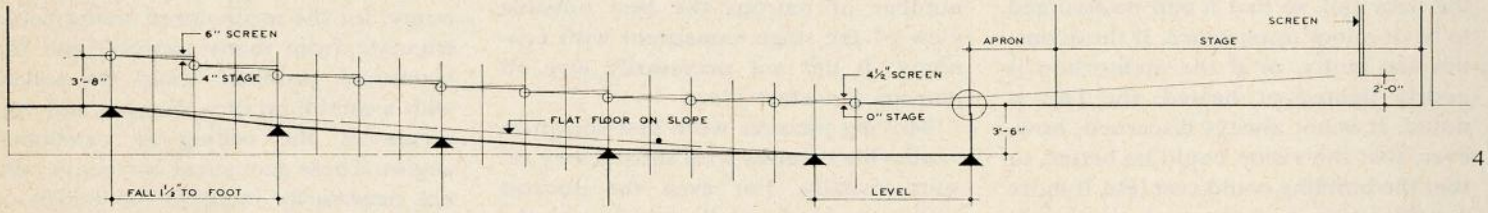
1


LINE DRAWN FROM FLOOR AT LAST ROW OF SEATS TO FLOOR AT STAGE
STAGE
3'-2"
APPROXIMATELY 2'-3"
SECOND FLOOR FALL
FLOOR FALL - ONE IN SIX
LEVEL

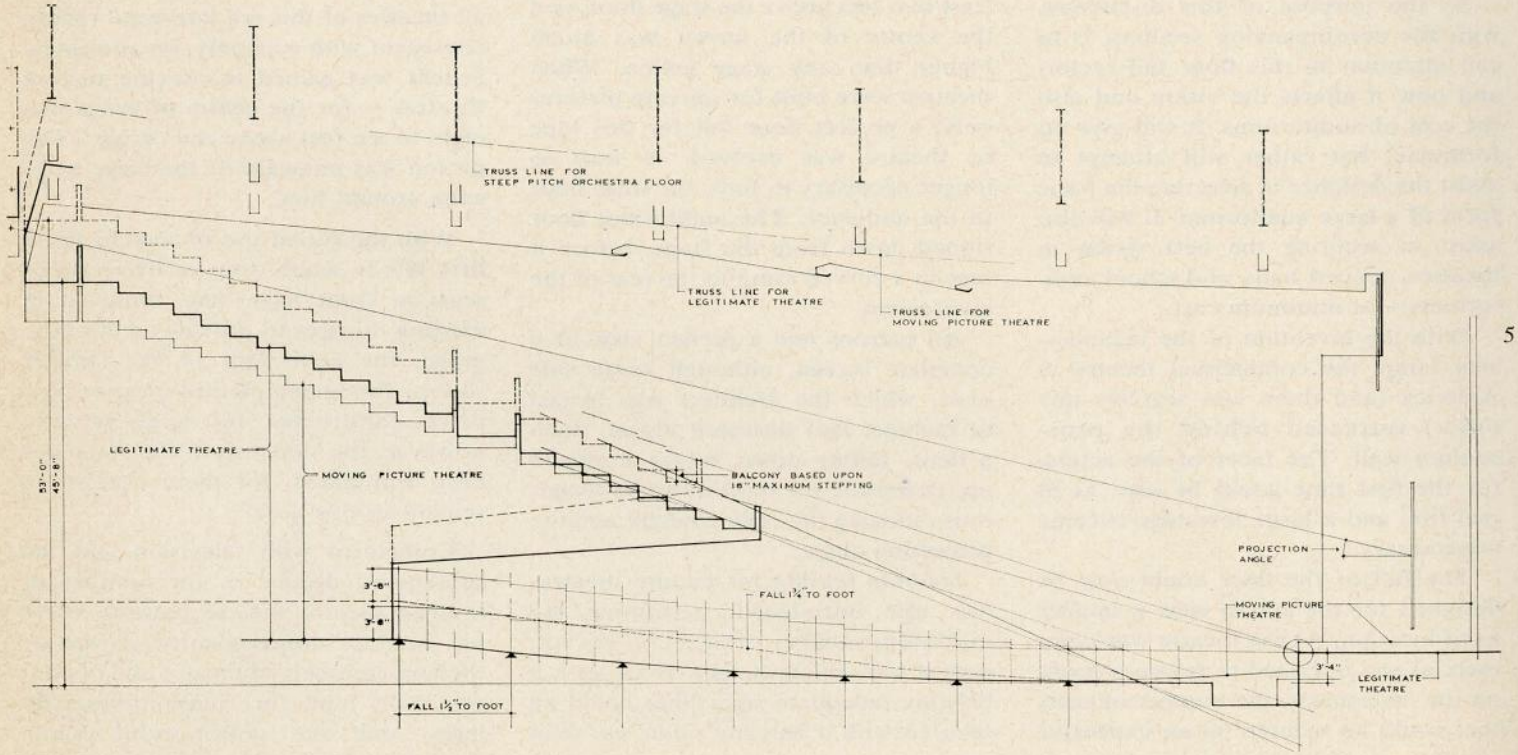
2


3" SCREEN
3'-8"
1" STAGE
FLAT FLOOR ON SLOPE
5½" SCREEN
½" STAGE
APRON
STAGE
SCREEN
2'-0"
3'-6"
LEVEL

3


6" SCREEN
3'-8"
4" STAGE
FLAT FLOOR ON SLOPE
4½" SCREEN
0" STAGE
APRON
STAGE
SCREEN
2'-0"
3'-6"
FALL 1½" TO FOOT
LEVEL

4


TRUSS LINE FOR STEEP PITCH ORCHESTRA FLOOR
TRUSS LINE FOR LEGITIMATE THEATRE
TRUSS LINE FOR MOVING PICTURE THEATRE
LEGITIMATE THEATRE
MOVING PICTURE THEATRE
53'-0"
45'-8"
BALCONY BASED UPON 18" MAXIMUM STEPPING
3'-8"
3'-8"
FALL 1¾" TO FOOT
FALL 1½" TO FOOT
PROJECTION ANGLE
MOVING PICTURE THEATRE
3'-4"
LEGITIMATE THEATRE

5

1) This section, through the centreline of the auditorium in a recently constructed educational building, is an excellent example of poor sight lines. Assumed eye level of the first row of seats is actually higher than the eye level of the last row, where it should be below it. Vision becomes noticeably worse near the walls.

2) Though this large, recently constructed auditorium has a flat floor on the slope, there are actually two floor slopes. The excellent vision secured is not entirely due to the steep pitch – but to the two pitches used. The architect should draw experimental sight lines and floor slopes, before he assumes maximum floor slope is necessary or desirable. (See section 5.) Maximum floor slope is tolerable for a great number of rows of seats, but would be a hazard for a few rows only. The maximum pitch floor is also more costly, because recesses in the floor or steps upon it must be provided for seating. It should also be noted that the maximum pitch floor of this auditorium was selected principally for acoustics.

3) This is the auditorium floor of an educational building seating about 500. An extra row of seats at the stage has been added on the section to give greater clarity to the diagram. It is often assumed the flat floor on the slope gives equal vision to all rows of seats, and nothing would be gained by using a curved slope. The fallacy of this impression becomes evident, when sight lines are drawn. It may be readily seen that the viewer in the last rows must look down to a greater degree than the viewers in the first few rows, and those in the first rows must look up to view any action on the stage or screen. They also look through fewer heads. With the flat floor on the slope, the vision, far from being equal, becomes progressively worse toward the rear, where it should grow progressively better.

4) This is the same auditorium, if the recommended curved floor section was used. Note that the vision progressively improves toward the rear of the auditorium, so that the patron in the last row looks over the head of the patron in the second row ahead to see the stage and has an additional 2" to view the bottom of the screen. The fall of 1½" per ft at the rear is recommended as the maximum for a curved floor. Though the diagram shows four different slopes, each of these spacings could be five or six rows of seats, depending on the auditorium's length. You may assume that, although the curved floor is better, it is not worth the additional cost to provide it. Has the architect secured an estimate both ways? A contractor who has constructed many theatre floors told the writer that the additional cost, if on earth, would not exceed $800 in the example shown. Such additional cost, to secure better vision for an auditorium in a $2 million building, is negligible.

5) This is based on the actual section of an existing first run "luxury class" moving picture theatre, seating about 1,500. Sight lines give excellent vision to the screen, with a maximum orchestra floor fall of 1½" to the foot (1 in 8). The heavy section line indicates orchestra floor and balcony section for a theatre for stage productions. All sight lines shown on these sections are to the front of the stage. The broken line is for a theatre with orchestra floor consisting of two flat floors with dissimilar pitches on the slope. Maximum pitch shown is 1¾". Note: with this steeper floor, the vision at the rear of the orchestra floor is about the same as for the solid floor line, but is better in front and centre. Two rows of seats must be eliminated from the front of the balcony or the stepping would exceed 18", which may be considered maximum. This resulting steeper balcony for the steep pitch floor is more expensive and not as desirable as the balcony section shown on the solid line. Such stepping also increases the height of the building with additional entrance and exit stairs. The architect is advised to balance this cost increase with the acoustical improvement secured with the steeper floor, before making a decision to use it.

***All the sight lines shown are drawn to the stage floor. On sections 3 and 4 they are drawn both to this location and to the screen. All seated patrons will not theoretically see the floor, unless seats are on steps. This line, however, will assist the designer in plotting and checking his floor slope. By establishing another line to the bottom of a screen, an additional check is secured in endeavoring to give the best vision to the greatest proportion of the audience. 3'-4" is the recommended height for most stages.***

societies. With these new buildings, the cost per seat is not usually the governing factor in planning, and the land cost is usually lower. The cubage of the whole building is much greater than that of old commercial theatres. The cubage of the auditorium per seat is often greater, also, for the factor of acoustics has attained major importance, especially in multi-purpose auditoriums. Acoustical engineers' rulings on sound often result in a cubage per seat in the auditorium far in excess of that required for the sight lines, which previously determined the height of the auditorium.

This extra cubage per seat originates from the steep floor requested by acoustical consultants; this floor slope is often one in six. This is the steepest pitch permitted by building codes. The balcony above this floor must still be governed by sight lines and by maximum step heights. This limits the balcony overhang as well as making the pitch of the balcony greater. The foregoing is particularly true of large theatres. It is even truer today than formerly: other factors being equal, the cost of theatres and auditoriums per seat rises with seating increase. It does not decrease per seat as might be expected.

With the decline in the popularity of proscenium, or picture frame stage, we are experimenting with many new and revived forms of theatre, including the theatre-in-the-round, or arena theatre, the apron theatre, and the caliper theatre. Each of these types requires some kind of floor, and the designer must decide upon flat floor on the slope, curved ramp, or stepping. In studying the plans of some of these new theatres and auditoriums, the architect (for small auditoriums — and auditoriums in educational buildings) may wonder if theories pertaining to curved ramp floors are no longer valid; steps and steep pitch flat floors on the slope are increasingly used. Many recently built schools, which include auditoriums with fixed seats on a radius, have flat floors on the slope — thus ignoring all previous solutions to auditorium seating.

Large multi-purpose theatres, and medium and small ones, are now being built with steep pitch floors, or with stadium seating, resulting in a building height often far in excess of that previously used. On the other hand, some still make use of the standard curved floor section. Many architects assume, without investigation, that good vision is obtained by increasing the pitch of a flat floor on the slope to the maximum angle permitted by building codes; *better* vision could be secured by curving the floor and decreasing the pitch, or by having two flat floors on the slope with dissimilar pitches.

The designs of some new theatres and auditoriums might give the architect the impression that all commercial theatres and concert halls, built in the past, had poor seating, poor vision, poor acoustics, as well as inadequate stages. Billions of dollars have been paid into the box-office of North American theatres and halls by patrons who were satisfied with the entertainment provided.

It is evident that a wealthier age can provide something better, particularly if the money is supplied by wealthy donors. Nevertheless, we may discourage the building of many new theatres and concert halls, if we assume that the most costly is the acceptable minimum. In many cases, it is possible that if the architect presented a theatre plan and section — based on adequate sight lines, along with the higher cubage solution, with their estimated cost — to his acoustical consultant, they both might be satisfied with something less than calculated acoustical perfection. It is hoped the diagramatic sections shown, with the comments, will enable the auditorium architect to better appraise and solve his problem.

It is self-evident that seats on steps give better vision than a flat ramped or a curved ramped floor. The designer, however, must take into account many factors that militate against the use of steps; for a balcony cannot normally be used above such steps. Patrons must walk up and down steps, often in semi-darkness, and the building height and the cost is usually increased. The next consideration is a floor fall.

In designing a floor fall for any theatre or auditorium, the architect must assume certain conditions. First, that all seated patrons, men, women, and children, have a uniform eye level of 3 feet, 8 inches above the floor, and that the tops of their heads are 4 feet above the floor. This eye location may be assumed to be on a vertical line rising from the back of the seating standard fastened to the floor. This is the seating line that the seating contractor draws on his shop drawing, and on the floor for installation. It must then be assumed the seated patron automatically adjusts himself in his seat to look between the heads of those in the row ahead, but that his eyes should clear the tops of the heads of those in the second row ahead to a moving picture screen and should have as much clearance as possible to the front of the stage.

Staggered seating assists in this adjustment, but it is necessary in the centre bank of seats only. With such staggering, however, one half seat is lost in each row of seats. It is usually not considered essential.

This clearance, over the tops of the heads in the second row ahead for screens, should average about four inches, but it should be more at the rear than at the front. It may be readily seen from the sections shown that it is more important to have the greatest clearance progressing toward the rear of the auditorium; for the patron at the rear is looking down to a greater degree than a patron near the stage.

It should be mentioned, also, that in moving picture theatres for standard screens, the seated patron need not see the floor of the stage, but should have clear vision only to the bottom of the screen. This permits the floor to fall down from the stage before it rises, thus reducing the pitch of the balcony, as shown on Section 5.

CANADIAN
# BUILDING DIGEST

DIVISION OF BUILDING RESEARCH • NATIONAL RESEARCH COUNCIL CANADA

# SOLAR HEAT GAIN THROUGH GLASS WALLS

by D. G. Stephenson

UDC 697.132.3:69.022.32

If the radiant energy from the sun that is constantly falling on the earth's surface had to be bought at ½¢ per kilowatt hour the daily bill would be the staggering sum of $10,000 billion. On a more comprehensible scale, the maximum intensity of solar radiation falling on a square foot of horizontal surface in the temperate latitudes is of the order of 100 watts; for vertical surfaces it is about 75 watts. There is, therefore, a large amount of energy falling on the outer surfaces of every building at certain times of the year – energy that can cause serious performance problems if it has not been fully taken into account by the designer. It is the purpose of this Digest to show the magnitude of the solar heat gain associated with glass areas in the different facades of a building, and to discuss the several ways that it can be reduced.

*Intensity of Sunshine*

The intensity of the sun's rays that penetrate to the bottom of the atmosphere depends on the clarity of the atmosphere and on the length of their path through it (i.e. the angular elevation of the sun above the horizon). The energy that is incident on a unit area of a particular surface depends upon the intensity of the sun's rays and the angle at which they strike the surface. The maximum intensity for a horizontal surface occurs at noon at the time of the summer solstice for all latitudes outside of the tropics. For example, the maximum insolation on one square foot of horizontal surface is 93 watts at Ottawa (latitude 45°N) and 88 watts at Winnipeg (latitude 50°N). At the winter solstice the corresponding figures for noon on a clear day are 39 watts and 29 watts respectively. (Multiply watts by 3.4 to obtain Btu/hr.)

The radiation that falls on vertical surfaces is, however, often of more importance in building design (because of windows) than the radiation on a horizontal surface. The orientation of a wall is an additional variable. A wall facing south at Ottawa receives a daily maximum of 45 watts/ft² at noon on June 22nd or thereabouts; but at the equinox the daily maximum has increased to 65 watts/ft²; and the yearly maximum may be as high as 100 watts/ft² in winter if there is snow on the ground to reflect some sunshine onto the wall. East and west facing walls, on the other hand, receive their maximum irradiation in the morning and afternoon, respectively, when the sun's rays are more nearly perpendicular to the wall surface. The annual maximum for east and west facing surfaces at Ottawa is about 75 watts/ft². It occurs at midsummer approximately 4 hours before and after noon respectively (as indicated by a sun-dial). The magnitude of the daily maximum changes very little between midsummer and the equinox, so that the value of 75 watts/ft² is representative of the daily maximum insolation on east and west facades during the period from April to October.

*Transparent Walls*

When solar radiation falls on glass and other partially transparent material some of the incident energy is reflected, some is absorbed by the material, and the rest is transmitted to the inside of the building. For ordinary windows the absorption is quite a small fraction and transmission much the largest part. It is not always appreciated, however, that the reflection from the surface of glass varies considerably with the angle of incidence, i.e. the angle between the light rays and a line perpendicular to the surface. Figure 1 shows the variation of the reflection, absorption and transmission of solar radiation by a single sheet of ordinary glass. The noon values of the incident angles for a south wall at Ottawa are shown on Figure 1. They indicate that transmission will have a daily maximum value of 70 per cent of the incident radiation at midsummer and that this will increase to

85 per cent at the equinox and to a maximum of 87 per cent at noon in midwinter.

It is easy to appreciate why a building designer should take great care to minimize solar heat gain when one considers the cost of the air-conditioning plant needed to remove it. It has been stated that the insolation on east and west facing walls can be 75 watts/ft² at the daily maximum during the whole period from April to October. The incident angle for these surfaces at the time of peak insolation is less than 40 degrees so that transmission is about 87 per cent for a single sheet of glass. One hundred square feet of ordinary glass in a west facade would, therefore, transmit 6.5 kilowatts to the interior of the building. All this energy must eventually be removed by the ventilating and air-conditioning equipment.

Fortunately all of the transmitted solar radiation does not immediately act to increase the cooling load; some is stored in the floor and internal walls, which absorb the radiation and are warmed by it. The maximum cooling load has been found* to be about 60 per cent of the maximum instantaneous heat gain for a modern multi-storey office building with 80 per cent of the exterior wall made of glass. Thus the maximum cooling load associated with the solar transmission through 100 ft² of ordinary single glazing in a west wall can be taken as 60 per cent of 6.5 kilowatts, i.e. about 4 kilowatts or just over 1 ton of refrigeration.

The cost of an air-conditioning system depends on the type of building and the type of system used, but it usually exceeds $1,000 per ton. This represents about $300 per ton for the central cooling plant with the other $700 for the distribution system. The increase in the cost of a building that can be attributed to the solar heat gain through a window depends, therefore, on whether or not the added heat gain increases the peak cooling load for the building. If it does, the full $1,000 per ton should be charged to the window; otherwise, a figure approaching the $700 per ton cost of the distribution system would be more appropriate. If the added light provided will result in a decrease in the use of artificial illumination, however, some credit may be allowed. Thus the initial cost of air-conditioning equipment required to remove solar heat admitted through an east or west facing window may add about $7/ft² of window to the cost of the building. There is in addition an annual operating cost for this equipment. The heat gain from heat conduction through an equal area of insulated opaque wall is less than 5 per cent of the transmission through the glass, so essentially all of the $7/ft² should be added to the cost of the glass to give an equivalent first cost of a window.

The corresponding figures for a window area in a south facing wall are:

at the summer solstice, a transmission of 70 per cent of the incident beam of 45 watts/ft², which gives an instantaneous heat gain of 31 watts/ft² at noon;

at the autumn equinox, a transmission of 85 per cent of the incident beam of 65 watts/ft² for an instantaneous heat gain of 55 watts/ft². These figures show some of the advantages of orienting a building so that the windows are facing south rather than east or west; the maximum heat gain due to solar radiation transmitted through the glass is less and the maximum occurs at the end of the cooling season so that it does not coincide with the maximum cooling load due to ventilation. North windows, of course, have very small solar heat gains.

*Control of Solar Heat Gain through Windows*

The real cost of removing the heat that enters a building through the windows is so great that it is economic to spend considerable sums of money to reduce solar heat gain. The most obvious method is to use some form of shade to intercept the radiation before it even reaches the window. This can be done much more easily for south facing windows than for those facing east or west, since for the south facade the angle of incidence is large in summer and projections from the wall consequently cast long shadows.

Solar heat gain through a south facing window can be significantly reduced also by tilting the glass as shown in Figure 2. The energy falling on the window in this configuration is the same as would occur if the window were vertical and had a 1.4-foot projecting shade along the lintel. The tilted glass reflects 45 per cent of the radiation when the incident angle is 78 degrees, compared with 23 per cent when the glass is vertical. This difference in reflectivity decreases as the season progresses toward the winter solstice, and in winter the tilted and vertical windows transmit essentially the same amount of solar energy.

Reflectivity of glass can be increased by coating the surface with either a very thin metallic film or a film of dielectric material that has a high index of refraction. Sealed double glazing units are now available with a reflective coating on the inside surface of the outer pane. Their reflectivity depends on the angle of incidence just as for uncoated glass, but the

* Stephenson, D. G. and G. P. Mitalas. An analog evaluation of methods for controlling solar heat gain through windows. Journal, American Society of Heating, Refrigerating and Air Conditioning Engineers, Vol. 4, No. 2, February 1962, p. 41-46. (NRC 6560)

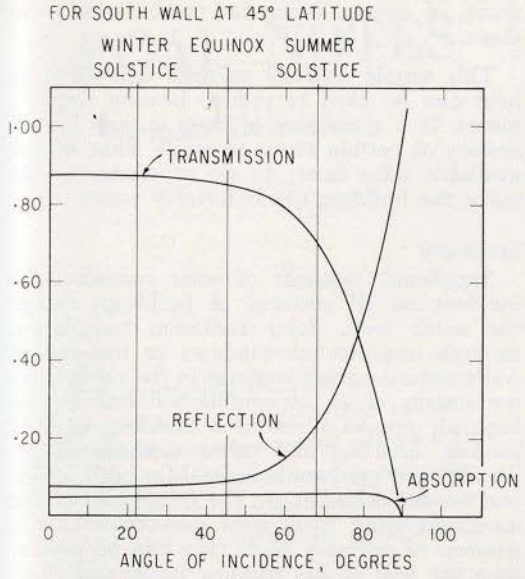



Figure 1
Absorption, reflection and transmission for single sheet of ordinary glass.

value at all angles of incidence is higher than for ordinary glass.

Blinds provide another method of solar control. A light coloured blind reflects some of the solar radiation and absorbs the rest. This causes the blind to heat until it is losing heat at the same rate as it receives it from the sun. If the blind is in the room, most of the energy it absorbs is added to the room's cooling load. If it is between the panes of a double window, however, some of the absorbed energy is transferred to the outside air and the room's cooling load is reduced accordingly. It is desirable, therefore, to use light coloured blinds and, if possible, to place them between the panes of a double window.

Heat absorbing glass is also widely used to reduce solar heat gain. Glasses are available that absorb over 70 per cent of the incident radiation so that transmission to the inside of a building is about 20 per cent when the angle of incidence is small and even less when it is large. Absorbing glass is not as good as these figures indicate, however, because the energy that is absorbed by the glass is dissipated to the surroundings on both sides of the window. The proportion of absorbed energy that is transferred to the inside depends on the relative magnitudes of the heat transfer coefficients at the inside and outside surfaces. If cool air is introduced into the room through a grill along the window sill more than half the absorbed energy is transferred to the room side. Thus, the use of heat absorbing glass may cause a higher maximum cooling load than occurs with ordinary glass because part of the absorbed energy is transferred to the room air very soon after it has been absorbed by the glass. Energy transmitted through ordinary glass is absorbed by the floor, walls and furnishings and released much later. The heat storage capacity of these objects tends to spread the cooling load over a considerable period of time so that the peak value is reduced.

The effectiveness of heat absorbing glass may be increased by using it as the outer pane of a double glazed window so that absorbed energy can be more readily dissipated to the outside air than to the room air. An even greater fraction of the absorbed energy can be rejected to the outside atmosphere if there is a free circulation of outside air through the space between the panes of the double window. The outer sheet of heat absorbing glass is then just a semi-transparent outside shading device.

Heat absorbing glass can sometimes be used to advantage for south windows if shading or tilting are unacceptable for architectural reasons. It has its best application, however, for east and west facing windows where effective outside shading becomes expensive and the simple expedient of tilting has no appreciable effect.

Large areas of glass in the outer walls of a building can cause undesirable glare in the space near the windows. Any method of re-

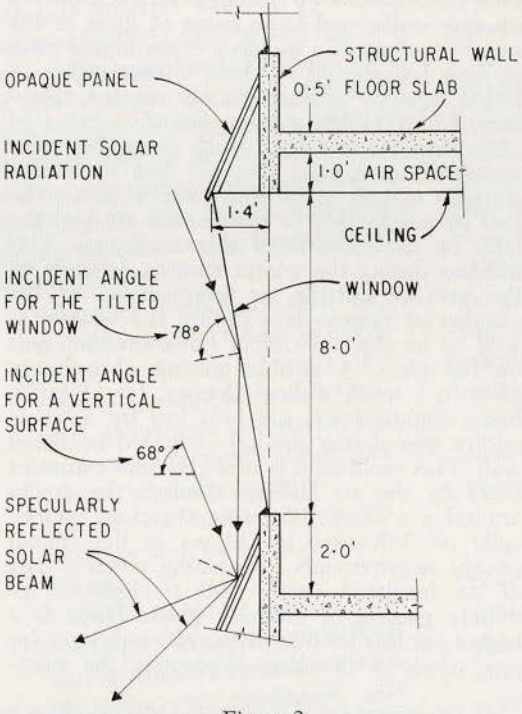



Figure 2
Schematic arrangement of a tilted window in a south facade.

ducing solar heat gain will also alleviate glare since approximately half of the total radiant energy from the sun is in the wavelength region of visible light.

*Heat Gain through Glass during Fall and Winter*

The foregoing discussion has been concerned with solar heat gain during the summer. It is also important to consider heat transfer through windows during the other seasons. Any building that has 50 per cent or more of its outside walls made of glass will have sufficient solar heat gain during some hours of the day in spring and fall to require cooling, even though the outside air temperature is well below the desired room temperature. During the dark hours of these same days there will be a substantial heating load because of the high heat loss outward through the glass. The need for cooling during what is normally considered the heating season means that the air-conditioning distribution system must allow for the simultaneous distribution of a heating and a cooling medium; and the building must be carefully zoned so that each area can have the heating or cooling that it requires. As this increase in the complexity of an air-conditioning system is mainly a consequence of the use of transparent walls its cost should be charged against the glass walls.

Glass areas have higher values of over-all heat conductance (U value) than do insulated opaque walls; and large areas of glass in the outer envelope of a building cause higher rates of heat loss during the long winter nights. A larger capacity heating plant is needed, therefore, for a building with extensive areas of glass than for one with walls containing conventional insulation. The net loss of energy through a wall is the difference between the loss by conduction to the outside air and the gain by transmission of solar radiation. This net loss during the winter months depends on the average outside air temperature, or the number of degree-days during the winter, as well as on the amount of radiation that falls on the glass. A double glazing of ordinary glass in a south wall at Ottawa, for example, has a slightly lower net heat loss for a whole winter than has a similarly exposed insulated wall. This small gain is probably offset in most cases by the air leakage through the cracks around a window. There is, therefore, practically no difference in Ottawa in the annual energy requirements for heating when a part of an insulated south wall is replaced by double glazing of ordinary glass. There is a higher net loss for other types of windows or for any windows in other exposures, the maximum, of course, being for north facing windows.

This simple analysis assumes that all solar heat can be used to reduce heating requirements. If a glass area is large it may be necessary at certain times to waste some of the available solar heat; to do otherwise would make the building uncomfortably warm.

*Summary*

Significant amounts of solar radiation are incident on all surfaces of buildings except the north wall. Solar radiation transmitted through unprotected windows or transparent walls causes a great increase in the cooling requirements of an air-conditioned building or high air temperatures in a building without cooling. Shading and other methods of reducing solar gain are beneficial for both cooled and uncooled buildings. The initial cost of the air-conditioning equipment necessitated by a window of ordinary plate glass can be greater than the cost of the window itself; and there is, in addition, an annual cost of operating the system to pump out the heat that the glass lets in. Both these costs should be included as part of the price that has to be paid when a building designer decides to use large areas of transparent materials in the envelope of a building.

Solar heat gain can be substantially reduced by orienting a building so that there is a minimum of glass in the east and west facades. Windows facing north have very little solar radiation incident on them; this is an advantage in summer, but results in increased energy requirements during the heating season. Solar heat gain through south facing windows can be controlled during the summer by outside shades or by tilting; if they are double glazed such windows do not increase the energy requirements for heating in the southern parts of Canada.

Where windows are deemed necessary in east or west facades the heat gain can be reduced by using double glazing, with the outside pane of heat absorbing glass; the effectiveness of such windows is increased by allowing a free circulation of outside air through the space between the panes. If sealed double glazing units are used a reflective coating on the inside of the outer pane is more effective than a pane of heat absorbing glass with the same light transmission. Finally, blinds can be used to reduce solar heating. They are more effective when located between the panes of a double window than on the room side of the window.

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# LEGAL NOTES

by Norman Melnick

*After examining the uses and advantages of surety bonds in last month's article, it is now proposed to deal with the legal effects of a bond in the situation where the contractor goes into default and is unable to complete a project.*

## LEGAL NATURE OF BONDS

A surety bond, unlike an insurance policy, is a contract between three parties (rather than two) — the owner, contractor, and the surety. It is the existence of three parties that creates the essential difference between insurance and suretyship. A contractor does not take out a surety bond as he would an insurance policy, that is as protection against public liability and property damage. The surety bond in no way serves to relieve him of his obligation to the owner.

## LEGAL EFFECT OF BONDS

Examination of the wording of common bond forms reveals the extent of protection and the effective operation of bonds in the situation where the contractor defaults.

a) BID BOND The standard wording in most non-government bid bond forms is as follows:

> *Now, therefore, the condition of this obligation* is such that if the aforesaid Principal shall have the tender accepted within sixty (60) days from the closing date of tender and the said Principal will, within the time required, enter into a formal contract and give a good and sufficient bond to secure the performance of the terms and conditions of the contract, then this obligation shall be null and void; otherwise, the Principal and Surety will pay unto the Obligee the difference in money between the amount of the bid of the said Principal and the amount for which the Obligee legally contracts with another party to perform the work if the latter amount be in excess of the former.

The legal effect of this provision is immediately evident — the owner is protected against detrimental reliance upon the bidder's apparent good faith in submitting his quotation.

b) PERFORMANCE BOND The usual form of performance bond incorporates, by specific reference, the construction contract and the plans and the specifications, thereby making them part of the bond itself. The legal effect of this incorporation is to ensure the performance of the work in strict accordance with the terms of the contract and in compliance with the plans and specifications. The surety's obligation is usually expressed in the bond in the following manner:

> Whenever Principal shall be, and declared by Obligee to be, in default under the Contract, the Obligee having performed Obligee's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:
>
> 1. Complete the Contract in accordance with its terms and conditions, or
>
> 2. Obtain a bid or bids for submission to Obligee for completing the Contract in accordance with its terms and conditions, and upon determination by Obligee and Surety of the lowest responsible bidder, arrange for a contract between such bidder and Obligee and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price;

c) LABOUR AND MATERIAL PAYMENT BOND While the effect of the bid and performance bond is primarily to protect the owner, the contractor and the owner are not the only parties involved in a construction project. In any substantial project there are subcontractors, sub subcontractors, and suppliers of labour and materials who also stand to lose in the event of a general contractor's default. The labour and materials payment bond is designed especially to protect the people lower down the subcontractual scale. The common form of bond contains the following provision:

> *Now, therefore, the condition of this obligation* is such that, if the Principal shall make payment to all Claimants for all labour and material used or reasonably required for use in the performance of the Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

The claimant is defined as "one having a *direct contract with the principal* (general contractor) for labour, material, or both; used or reasonably required for use in the performance of the contract." By this definition, a supplier of labour or material to a subcontractor is not such a claimant unless he has insisted on contracting directly with the general contractor as well as, or in lieu of contracting with the subcontractor. The exclusion inherent in this definition often results in the general contractor's requiring a payment bond from each of his subcontractors, thus giving rise to a double bonding situation.

It must be noted that the payment bond is of doubtful legal effect under Canadian law. A claimant is not a party to the bond (the parties are the same three, i.e., the owner, general contractor and surety) and is only a third party beneficiary, that is a stranger to the contract and totally unable to enforce it under our law. However, in spite of this legal loophole to the enforcability of payment, surety companies in practice have always honored their apparent responsibility under the bond and have never taken advantage of the technical "out" to refuse payment. One wonders however, what a

surety company would do if confronted with an unusually large claim under a payment bond!

## RIGHTS AND LIABILITIES

OBLIGATIONS OF THE SURETY The obligation of the surety under a bond is single and straightforward, namely in the case of default by the general contractor and in the absence of any defences that arise through the failure of the owner and the contractor to carry out their obligations – to see that things to be done under the construction contract are in fact done and that the owner is given financial protection up to the limit of the bond. In these circumstances the surety should act immediately and without delay, devoting every effort to restore the momentum of the project and to keep the cost of completing the contract to a minimum.

OBLIGATIONS OF THE OWNER AND THE CONTRACTOR Certain acts both of commission and omission by the owner and the contractor may relieve the surety from his obligation to pay under a bond:

1. The owner and contractor must make full disclosure of all material facts at the time the surety contract is entered into. Fraudulent concealment of such facts to the prejudice of the surety will vitiate the contract.
2. In view of the incorporation of the construction contract, plans, and specifications in the surety contract, the surety has a continuing interest in these documents and must be informed of all substantial amendments thereto.
3. On the contractor's default, the surety is entitled to subrogation with respect to all assets held by the owner which, except for the default, would have been payable to the contractor. Care must be taken to preserve such security, e.g., the owner must place adequate insurance on buildings and equipment and preserve any collateral security; he must comply with the statutory hold-back requirements and avoid paying the contractor in excess of amounts stipulated in the architect's progress certificates, etc.

SALVAGE AND INDEMNITY When a contractor defaults and the corporate surety pays off, honouring its obligation under a bond, it may seek indemnity from the contractor for its loss. Indeed, the contractor when applying for the bond has had to execute a general assignment to the surety of all money which may ever become due him from the owner.

A substantial portion of all losses paid on bonds are recovered by the surety through salvage. The following are a few items of salvage available to the surety as a means of reimbursement:

1. The use of premises, machinery, materials and tools, etc., of the contractor for the completion of the project.
2. Money in the hands of the owner at the time of the contractor's default that was earned but unpaid and which, but for the default, would have been paid over to the contractor.
3. The statutory hold-backs also in the owner's hands to be used as trust funds for the payment of suppliers of labour and materials.
4. The balance of the contract price, i.e., the money set aside to pay for the project which was money unearned at the time of default.

# INSIDE THE OAA

**This year the Ontario Association of Architects asked Mr Harry B. Kohl of Toronto to write his impressions of the 1963 convention in February for the *Journal*. Mr Kohl tape recorded the following and left immediately for Acupulco. The sketches were provided by Mr C. Ross Anderson.**

AT 15° BELOW ZERO, in the gorgeous, garrish Ontario Room of Toronto's Royal York Hotel, the 77th annual meeting began. Typical weather and a typical name for an Ontario organization meeting!

President *John Lovatt Davies* lit the defrosting fire: *"The RAIC needs more money!"*

Amid thunderous flapping of pages and rattling of chairs, he spoke seriously on raising $85,000. Roars of laughter – when he reported one of the non-co-operative chapters was his native B.C. Sighs of relief – when he reported the PQAA had voted 44 to 33 to remain part of the RAIC family.

Then, with an "I-just-returned-from-the-United-Nations" mien, *Ian Maclennan* approached the microphone to play the national anthem in honor of the RAIC. He encored with an out-chorus of "Lady of *Smale* (Simcoe), I Adore You."

Anyway, the vote for extra fees was unanimous (minus two members unable to wiggle frost-bitten hands).

*Rankin* (Toronto) rumbled bearded thanks. *Morgan* (Earle, not Rum) complained we were ahead of schedule. He asked *Raymore* (Toronto) to fill in with "The Twist" for *Carson Morrison* (Professor, not Auto), who was to become an Honorable Member. (Does he still pay the extra $15?)

The president reported everything was going smoothly: relationship with the engineers was unsatisfactory; client-architect agreement bad; fee schedule deplorable. Does *Jim Murray,* our new Big Daddy, have much to do to keep us happy? Tune in next meeting. . . .

*Coffee Break.*

*Ferguson* (Ottawa) delivered one of his sterling addresses. According to the Queensberry Rules, he warned us he could no nothing briefly. Away he went on Building Research Division. By the time he recited the proper name and address of his organization and thanked his colleagues, he was drowned out by approving snores. He exited as *Doug Sta-Cato* (Toronto) plunged on stage.

Doug tried. Then *Gerry Raymore* jumped in, describing stimulating aspects of legal and ethical studies. Like Eliot Ness, Gerry and his Untouchables are trying to solve the case of "The Illegal, Unethical Blueprint Bootlegger."

*A Day at the Art Gallery.*

No art. Just architecture. And nobody in the gallery.

*Geoffrey* (Toronto) *Strong*-armed us over to *Jim Craig,* who ushered us, program laden, into the *Arena of the Past.*

Its focal point was the circular Temple of Love. There, romance included the loveliness of an Upper Canada Village cottage; an old clergy house; Minden, the fickle lover of many; Barnum House, Grafton; the elegance of St Andrew's Church, Niagara-on-the-Lake; and the frightening Gooderham Club (York), Toronto.

We were then thrust into the *Present* – the present of *Strutt* (Ottawa), *Adamson* (Toronto), *Craig & Zeidler, A. Bruce Etherington, Alex Leman, Hart Massey, Bill McBain,* and countless others. . . .

*Past President Earle C. Morgan*

*President James A. Murray*

The Munk Residence of *Jerry Markson* (Toronto) encouraged lovers of romance to believe beauty of the past can be recaptured and retained. Ebb Zeidler's (Peterborough) old-age home gave us the comfort of security we felt we could have after working in the *Crang & Boake* (office building) or living in the *Irving Grossman* (Toronto) Flemingdon Park. *Marani's* (Toronto) Better Living Centre, with the sexiest curves, was second to only *Klein & Sears'* (Toronto) shapely housing unit.

We then escaped into the opium fog of the *Future.*

Through piazza-like roof-decks of the new scheme for central Toronto, we pirouetted. We came to the cultural plant of the St Lawrence Centres for the Arts.

Properly crammed with culture, we strolled through the lush and moonling walkways of the New Waterfront.

The future appears to be the World of the Student.

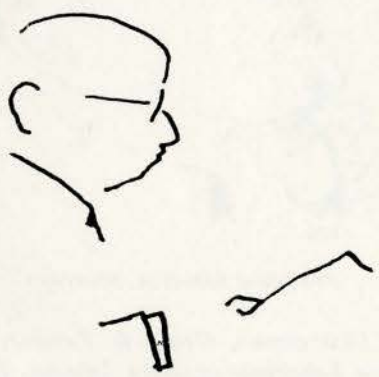
Oh, happy student days! *Football games . . . Aztec buildings . . . fraternities . . . bullsessions . . . terraced resort towns. . . .* You should have seen the phallic symbol on this resort town. It was indicated as an exclusive tower for exclusive entertainment. What more fitting reward for a retiring OAA president!

*Friday Night. Dinner.*

*Marcel Breuer!*

Breuer set sail on the theory of contradiction of gravity (a record of our times manifested in architecture). He spoke of ancient building stones, replaced by the continuous flow of forces, incorporated in the reinforced concrete design of contemporary architecture.

He examined the relationship between materials used in, and consequent shape of, our buildings. He encouraged us to exploit technological forces to their fullest — to generate a satisfactory emotional reaction to the mind beyond the eye.



*Secretary John Miller*

Breuer wandered through Greek post-and-beam stone construction into the area of the Gothic, which expressed the first structural frame. He touched on the Japanese timber frame — with a side trip to the geometry, continuity, and Mondrian pattern of the Japanese frame and panel.

He concluded with the steel frame. Like a tree, when its roots cantilever into the sky, it directs a continuous flow of vertical and horizontal forces through members of the structure. The prime characteristics of steel frame — with its slender members, consequent transparency, and minimum thickness of enclosing materials — create flat planes of translucent surfaces, which in turn create visual manifestations rather than an invitation to experience physical touch.

Breuer discussed the problems and possibilities of concrete: *the necessity to treat surfaces, sandblast, bush hammer.* This makes reinforced concrete flexible enough to tolerate its strength and form in sculpture.

In architecture, reinforced concrete is a three-dimensional sculptural art. Dividing line between sculpture and architecture is not definite.

"Sculpture," says Breuer, "is the three-dimensional art experience from the outside only. Architecture is a three-dimensional art experience, appreciated from the inside as well as the outside."

Glass is not everything any more, according to Breuer, "because a glass wall is not a satisfactory background for life. The slender structure of the . . . design may be an architectural accomplishment, but is not enough for full enjoyment and satisfaction."

Breuer explained there are requirements that need further study to advance architecture beyond the glass box and towards sculpture.

"We are now thinking of going from modern architecture to *good* architecture."

*Saturday. New Business.*

*George Banz* (Toronto), encouraged by his success along with *Henry Fliess* (Toronto) on the concept of competitions, urged that competitions should be held not only for Ontario, but for all provinces.

Since Fliess was still out to coffee, *Mike Barstow* (Toronto) seconded the motion. Under the influence of caffeine, we voted unanimously in favor.

*Alex Leman* (Toronto), OAA's Gregory Peck, ambled on stage. In an "Adult Only" movie style, he spun off the value of sessions.

*Marcel Breuer*

*Dr Northrop Frye*

"Like at Banff," he said. And, "We are *right,* geographically and historically," he said. He wound up confiding our sessions would be unlike the Banff sessions, where the research was "pure."

His motion was seconded by *Sullivan* (of Toronto, not Chicago). Discussion followed and was deafeningly silent. The motion was carried unanimously. (Nobody knows how much it will cost or where the money will come from!)

*George Peck* (Ottawa) asked for clarification on hospital design. Our president called on *Doug Cato* (Toronto), who in full battledress brought in a factory stimulant. A Peck of trouble avoided.

*Thomas* (Ottawa) wanted to skip dead horses, and their flogging, but felt it important that of 101 architects in the federal government, 77 were in Toronto, and only 24 were members of the OAA. ("Don't spread the word!" was the consensus.)

Smale, from Simcoe, then executed a *pas de deux* with Thomas, of Ottawa, on seminars.

*Irving Flemingdon* (Grossman, of Toronto) arose to support Smale on his delivery and speech. What we all pondered, because we couldn't understand what Flemingdon Grossman was talking about: *Did Breuer comb his hair like Grossman? Or did Irving comb his hair like Bill McBain?*

Irving's comments on the cross-sectional aspects of the Stratford seminars left you wondering about the real intent of seminars.

Irving then aimed his big artillery. He blasted the compulsory aspect of summer courses and the extent they would interfere with post-graduate work of students who wanted to travel. He mentioned rebellious and rumbling

students. ("The restless are growing native.")

*Watson* (Belleville) entered the fray to explain the salty Salter Report. *Compulsory?* — "Necessary, because we no longer excavate by horse teams and scrapers, and we want to beat the package dealers." *Traveling post-graduates?* —"Exceptions to the rule will be made."

A pitched battle followed — *Prof. Madill . . . John Sullivan . . . Gerry Raymore . . . Irving Flemingdon . . . Smale . . . Watson . . .* (Some of us decide, then and there, to open a travel agency: there's going to be a surging exodus to Europe to avoid the realities of the Registration Board.)

*Termination of the Meeting.*

*Lunch.*

*Speaker: Dr Northrop Frye,* who knows nothing of small talk, but lots and lots about the large, uneconomical pack.

He orates on "The Discipline of Vision."

As the first office boy of *Canadian Poetry Magazine,* I don't know what Frye's vision is like, but his discipline — wow!

*Primo,* Dr Frye doesn't believe in inspiration. He considers it a primitive view, closely allied with the attitude of lunatics. He holds there's no difference between the creative artist and the thinker. He says that to be creative you must grasp knowledge of conventions.

He feels that every artist must identify with a body of thought, study it, then begin to contribute. He opines that New York is a race between the manufacturer of glass and the manufacturer of curtains. *(Voila,* the curtain wall!)

Dr Frye thinks the arts try to transform the subhuman world into human significance. *(Have you met my clients?)*

He believes the architect's function is to realize the form of the human world and to represent the civilization it (architecture) represents. He further believes architecture is a mirror of society. (Lots of us are made of antique glass!)

He says design conception marries the major and minor arts. (I pass.)

Traditionally, the arts produced luxury goods for the leisure classes (architects?). The characteristic of luxury goods is elaborateness. In architecture, it is shown in buildings such as the Casa Loma, partially memorial in basic purpose.

Modern technology has eliminated development of oddities in the minor arts. A sense of spontaneous production is seen in the handcraft era, but has disappeared from today's architecture. Dr Frye maintains we are approaching a world-wide uniform art.

Using architecture as a mirror, you can read the character of a society from its buildings: our cities show that business has been deified; religion and culture have disappeared.

Dr Frye states that socially subversive satirical realism is healthy. But realism represents the ascending society, whether by the statues of Rome or mannequins in Bloor Street women's shops.

"Rediscovery of the conventions and traditions are signs of originality," explains the good doctor. "The end of any art is a transfer of its creative energy to persons who use it." (For some reason, mechanical toothbrushes come to mind!)

Dr Frye thinks the greatness of our buildings is a dramatic intensity of life, which the buildings make possible, not the appearance of buildings.

"Every work of art," he summarized, "is a process and product of free choice. This choice, on the part of its creator, will show if he wants to live under freedom or tyranny, and if he wants to carry on the fight for mankind's sanity."

*B. C. Binning*

# PROVINCIAL NEWS

## NEW OFFICERS ELECTED BY PROVINCIAL ASSOCIATIONS

### ONTARIO

ERIC TRUSSLER

*L to R: John Stewart Cauley, Toronto; Frank H. Burcher, Hamilton; David C. Stevens, London; D'Arcy G. Helmer, Ottawa; James A. Murray, Toronto, president; Douglas C. Johnson, Windsor, treasurer; Earle C. Morgan, Toronto, past president; Louis N. Fabbro, Sudbury.*

### ALBERTA

JOURNAL OF COMMERCE WEEKLY

*L to R: front row, H. Seton, first vice-president; J. A. Cawston, past president; D. G. Forbes, president; D. Bittorf, second vice-president; back row, J. McIntosh; E. Raines; H. Dunn; D. L. Sinclair, honorary treasurer; R. F. Bouey, honorary secretary; K. L. Bond.*

### NOVA SCOTIA

MAURICE CROSBY

*L to R: front row, M. H. F. Harrington, secretary; T. W. Bauld, president; A. F. Duffus, vice-president; back row, Aza Avramovitch; W. Vaughan; C. A. E. Fowler, past president; J. S. MacDonald.*

### ANNUAL MEETING OF THE AAA

At the Alberta Association's annual meeting the following were elected to the executive committee: D. G. Forbes, president; H. Seton, first vice-president; D. Bittorf, second vice-president; D. L. Sinclair, honorary treasurer; R. F. Bouey, honorary secretary.

Members re-appointed to the board are: A. Bowers, chairman; S. Hodgson; H. Dunn; M. Evamy; D. K. Bissell. Newly elected council members are: J. A. Cawston (past president); H. Dunn; J. McIntosh; K. L. Bond; and E. Raines.

A panel discussion on "Professional Responsibility" was conducted during the meeting and it was agreed that liaison committees should be established in Edmonton and Calgary to meet with committees from the Contractors Association for the purpose of discussing their mutual problems. Panel members included John Steel, moderator; G. Wynn, architect; B. Butler, consulting engineer; A. Anderson, owner; R. Stollery, contractor; M. Rodney, lawyer; R. McLean, bonding agent. The RAIC per capita increase of $35 was approved at the meeting. Elected to the board of examiners were T. G. Aberdeen, D. G. Forbes, A. Bowers, J. Wallbridge, D. Bittorf, D. L. Sinclair, and R. Clarke. Elected to the editorial board of the *Journal* were: A. Bowers, H. Dunn, M. Evamy, D. K. Bissell, and S. Hodgson; elected to the RAIC council, D. G. Forbes, J. A. Cawston, H. L. Bouey, R. F. Bouey, and H. Seton; Alberta representative to the RAIC Legal Documents committee, K. L. Bond.

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### ANNUAL MEETING OF THE NSAA

The Association's 31st annual meeting was held at the Lord Nelson Hotel in Halifax on February 1st, 1963.

Eleven members, one honorary member, and one affiliate member received their certificates.

The keynote of the meeting, chaired by Mr Fowler, was the cost of operating the Nova Scotia Association of Architects, the annual contributions to the RAIC and the actions of the committee on the review of the acts and regulations of the association.

The Association unanimously passed the following motions:

(a) to increase the per capital contributions to the RAIC by $15 per member;

(b) to increase the per capital assessment of each member of the NSAA by $25;

(c) to set up a financial advisory committee to oversee expenditures, to allocate funds to committees, and to draw up a budget for the direction of the council;

(d) to make an annual donation to the Nova Scotia Technical College, School of Architecture, to be spent to benefit the school at the direction of the advisory committee;

(e) to appropriate sufficient funds to employ competent legal authority to make improvements in the legal documents of the Association for presentation to the membership and, if acceptable, for presentation to the provincial governments.

(f) to consider a member's submitting specially prepared sketches on designs for a specific project to a prospective client, prior to being commissioned to carry out the work, as being unethical practice.

(g) that council seek clarification of Chapter 85 section 1 (h) Engineers Professional Act 1954, insofar as it effects the practice of architecture in Nova Scotia.

Reports from the various committees were approved. The members heard from the historical committee chairman, James MacDonald, who spoke of the newly appointed survey by the Department of Northern Affairs and Natural Resources by which 150 buildings of historic and architectural merit are to be surveyed. Mr MacDonald also referred to the re-establishment of the Heritage Trust of Nova Scotia in which he serves as treasurer and Lester J. Page, as secretary — the only architects on the board of directors. Mr Gregory Lambros and Lester J. Page were appointed as voting delegates to the Nova Scotia Arts Council. Mr Robbins Elliott, executive director of the RAIC, reported on Institute activities.

Mr Peter Stokes and Mr Jack Richardson, two members of the Department of Northern Affairs and National Resources visiting Halifax on the historical and architectural survey, spoke to the members on their proposed work.

T. W. Bauld was elected president of the NSAA for the ensuing year. Other officers elected were, Mr Allan Duffus, as vice-president, Mr Leslie Morley as treasurer, Mr Frank Harrington as secretary, with Messrs Aza Avramovitch, J. S. MacDonald, and Wykeham Vaughan, serving as councillors.

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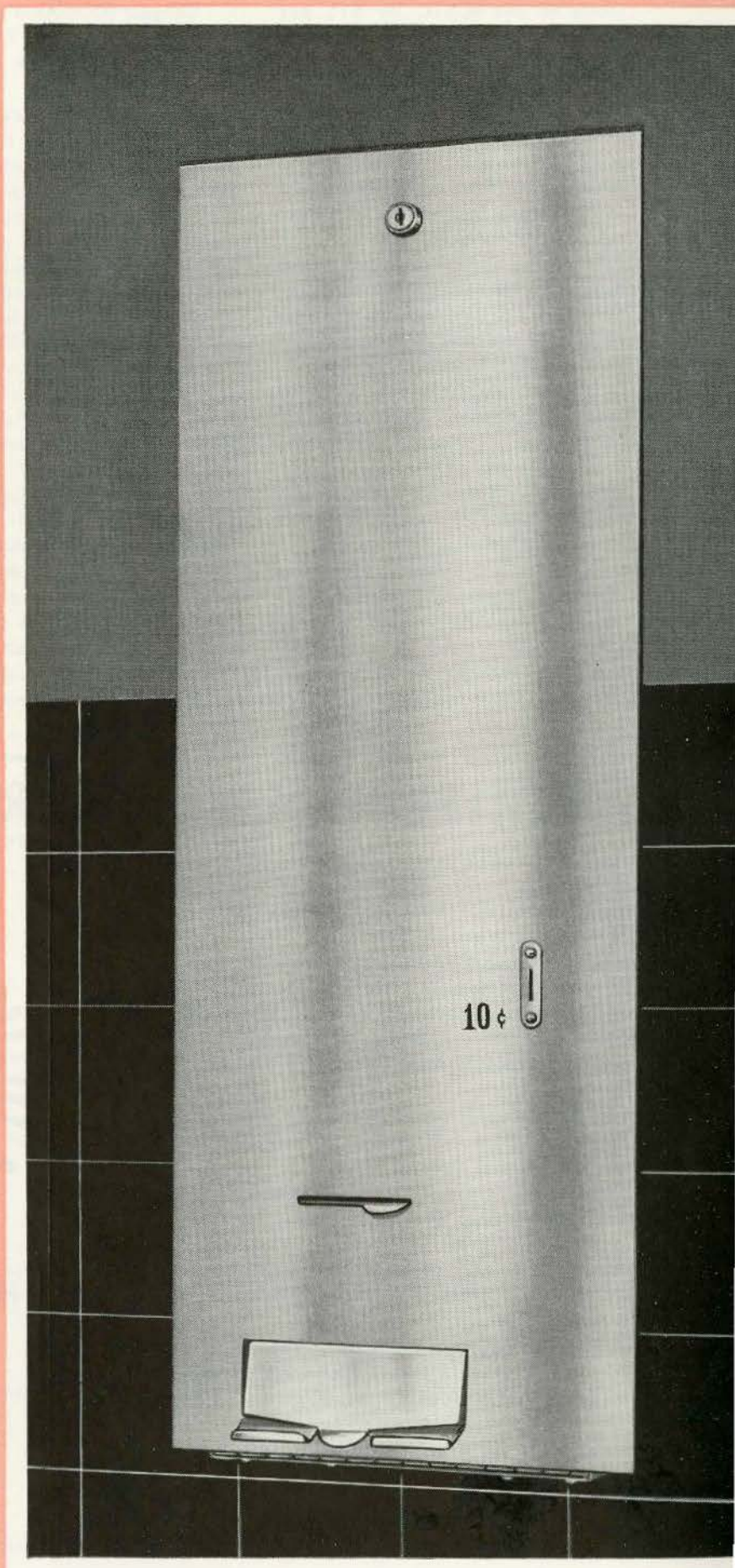


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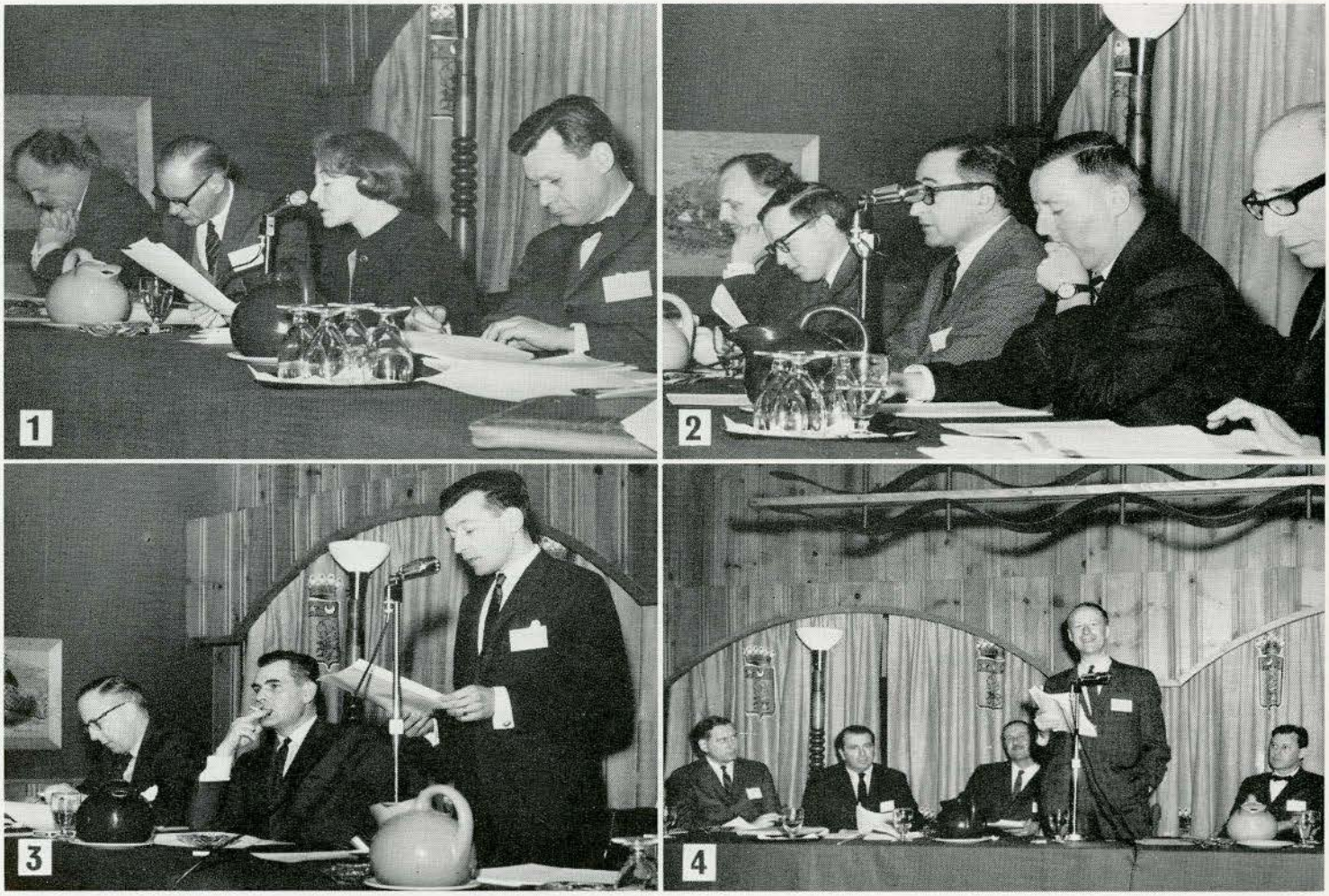
# L'EXPOSITION UNIVERSELLE DE 1967

## Sommaire des Conférences Prononcées au Congrès Annuel de l'AAPQ




*Les conférences — 1) Le concept, g. à d. — H.P.D. van Ginkel, Hazen Sise, Blanche L. van Ginkel, Roy E. LeMoyne; 2) Le thème, g. à d. — H.P.D. van Ginkel, R. David Bourke, Harry Mayerovitch, Gilles Gagnon, Alfred Neumann; 3) La mise-en-scène, g. à d. — J. Campbell Merrett, Aimé Desautels; Jean Gareau; 4) Les méthodes, g. à d. — Arthur B. Nichol, George F. Eber, Henri P. Labelle, Ray T. Affleck, Roy E. LeMoyne.*

PHOTOS — W. B. EDWARDS

L'EXPOSITION UNIVERSELLE et internationale de 1967 a été le principal sujet d'études et de discussions au Congrès annuel de l'A.A.P.Q. tenue au Lac Beauport en janvier. C'est Jean-Louis Lalonde qui a organisé et présidé cette partie du programme. Quatre conférences ont été prononcées; elles étaient le fruit de plusieurs semaines de travaux intenses avant le Congrès. Des colloques animés ont également eu lieu sur les sujets des quatre conférences, suivis de l'adoption, la dernière journée, de plusieurs résolutions importantes qu'on a depuis transmises au Commissaire Général de l'Exposition comme représentant les vues officielles des architectes du Québec sur le sujet de l'Exposition Universelle.

Les conférences avaient pour titres: Un concept — Le thème — La mise en scène — Les méthodes à suivre pour réaliser une exposition de qualité supérieure.

La conférence sur le concept a peut-être été la plus significative, en ce sens qu'elle a porté sur la question de base que plusieurs architectes se posaient eux-mêmes, à savoir: Quelle est la véritable raison d'être d'une exposition universelle en ce moment et à cet endroit? Suffit-il de s'accorder une autre extravagance, ou peut-on introduire dans cette idée d'exposition internationale un élément qui aurait une signification réelle pour le Canada et le monde de notre temps.

Cette première conférence a dressé le bilan des Expositions antérieures et a démontré comment les expositions importantes ont toujours reposé sur une compréhension et une manifestation nouvelles de la réalité de leur temps (par exemple: le Crystal Palace 1851 — Paris 1867 et 1889). Les foires de notre siècle ont ordinairement débouché sur la faillite, si on les jauge d'après ce critère, en dépit du succès remporté par quelque-unes d'entre elles du point de vue faste et argent. L'exposition de New York de 1964-65 promet encore d'être un étalage monstre dans la tra-

dition du XXe siècle, une exposition avec laquelle Montréal ne peut ambitionner de se mesurer en termes de dollars et de spectacle. Montréal ne peut se permettre de simplement reproduire un New York miniature deux ans plus tard.

On ne s'étonne plus aujourd'hui à la simple dimension d'une charpente ou devant la complexité d'un produit. La compétition entre nations, chacune dans son propre pavillon national distinct, chacune essayant d'attirer l'attention de la foule, est devenue stérile et monotone. La concurrence se justifie lorsque les réalisations d'une nation peuvent s'afficher côte à côte avec celles d'autres nations, où il s'avère possible de les comparer et de les relier à un domaine donné des activités humaines. La présentation disparate de pavillons nationaux n'a pas sa place dans une véritable exposition internationale. En fait, ce n'est que dans les foires mondiales du XXe siècle que le pavillon national a pris la vedette.

Au lieu de cet étalage disparate de pavillons nationaux, le thème de l'exposition "Terre des hommes" doit être présenté dans ses aspects fonctionnels supérieurs, tels les besoins de l'homme, l'environnement de l'homme, l'esprit de l'homme, la famille de l'homme, les aspirations de l'homme.

La deuxième conférence a étudié la façon dont ces aspects pourraient à leur tour être sub-divisés en sujets de présentation qui intéresseraient plusieurs nations, par exemple, l'agriculture — la vie urbaine — les forêts — le développement du nord — la récupération des terres arides — les voyages dans l'espace — l'art — la science — l'éducation — et plusieurs autres sujets dont on pourrait faire une sélection judicieuse.

Chaque sujet de présentation pourrait être logé dans un secteur distinct des terrains de l'exposition; chaque nation pourrait exposer dans autant de sections ou sous-sections fonctionnelles qu'elle voudrait. Cette façon de traiter le thème créerait de l'unité dans la présentation, le "design," l'effet d'ensemble, et à la fois permettrait une diversité qui est essentielle à tout spectacle. Idéalement, ces sous-thèmes seraient développés d'une manière vraiment internationale par les experts les mieux qualifiés du monde entier. Il serait néanmoins possible de présenter des exhibits nationaux à l'intérieur des cadres de ces divisions par fonctions.

La conférence intitulée "mise en scène" s'est intéressée à la possibilité de présenter une exposition internationale de cette nature en tant que grand spectacle plutôt que conférence illustrée ou visite de musée.

On a pensé que le spectacle pourrait être conçu et dans le temps et dans l'espace, où le spectateur est concerné physiquement, émotionnellement, intellectuellement et spirituellement — un spectacle qui dépend pour sa réussite non seulement du sujet, mais également de la mise en scène et de l'exécution.

L'exposition devrait tirer son atmosphère de son emplacement: la Cité de Montréal — elle devrait s'identifier à la Ville d'aussi près que possible; l'idéal serait qu'on la situe entre les deux points d'attraction: le Mont Royal et le Fleuve St-Laurent. Là où c'est possible, l'exposition devrait s'intégrer au milieu urbain.

L'exposition devrait tendre à réaliser un caractère urbain compact, tout en évitant la congestion. Elle devrait fondre les nombreuses idées individuelles en une unité significative, tout en évitant la monotonie et le conformisme stérile. Elle devrait marier vieux et neuf.

La conférence qui traitait des "méthodes" a étudié le sujet sous les trois titres principaux suivants: programme, composition et contrôle. En prenant pour bases ces trois catégories, on a proposé trois entités fonctionnelles distinctes mais reliées entre elles: un comité du programme; une équipe de travail "création — technique," et un comité spécial consultatif pour contrôler la qualité de la composition et du contenu.

La tâche principale du comité du programme serait de choisir les principales catégories du thème "Terre des Hommes" qu'on utiliserait dans l'exposition, et de définir le programme de chacune de ces sous-divisions. On a jugé cette tâche comme l'une des plus vitales dans tout le développement de l'exposition; elle exigerait la contribution d'experts du monde entier dans les divers domaines concernés. Le travail détaillé de ce comité pourrait éventuellement être organisé en équipes de travail semi-autonomes parallèlement aux subdivisions principales du thème.

La deuxième grande catégorie est l'équipe créatrice-technique — c'est-à-dire les planificateurs, les ingénieurs, les architectes, et les designers qui seront responsables de la composition même et de la réalisation de l'exposition. Les principaux points soulevés concernant ce travail ont été les suivants:

1) Les principales professions dont les talents seraient requis pour la création de l'Exposition devraient fonctionner comme une équipe complète par elle-même et inspirée par un commun intérêt dans les aspects humain et esthétique de l'Exposition;

2) Des professionnels de toutes les parties du Canada et du monde entier doivent participer à la création de l'Exposition. Les Associations professionnelles devraient adopter les amendements légaux et les ajustements d'ordre pratique requis pour faciliter cette collaboration mondiale.

3) L'équipe créatrice-technique devrait agir en étroite coopération avec le comité du programme, et son organisation devrait être parallèle à la subdivision du thème en diverses fonctions. Cette division du programme pourrait fournier l'avantage, au sein de l'équipe créatrice-technique, de plusieurs petites équipes organisées dans le sens vertical et vouées à des fins architecturales spécifiques, plutôt qu'une vaste organisation "horizontale" et peu flexible qui tenterait de voir à toute l'Exposition.

4) Dans le but d'éviter des pertes de temps et des négociations à répétition et pour assurer un traitement équitable pour toutes les professions, on devrait uniformiser les honoraires professionnels de tous les membres de l'équipe créatrice-technique.

La troisième considération importante a été de protéger le concept et son programme de réalisation, et de contrôler la qualité de la composition. La meilleure manière d'atteindre ces deux buts serait de créer un comité consultatif de composition et de pouvoirs soigneusement définis. Bien qu'il n'établisse pas de ligne de conduite, ce comité s'intégrerait à la structure d'organisation de l'Exposition de façon à ce qu'on ne puisse le contourner.

Une des tâches principales de ce comité serait de recommander des professionnels ou d'en approuver l'engagement sur une base de compétence établie. A cet effet, le temps et les considérations d'ordre pratique le permettant, on recommande la tenue de concours.

On suggère que ce comité soit composé d'hommes de renommée internationale dans les arts, les humanités ou les sciences.

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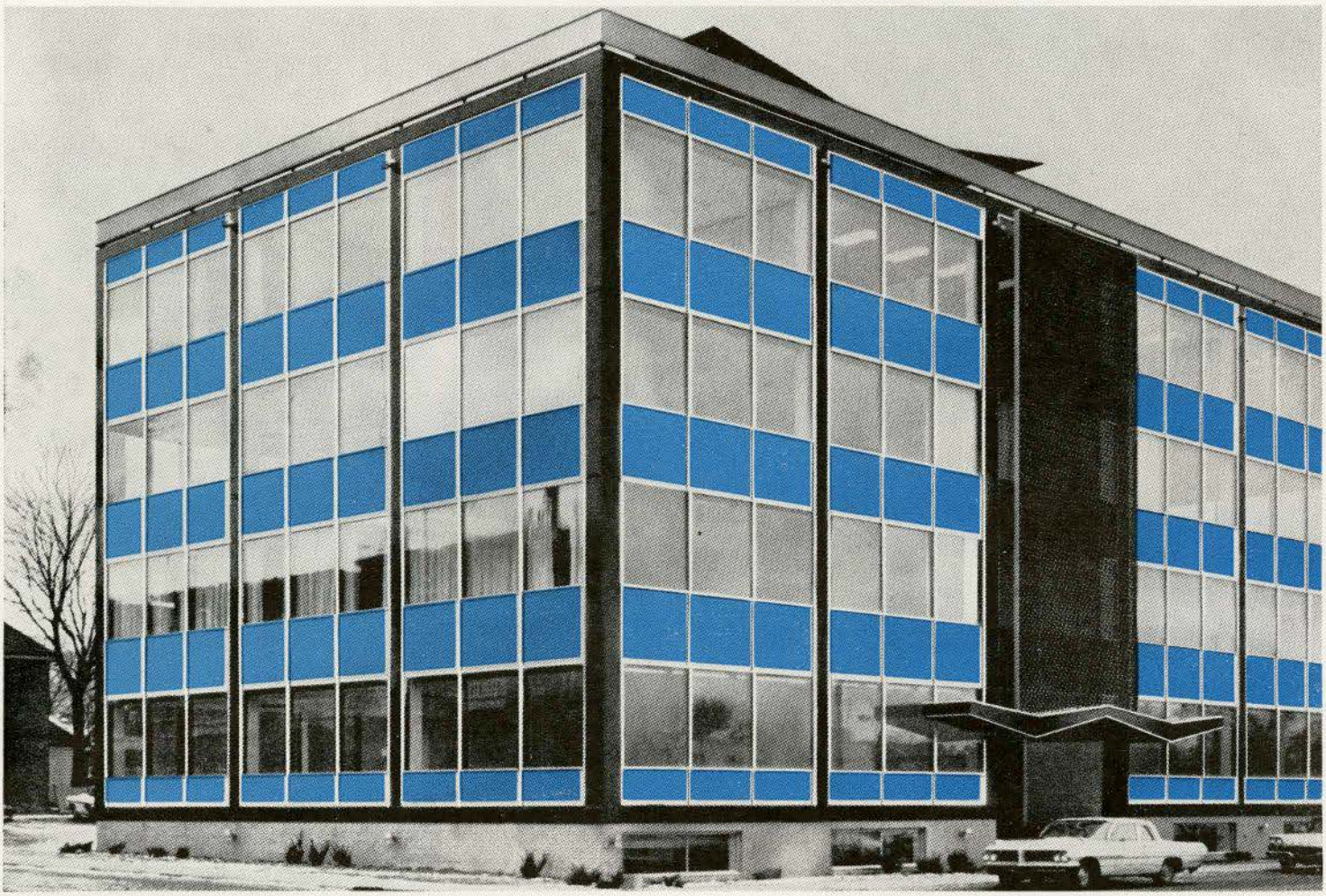

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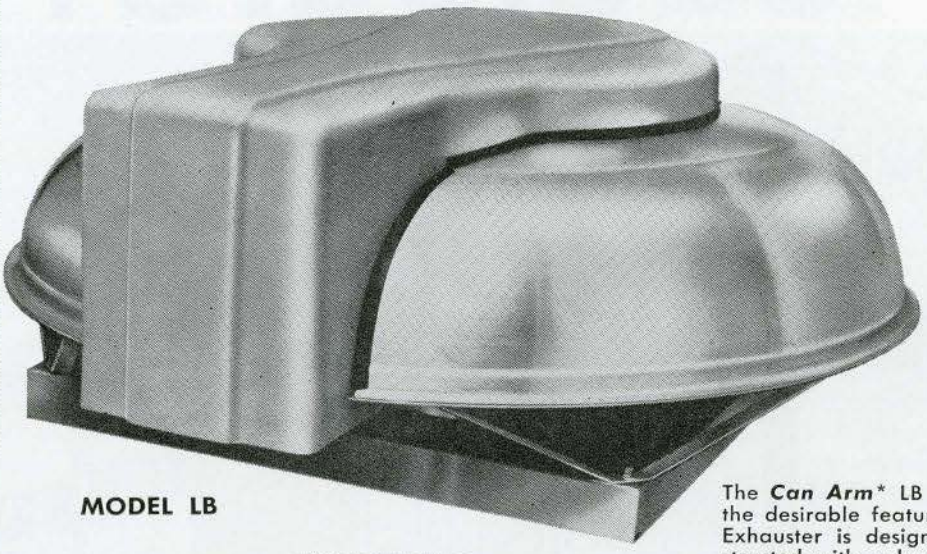

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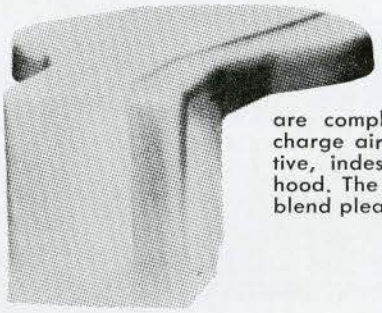
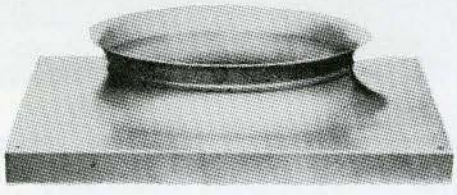
The ***Can Arm**** LB Unit is supported from the base with heavy gauge V-Type steel braces welded to an angle ring on which the spun aluminum hood is supported.

This ***Can Arm**** engineered design gives the LB Unit tremendous strength and rigidity and leaves the discharge area free of obstruction.



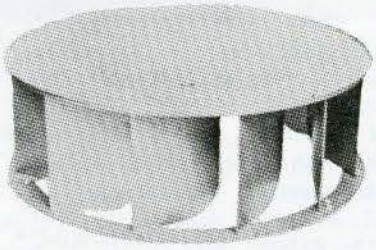
### MOTOR COVER

The motor, belt, bearings, and drives on the ***Can Arm**** LB, Low Silhouette Exhauster are completely isolated from the discharge air and protected by an attractive, indestructible, Fiberglass weather hood. The hood is smartly sculptured to blend pleasingly with the roof line.



### CURB

A deep cone spun into the rugged base of the ***Can Arm**** LB Low Silhouette Exhauster forming an unobstructed free flow venturi is greatly responsible for the efficient performance of the LB Exhauster.



### WHEEL

The backward curved, non-overloading wheel used on the ***Can Arm**** LB, Low Silhouette Exhauster is ruggedly constructed with a deep-dish cone spun in back plate to increase rigidity and reduce turbulence. This insures a smooth running, more quiet wheel.

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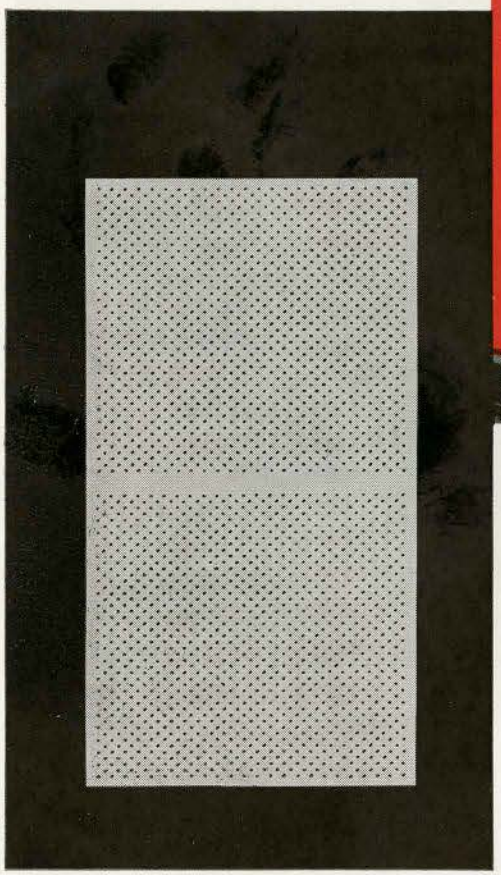

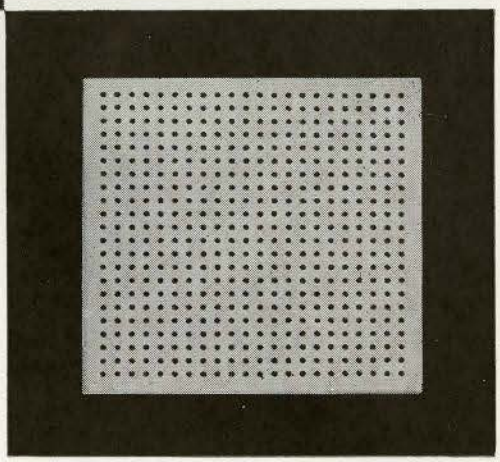

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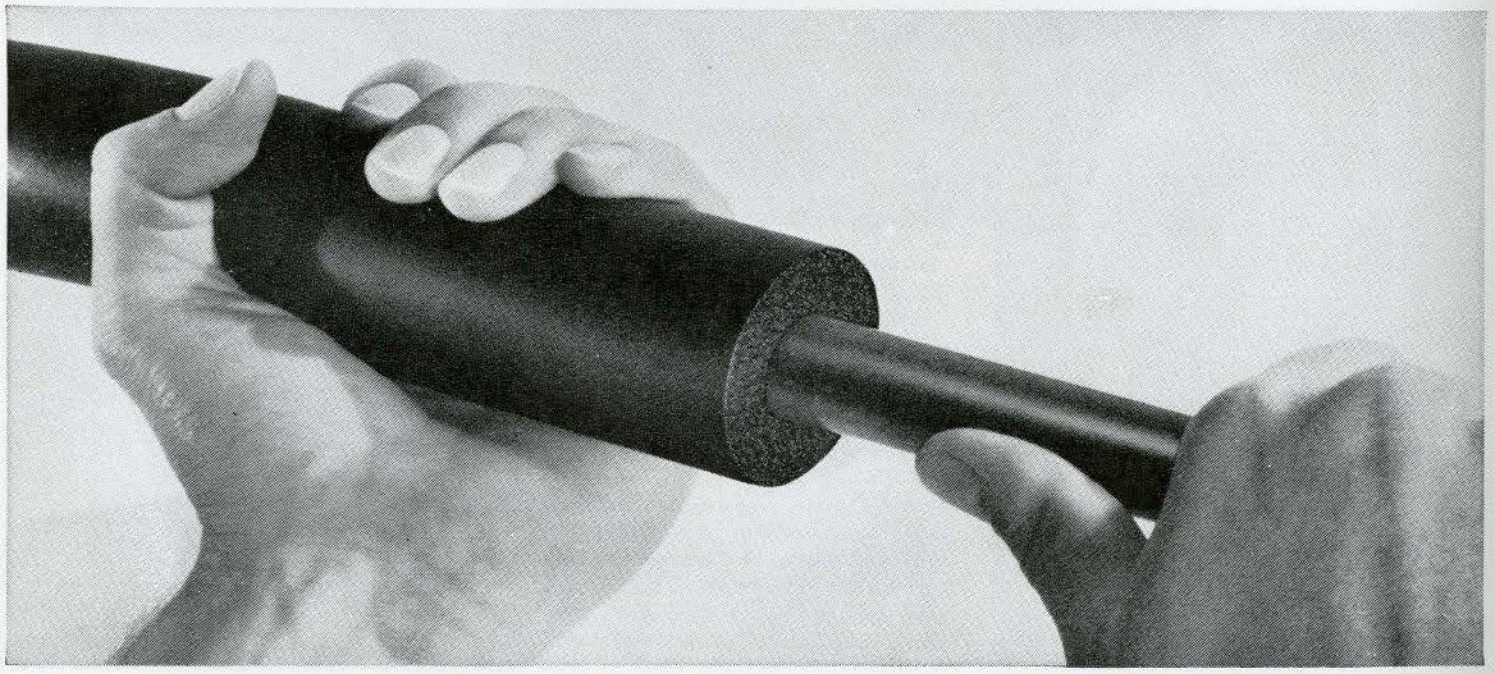

## *slip on Armaflex*

Quickest and easiest way to insulate piping in the below zero to 220F range is to slip on Armstrong Armaflex 22 Insulation. This flexible foamed plastic material slides over straight or bent pipe with the greatest of ease. Connect the pipes, cement insulation end joints, and the job is done. No vapour barrier finish is needed because Armaflex is airtight and moisturetight. Savings run to 50 per cent, compared with many commonly used types of insulation materials.

Armaflex is one of a complete line of insulations for pipes, fittings, tanks, vessels, and equipment. Included are Armaflex 22 Sheets, Rigid Armaflex and Adhesives. For literature containing complete product and specification data, write today to Armstrong Cork Canada Limited, Dept. RA5A, P.O. Box 919, Montreal, P.Q.

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A Venus Drawing Pencil with a useful eraser-tip costs the same as a Venus Drawing Pencil without . . . you get the useful tip free. Either with or without tip Venus gives you leads of the world's finest ground graphite . . . makes your drawings reproduce with crispness and perfect definition.

#3800 Venus Drawing without tip comes in a complete range of 17 degrees of hardness, 6B to 9H. #3820 Venus Drawing eraser-tipped comes in 11 degrees, 3B to 6H.

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where beauty of design accords with maximum efficiency in use, both advantages result from the integrity of the structural concept

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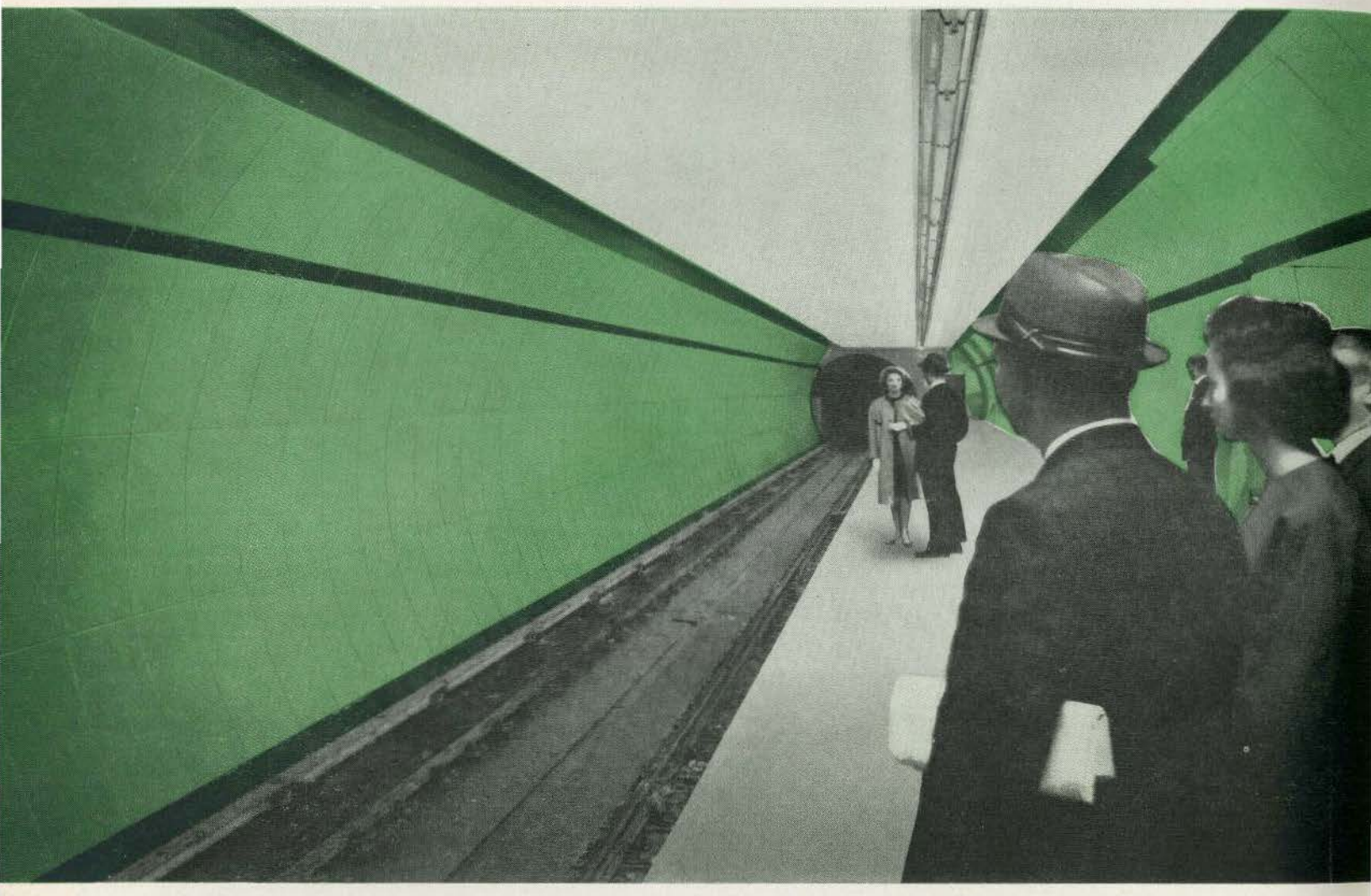

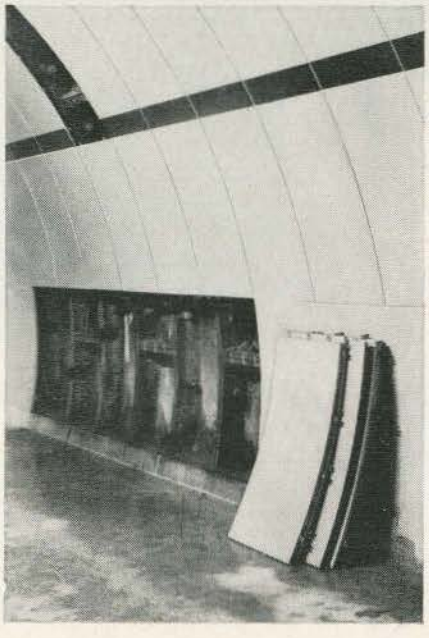

IN NEW EAST-WEST TORONTO SUBWAY, Porcelain Enamelled Steel was selected by the Toronto Transit Commisson for panelling in tunnelled stations. CURVED PANELS were essential to station design. The requirements of strength, shape, durability and attractive finish—all within strict limitations of space—were met by porcelain enamelled steel.

TUNNELLED STATIONS OWNER:
Toronto Transit Commission

ARCHITECTURAL DESIGNERS & CONSULTING ENGINEERS:
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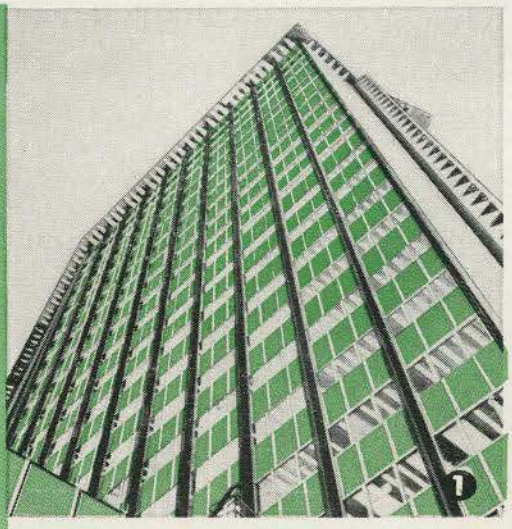
CONSULTING ARCHITECTS:
John B. Parkin Associates
Margison & Keith Engineers & Architect

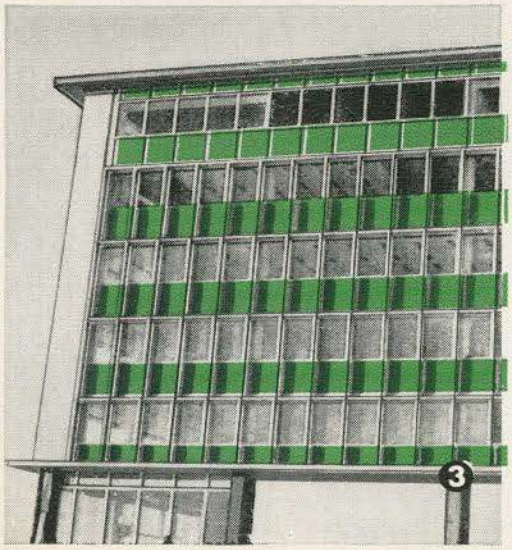
GENERAL CONTRACTORS:
Anglin-Norcross Ontario, Limited

ARCHITECTURAL PORCELAIN PANELS by Moffat's Limited

# **PORCELAIN ENAMEL** *on a top quality Canadian steel!*








The strength of steel sheet . . . the lifetime beauty of colour . . . are combined in Porcelain Enamelled Steel.

This modern material was chosen for the Toronto Transit Commission's new Bloor-Danforth-University subway. It has a durable, scratch proof finish requiring minimum maintenance. It is used here to follow both curved and "mirror flat" lines, within strict limits of space. It is easily moved or removed if necessary.

Porcelain Enamelled Steel offers permanent colours ranging between full gloss and a variety of matt, matching and simulated finishes. It gives the designer exceptional freedom at costs competitive with other quality materials.

For further information contact any Stelco Sales Office. A copy of the brochure "Accent on Colour" is available upon request.

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ARCHITECTS:
Thompson, Berwick & Pratt, Vancouver, B.C.

GENERAL CONTRACTORS:
John Laing & Son (Canada) Limited

ARCHITECTURAL PORCELAIN PANELS by Cerametal Industries Limited

②
OWNER:
La Compagnie d'Assurance Canadienne Mercantile, St-Hyacinthe, Quebec

ARCHITECTS:
David & David, Architects, Montreal

STRUCTURAL ENGINEERS:
Lalonde & Valois, Montreal

MECHANICAL ENGINEERS:
Huza & Thibault, Montreal

GENERAL CONTRACTOR:
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Allward & Gouinlock

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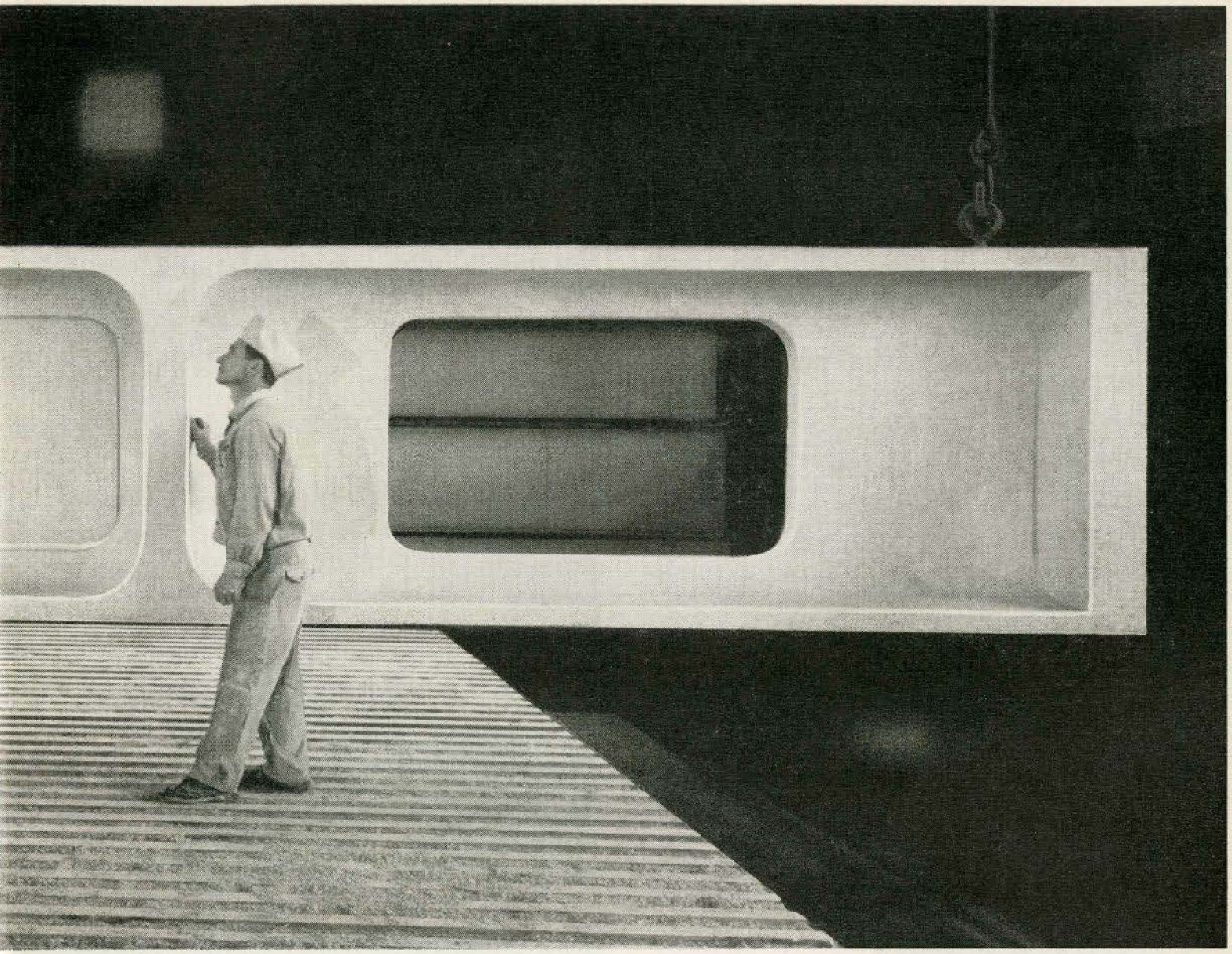

# PRECAST EXPOSED AGGREGATE

## fabricated for addition to Simpson's store, Halifax

These unique integrated window wall panels faced with polar quartz and backed by Ritchie's minus zero slump concrete are tested and controlled by nuclear methods to maintain a uniformity in density, elasticity and moisture, thus assuring durable, warpage-free concrete.

For compounded frames of this type, structural analysis and warpage calculations are obtained by the use of energy strain formulae, rather than current elastic and plastic design formulae.

TECFAB

**THE RITCHIE CUT STONE COMPANY, LIMITED**

*ARCHITECTURAL CONCRETE DIVISION*

**NEW TORONTO** **ONTARIO**

*Licensed by Tecfab Incorporated, Beltsville, Maryland*

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C. A. Fowler & Co., Halifax
General Contractor: Annapolis Valley Construction Ltd.
Precast Panels: The Ritchie Cut Stone Company Limited

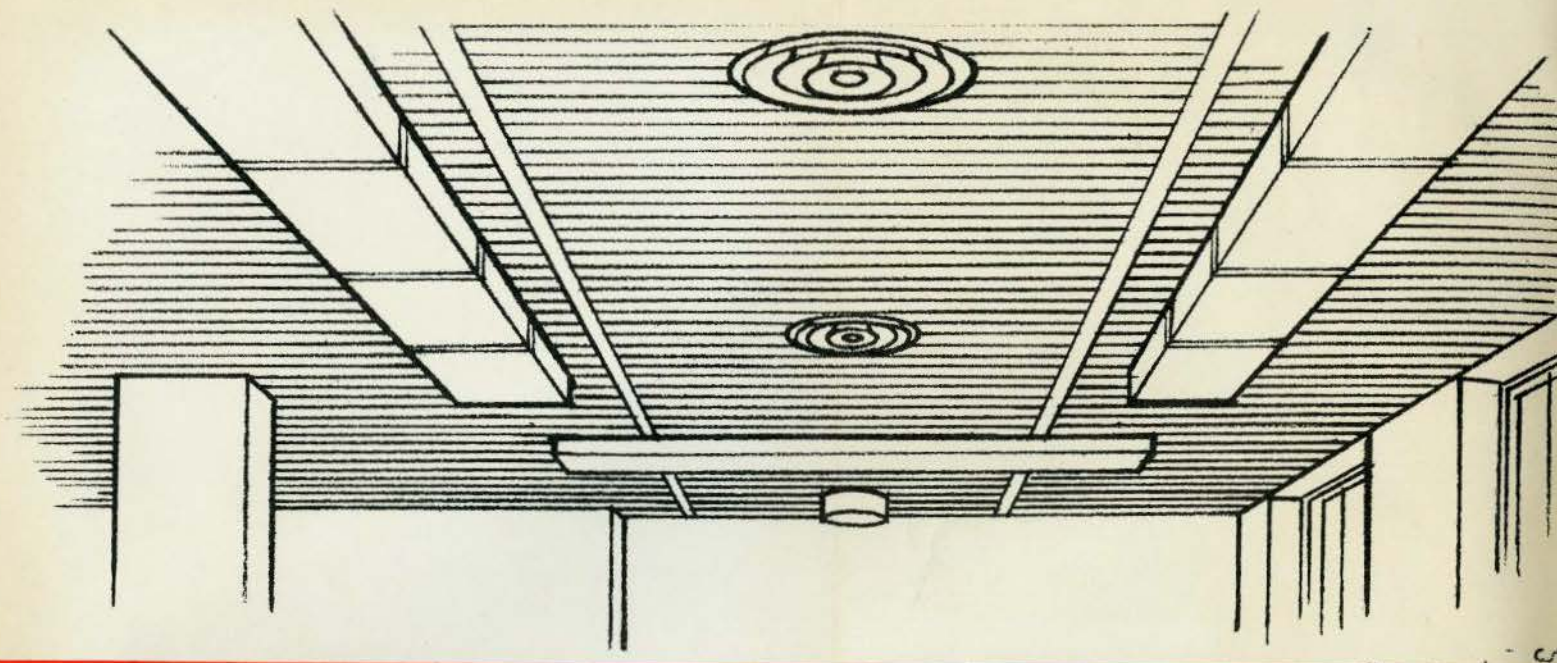
**NEW IDEAS TAKE SHAPE WITH REYNOLDS ALUMINUM**

**"REYNOCOUSTIC"
SOUND CONDITIONING
SYSTEMS**

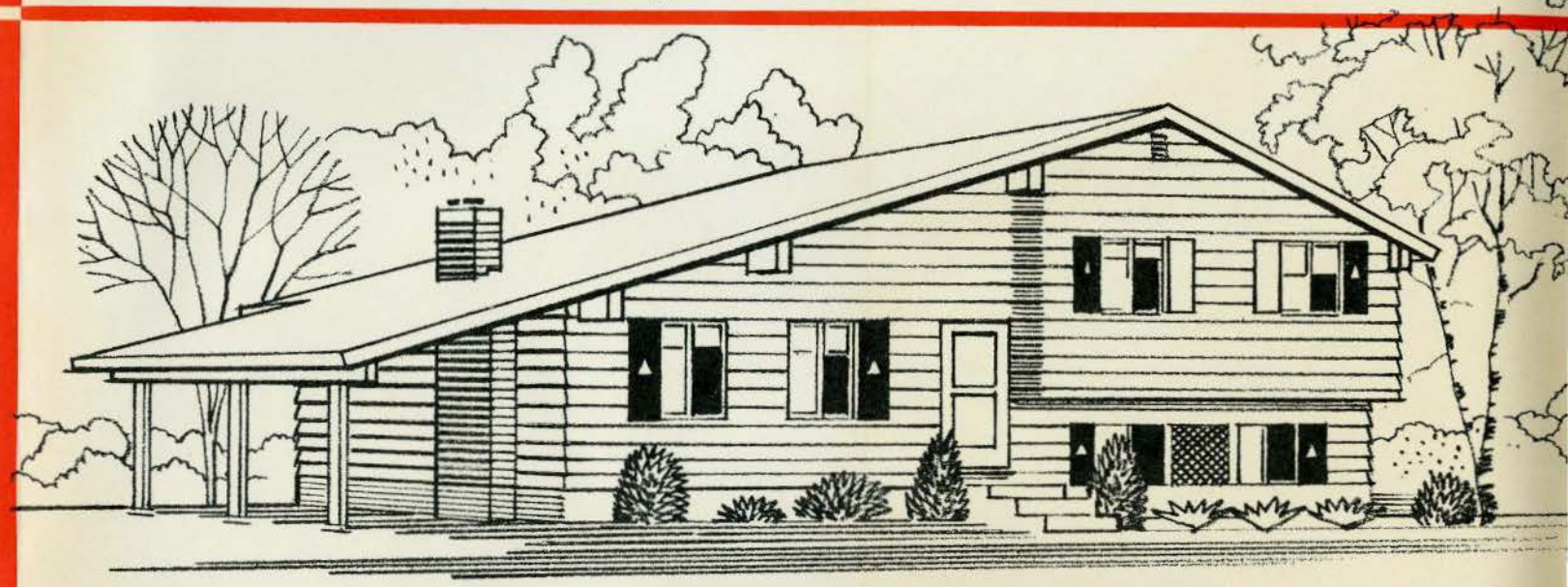
**BEAUTIFUL,
BAKED ENAMEL
ALUMINUM SIDING**

**RUGGED,
RUST-RESISTANT
AIR DUCTS**

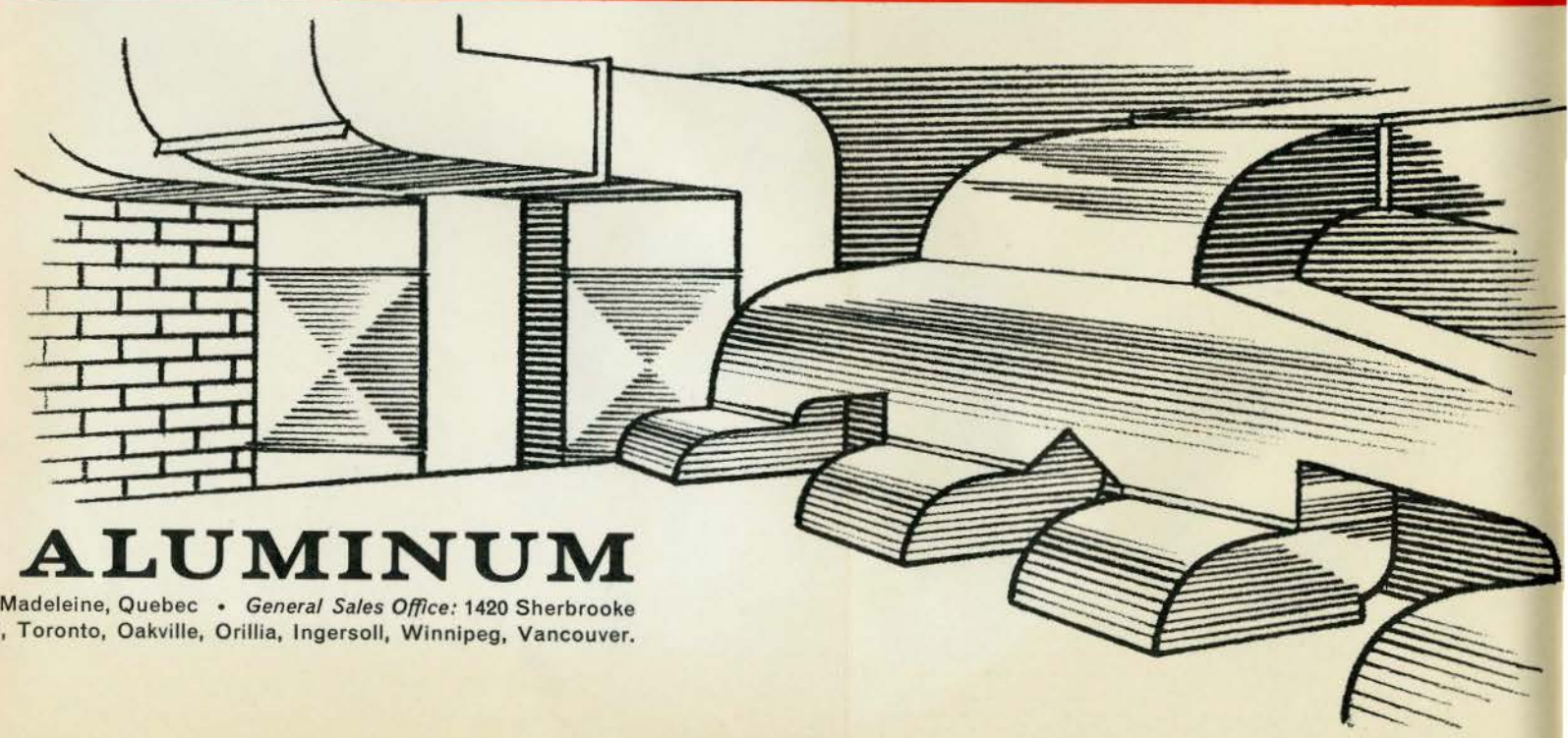
**Lightweight, easy-to-install, "Reynocoustic" systems** provide the architect with a wide range of materials for outstanding noise control in commercial and public buildings, and institutions. "Reynocoustic" acoustical panels adapt easily to various lighting fixtures and air conditioning systems. They permit early occupancy of new projects, and reduce shutdown time for renovation projects. Fire and moisture-resistant, individual corrugated or pyramid panels can be quickly removed to provide access to concealed utilities. Available in natural aluminum or baked-on white enamel.



**Colorful, weather-resistant siding made of Reynolds aluminum** offers you increased scope for handsome home designs. Available in a distinctive range of bright tones, baked-enamel aluminum siding combines rugged beauty and durability for a completely rust-proof finish that prevents absorption or transmission of moisture. Aluminum siding has withstood exposure to the weather for 10 years—repainting may not be necessary for 15 years or longer. For exceptional design, always keep Reynolds aluminum in mind.



**Rust-resistant aluminum air ducts** for air-conditioning, heating and ventilating systems are increasing in demand. Condensation which rapidly deteriorates other materials can't harm corrosion-resistant air ducts made of Reynolds aluminum. Another important benefit: Aluminum air ducts are lighter, easier-to-handle and install, require practically no maintenance.



# REYNOLDS ALUMINUM

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Bandroom, Clark Road Secondary School—London, Ontario

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Another testimonial to the wonders of 'Tintawn' the lifetime Irish carpeting. Here is a floor covering with virtually everything—sound deadening quality—beautiful decorator colours—longer than average wear-life—and low maintenance factor.

Contrary to some opinion, Tintawn carpeting is not indestructible but it takes more traffic than a school has to offer to show signs of wear on Tintawn . . . and that's going some!

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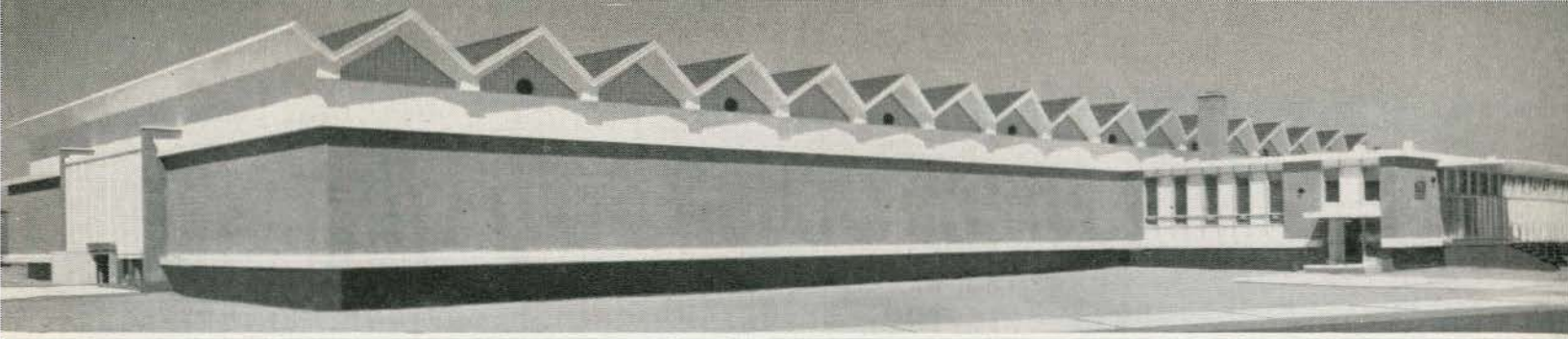
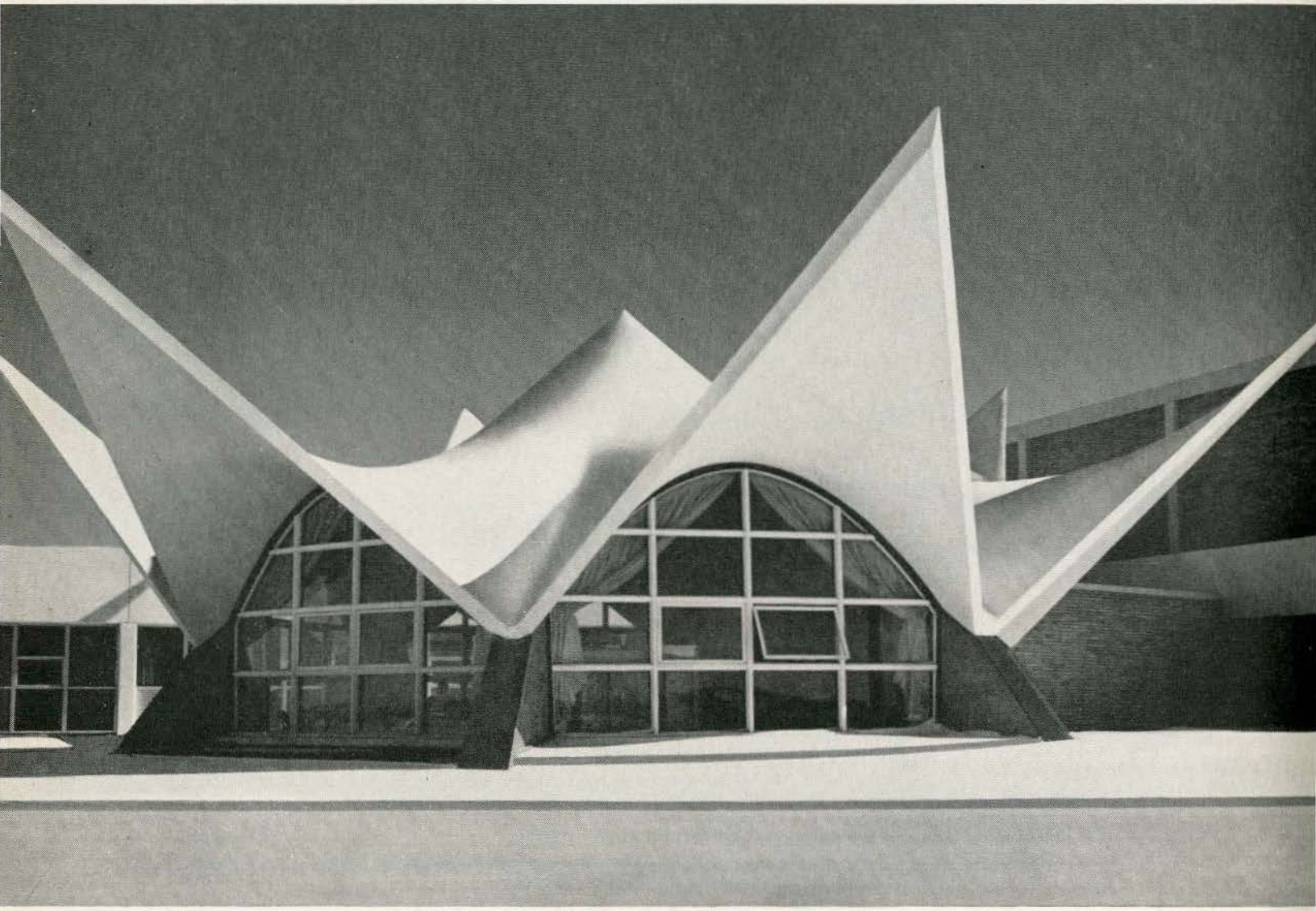




**1 (above)** **2**

**1** SPORTS ARENA AT VILLE LASALLE, Que.
**Architects:** Rioux & Morin
**Consulting Engineers:** Gagnon and Associates
**General Contractors:** Desaulnier Construction Ltd.
**Lift Slab Contractor:** Lift Slab of Eastern Canada Ltd.

**2** SCHOOL AT TABER, Alberta, featuring concrete hyperbolic shell roof
**Architect:** N. Fooks
**Design Engineer:** J. R. Milne
**General Contractor:** Chronik Construction
**Gunite Sub-Contractor:** Canada Gunite Co. Ltd.

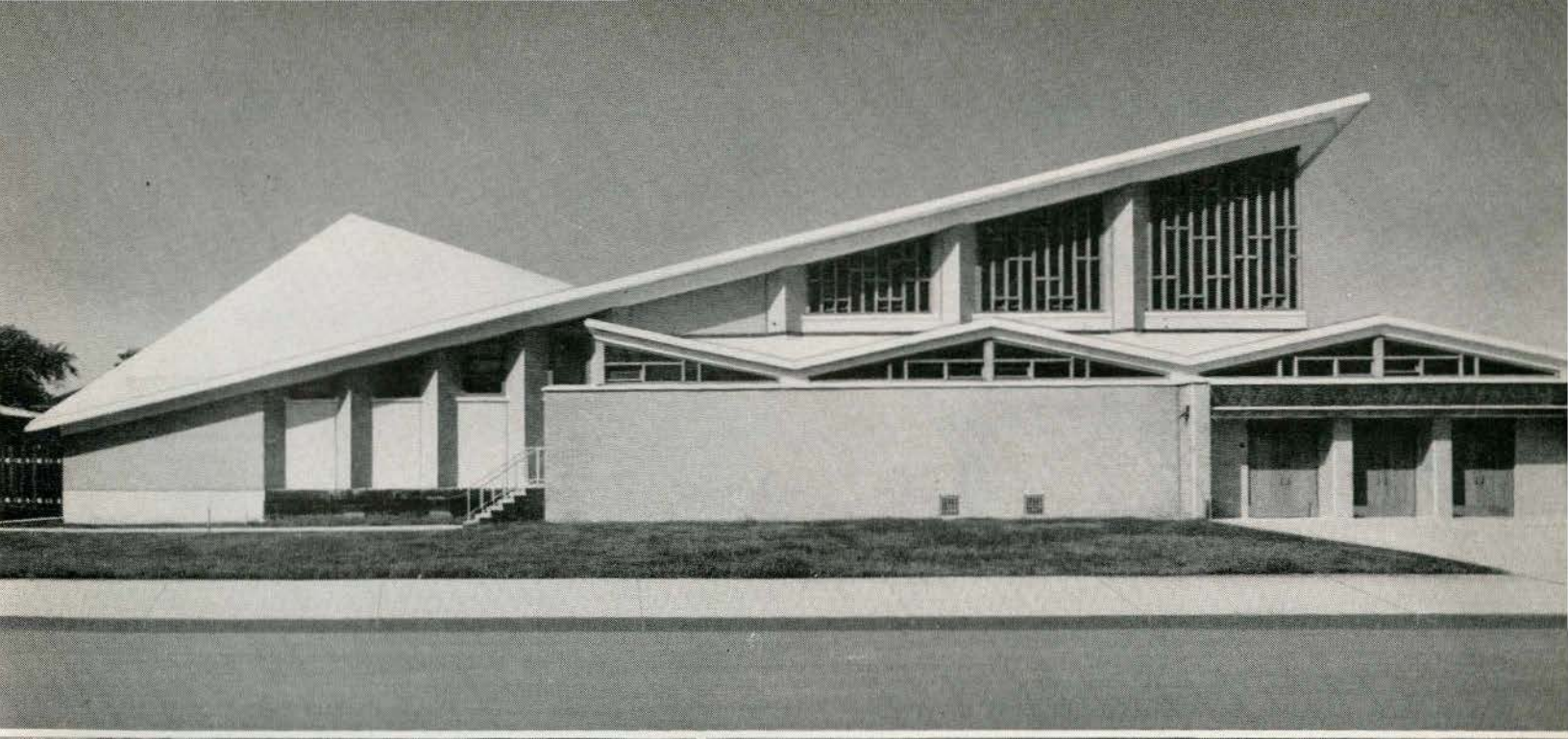
**3** CHRIST THE KING CHURCH, Moncton, N.B.
**Architects:** LeBlanc, Gaudet & Associates, Moncton
**Project Architect:** Jacques Roy
**Consulting Engineers:** Adjelelan and Associates Ltd., Ottawa
**General Contractor:** Modern Construction Limited

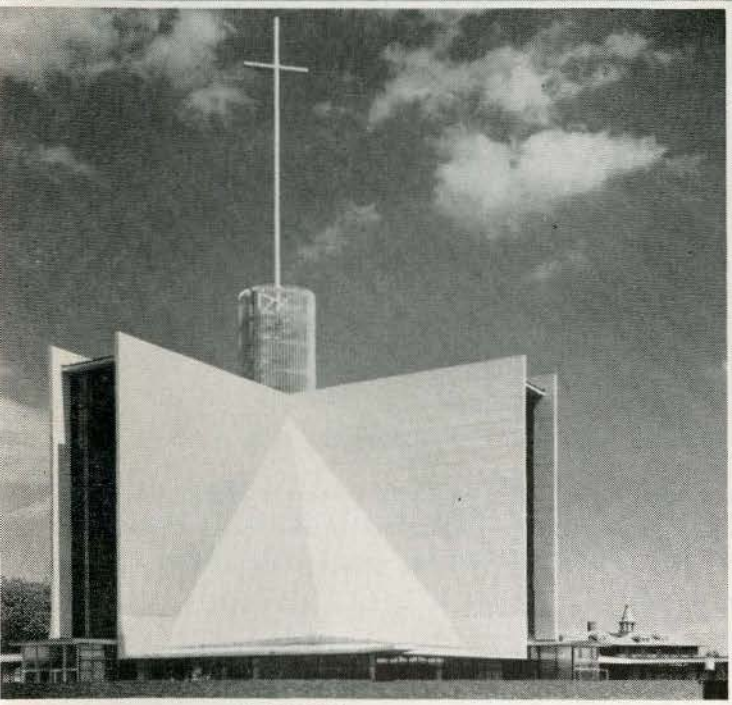
**4** STE. GERMAINE-COUSIN CHURCH, Pointe aux Trembles, Montreal, Que.
**Architect:** Gérard Notebaert
**Consulting Engineers:** Lalonde & Valois
**General Contractor:** Paul Desormeaux Ltée.

**5** ST. HILDA'S ANGLICAN CHURCH, Toronto
**Architect:** Philip C. Johnson, London, Ont.
**Consulting Engineer:** Raimond Miniats
**General Contractor:** Fassel Construction Co. Ltd.

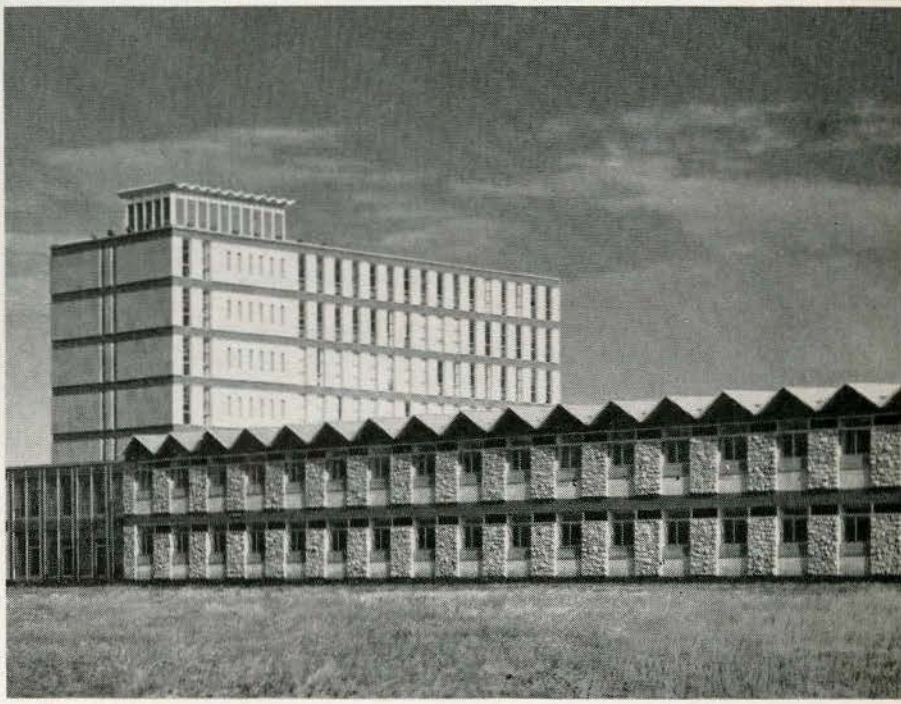
**6** UNIVERSITY OF SASKATCHEWAN new Arts Building, Saskatoon
**Architect:** Shore & Moffat, Toronto
**General Contractor:** W. C. Wells Construction Co. Ltd.
**General Contractor:** (For tall part of the building):
Bird Construction Co. Ltd.
**Sub-Contractor for Precast Concrete:** Precast Concrete Ltd., Edmonton

CANADA CEMENT





5 (above)



6

# UNDER THESE DRAMATIC CONCRETE SHELL ROOFS... MAXIMUM COLUMN-FREE AREA

Expressive, non-traditional forms like these proclaim a new freedom of design in churches and schools, commercial and sports centres. The remarkable strength of light, soaring concrete shell construction has opened the way to important economies as well—in materials, in column-free space, in construction time.

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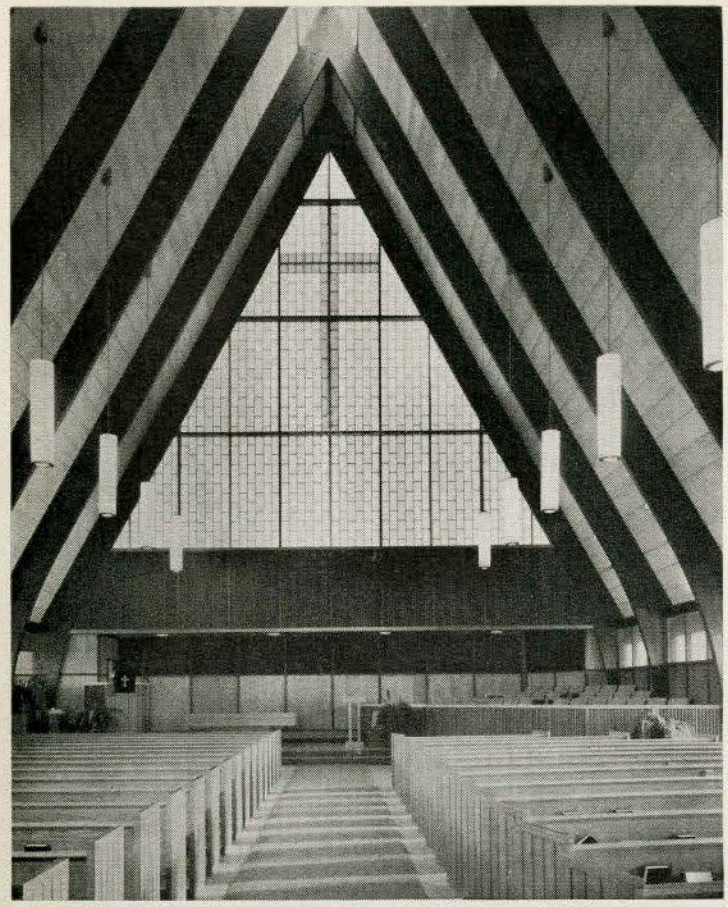
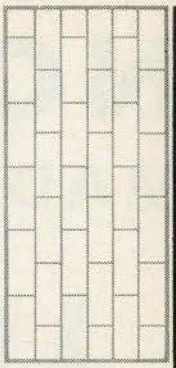


Architect: John F. A. Haayen, Guelph
General Contractor: Len Ariss and Co. Ltd., Guelph

# KALWALL®
# WALLS OF LIGHT..



Embrace the Harcourt Memorial United Church in Guelph. By day . . . by night . . . buildings walled with translucent Kalwall take on a new architectural dimension: WALLS OF LIGHT. Diffused, natural day light floods interiors during daytime hours . . . and at night, buildings glow with a soft outward radiance.

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  —Thompson, Berwick & Pratt, Vancouver
- National Trust Building
  —Page & Steele
- Riverdale Hospital
  —Chapman & Hurst

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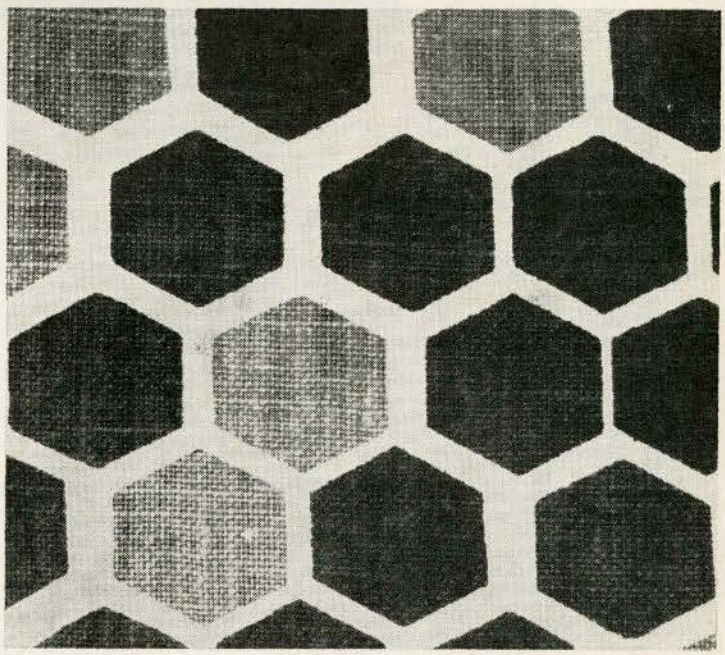

**HEXAGON** One of ten great drapery prints designed by John Gallop for J & J Brook Limited. Each print is hand screened in a wide range of colours on a variety of base fabrics. (The sample above is a three colour print on a heavy white linen). For further information write: **J & J Brook Limited, 4 New Street, Toronto 5, Ontario.**

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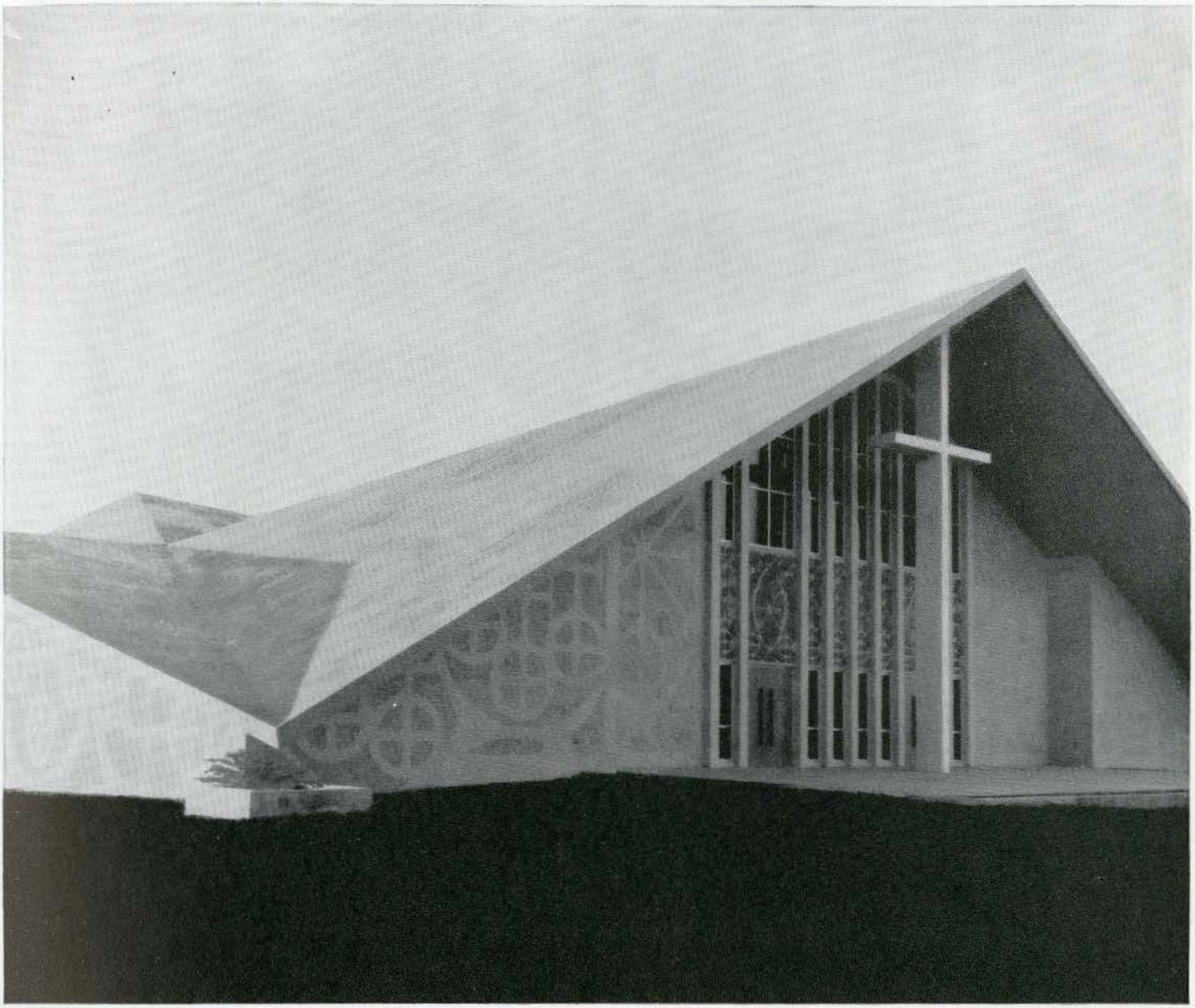

Holy Name Church, Vancouver. *Architects:* Toby & Russell. *Structural Engineers:* McKenzie and Snowball. *Ready Mix Producer:* Deeks-McBride Ltd. *Testing Engineers:* Coast, Eldridge Testing Laboratories Ltd. *Lightweight Aggregate Suppliers:* Saturnalite Sales Ltd., subsidiary of B.C. Lightweight Aggregates Ltd.

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In the Holy Name Church, Vancouver, POZZOLITH played a valuable role in the handling and placing of lightweight aggregate concrete . . . by reducing mixing water requirements for a given slump, by reducing segregation in placement, by providing maximum plasticity and workability, and by entraining optimum amount of air.

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POZZOLITH, whenever used, makes concrete a more durable, more versatile building material . . . superior in performance and economy to plain concrete or concrete produced with any other admixture.

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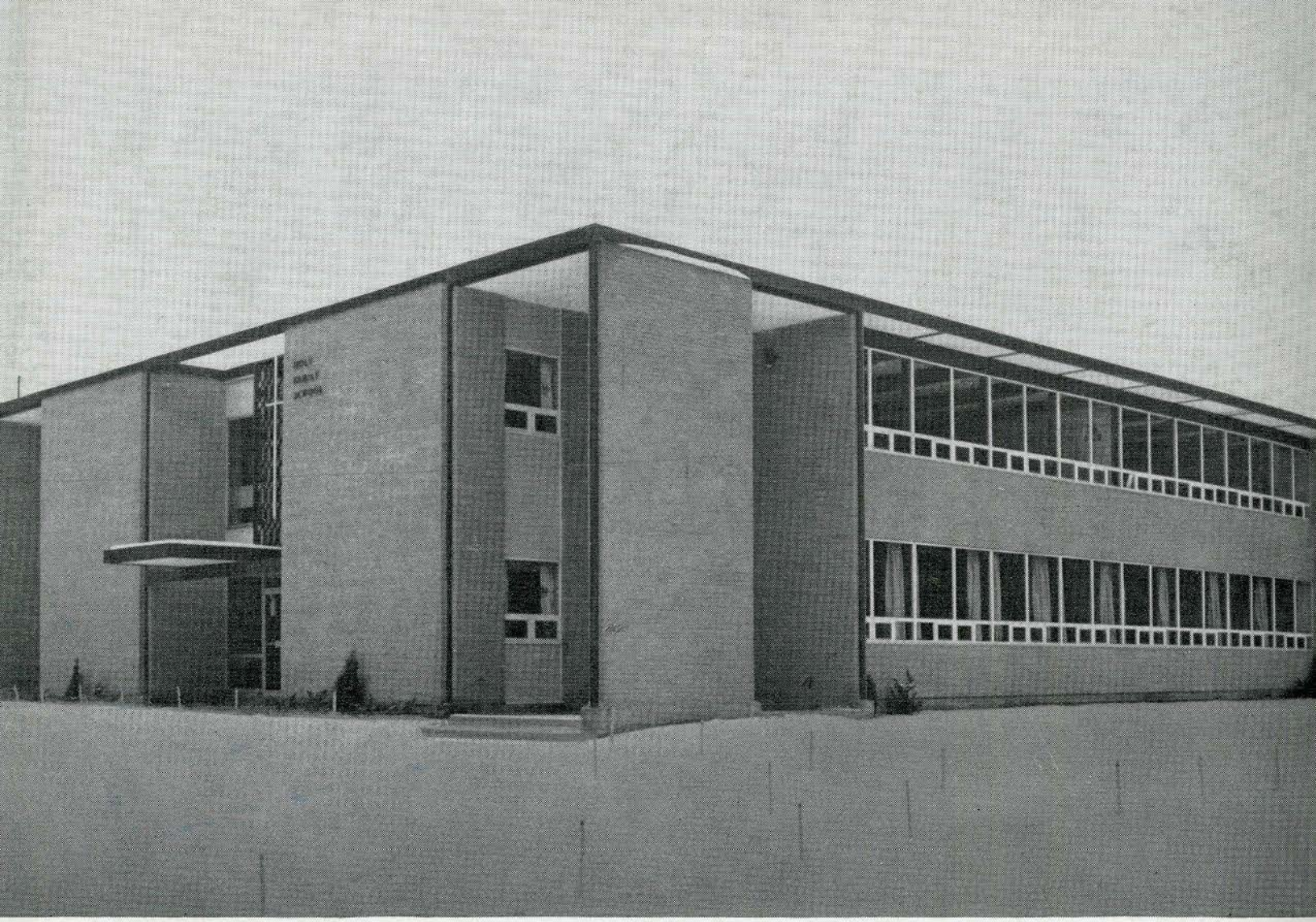

*Architect: W. G. Overs*
*Niagara Falls*

*General Contractor: Dominion Construction (Niagara) Limited*
*Niagara Falls*

# Holy Family School

## Niagara Falls Ontario

Not large, but attractive and efficient, designed to serve student and teacher. Holy Family School classrooms provide for plenty of daylight and controlled ventilation. Rusco Steel 75 Series Hopper Windows and Fixed Lites were installed throughout. Window finish is White epoxy enamel baked-on.