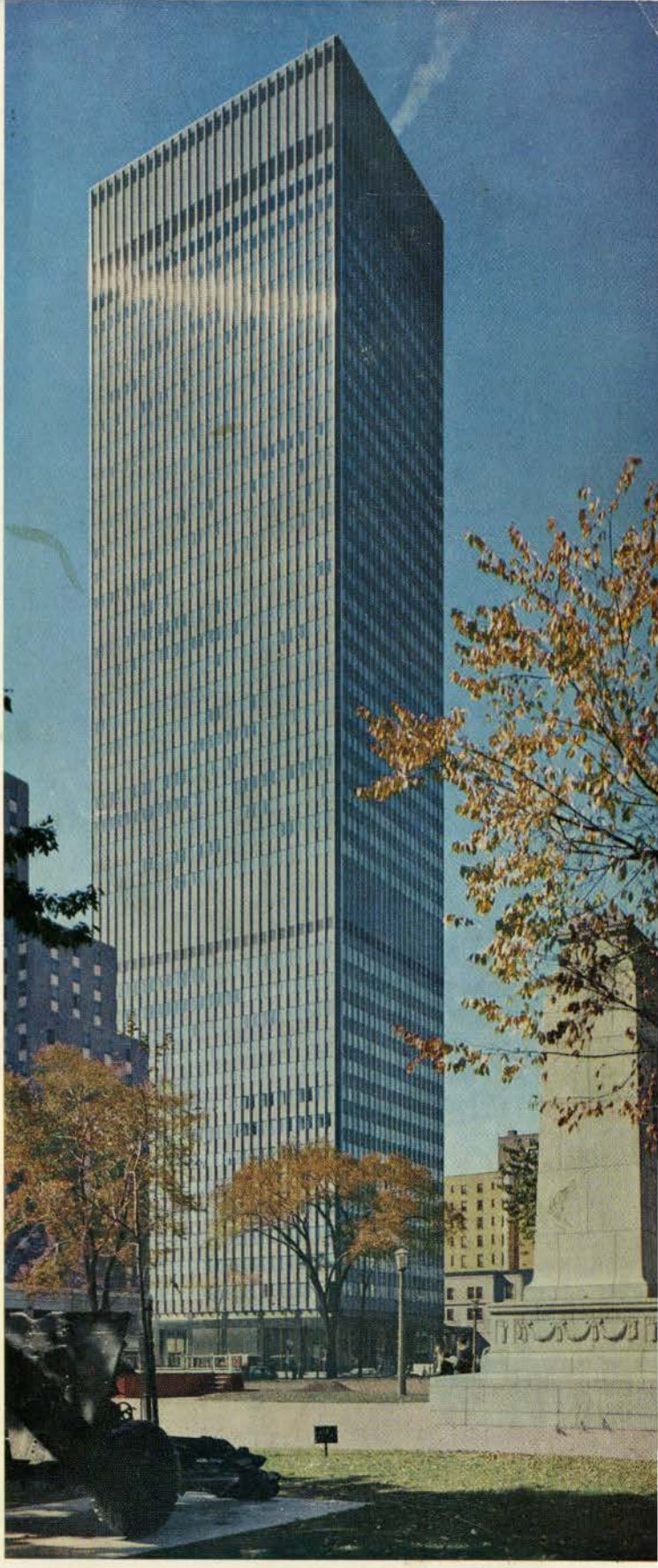
ROYAL ARCHITECTURAL INSTITUTE OF CANADA JOURNAL



NOVEMBER 1962

ROYAL ARCHITECTURAL INSTITUTE OF CANADA
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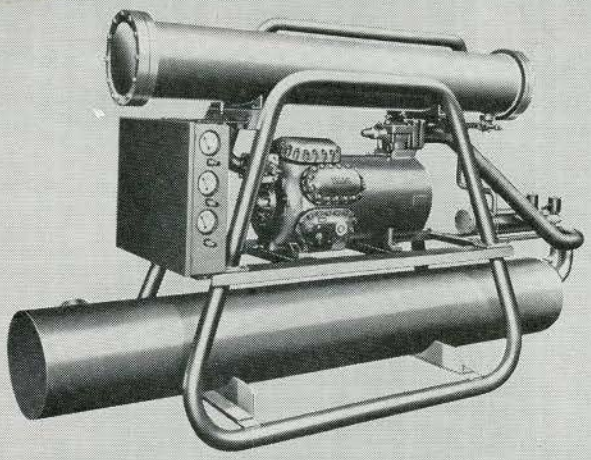
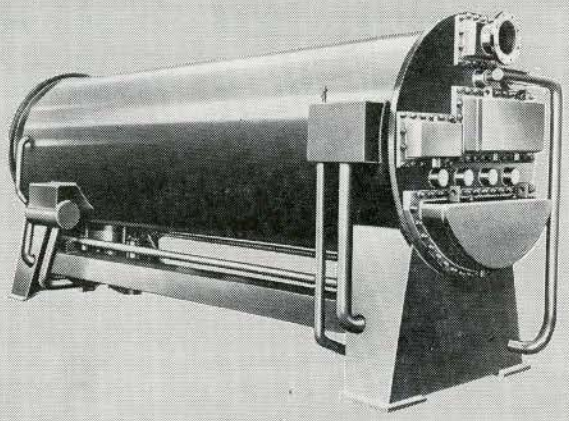
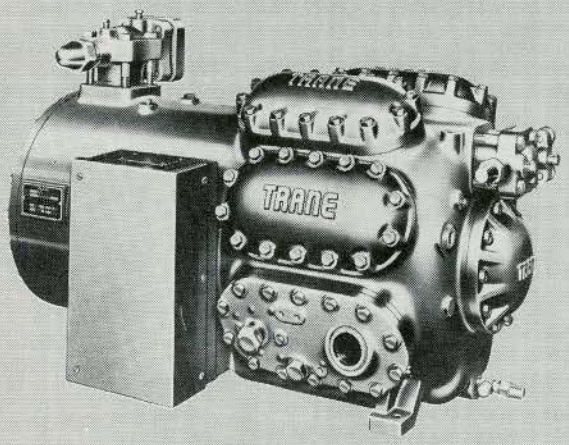


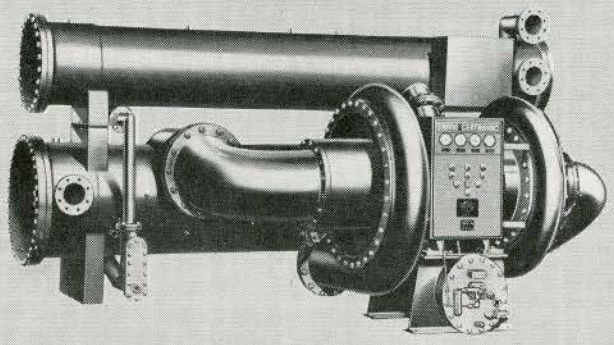
Here's the well-proven Trane Reciprocating Cold Generator, *now completely hermetic.* Engineering features include:—a new hermetic compressor, a new chiller and a new condenser with a built-in sub-cooler—all of Trane design and manufacture. Units are sized from 10 to 100 tons, incorporating a factory-wired control panel to cut on-the-job wiring cost.



New Trane Absorption Cold Generator. A compact single-shell packaged water chiller, specially designed to slash installation costs. It's *hermetic,* resists air intrusion and avoids crystallization. Fully automatic, it's available in 18 sizes — 106 to 1065 tons. Operating and maintenance costs for this steam or hot water operated Cold Generator are very small.



Trane Reciprocating Compressor—*hermetic* model designed for R.12 and R.22. One shell only contains motor and compressor, eliminates alignment problems. Multi-step capacity control reduces starting and stopping.
With an exclusive internal thermal protector, it's available in sizes 10 to 100 tons.



Hermetic CenTraVac with electric drive modulates to 10% of capacity or lower: Power saving is in almost direct proportion to load. Compact, lightweight with low silhouette design, it's used on more water chilling applications with hermetic centrifugal compressors than all other makes combined.

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three fully-packaged air conditioning units

For more detailed information on these and other matched equipment advances, call your local Trane branch office or write—Trane Company of Canada, Limited, Toronto 14, Ontario.

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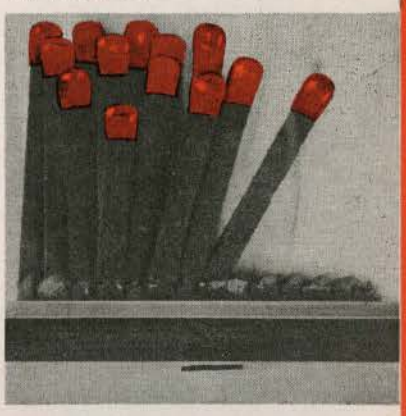

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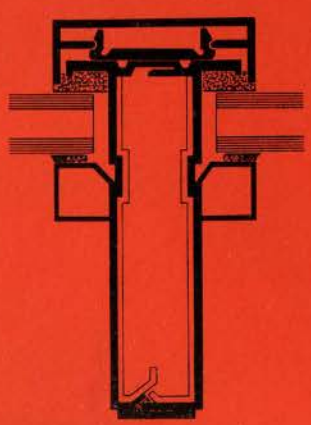
5

SERIES 1500

System Type: UNIT (Optional Thermal Break)
Application: HIGH or LOW-RISE Construction
This is the preferred system wherever lowest cost is essential. You can create monumental wall features with a minimum budget. Specify factory-assembled Kawneer Series 1500 Units.

CHARACTERISTICS

Appearance	• emphasized vertical mullions
Construction	• screw-and-spline joinery
Design	• three depths of mullions for strength and design aesthetics
Panel Thickness	• unflanged:—1⅝″ maximum flanged:—2″ maximum
Glass Thickness	• 3/16″ to 1″ maximum
Glazing	• Neoprene tube and Polysulphide sealant
Vent Types	• projected, casement, as well as top-hinged are available
Finish	• thirty-minute etch and anodize (CE/AN/.0004)

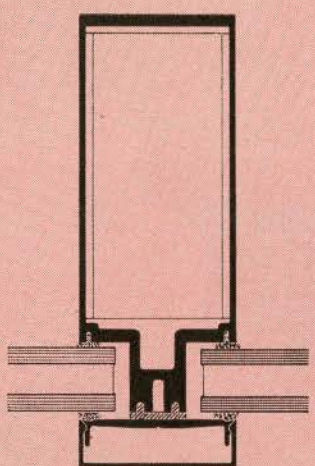


SERIES 1600

System Type: STICK (with Thermal Break)
Application: HIGH or LOW-RISE Construction
Here is true flexibility for the designer of building facades. Glass is located forward in each section. Snap-on caps come in many forms and materials. Three mullion sizes available to satisfy almost every structural requirement.

CHARACTERISTICS

Appearance	• emphasized mullion or full grid
Construction	• screw-and-spigot joinery
Panel Thickness	• ¼″ to 3″ maximum
Glass Thickness	• ¼″ to 1″ maximum
Glazing	• flush-glazed utilizing a dry-pressure glazed system
Vent Types	• accommodates a full range of projected series windows
Finish	• thirty-minute etch and anodize CE/AN/.0004 as a standard. (Optional finishes available)

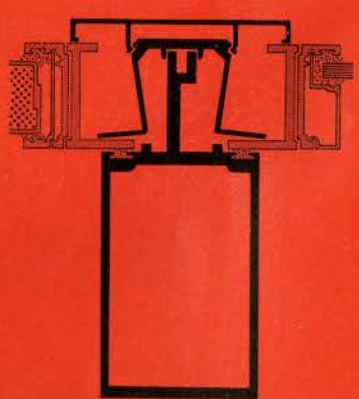


SERIES 2100

System Type: WINDOW WALL
Application: LOW-RISE Construction
Where all-'round flexibility of design, on the drafting table or at the site of construction, is a prime requisite . . . Series 2100 Window Wall is the creative architect's choice. Different mullion styles spark creativity constantly!

CHARACTERISTICS

Appearance	• emphasized batten-type verticals
Construction	• conforms to all Sealair Window specifications
Panel Thickness	• unflanged:—1⅛″ maximum
Glass Thickness	• ½″ maximum
Glazing	• mastic glazing compound with optional aluminum beads
Vent Type	• projected, casement, as well as top-hinged are available
Finish	• thirty-minute etch and anodize (CE/AN/.0004)



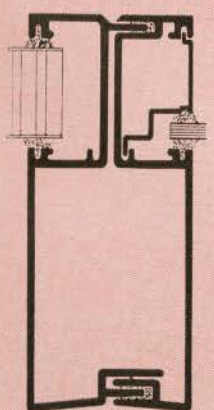
PROVEN WALL SYSTEMS BY Kawneer

SERIES 3000

System Type: UNIT
Application: LOW-RISE Construction
Throughout the architectural profession, the leading wall system for low-rise application is acknowledged to be this famous Series 3000, by Kawneer. For excellent performance, time-tested weatherability, precise detailing and dependable construction, specify Series 3000.

CHARACTERISTICS

Appearance	• emphasized vertical mullions
Construction	• screw-and-spline joinery
Panel Thickness	• unflanged:—1⅜" maximum
Glass Thickness	• ¼" to 1" maximum
Glazing	• Dry. Internal drainage design ensures weather-tightness
Vent Types	• choice of projected, casement, top-hinged, vertically pivoted
Finish	• thirty-minute etch and anodize (CE/AN/.0004)



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Today's architect, by using advanced techniques, develops structures that save building and maintenance costs! His creations rise faster and last longer than his architectural predecessors dreamed possible, probable or even postulateable! But then, they didn't know about Curtain Walls.

Fortunately, you can use the Curtain Wall technique in almost any part of your design concept. Now you can PREDICT CURTAIN WALL PERFORMANCE, by accurate material selection! Specify only components that do the best job! (Inadequate systems or poor products cause "leakers." Clients, reputations and bank accounts suffer). Solution? Call a dependable manufacturer. Call on KAWNEER! We're supplied with such commodities as years of experience, quality products, plus reams of data collected on-the-job and in-the-lab.

As stated (so boldly) above, Kawneer has five proven Curtain Wall Systems. All three Basic Systems are used:

- STICK. Highly adaptable. All the assembly is done on structure.
- UNIT. Factory-assembled. Fastest to install. Best weatherseal.
- WINDOW WALL. Stick combined with Unit System. Fabricated Window Units. Loads carried by mullions.

Our five proven Kawneer Wall Systems adapt to any building and budget.

We'd be pleased to help you. Phone us.

Might prove profitable for us both!

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ZIPPERWALL

(Series 2500)
System Type: STICK
Application: LOW-RISE Construction
Totally unique in concept and application is **Kawneer's New Zipperwall!** Combining aluminum mullions with the weather-resistant qualities of neoprene structural glazing, Zipperwall is designed and priced for quality and economy!

CHARACTERISTICS

Appearance	• emphasized vertical mullions • flush interior surfaces and sharp, black accent lines
Construction	• bolted and gasket-sealed type
Panel Thickness	• uses special 1" flanged panel
Glass Thickness	• 3/16" and ¼" only
Glazing	• unique neoprene "zipper" type
Vent Types	• hopper or projected. Utilizes special 1" Zipperwall Window
Finish	• thirty-minute etch and anodize (CE/AN/.0004)

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Serial 447 Volume 39
Number 11

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NOVEMBER 1962

TWO MONTREAL BUILDINGS

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Toronto City Hall

Curtain Walls & Windows in Nickel Stainless Steel

For aesthetic reasons, quality appearance, economy of design, enduring lustre and ease of cleaning, nickel stainless steel was chosen by the architects *in competitive bidding* for curtain walls, windows and entrances, as well as many other applications for the new, world-renowned Toronto City Hall.

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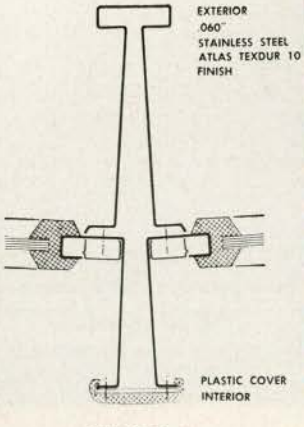
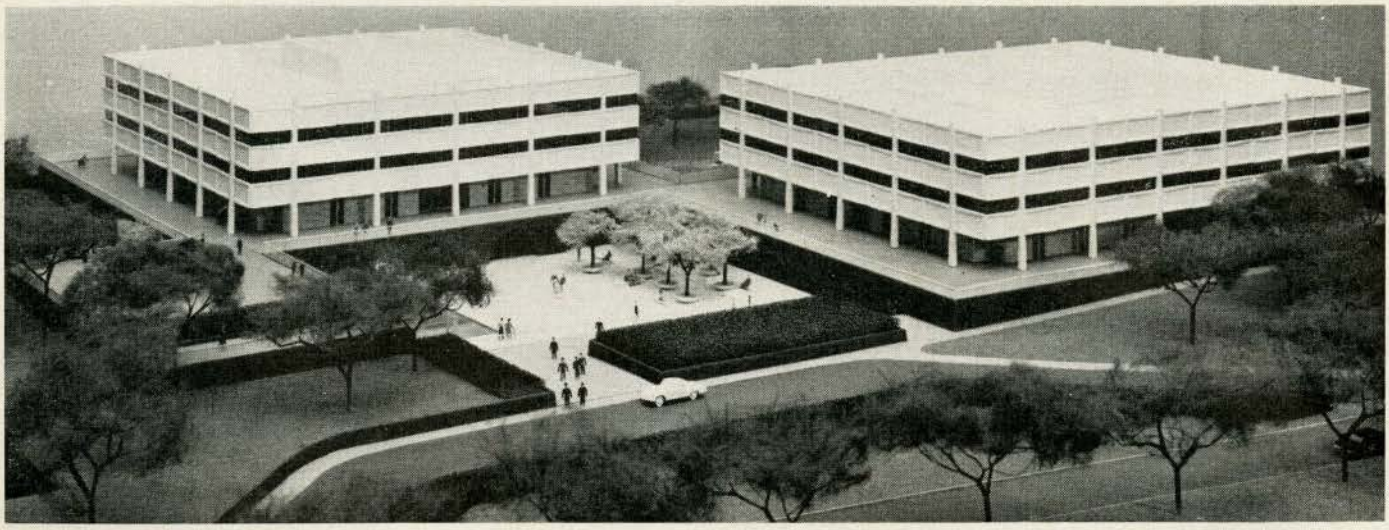
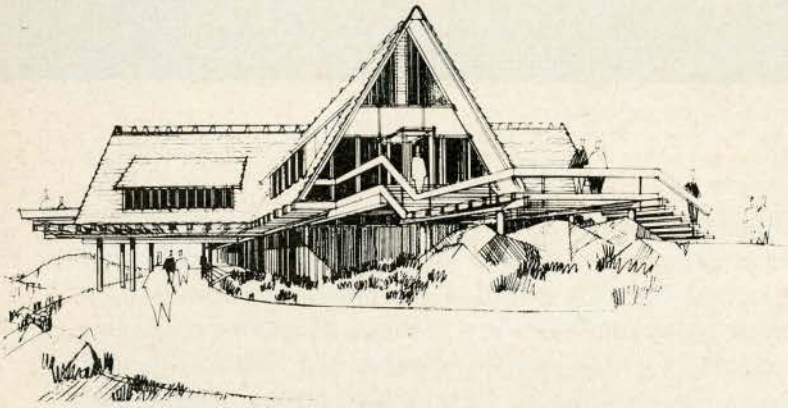


MULLION PLAN



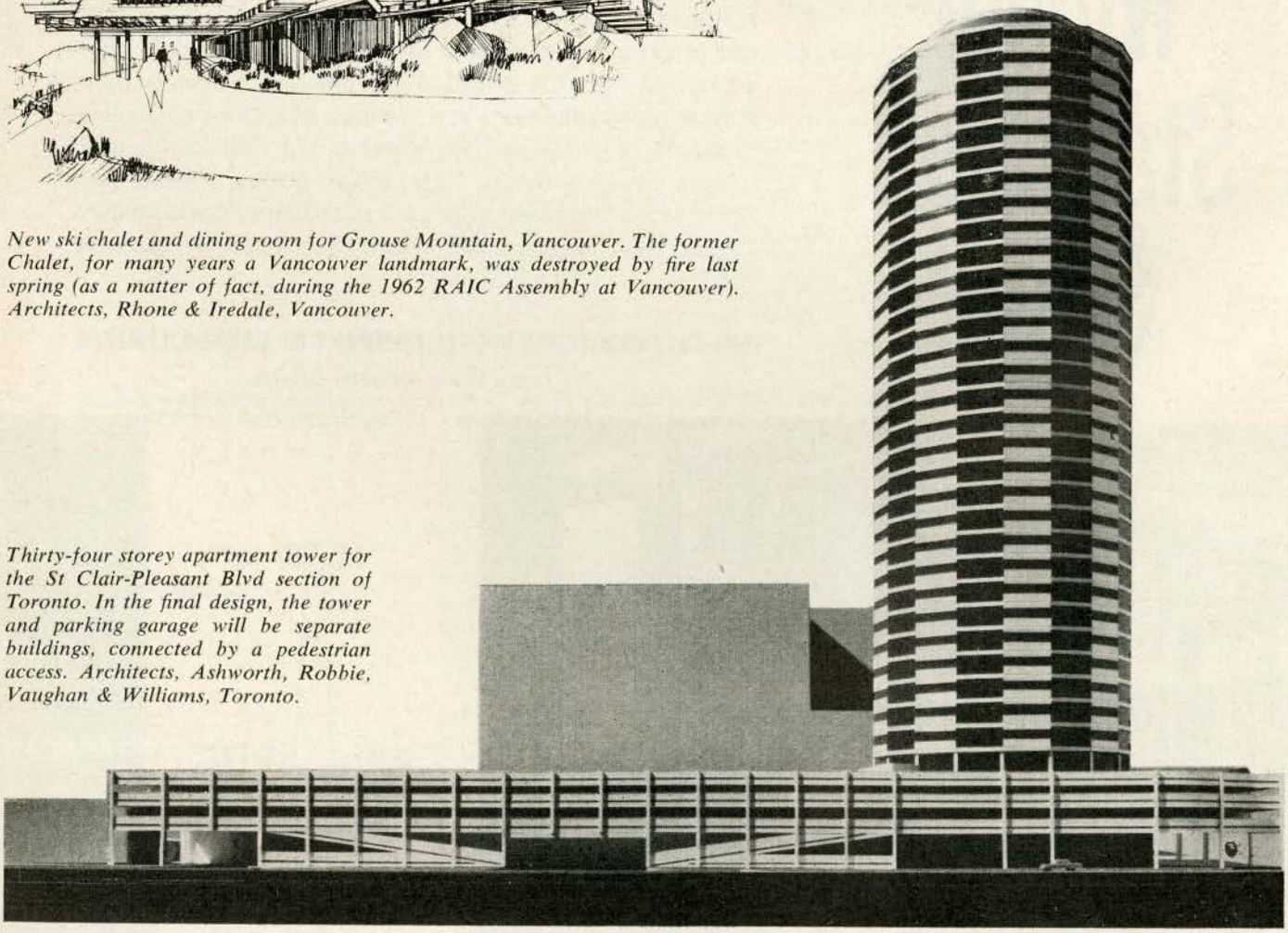
PROJECTS

Model of first buildings of University of Saskatchewan's Regina Campus. Three connected units will house the College of Arts and Science. Architects, Minoru Yamasaki & Associates, Birmingham, Mich.; associate architects, Izumi, Arnott & Sugiyama, Regina.



New ski chalet and dining room for Grouse Mountain, Vancouver. The former Chalet, for many years a Vancouver landmark, was destroyed by fire last spring (as a matter of fact, during the 1962 RAIC Assembly at Vancouver). Architects, Rhone & Iredale, Vancouver.

Thirty-four storey apartment tower for the St Clair-Pleasant Blvd section of Toronto. In the final design, the tower and parking garage will be separate buildings, connected by a pedestrian access. Architects, Ashworth, Robbie, Vaughan & Williams, Toronto.



PROVINCIAL NEWS

At the annual meeting of the Saskatchewan Association of Architects at Saskatoon, left to right: Prof. A. H. Douglas, University of Saskatchewan; W. E. Marvin, Regina, honorary secretary-treasurer; John Preston, Regina, councillor; G. R. Forrester, Saskatoon, newly elected president; John Davies (F), Vancouver, president, RAIC; Gordon Arnott, Regina, retiring president; James Langford, Regina, first vice-president; John Webster, Saskatoon, councillor.

RAIC President Addresses SAA in Saskatoon

Dealing with national topics, RAIC President *J. L. Davies* recently addressed the 51st Annual General Meeting of the Saskatchewan Association of Architects in Saskatoon.

With President *Gordon Arnott* in the chair and 35 architects attending, the main topic centred on the increased RAIC levy to individual members. It was passed unanimously.

It was also agreed to hold all future Annual Assemblies of the Association in the spring – to coincide more closely with the RAIC Annual Assembly.

Guest speaker at an evening banquet was *Mr A. K. Gilmour,* Executive Director, Wascana Centre Authority. He discussed the proposed development in Regina surrounding Wascana Lake legislative buildings.

Delegates viewed the drawings of the Saskatoon Art and Civic Centre and Conservatory Competition. They discussed the pros and cons of architectural competitions in general.

Winner of the SAA Scholarship for second and third year architectural students at University of Manitoba was announced: *W. A. Johnston,* Edmonton.

Officers elected for the ensuing year: *G. R. Forrester,* Saskatoon, President; *W. E. Marvin,* Regina, Honorary Secretary-Treasurer; *J. Langford* and *H. L. Larson,* Regina, 1st and 2nd Vice-Presidents; *John Webster,* Saskatoon, *J. Preston,* Regina, Council Members.

Dept. of Immigration Surveys Architects

The Canadian government, Department of Citizenship and Immigration, in connection with a survey on immigrants who have settled in Canada since 1946, has issued a questionnaire to the RAIC. Members within the scope of this survey have been asked by the Institute to obtain a copy of the questionnaire from the RAIC secretary, 88 Metcalfe St, Ottawa, and forward it to the Department of Citizenship and Immigration.

Jean Damphousse (right) of Montreal represented the RAIC at the International Educational Building Conference in Britain recently. He is seen with another Canadian delegate, B. M. McLean (left) of Toronto, talking to D. Poole of the Color Section at Britain's Building Research Station at Watford. The purpose of the conference was to discuss how best to share, among the countries of the world, the limited resources, professional, technical, and administrative skills available for educational building.

ERRATUM

In the September 1962 issue, page 15, we announced that Frank MacDowell had been appointed chief architect for Canadian National Railways. The information we had been given was incorrect and the item should have read that Mr F. MacDowell was appointed Assistant Chief Architect, succeeding Mr G. F. Lithgow.

Olympic Centre Winners

Three winners for the first stage of the competition for an Olympic Centre for Banff 1968 have been chosen from twenty entries. (See *Journal,* June and September, 1962.) Prizes of $2,000 for each group have been awarded to: Associated Architects (Gustavo da Roza, Claude de Forest, and Radoslav Zuk), Winnipeg; Cohos-Delesalle & Associates, Calgary; J. Stevenson & Associates, J. A. Barrett, E. Raines, H. W. Seton, Calgary. Winners will compete in a second and final stage if the 1968 winter olympic games are awarded to Canada by the International Olympic Congress at its meeting a year from now. In keeping with the mandatory regulation for two stage competitions as established by the code of competitions of the RAIC, results will not be published until judgment of the final stage has been made.

Resilient floors and indentation problems

Resiliency—the ability of a floor to provide underfoot comfort, quietness, and long wear—is a primary advantage of resilient floors. It is the reason why these floors do *not* indent, and also why they *do!* This seeming paradox is easily resolved. Under normal pressure from weight or impact, a resilient floor will "give" slightly and then, when the stress is relieved, will regain its normal surface. Under excessive pressure, the floor will give, but not return in full—and an indentation will result. Whether or not a floor is damaged depends on two factors: the nature of the pressure and the composition of the flooring material. When specific problems are anticipated in an interior from either static or dynamic loads, resilient floors that will not be damaged by the pressures involved can usually be chosen. The following offers suggestions on solving some of the more common indentation problems.

Preventing damage from static loads

Overcoming the effects of static loads is quite easy. The static load limits of all Armstrong floors are known. They vary from 25 psi for Asphalt Tile to 200 psi for Rubber Tile, Linotile, and for Custom Corlon and Castilian solid Vinyl Tiles. Since the probable weight of furniture or other heavy objects can usually be calculated, you have a guide to what type of floor would best meet the load requirements of an interior. You can also tell, by comparing the static load limits of the flooring material to be used with the weight of the furnishings, whether furniture rests—or other supports to distribute the loads—must be used. (As a double safety measure, furniture rests are recommended for use with all resilient floors.) Either by using a floor that has a load limit in excess of the weight to be placed on it, or by furniture rests, or by a combination of both methods, indentation damage from static loads will be prevented.

Preventing damage from dynamic loads

Dynamic loads include pressure from moving objects, such as furniture and heavy equipment being pushed across a floor, and from impact, such as heels striking the floor. Moving loads are not a real threat since a few common sense practices will prevent damage to resilient floors. The use of boards to cover the floor when moving heavy furniture, for instance, or the use of standard protective coverings on wheels and casters, will eliminate harm to the floor.

Floor damage from impact is frankly somewhat of a problem, since there are so many variables involved. One major problem is the current vogue for spike heels. Spike heels are the bane of all flooring materials. Whereas a 224-pound man wearing ordinary shoes exerts only 28 psi on a floor, a 105-pound woman wearing spike heels may exert a pressure of 2,000 psi when her heel strikes the floor! And if nailheads are protruding from her heel, the pressure can be as much as 60,000 psi! Such incredibly concentrated pressures are bound to affect resilient floors, just as they chew up wood, chip terrazzo, and snag and cut carpets.

Resilient floors do not act under these forces the same way they do under static loads. Oddly enough, research has indicated that the less resilient floors, such as asphalt tile or vinyl-asbestos tile, tend to resist heel impact better than many of the more resilient materials, such as rubber tile, linoleum, and Custom Corlon (homogeneous vinyl) Tile. This is because the high pressure is exerted for only a fraction of a second when the edge of a spike heel strikes the floor. A hard surface literally does not have time to indent. Some floors, however, have exceptionally high resistance to both static and dynamic loads. Armstrong Linotile, Tessera, Montina, and Patrician sheet Vinyl Corlon, and the recently developed Castilian solid Vinyl Tile stand up extremely well in regard to the two types of loads. And these floors are recommended for heavy traffic areas where spike heels are apt to be a problem.

Here are four methods of minimizing the apparent damage to resilient floors from impact:

1) Make use of light, multi-coloured, low-gloss floors. They reflect less light than dark, plain, shiny surfaces, and are less apt to show indentations.

2) Select patterns having swirl grainings, or terrazzo, mosaic, and spatter effects. The fine detail of such patterns visually obscures indentations.

3) Use floors with embossed textures, such as Armstrong Montina, Tessera and Patrician Corlon or Embossed Linoleum. The texture tends to camouflage indentations.

4) Recommend to building maintenance people that they not buff wax finishes, thus minimizing the shadows caused by indentations; suggest that at most the buffing be very light.

Special help for architects

Your Armstrong representative can offer suggestions on choosing floors that will help overcome indentation problems. He can also get you further assistance from Armstrong research, decorating, and installation specialists. Call him at your Armstrong District Office. Or write direct to Armstrong Cork Canada Limited, Dept. RAIC 4, P.O. Box 919, Montreal, P.Q.

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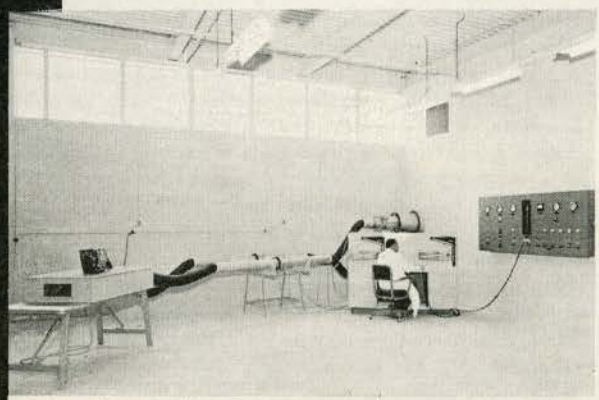
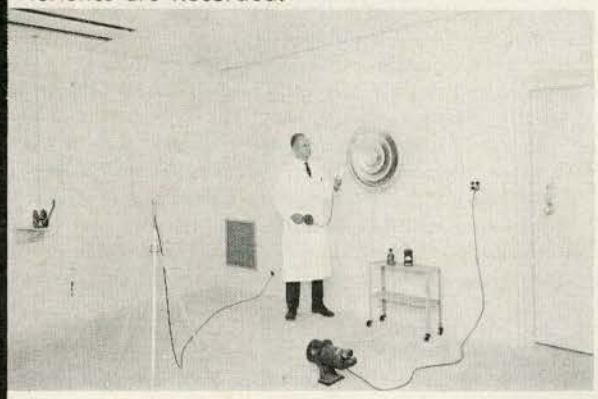


Control Panels where Air Velocities, Temperatures, Pressures and Other Operating Characteristics are Recorded.



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The Hamilton Chapter of the Canadian Joint Committee on Construction Materials of the RAIC, the CCA and the ACEC was presented with its charter by R. E. Briggs, Toronto, representing the Joint Committee, at the second meeting of the local group on October 24. Photographed, left to right, are M. W. Mackenzie, of the Manufacturers and Suppliers Section of the Hamilton Construction Association and Builders' Exchange, chairman; G. M. Gerrie, architect co-chairman of the chapter; Stuart Frost, of Frost-Fernandez Associates, Toronto, the guest speaker; and Mr Briggs. A feature of the meeting was a display of the award winning product literature in the 1962 Competition for excellence in product literature, sponsored by the Joint Committee.

Competition Announced for Bagdad Opera House

The government of Iraq has announced an international competition for the design of an opera house for Bagdad. (The competition has been approved by the RAIC.) To be designed to have a total area of approximately 8,000 sq. metres, the building will be located on a site of approximately 43,000 sq. metres. Cost is not to exceed two million dinars (approximately $6,000,000).

The program calls for a fully air conditioned, multi purpose building, flexible enough to allow for a maximum audience of 2,500 persons and a minimum of 500. A small hall for chamber music and recitals is required for smaller audiences, and a school of drama is also to be incorporated in the opera house. Competition regulations with detailed documents may be secured, till December 31, 1962, from the Iraq Embassy, Washington, DC. Cost of the conditions is $9.00.

Special Section on RAIC in December Journal

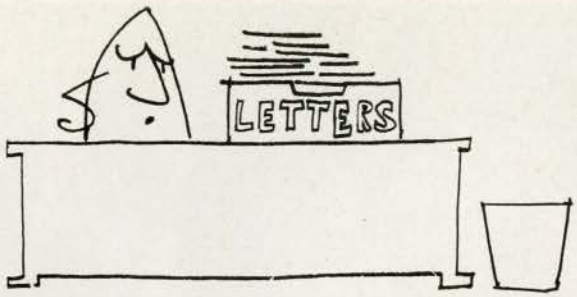
For a long time the need has been felt for a comprehensive presentation of the history and development of the Royal Institute, the services it performs for its members and for the profession of architecture, and for a detailed report on the work of committees and the operations of Institute Headquarters at Ottawa. This has now been prepared by the Ottawa office, and will be presented, in both French and English, in the December issue of the *Journal*. The December editorial, written by the President RAIC, Mr John L. Davies (F) of Vancouver, will introduce the special section on the Royal Institute.

Government Reports Available

The Division of Building Research of the National Research Council of Canada has issued a report on their work for 1961. At $1.00 each, copies may be obtained by writing to the Publications Section, Division of Building Research, National Research Council, Ottawa 2, Canada.

La version française du *National Building Code of Canada* (1960) vient de paraître. On peut obtenir ce document, relié ou en feuillets mobiles, moyennant $4, en écrivant à l'adresse suivante: Monsieur le Secrétaire, Comité du Code National du Bâtiment, Conseil National de Recherches, Ottawa.

The Forest Products Research Branch of the Department of Forestry has issued a report (No. 189) titled Grade Marking of Canadian Lumber by J. H. Jenkins. For copies of the report write the Department of Forestry, Ottawa.



Coventry Cathedral

Editor, RAIC *Journal:*

The critical review of the new Coventry Cathedral by Prof. Peter Collins in the September issue of the RAIC *Journal* was most interesting reading. Having recently had the privilege of visiting this remarkable structure myself, I would like to say how much I appreciated Prof. Collins' criticism, with almost all of which I fully agree, despite our different approaches.

One detail of design that Prof. Collins does not mention is the unusual arrangement at the bases of the main columns. The slender gracefulness of the columns has been commented upon, but I have not yet seen any reference to, or explanation of, the quite remarkable metallic pin-supported seats through which the columns presumably transfer their loads to the foundations — details not normally seen since they are usually shrouded by the seats in the cathedral nave. How this detail can be correlated with the architect's description of his design is more than I can understand.

Robert F. Legget, Ottawa

Editor's Note: See photo 2, page 62, September issue

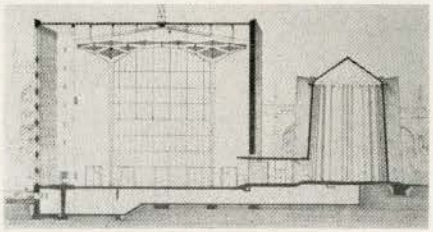
In Reply

Professor Collins replies as follows:

I find it difficult to understand why Mr Legget claims that he has never come across any mention of the bronze pins supporting the cruciform columns in the nave of Coventry Cathedral, because they are referred to in the article to which he alludes.

On page 68 of the September issue, lines 29-30, I specifically mention that the tapering concrete columns "are in turn supported from the floor on bronze pins." It did not seem to me to call for any further explanation, since although they are an ingenious and poetic device, they do not carry a very heavy compressive load. The columns are not "main columns" (as Mr Legget states) but are simply the supports of an openwork timber ceiling, as my article made clear. Moreover, they do not transfer the column loads directly to the foundations, as Mr Legget implies, but are supported on free-standing columns that occupy the basement, undercroft or crypt, as shown in the accompanying illustration.

If, by his last sentence, Mr Legget means that he would like more information regarding the reason for the substitution of bronze pins for the crystal spheres which Sir Basil Spence and Partners envisaged, I am afraid I am unable to help him.

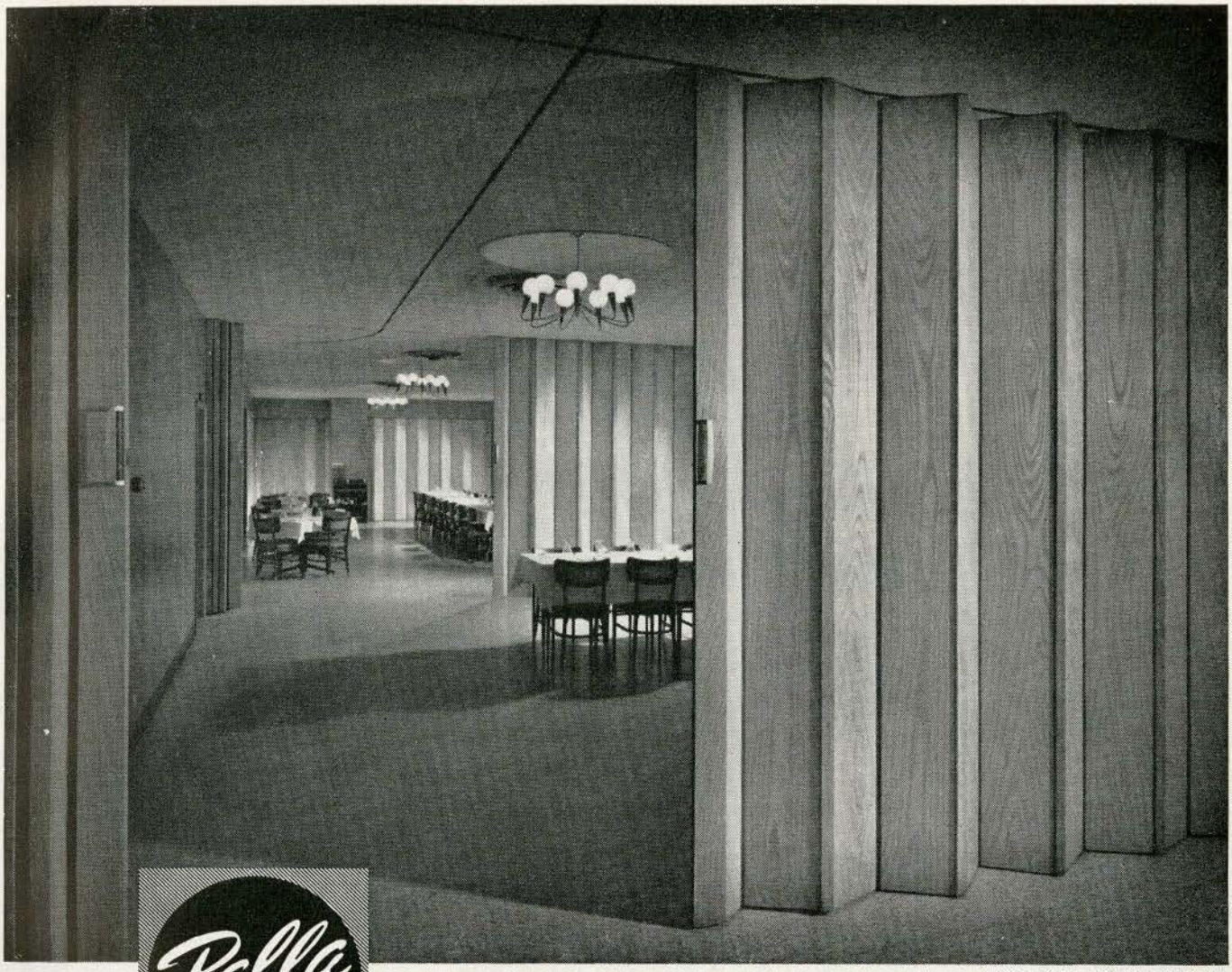


Homes for the Aged

Editor, RAIC *Journal:*

Mr D. Warrilow's letter in your October issue, commenting on the policies and practices of the Ontario Department of Public Welfare with respect to Homes for the Aged, as explained by Mr Lawrence Crawford in the *Journal's* August issue, has been drawn to my attention for reply. I am sure that all members of the Department of Public Welfare appreciate sincere criticism. The tone of Mr Warrilow's letter, based on his own observations, distinctly imparts a true aura of sincerity.

This program of Homes for the Aged in Ontario is still progressively developmental and occasional inequities do arise. Mr Warrilow mentions in reference to one institution that "the true picture reveals a two-to-one dominance of women over men wishing accommo-



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dation." In certain areas of the province the reverse holds true and male applications exceed females. The program is young and much of the activity in the past four years has been the adding of additional accommodation to Homes that are only a few years old. This is the general picture and the original plans for a municipality cover the ordinary need, and subsequent additions can take care of the specific area needs.

A true understanding of the multiple-bed bedrooms is enhanced by knowing that as persons grow older and more infirm the need for security and the need for present evidence of succor becomes increasingly important. There is a marked change in the social needs of elderly persons as they change from a well, self-sufficient elderly person to an uncertain, unsteady, disabled elderly person. Thus, the multiple-bed bedrooms in municipal Homes for the Aged serve many cogent and potent facets for social participation and fulfillment. Four-place bedrooms are in no wise as economical as the 12-14-16-bed rooms, so common in hospital facilities, where the majority of bed-ridden, incapacitated persons would be housed in jurisdictions other than Ontario.

As for the storage of belongings in an area other than the bedroom, this is not uncommon in many households where things not in common use are stored in other portions of the dwelling, such as attics and basements. However, this problem has been under active consideration and newer experiments may well place the facilities in the immediate environs of the resident.

The three types of care under the same roof has much to commend it. This is an important element to most older persons. They may enter the Home somewhat disabled yet fully ambulent. On numerous occasions residents in Homes for the Aged have expressed a feeling of much comfort in knowing that should they become increasingly weakened in mind or body they would not have to move to another institution – they would simply take up residence in the appropriate special care or bed care sections. Since the first of these Homes embodying this new concept in care received its first residents in 1949, the public recognition and acceptance of these tenets has developed in these Homes facilities whereby disabled, elderly persons receive the care and encouragement to permit them the maximum of participation in, and enjoyment of, whatever years they may have remaining.

Section 13 of the Homes for the Aged Act, which defines persons who may be admitted to a municipal Home for the Aged, describes four types of persons who may be admitted and in all instances the criterion is the need for care. This means that persons rightfully admitted to Homes for the Aged have reached a stage of infirmity where gradations of constant care are indicated. At this point the personal needs of most residents change – this point lends substance to, and brings about, basic differences of the two types of Homes described in the second paragraph of Mr Warrilow's letter.

C. Keith Stuart, MD, FACP, Toronto

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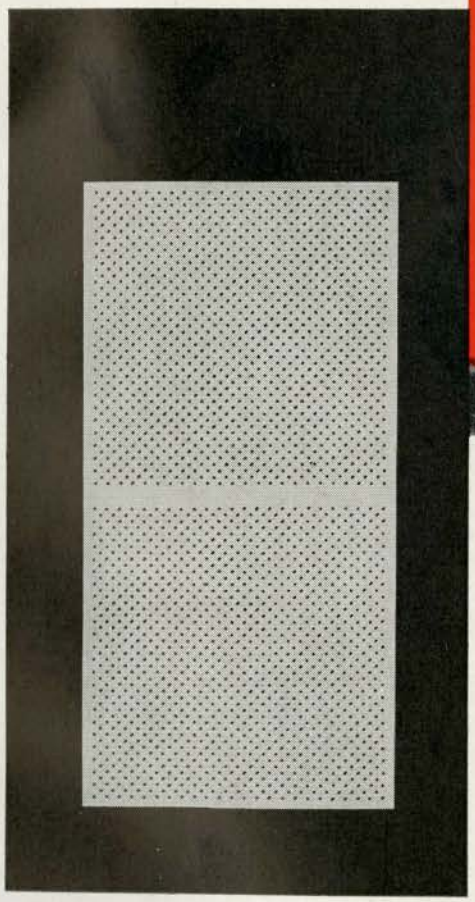
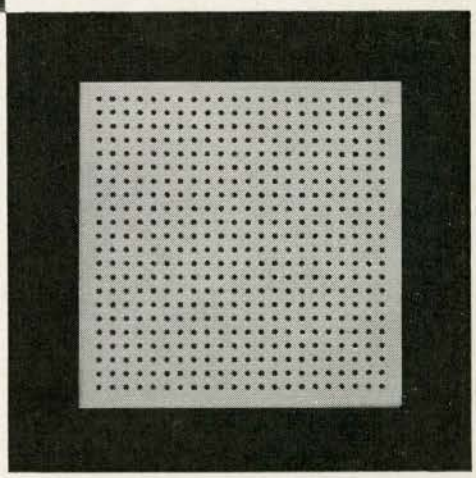


The Canadian Imperial Bank of Commerce, Toronto
Architects: Marani, Morris & Allan, Toronto



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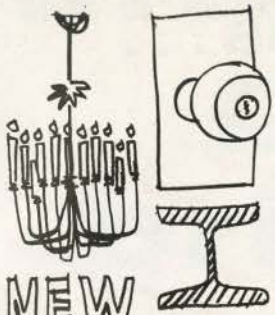

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Custom aluminum eavestroughing. **Shully's Industries Limited, 73 Wingold Avenue, Toronto 19.**

Extruded wire cut bricks in a range of textures, colours, and styles. **Brampton Brick Limited, 147 University Ave., Toronto.**

Fluorescent lamps for exit signs, 116 standard models plus optional features. **Wakefield Lighting Limited, 644 Highland Road, London, Ont.**

Re-arrangeable structural system for storage, display, divider units, etc. Used in conjunction with decorative and storage accessories. **Octopus Products, 200 Geary Avenue, Toronto.**

Kerf, weatherstripping in anodized aluminum, bronze, and stainless steel; five basic shapes. **Unique Sash Balance Company Ltd., 7590 19th Avenue, Ville St. Michel, Quebec.**

Trussteel, light weight metal partition studs for dry wall and lath or plaster wall construction. **Canadian Gypsum Company, Ltd., 790 Bay Street, Toronto 2.**

Viscount 65, free form modular seating. To facilitate curved or circular arrangements. **Royalmetal Corporation Limited, Galt, Ont.**

Adjustable ship curve; gives variety of curves with one instrument. Used with pencil or pen. **Carsen Instruments Limited, 162 Bentworth Road, Toronto 19.**

Line of pressed steel frames and metal fire doors. Calcium silicate core; flexible range of colours. **General Steel Wares Limited, P.O. Box 5034, London, Ont.**

Exhauster Jenny, a power roof ventilator. **Air Conditioning Engineering Company (Canada) Ltd., 636 St. Paul St. W., Montreal.**

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Catalogue on Dimension, a movable wall system. **Hauserman Ltd., Don Mills, Ont.**

Brochure no. 61, illustrating lighting chandeliers. **Lightolier, Jersey City 5, N.J.**

Brochure: Powerlock Floor System, wood floor installations. **Northern Flooring Co. Limited, 70 Brownville Ave., Toronto.**

Reference booklet for the application of fire doors. **Rocket Sheet Metal Co. Ltd., 45 Milford, Toronto.**

Brochure and specification sheets on Rubwood toilet seats. **Viceroy Manufacturing Company Limited, 1655 Dupont Street, Toronto 9.**

Catalogue no. 112B on electrical heating. **Canadian Armature Works Inc., 6595 St. Urbain Street, Montreal 14.**

Brochure on luminous ceilings. **Integrated Lighting Limited, 135 Van Horne Avenue, Montreal 14.**

Folder on Actoflex, spot and flood lighting units. **Rotaflex of Canada Ltd., 609 King Street West, Toronto 2B.**

Catalogue on doors for special services, from the Bilco Company. **J. J. Thomas Agencies, P.O. Box 125, Brantford, Ont.**

Information on back-up and cavity masonry walls. **Dur-O-Wal, 789 Woodward Ave., Hamilton, Ont.**

Information on safety rails for corridors and bath tubs. **Hubert Industries, 385 King William St., Hamilton, Ont.**

Specification sheets for Panelaire ornamental hardboard grillework. **Panelboard Manufacturing Co. Inc., 222 Pacific Street, Newark 14, New Jersey.**

Bulletin no. 255-s, on the 3-Way Functional Ceiling, a radiant acoustical ceiling system. **Burgess-Manning Company, Architectural Products Division, 749 East Park Ave., Libertyville, Ill.**

Brochure on Monobond, a bonding agent for thin-bed installations of terrazzo and concrete. **Macnaughton-Brooks Ltd., 315 Symington Avenue, Toronto.**

Brochure on Wisper Tone, a range of fire rated acoustical tiles. **International Panel Boards Limited, Sales Promotion Department, Gatineau, Quebec.**

36-page catalogue, FV-8, on electrically operated flush valve systems. Includes complete descriptions of all operating parts. **Department "VH", Mueller Limited, Sarnia, Ont.**

Catalogue containing specifications and engineering data on hot water heating products. **H. A. Thrush & Company, Peru, Indiana.**

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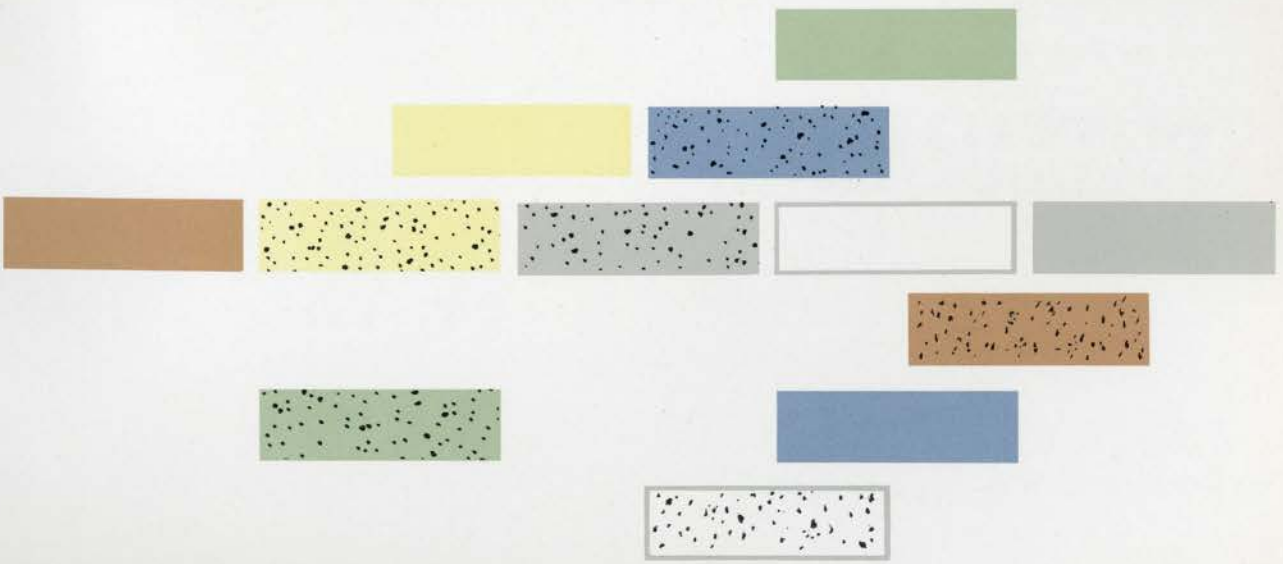

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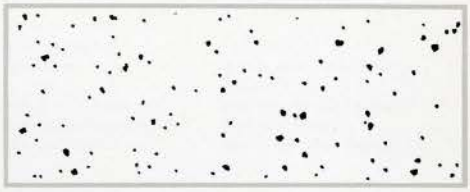

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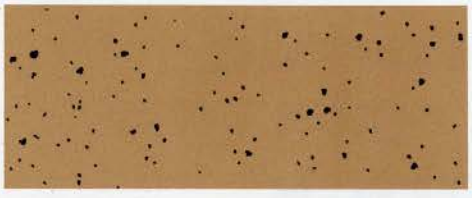

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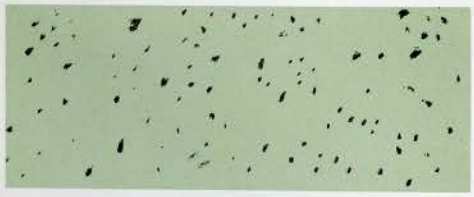

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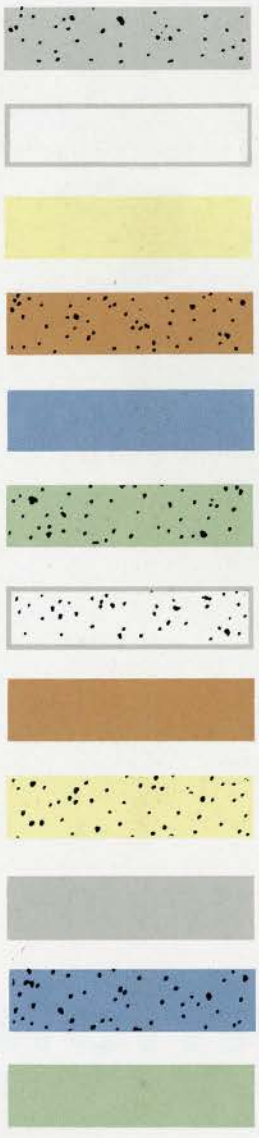

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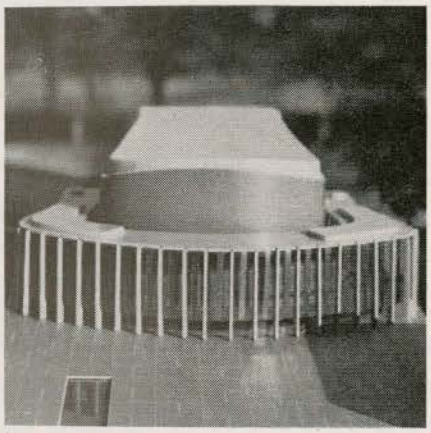
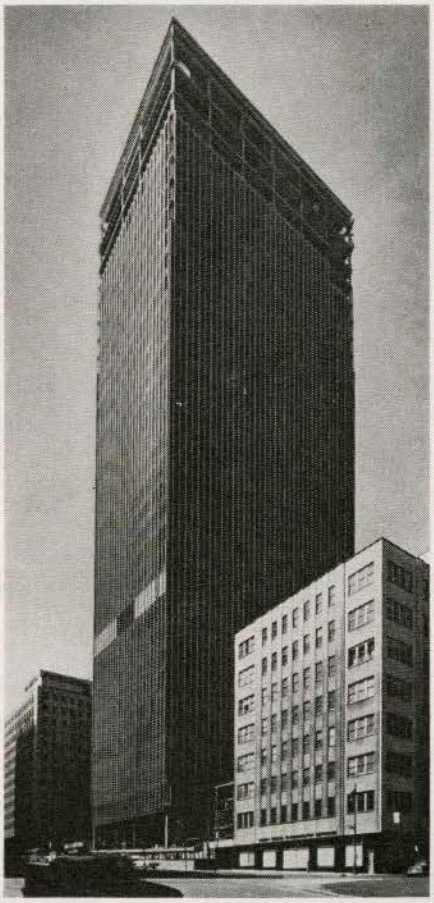
General Contractors:	Quemont Construction Ltd. — Charles Duranceau Ltd. A joint venture.
2, Head Office Building & Garage, C.N.R.	
Architects:	C.N.R., H. C. Greensides, Chief Architect
Consulting Engineers:	Owners Staff
General Contractors:	E.G.M. Cape & Company (1956) Ltd.
3, C.I.L. House	
Architects:	Greenspoon, Freedlander & Dunne
Consulting Architects:	Skidmore, Owings & Merrill
Consulting Engineers:	Slocum & Fuller
General Contractors:	Anglin-Norcross Quebec Ltd.
4, Canadian Imperial Bank of Commerce	
Architects:	Peter Dickinson & Associates
Consulting Engineers:	Jack Chisvin & Associates
General Contractors:	Perini Ltd.



1 Place des Arts

2 Head Office — C.N.R.



3 C.I.L. House

4 Canadian Imperial Bank of Commerce

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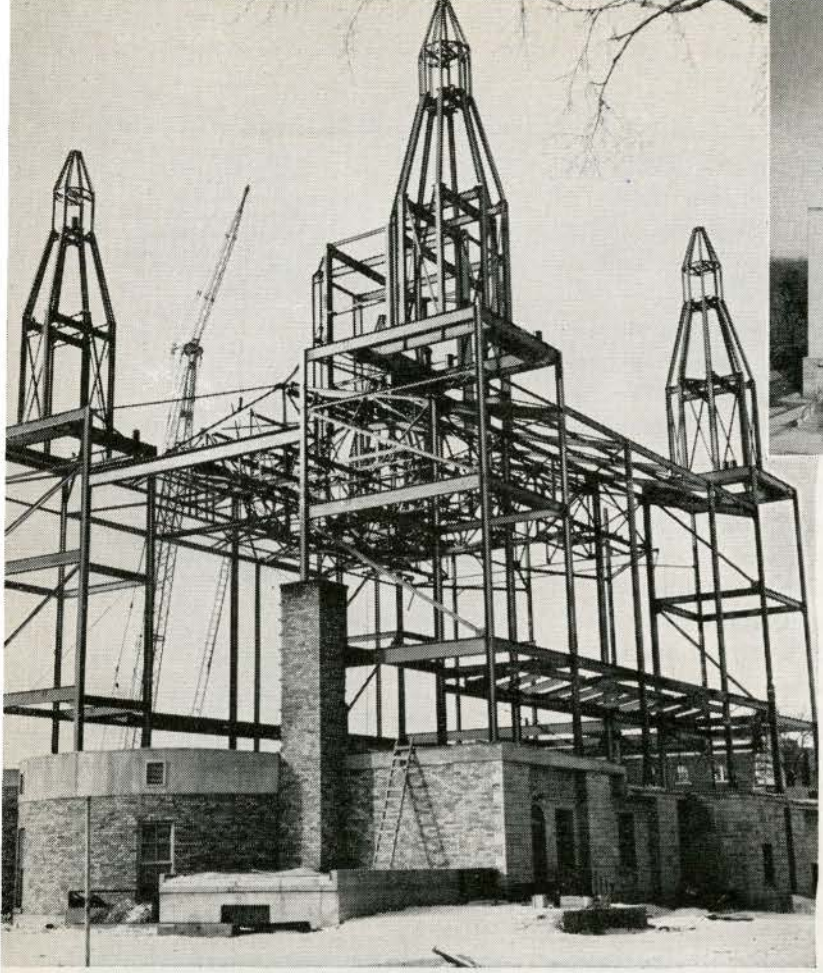
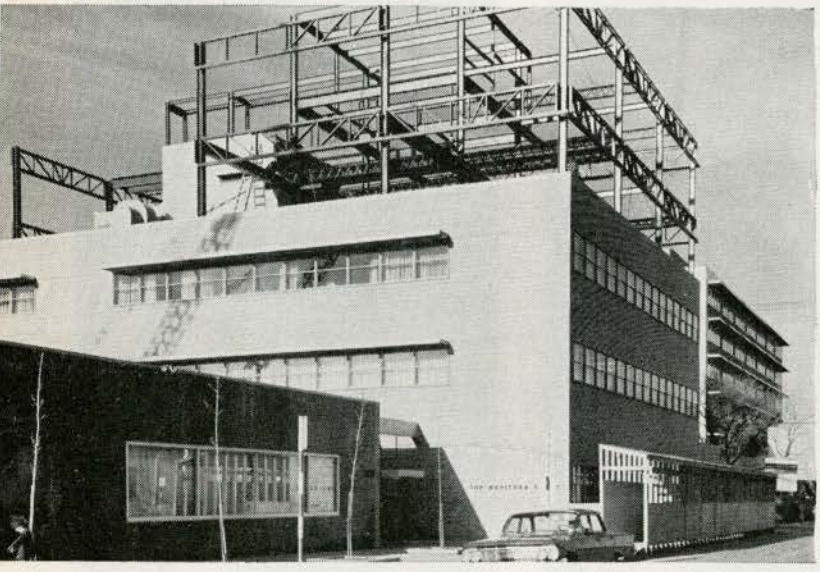


Steel is versatile

Structural steel can be used to build complex design shapes. This steel frame is for the Greek Orthodox Holy Trinity Cathedral in Winnipeg and inset is the finished building.

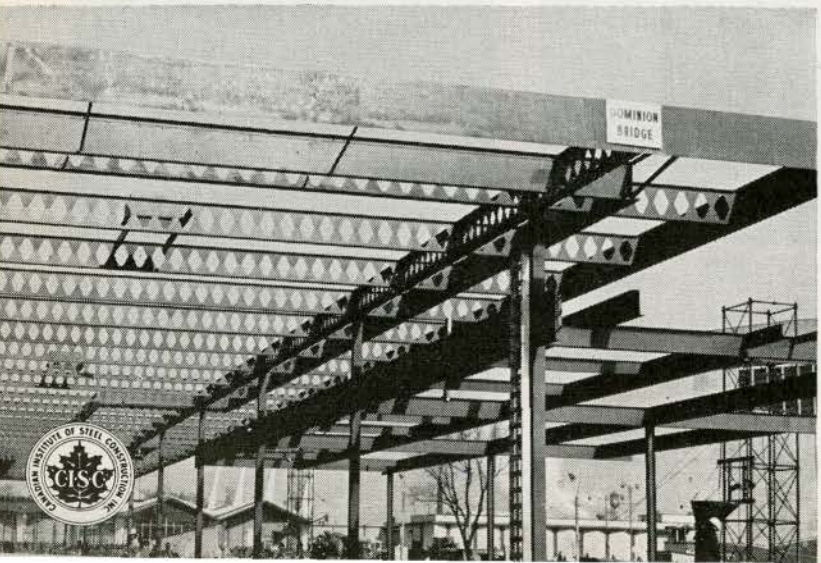
Architects: Green, Blankstein, Russell & Associates.



Additions are easy with steel

When this building was first constructed two extra floors at a later date were a possibility. Last year they became a reality. The tops of the main support columns of the original steel frame had been left exposed and the new steel was added quickly and economically.

Architects: Smith, Carter, Searle & Associates.



Castellated steel beams reduce weight

The use of castellated beams in the C.N.E. Home Furnishing Building in Toronto resulted in roof purlins that were about 75% of the weight of an equally strong rolled beam and about 60% of the weight of an equally rigid rolled beam. Beams are castellated by cutting the web zigzag fashion, offsetting the halves one notch and rewelding peak to peak. Castellated beams can free the designer from the restrictions of excessive deflections when using the new high strength steels.

Architects: Marani, Morris & Allan.
Consulting Structural Engineer: W. Sefton & Associates, Limited.

Steel gives design freedom

Y-shaped with clear spans. This is the Saskatchewan Power Corporation's head office building in Regina. There are no columns inside the wings of the building and each floor is a wide open space 43 ft. x 270 ft. You can build this way with steel—it simplifies interior partitioning and makes future changes easy.

Architects: Joseph Pettick, M.R.A.I.C.
Consultants: C.C. Parker, Whittaker & Co. Ltd.

Steel shows some of its qualities

Some of the basic qualities of steel as a building material are illustrated in this round-up of recent projects from across the country. Steel produces light, flexible structures and its inherent qualities offer great scope to the imaginative architect.

When evaluating structural framing materials it is worth considering all the advantages offered by steel. Steel goes up fast to give an early return on invested capital and reduces interest charges on construction loans. Lightweight framing keeps foundation costs down and the strength of the material permits large column free areas for better rentable floor space. Later alterations or additions are also easily effected and more economical to undertake when steel is used.

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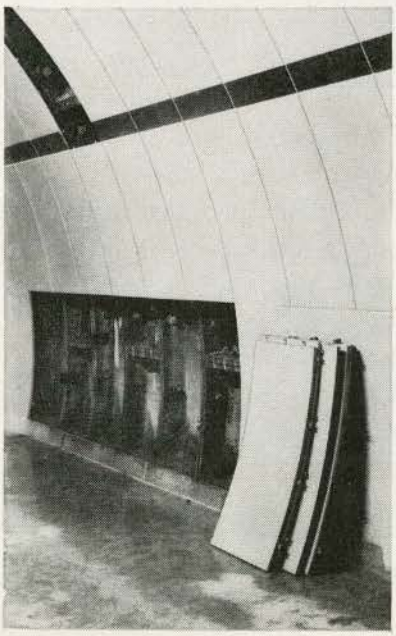

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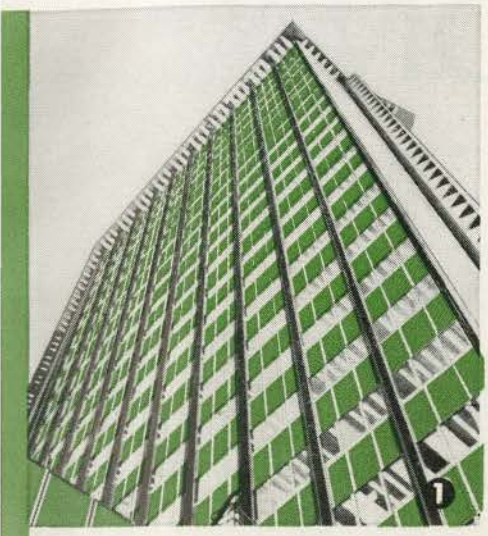

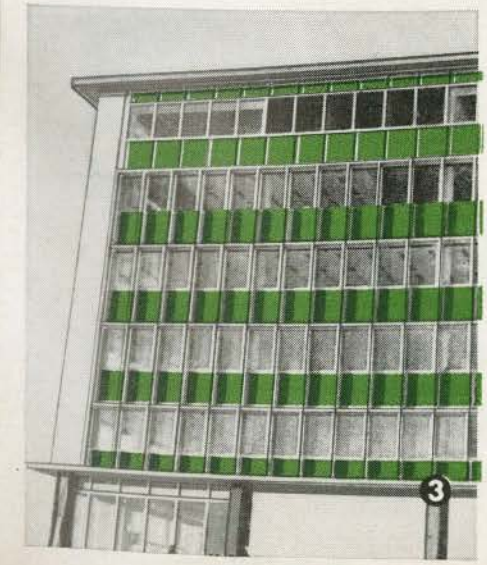

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STRUCTURAL ENGINEERS:
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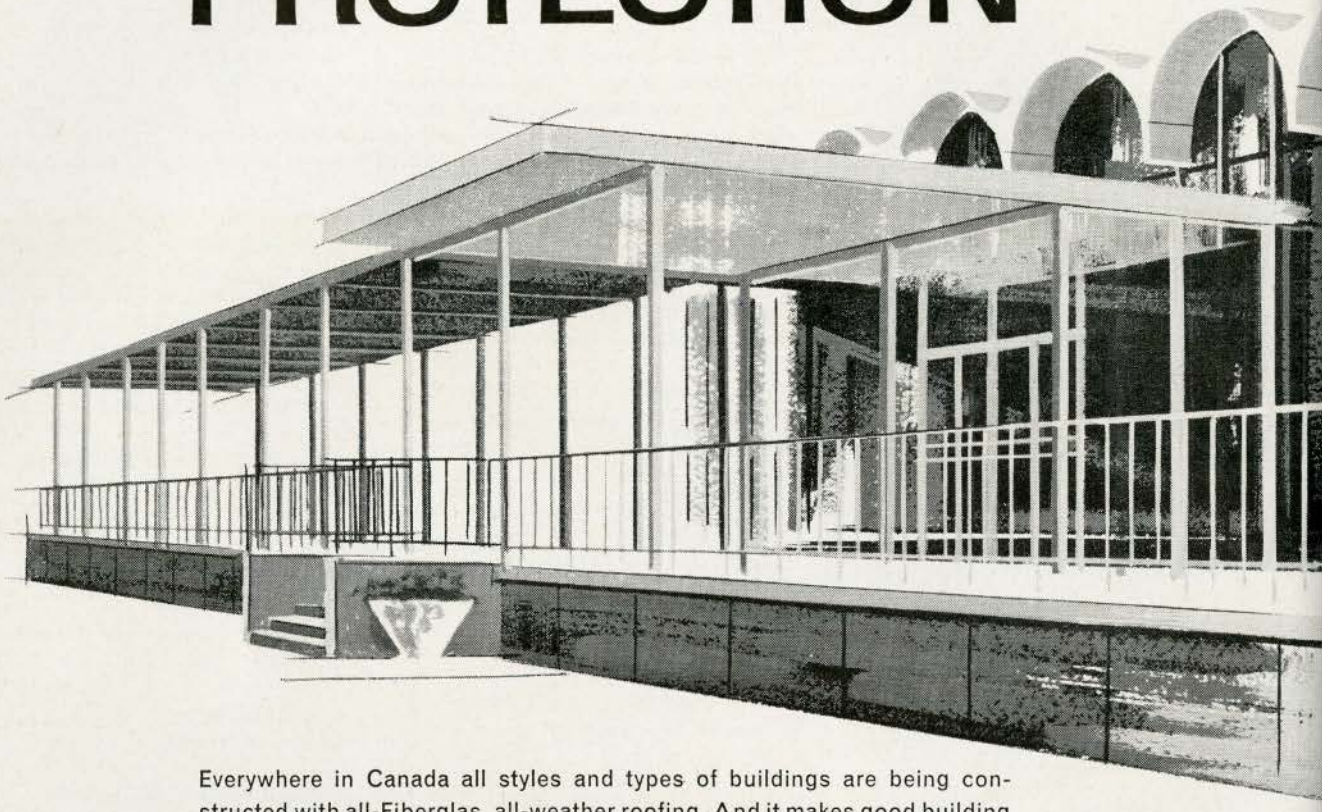

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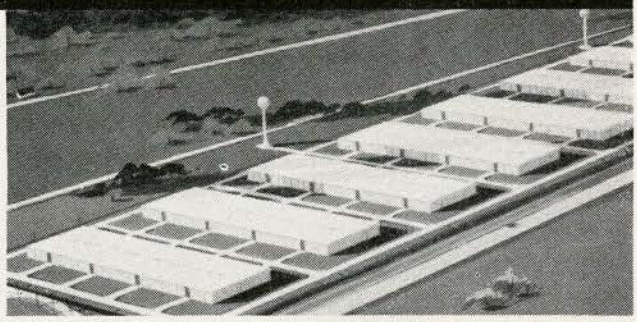

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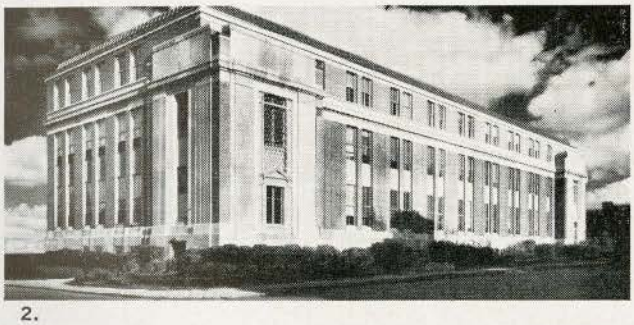

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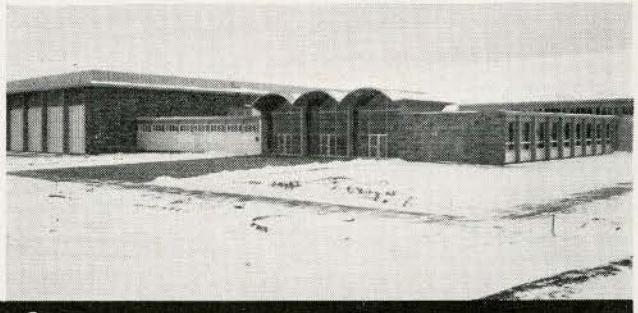

6.

1. Pictou Academy Recreation Hall, Pictou, N.S.
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General Contractor—MacDougall Construction Company Limited, New Glasgow, N.S.
Roofer—Tasco Sheet Metal and Roofing Company Limited, Sydney and Halifax, N.S.

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Architects—Barott, Marshall, Merrit and Barott, Montreal
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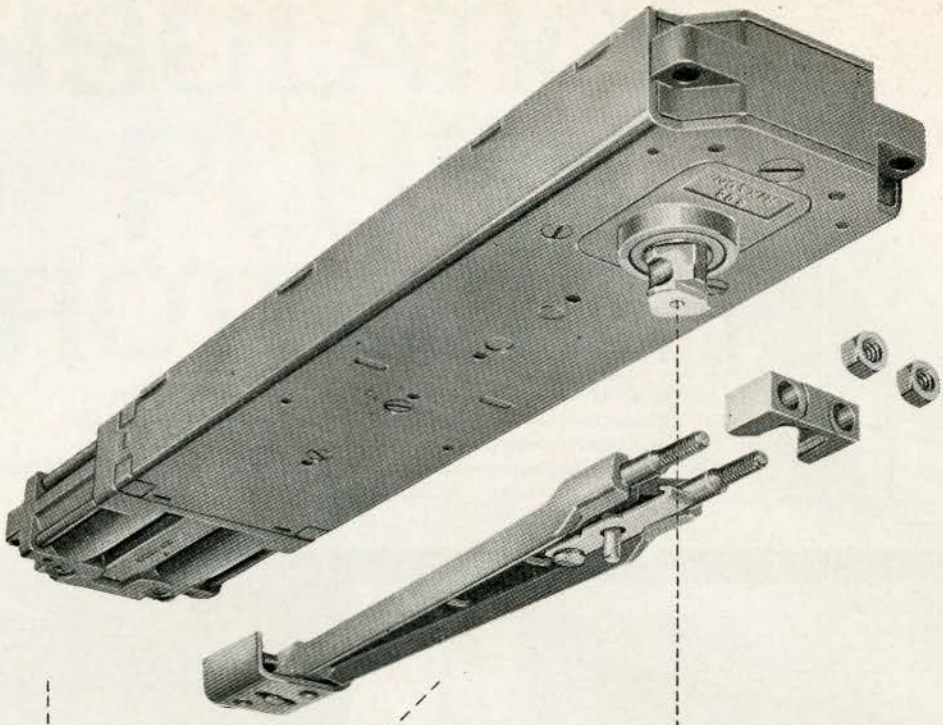
General Contractor—Foundation Company of Canada Limited, Toronto.
Roofing Contractor—Semple Gooder & Company Limited, Toronto.

4. Maturing Warehouses—Hiram Walker & Sons Ltd., Windsor.
Engineers—Smith, Hinchman & Grylls Associates, Windsor.
General Contractor—Eastern Construction Limited, Windsor.
Roofing Contractor—Schreiber Bros. Limited, Hamilton.

5. River East School Division No. 9, North Kildonan, Man.
Architect—Ward and MacDonald Associates, Winnipeg.
General Contractor—Wyatt Construction Company Limited, Winnipeg.
Roofing Contractor—Aetna Roofing Company Limited, Winnipeg.

6. Gymnasium—University of Alberta, Calgary.
Architects—Department of Public Works, Province of Alberta.
General Contractor—Burns & Dutton Concrete and Construction Company Limited, Calgary.
Roofing Contractor—William Clark Roofing Company Limited, Calgary.



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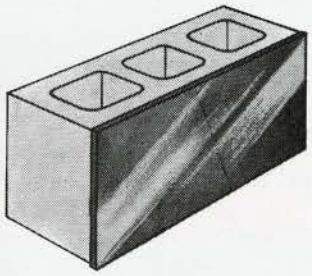

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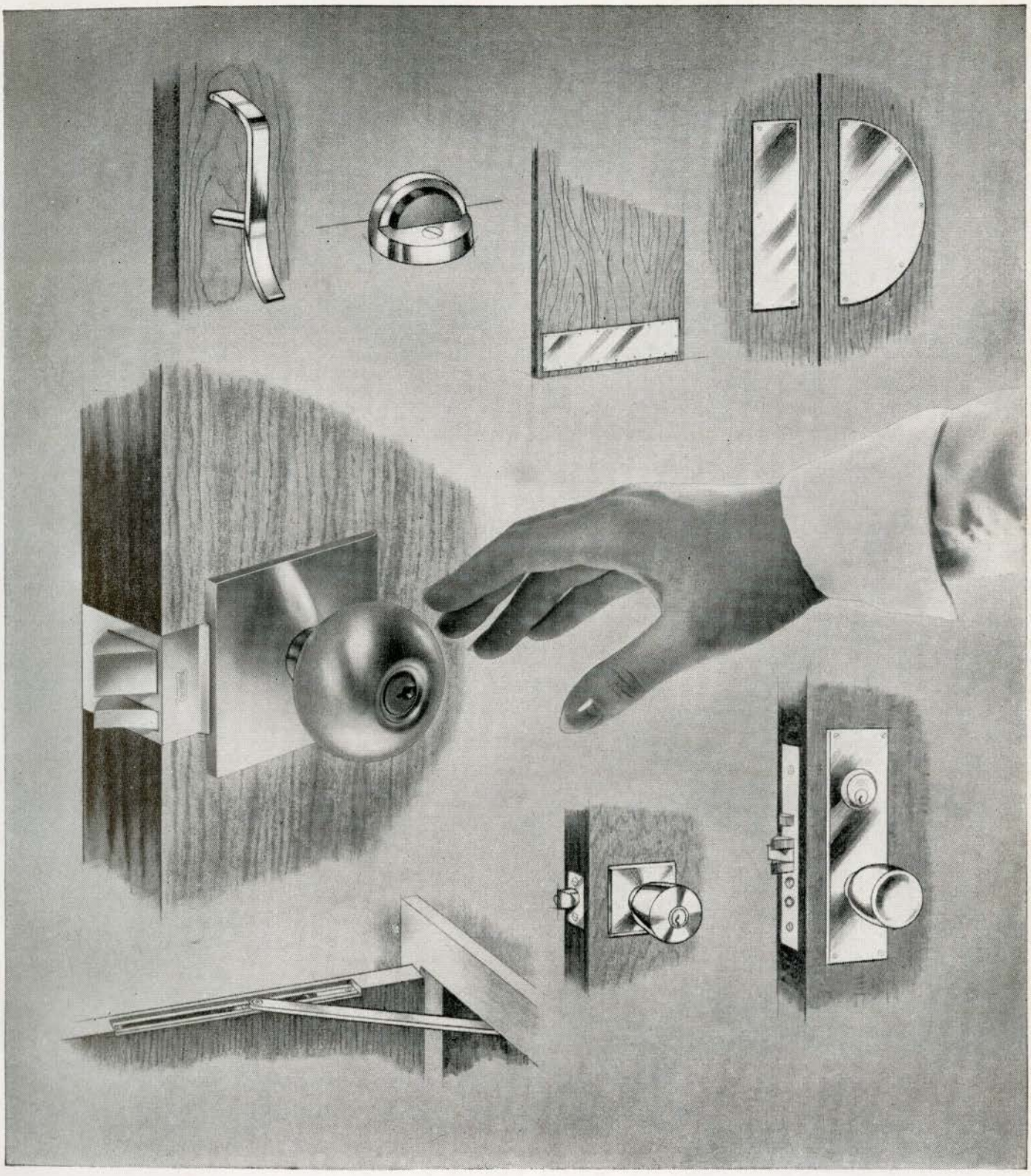

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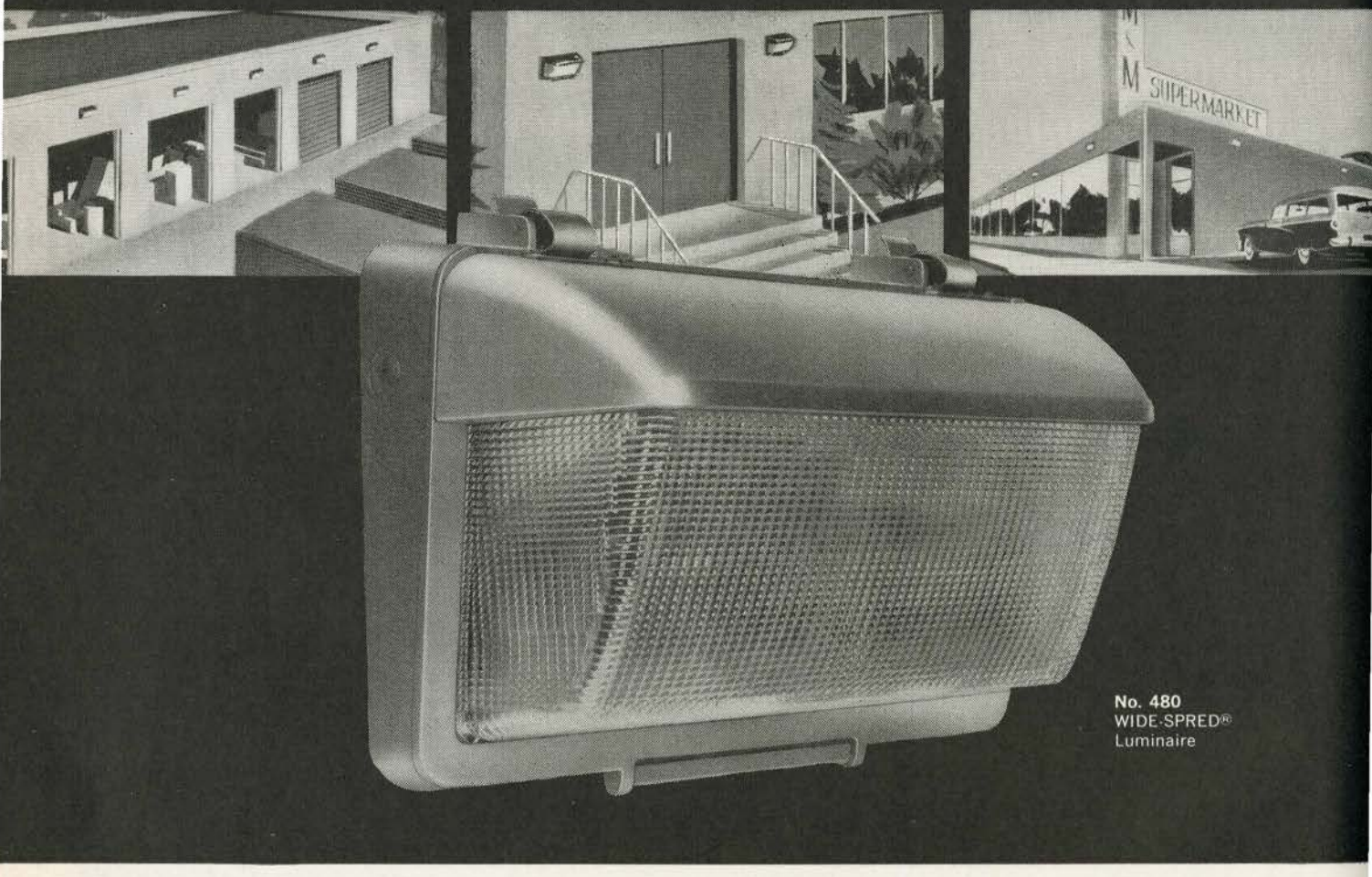

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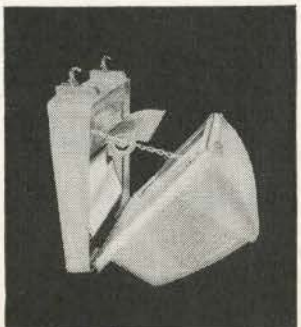

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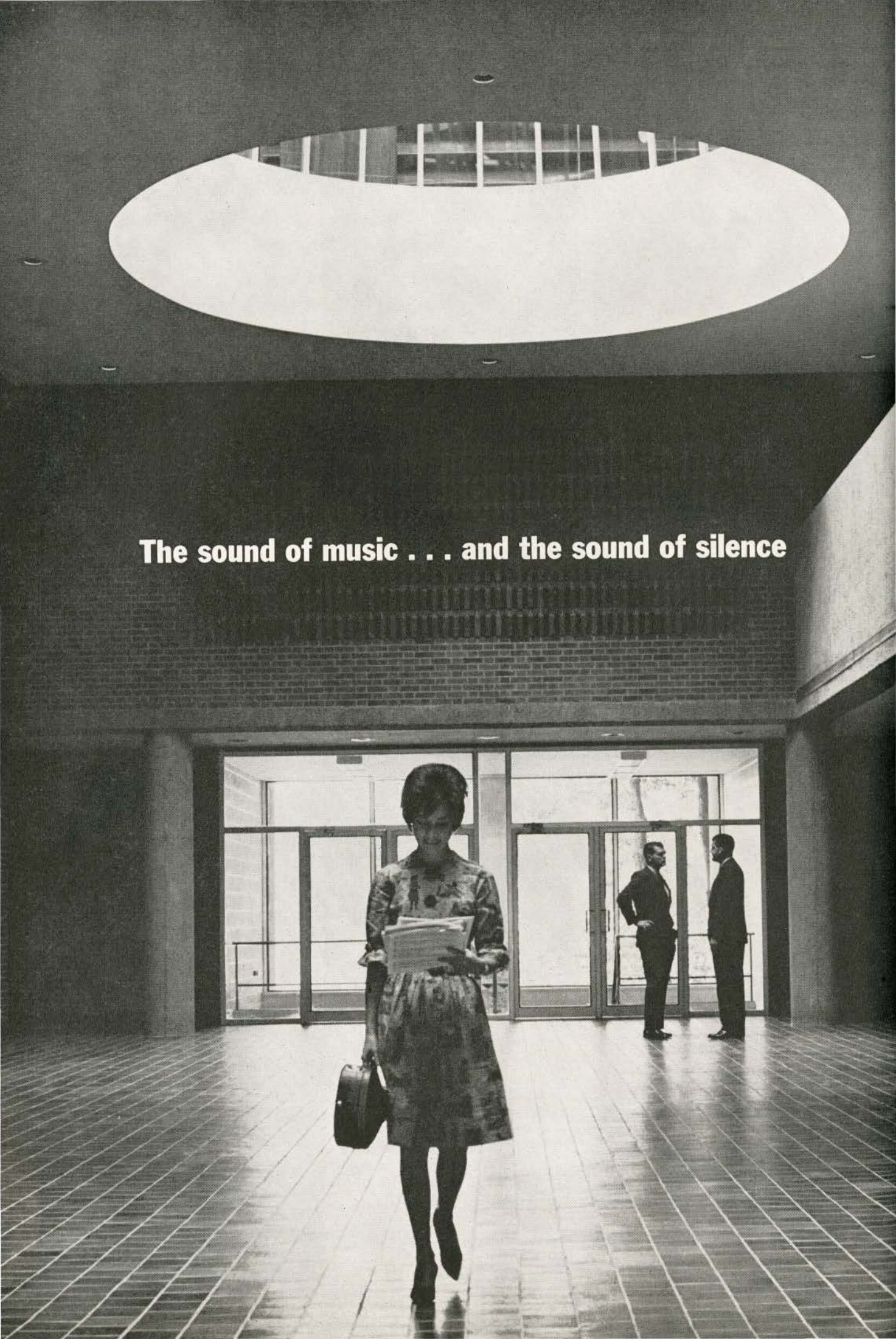
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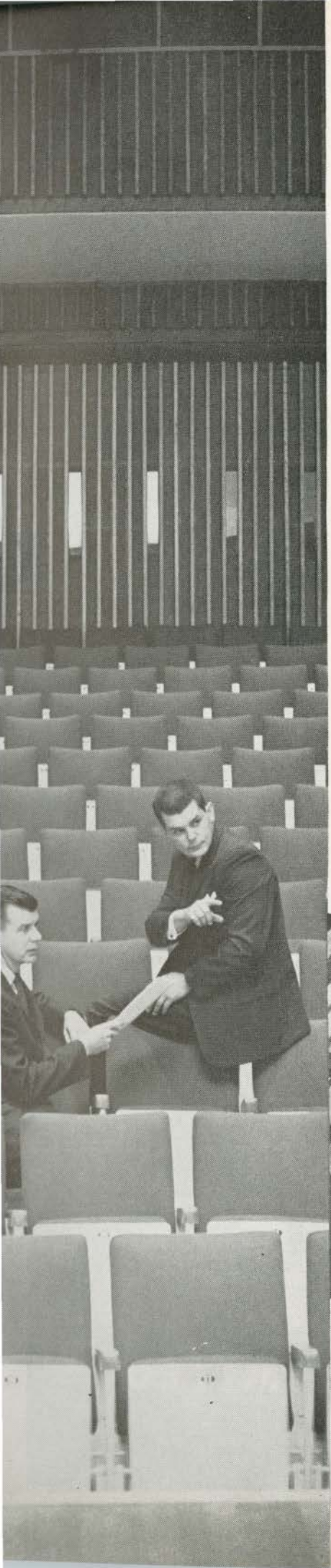

(Above) J-M Spintone panels were selected for the upstairs library. (Extreme left) A Permacoustic ceiling graces the main lobby. (Left) No. 61 Sound Absorbing Elements were installed in the back of the concert hall.

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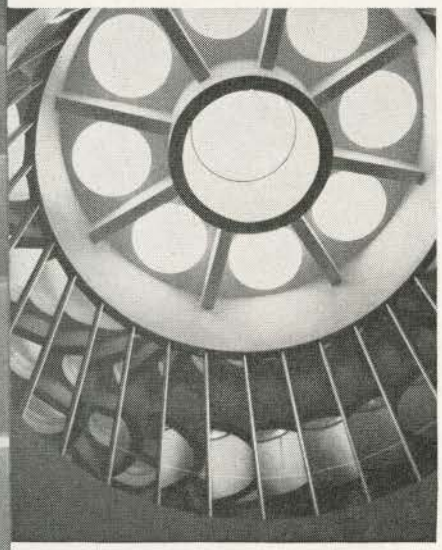

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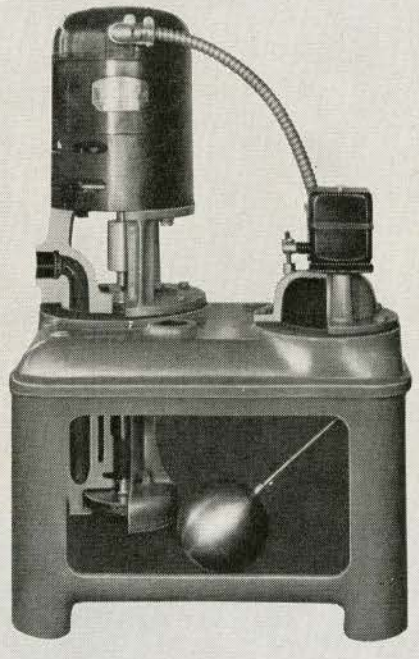

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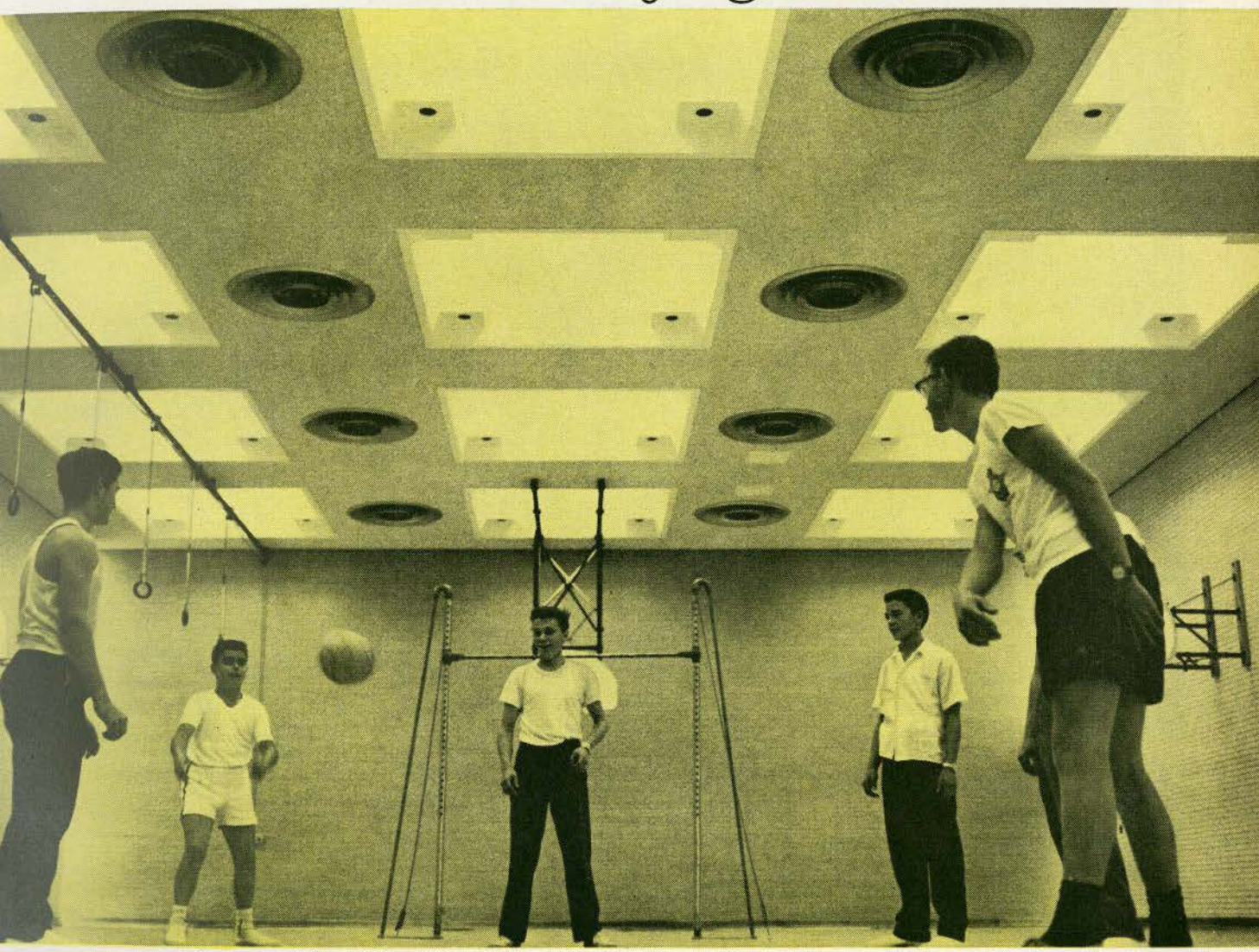

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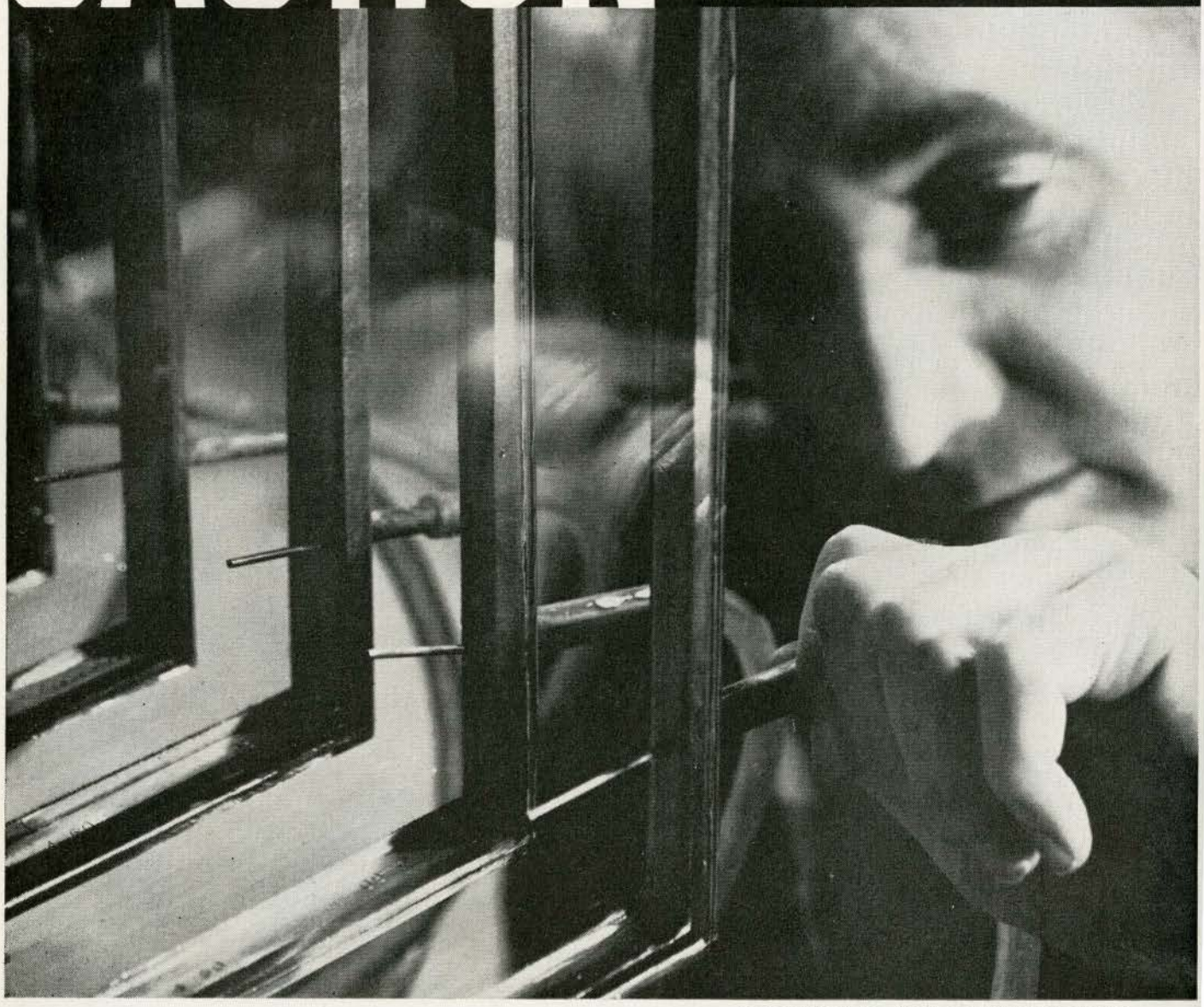

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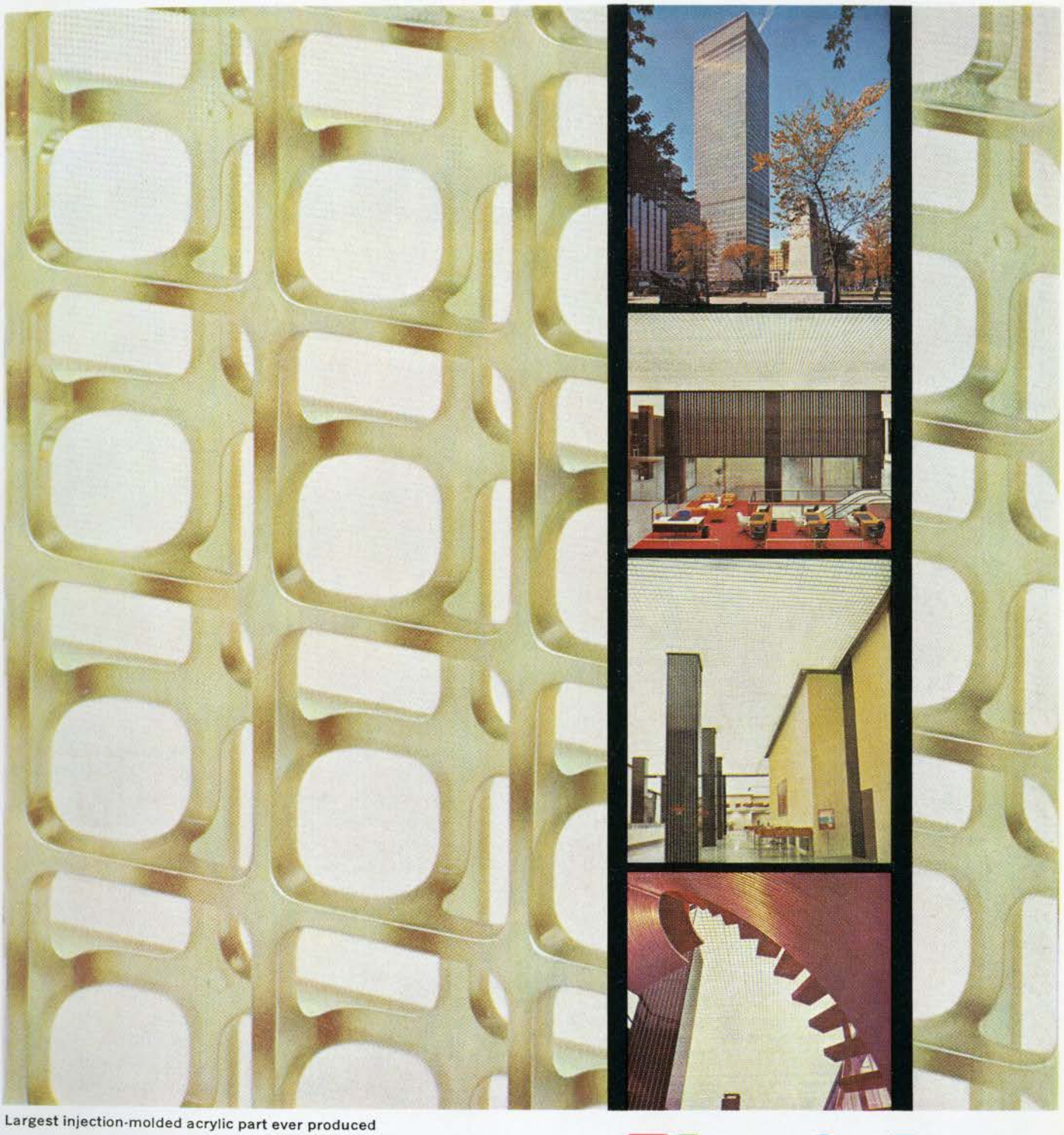

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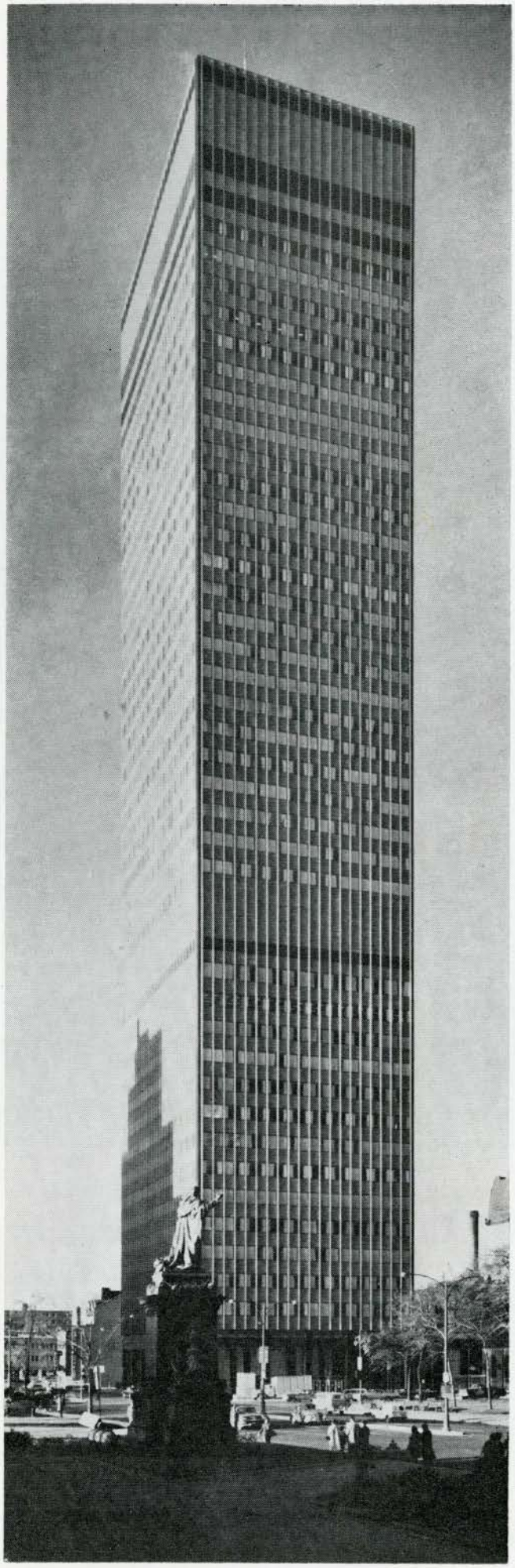

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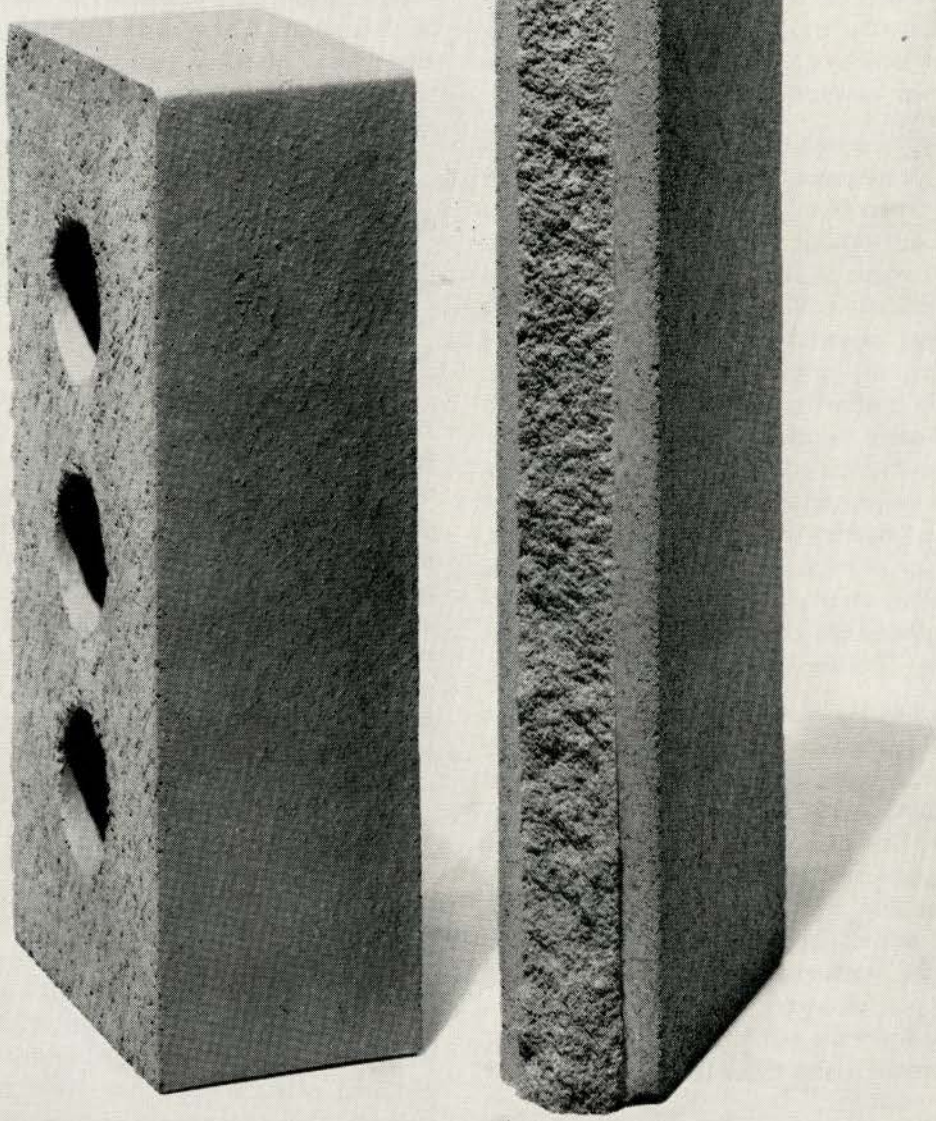

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The Canadian Imperial Bank of Commerce . . . An Appraisal

By Peter Collins

THE BANK OF COMMERCE Building in Montreal possesses four features or qualities which seem particularly worth singling out for attention. The first two derive from its proportions; the others from the materials employed.

The general proportions of the building apparently resulted initially from the usual rigid financial requirements. It seems fair to assume that the original promoters (not the Canadian Imperial Bank of Commerce) insisted that they must have a building which would contain the maximum rental floor area, whilst at the same time being slightly higher than the nearby Ville Marie tower as then proposed. The law imposes a maximum floor area calculated as twelve times the area of the site. The result was, therefore, a tower which in height was 591 ft above the sidewalk and in plan covered an area of 15,225 sq. ft.

The result of such condition has nevertheless been a tower, which, in its elegance, goes far beyond what one might ordinarily expect from real-estate arithmetic. Seen suddenly from a distance, as a shaft silhouetted against the sky, it is as dramatic as anything to be found starred in Baedeker's Guidebooks. Viewed from close to, especially from its most favourable angle (i.e., facing the narrowest facade), the effect is even more striking. Though the height is only five and a half times its width (which does not seem particularly slender when compared with, say, a classical column), it is in fact remarkably slender for a tower, and almost unique in the present decade, when the tendency is towards high-rising slabs. If we compare, for example, the campanile in Venice (which is also oblong on plan), we find that the proportions are almost the same, namely 10:8½:41, as compared with 10:7½:42 of the Bank of Commerce.

The slenderness of the Bank of Commerce Tower is even more striking when one walks around Dominion Square to look at it, because of all sorts of optical and psychological factors which it is difficult, if not impossible, to measure. One cause may however be the violently contrasting effects of perspective and recession as the eye travels dizzily upwards. If, for example, one stands at the far side of the Square, and measures the proportions by the traditional technique of squinting across a pencil, one discovers that the height is apparently only four times the width measured at the base, though it is apparently seven times the width measured at the top.

Seen across the Square, its similarity to the campanile at Venice is quite remarkable, as regards the aesthetic effects produced. The Piazza San Marco is the most hoary example of successful urban design to be found in the textbooks; and indeed, no public discussion on urban design ever passes without some sonorous pundit citing it, usually with an air of selecting it thoughtfully from a well-stocked memory of many other plazas, all equally good. In fact, the Piazza San Marco is of course unique, but it is unique in a more peculiar sense than is sometimes realized, as is apparent to anyone who has also visited Vicenza, where the Piazza dei Signori is composed of similar elements (including a campanile and a building based on Sansovino's Venetian Library), but where the spaces are most unsympathetically and awkwardly enclosed.

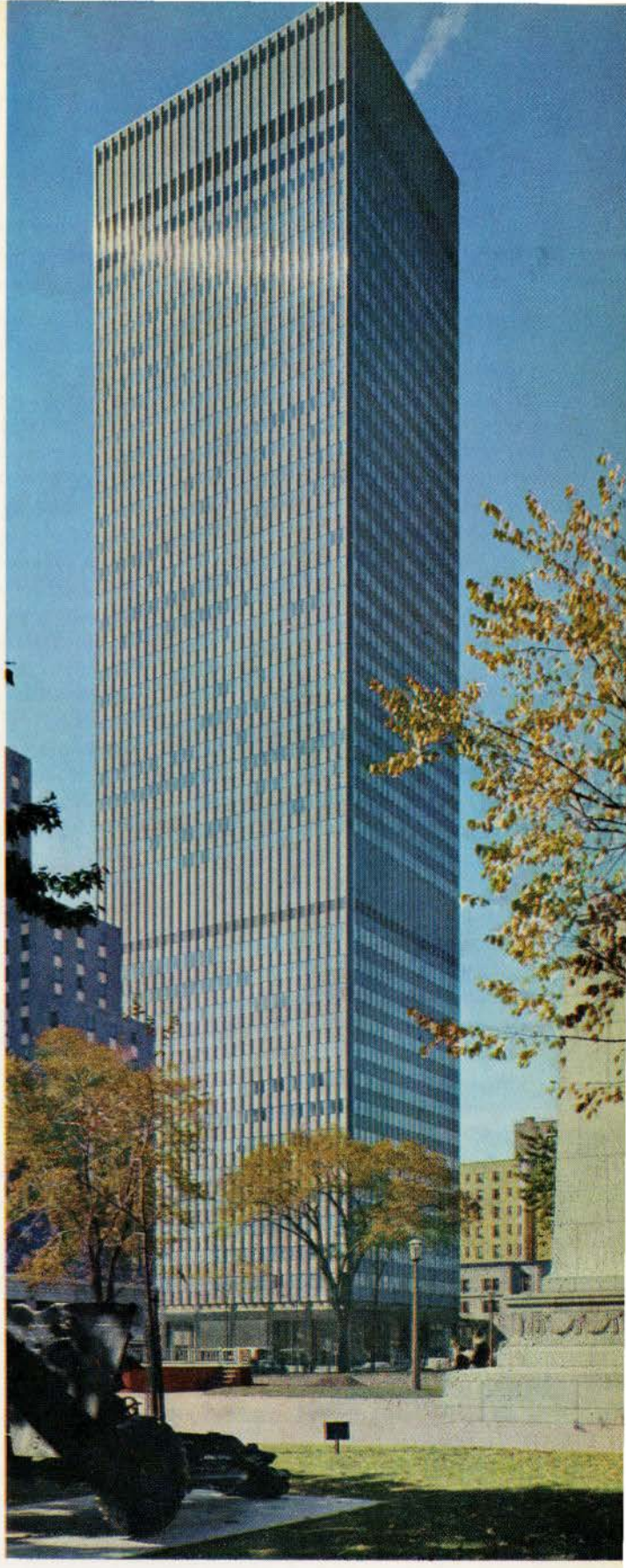
The placing of the Bank of Commerce tower was presumably entirely fortuitous (in the sense that the promoters might have selected any other well-located site in the city for their investments). But although its location was haphazard, and materialistic considerations dictated its general shape, it constitutes, as a result of the architects' skilful handling of the details, and other refinements of proportion and composition, an element in Dominion Square which, if respected, could make this square one of the most beautiful in the world. How this is to be done will be obvious to anyone who studies carefully the Piazza San Marco. Indeed, the history of architecture could hardly have a more demonstrably obvious use.

The other two distinctive features of the building are the use of stainless steel and the detailing of the spandrels (which are of concrete faced externally with pieces of slate). Of the spandrels, with their pseudo-pseudo-isodomic bonding, it is enough to say that they create a wall pattern which, in its scale, colour and texture, seems to offer a welcome change from the more usual type of curtain wall, and is none the worse for having been invented by Auguste Perret. Moreover, these spandrels contrast most effectively with the polished stainless steel ribs which maintain them in position. Indeed, few Montrealers, in their travels, can ever have seen anything so poetic as the brilliant sparkle of these fins, flashing against their more sombre but by no means lustreless background, when caught in the rays of the setting sun.

The most remarkable use of stainless steel in the building is not, however, in the tower itself, but inside the banking hall linking the tower to the Windsor Hotel. This is the steel spiral staircase which rises from the main floor to the mezzanine. It is quite unlike the gimmicky metallic stairways usually held up for admiration as expressions of the modern age, for it not only combines technical skill with engineering audacity, but is a model of classical restraint. Without any ostentatious appearance of effort, without any elaborate web of tension wires, it rises into the air with unassuming elegance; and the grace of its curves is only matched by the exquisite accuracy with which each rectangular bar has been wrought, polished, and fixed into place.

Canadian Imperial Bank of Commerce

Montreal



Architect:
Peter Dickinson

Supervising Architects:
Ross, Fish, Duschenes & Barrett
Montreal

Architects & Design Consultants to Canadian Imperial Bank of Commerce:
Clifford & Lawrie,
Toronto

Consulting Engineers:
Structural: M. S. Yolles Associates, Ltd

Mechanical: G. Granek & Associates

Electrical: Jack Chisvin & Associates

General Contractor:
Perini Limited

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CANADIAN IMPERIAL BANK OF COMMERCE

Background and Vital Statistics

by John K. Ross
Ross, Fish, Duschenes and Barrett
Supervising Architects

THE WINDSOR HOTEL has for many years been a landmark in the uptown business area of Montreal. Built at the corner of Windsor and Dorchester Streets, it faces Dominion Square and the Sun Life Building and is one of the most prominent building sites in the city. The original hotel was built before 1890, and "The Windsor" has long been known for its many public functions.

The original part of the hotel has been obsolete for many years. In 1958, a syndicate of Montreal businessmen bought the property and proposed demolishing the old wing to provide a 45,000-sq.-ft building site. At this stage, the Canadian Imperial Bank of Commerce and others formed Dorchester Commerce Realty Limited, which bought the property and began to develop the project.

Architect *Peter Dickinson,* Toronto, had been retained to prepare sketches for the site's development, which at one time contemplated the construction of two office tower buildings. The final decision, however, was in favor of one 43-storey office building and retaining the newer part of the hotel as a hotel operation.

The interest of the Canadian Imperial Bank of Commerce in this project was created by the necessity to move from their outgrown facilities on St James St and to provide large, new quarters in the developing uptown area for themselves and many of their important clients.

Design: On this basis, Mr Dickinson drew plans to provide three garage floors, two banking floors, ground and first basement, and 40 tower floors, three being occupied by bank offices.

Size and shape of the "Tower," which was to provide tenant space, was based on a 5-ft square module. All ceiling layouts, lighting, diffuser locations, underfloor duct systems, etc., are based on this module. Subsequent tenant layouts have proved it a satisfactory arrangement.

There have been many discussions as to the best "module" to use. There are advocates for modules varying from 4 ft 8 ins square to 5 ft 6 ins square. I am sure the arguments will continue. But in this instance, the 5-ft module has been fully accepted.

Basic planning of a tower of this kind is, of course, centred around the problems of vertical transportation. The adjoining plans show three banks of elevators; low rise ground to 15th floor; mid-rise 15th to 29th; high-rise, 29th to 41st. A small elevator serves the observation gallery at the 43rd floor level.

All elevators can stop at the 15th floor, which has been reserved for general building functions such as management office, restaurant, barber shop . . .

Two floors are entirely given over to mechanical services. The 16th-floor equipment serves the lower levels; main heating and air conditioning equipment, on the 42nd floor, serves down to the 17th floor.

Selection of building materials and methods of construction, used for a large project of this kind, could be reported on at great length. In fact, each material becomes the subject of a complete analysis – based on original cost, suitability, availability, durability, and maintenance costs.

The following outline specification lists the materials used, without going into the pros and cons of why they were selected:

Building Frame – Structural steel with concrete fireproofing of columns and sprayed asbestos fireproofing of beams and girders.

Floors – "Q Floor" with reinforced concrete topping and sprayed asbestos fireproofing on the underside.

Exterior Walls – Concrete and terra cotta block plastered. Reinforced concrete spandrels are faced with green slate and backed up with 2 ins of insulation.

Ceilings – Hung, perforated metal pan type with acoustical blanket and asbestos board.

Typical Partitions – Steel stud with two layers of gyproc board each side, taped joints, painted.

Finished Floors – Asbestos vinyl tile in rental areas. Ceramic tile in washrooms.

Stairs – Steel pan with cement fill and linoleum treads and nosings.

Windows – Fixed insulated stainless steel frames with sealed double glass.

Exterior Mullions – Stainless steel mullions with concrete fill.

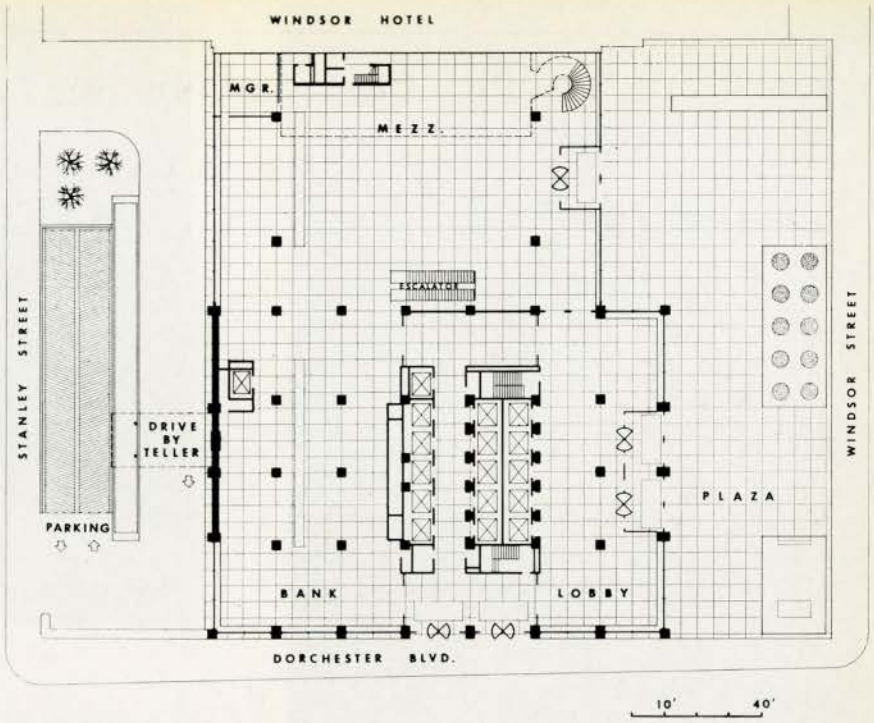
Movement of the Building: Owing to settlement and its effect on the various metals used, one normally thinks of the possible vertical movement of a building. But in a building of this height, the horizontal movement, owing to wind loads, is equally important and more difficult to overcome.

In the core of the building, masonry partitions are kept free of columns by use of expansion joints. The basic tenant partitions are either steel or drywall construction. Partitions butt to ceilings with a foam rubber joint, which also improves the acoustical value of the partitions.

Construction: Construction on the site was begun by the general contractors, Perini Limited, in October, 1959. The first tenants were moved into the building in March, 1962, some 30 months later. The banking floors were occupied by June 30, 1962.

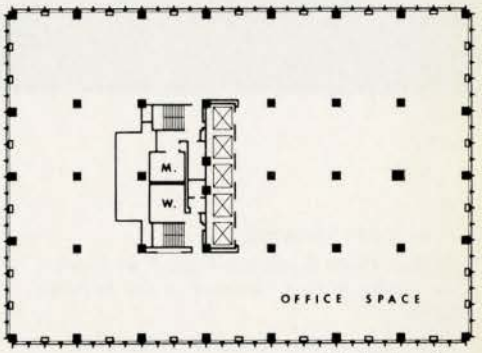
Besides all the normal problems of construction in a project of this size, handling of materials is probably the most important. Even with material hoists running 24 hours a day and truck deliveries scheduled carefully, it was often impossible to keep ahead of the construction requirements.

Vital Statistics: Land area, 45,000 sq. ft; rental floor area, 480,000 sq. ft; building cube, 11 million cu. ft; height above street level, 590 ft; height of broadcasting tower above main roof, 185 ft. Observation Deck, on the 43rd floor, is some 60 ft above the level of Mount Royal's mountain lookout.

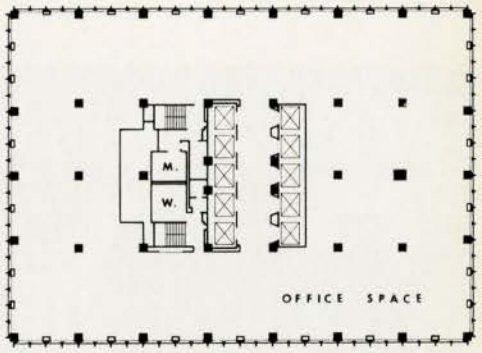


Ground floor and plaza

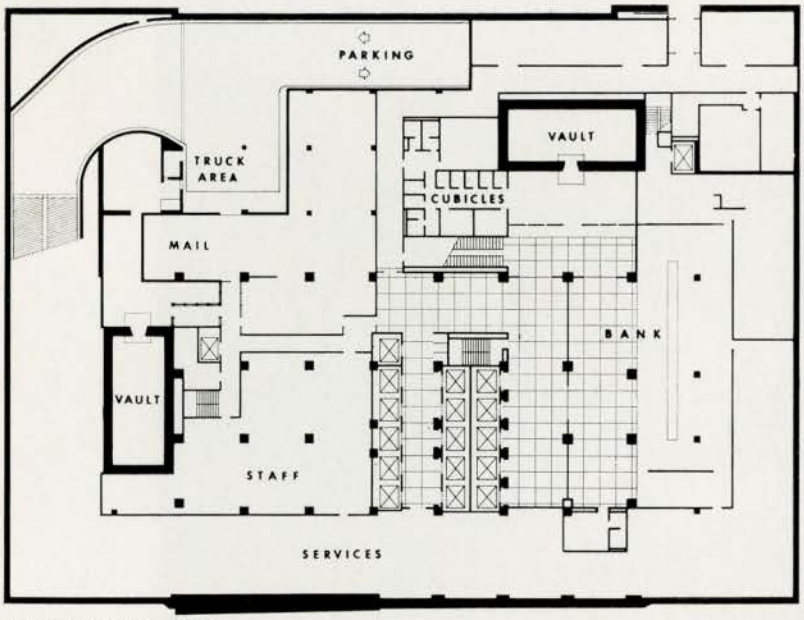
CANADIAN IMPERIAL BANK OF COMMERCE



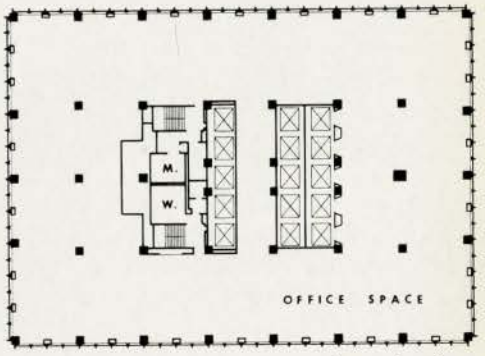
High rise floors



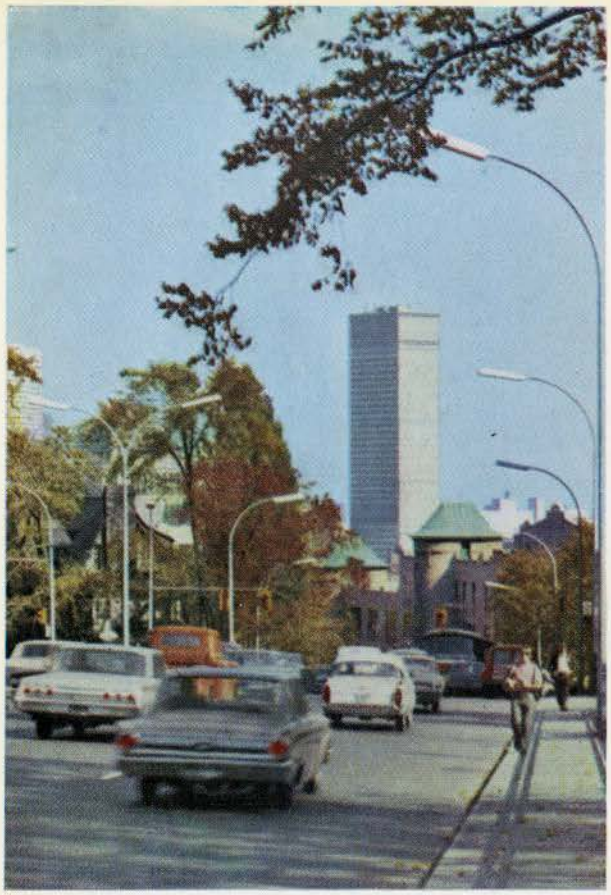
Mid rise floors



Lower banking floor



Low rise floors



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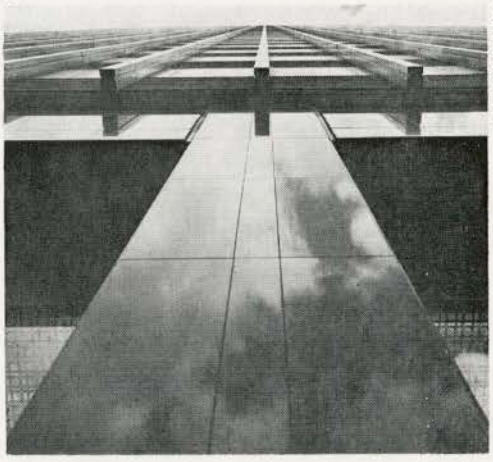

CLEEVE HORNE

1. View from the north
2. "Three Piece Reclining Figure" in bronze, by Henry Moore, situated in the building plaza
3. Detail of column-spandrel connection
4. Main banking hall — island platform area

4

5. The helicoidal stairway seen from the plaza
6. The branch manager's office in the main banking hall
7. Detail of the underside of the stairway, a column, and the illuminated ceiling
8. View of the main banking hall from the plaza

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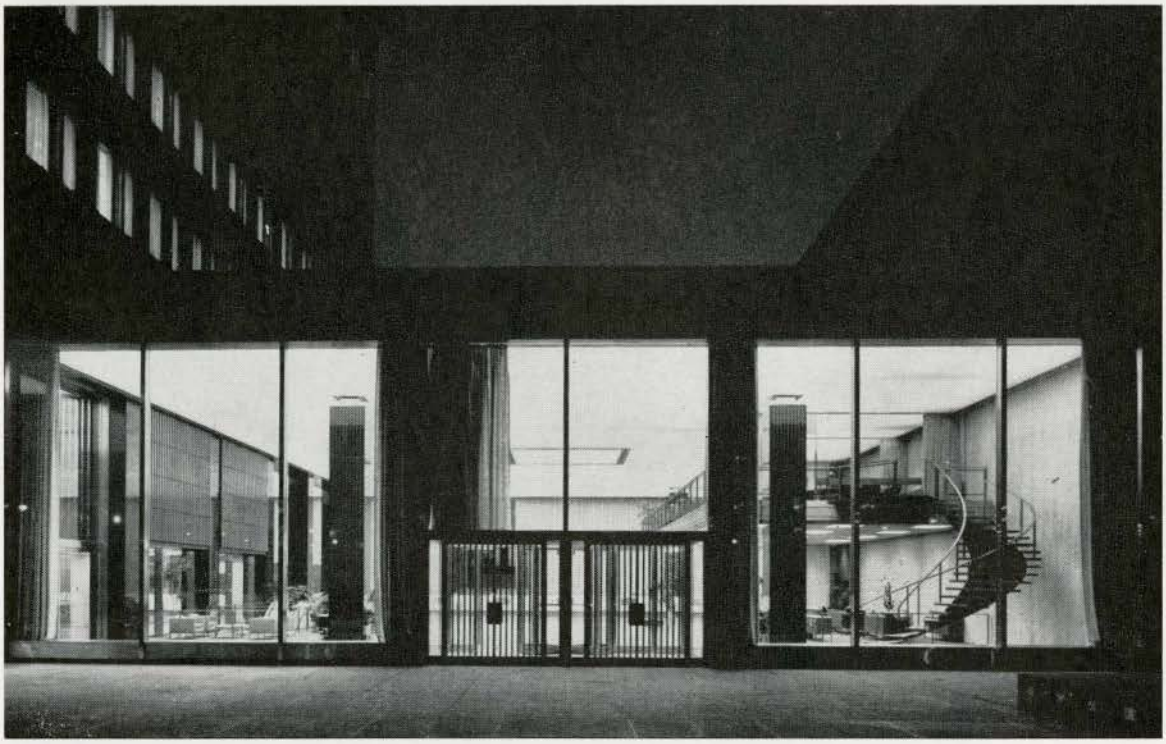

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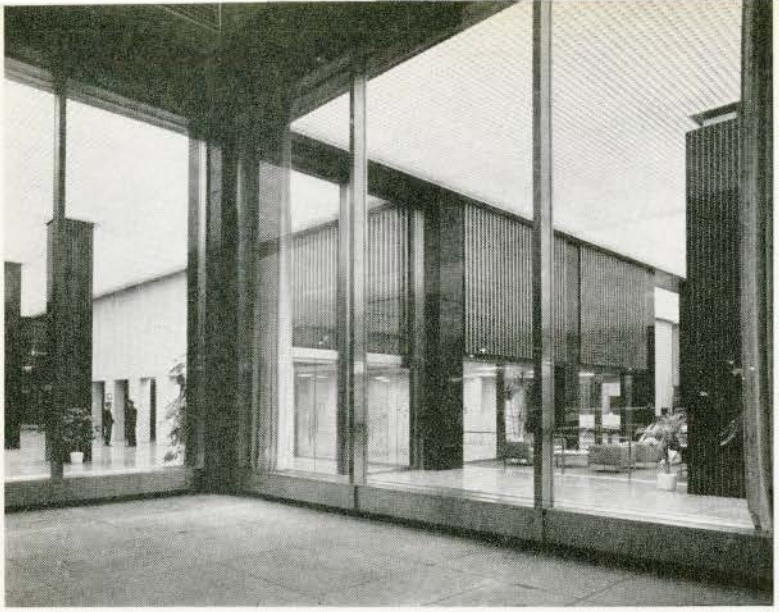

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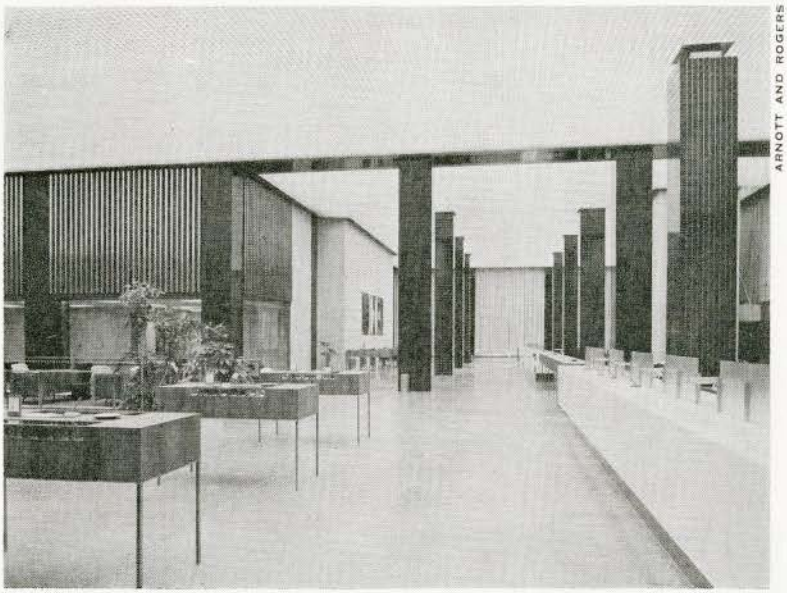
9. *The junction of the building foyer and the main banking hall seen from the plaza.*
10. *The main banking hall — savings and current accounts department counters.*
11. *Check writing desks in the savings department.*
12. *The main banking hall and savings department counter seen from the mezzanine.*
13. *The current accounts counter.*



ARNOTT AND ROGERS

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CLEEVE HORNE

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CLEEVE HORNE

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14. *The island platform area from the assistant manager's desk under the mezzanine.*
15. *The first floor banking hall — detail of the vestibule and grille.*
16. *The mezzanine from the main banking floor.*
17. *The new savings accounts area.*

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CLEEVE HORNE

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CLEEVE HORNE

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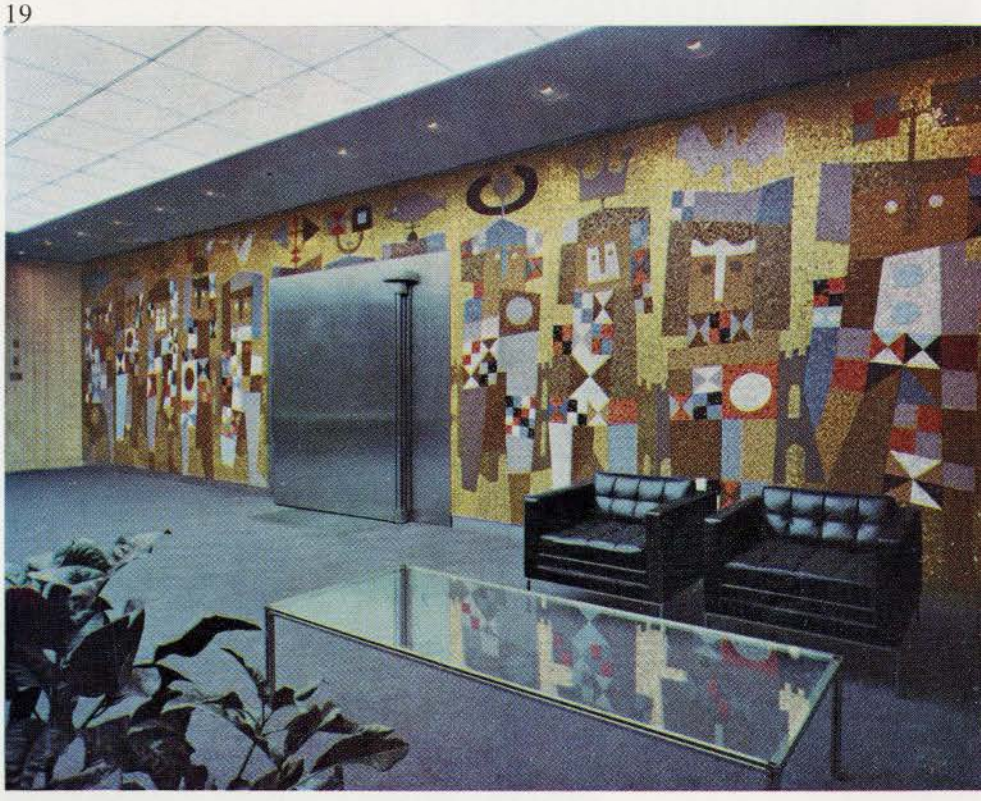

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18. The regional office board room on the fourth floor.

19. View of the reception area showing the safety deposit vault and the mural by Sydney Watson of Toronto.

20. Safety deposit department cubicles.

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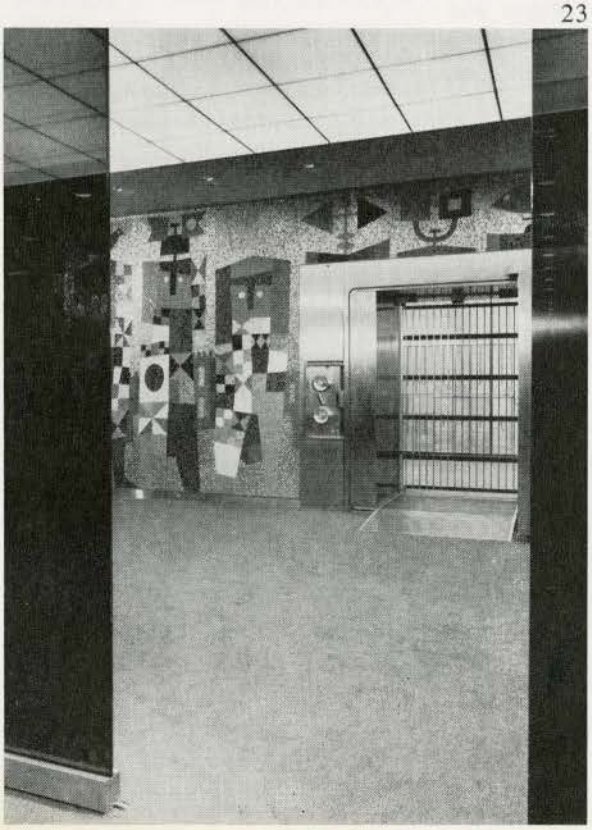

21. The securities and international department.

22. The securities and international department with the safety deposit vaults to the left, rear.

23. The safety deposit vault, reception area. Screens in the foreground are grey glass.

24. Interior view of the safety deposit vault. Panelling is burly teak.

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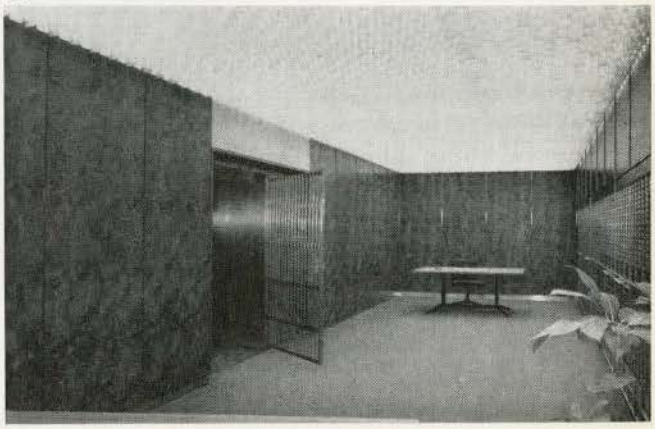

Base, Plaza & Banking Halls

By W. Michael Clifford,
Clifford and Lawrie,

Architects and Design Consultants of the Canadian Imperial Bank of Commerce

THREE MAJOR PROBLEMS were faced in the design of the base, the plaza and the banking halls:

- release of the base of the tower from appendages and the accenting of its vertical thrust;
- integration of the interior floorscape and the limited plaza area into Dominion Square's overall composition in such a way as to involve, rather than visually separate, the building with its environment;
- stressing the banking function as an eye level activity, dominant and self-explanatory from all viewpoints, both interior and exterior.

At the first floor and plaza, a firm "banking hall" statement was made in the low roof area by fully glazing the east and west elevations, incorporating four columns supporting an extended roof plate, and by perimeter and junction detailing visually separating the banking hall from the base of the tower. (Photo 8).

In the tower itself, the elevator core has been released from the mechanical mezzanine by a basic change in materials from travertine to stainless steel. Articulation of the column-spandrel connection, coupled with flush cladding on the perimeter column, has stressed the vertical thrust at the base. (Photo 3).

Relationship of floor and paving materials – directional patterns and organic treatment of the plaza elements – is aimed at ground level unity and integration with the environment.

Detail Solution: Accepting the theme of materials at the ground level – granite, travertine, stainless steel, and acrylic plastic – the selection of the natural materials was affected to a certain extent by availability and the fact that predominant materials had to be permanent.

Granite flooring and paving slabs were held to the maximum dimensions of 5 ft by 5 ft to meet existing site conditions.

Travertine, with a strong vertical grain, was selected for major plain wall surfaces at the elevator cores and north wall of the banking hall. Cladding is neutral in color and is used as a backdrop rather than a focal device.

All perimeter columns of the tower are faced with plain polished black granite and related with a black granite soffit set flush with the ceiling. Interior tower columns are faced full height with polished black granite with stainless steel vertical accent strips inlaid in the granite at about 3½ins on centre. (Photos 3 & 6). The four internal columns, supporting the roof of the main banking hall, are also inlaid, but terminated with a stainless steel neck and cap to the ceiling. (Photo 14).

Ceiling: Of special interest was the design and development of the first floor ceiling. In the design of this ceiling, we were searching primarily for a re-emphasis of the traditional importance of a major surface.

We sketched an interlocking grille, selected an acrylic plastic, and had a model made 2½ ins by 2 ft by 4 ft, with the cell established at 4 ins by 4 ins. The unit, as far as we know, is the most massive injection moulding ever undertaken. The result was a ceiling illumination twice as efficient as anticipated – at little more than half the original estimate. (Photo 10, etc.).

Stair and Sculpture: These were intended both to relieve and accent the strong vertical and horizontal lines of the composition. (Photos 2, 5 & 7).

Since the spiral stair form is traditional in Montreal, we tried for an interpretation that would be expressive in contemporary terms. We gave the structural engineer two radii, a rise, a warped plane of 2 in. maximum thickness, no beams, no posts, teak treads, a single line ballustrade, and a firm attitude. We are indebted to the structural engineers and the fabricator for the resulting successful design and construction. (See page 62).

Simple forms were employed to define the plaza, the base of the flagpoles, the planting area and the raised podium of the flagpoles. No attempt was made to enrich these elements by profiles or changes in materials or finishes.

The Henry Moore sculpture has none of the surface flow characteristics of his intermediate years. Its rugged subtlety is well suited to form a foil to the line of the building and a link with the natural setting of Dominion Square. (Photo 2).

Materials & Suppliers

Chairs: *Business Furniture Co. Ltd.; Knoll International Canada Ltd.; J. & J. Brook Ltd.;* Sofas: *J. & J. Brook Ltd.;* Steel desks and special units: *Sunshine Office Equipment Ltd.;* Wood desks: *Knoll International Canada Ltd.;* Carpets: *The Robert Simpson Co. Ltd.; George Courey & Sons Ltd.;* Board table: *Jas. F. Gillanders Co. Ltd.;* Steel partitions: *General Steel Wares Ltd.;* Building elevators: *Turnbull Elevator of Canada Ltd.;* Bank elevators and escalators: *Otis Elevator Co. Ltd.;* Granite: *Stanstead Granite Quarries Co. Ltd.; Cold Spring Granite (Canada) Ltd.;* Spandrels and mullions: *Toronto Cast Stone Co. Ltd.;* Light fixtures: *J. A. Wilson Lighting Ltd.;* Travertine wall facing: *De Spirt Mosaic & Marble Co. Ltd.;* Stainless steel: *Atlas Steels Ltd., fabricated by A. Faustin Co. Ltd.;* Panelling and bank counters: *Jas. F. Gillanders Co. Ltd.;* Vaults, drive-in teller: *Diebold of Canada Ltd.;* Hardware: *J. S. Mitchell & Co. Ltd.;* Structural steel: *Dominion Bridge Co. Ltd.;* Toilet partitions: *Westeel Products Ltd.;* Glass: *Canadian Pittsburgh Industries Ltd.;* Acrylic ceiling material: *Rohm & Haas Co. of Canada Ltd.*

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Regional offices on the fourth floor.

25 & 26. Senior executives' offices.

27. A reception area.

28. The general office area.

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All furnishings not designed by Clifford & Lawrie were chosen from manufacturers' standard lines. Furnishings designed by the architects include: the marble lamps; all tables; all wood desks (except those in three of the senior executives' offices); carpets, in collaboration with the manufacturer (except those in three of the senior executives' offices); the board room table.

The architects also acted as landscape designers.

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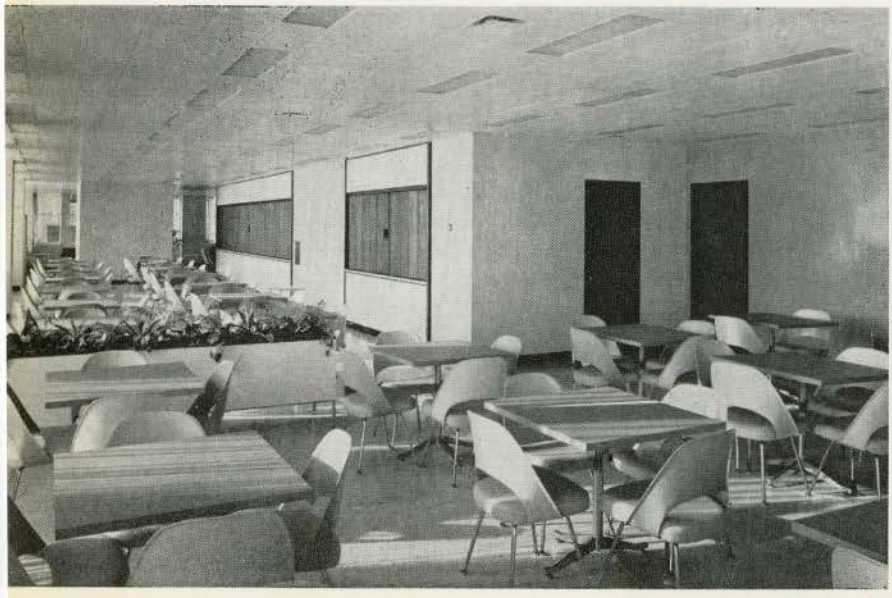


29. *The reception area for the regional offices, third floor.*
30. *The general office area for the regional offices, third floor.*
31. *The staff lounge, second floor.*
32. *The staff cafeteria, second floor.*

CANADIAN IMPERIAL
BANK OF COMMERCE

Structural

Mechanical

Electrical

Structural

By John A. Bowland, P.Eng.
M. S. Yolles Associates Ltd

THE BUILDING TOWER occupies an area of 100 x 140 ft and rises 603 ft above the sidewalk level at Dorchester Blvd West. A substructure, 3½ floors in depth, covers the entire site of 245 x 185 ft.

The tower contains 39 rentable office floors, 5 mechanical floors and an observation gallery above roof level. A one-storey extension to the north at ground level serves as the main banking hall.

The building is founded on bed rock 48 ft below street level, with footings designed for 25 tons per sq. ft bearing capacity.

The structure of the plaza and basement areas outside the tower area consists of reinforced concrete, permitting the contractor to carry on this work while the structural steel was readied for erection.

The south basement wall on Dorchester Blvd was designed as a cantilever retaining wall for the full 48 ft depth of the excavation and for a 140′-0″ length adjacent to the tower. This design feature avoided introducing massive earth retaining forces into the structural steel frame below sidewalk level and permitted all substructure work to be completed before commencement of steel erection.

Steel base plates ranging up to 7′-2″ square x 11½″ thick to carry column loads of 7,000,000 lbs were set on leveling bolts before grouting. Lower column sections were composed of 320-lb core sections with up to 7″ thick x 28″ wide laminated cover plates. Some individual sections of column in the lower tiers weighed up to 45 tons with connections attached.

The wind resistance of the slender building is achieved by the columns and steel wind girders forming a semi-rigid framework. The connections consist of structural tees cut from 36″ wide flange beams, high tensile bolted to columns and girders. Shop connections were riveted and field connections high tensile bolted. Wind girders framing typical floors were haunched rather than holed for mechanical and electrical services to permit maximum flexibility for office layouts and for future revisions to them.

Typical floors are designed for a total live load of 100 lbs per sq. ft, including partition allowance. Corrugated metal deck units supported by purlins were used as the floor carrying members with full cellular units spaced at 5′-0″ centres. Poured reinforced concrete slabs were used for areas with heavy loading, such as at mechanical floors.

Exterior columns, spandrels and framing adjacent to internal shafts were fireproofed in concrete; steel sub floors and internal framing were fireproofed with sprayed asbestos.

The curtain wall is constructed of precast concrete faced with slate and precast concrete mullions faced with stainless steel. Exhaustive testing was conducted in the laboratory and on a two storey high, one bay-wide prototype panel. The prototype wall panel was set up in a test frame activated with automatic hydraulic jacks to simulate all movements of the building frame and was subjected to hundred mile per hour winds from an aircraft engine while being sprayed with water to duplicate a driving rain. The tests, conducted by the Warnock Hersey Co. Ltd, provided important information and the design was modified to incorporate the results. Curtain wall mullions and panels were connected to the structure with bolted and welded steel fittings, permitting the required movement to occur.

The curtain wall provided all the usual advantages of this type of construction such as prefabrication and speed of erection as well as the desired character of stone. This wall is believed to be the tallest of its kind in the world.

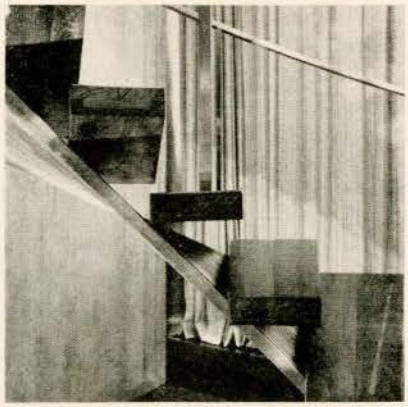
Two other interesting features of the building are the FM broadcasting antenna mast on the roof for radio station CKVL and the helicoidal stair in the banking hall.

The mast is a 3 ft diameter shell rising 200 ft above the roof with a 10″ diameter, 20′-0″ high light standard on top. Architectural considerations required the mast to be painted white with a 10′-0″ high section at the bottom site line reduced to 28″ in diameter and painted black. All electronic gear except the actual antenna probes are contained within the cylindrical mast and are serviced from the inside providing a clean exterior appearance. Because of the slenderness and the unusual position on top of a 600′ high building an extensive dynamic wind analysis has been carried out. Erection of this mast is to start in the near future.

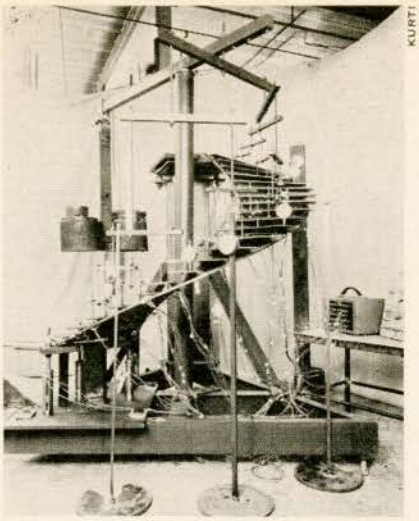
Architectural treatment in the main banking hall required a helicoidal stair leading from first floor to mezzanine and because of its location a stair of unique design was desirable.

It was decided to try a laminated helicoidal steel shell as the load carrying structural element. Using a laminated shell of stainless steel bars simplified the problem of achieving the helicoidal slope and would be in keeping with other finishes. To verify the results of the design analysis it was decided to construct a scale model based on the best information available and intuition. This model was tested for static and dynamic loading and provided the information required for the full sized stair. Dial gauges registered deformations and strain gauges registered stresses at all critical sections of the model. Because of geometric similarity and the applying of known loads, results could be extrapolated directly from the model to the prototype.

The tests indicated that a section 1″ thick and 48″ wide would have the desired strength and stiffness. However, the section was made using 128, ⅜″ thick bars alternately 1¼″ and 1½″ deep to obtain the architectural appearance desired and to use material available from stock. The connections between the laminations were made with stainless steel dowels and screws on non radial angles.

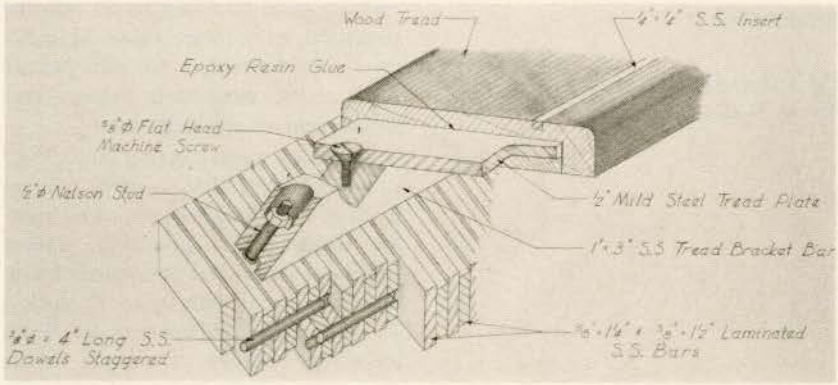


Detail of the stairway showing the teak treads.

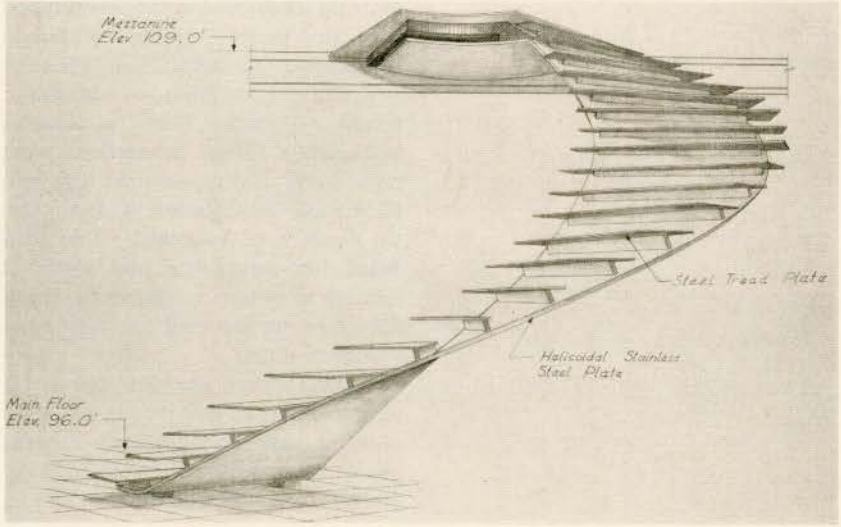


The test model of the laminated stainless steel helicoidal stairway, built to a scale of 3″ to 1'-0″ by Accurate Machine & Tool Limited, Toronto, upon which the tests were conducted by Dr. Joseph Schwaighofer, director of the Department of Civil Engineering at the University of Toronto.

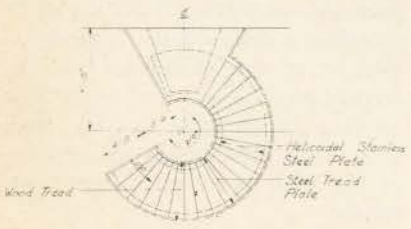
Isometric construction detail.



Perspective.



Plan.



Mechanical

by F. I. Smith, P.Eng.
G. Granek & Associates

THE GREAT HEIGHT of the building demanded additional space requirements for elevators, structure and mechanical services, thus, every effort had to be made to conserve space. The main air conditioning ducts were not locked into the structural core, but were allowed to decrease on successive floors. A horizontal distribution system for the perimeter air conditioning system was discarded in favor of vertical risers at the perimeter to avoid large vertical mains at the core which would have reduced the net yield and also resulted in an increase in floor-to-floor height due to horizontal duct cross-overs. Apparatus selected for a 20°F. chilled water temperature rise and the distribution of high pressure steam from the boiler plant considerably reduced pipe sizes and structural support in the core.

The location of boilers and refrigeration plant was of prime importance. Conventional practice would have placed the boiler plant below the lowest garage. However, this would have required expensive blasting of rock. The stack would have interfered with the architectural planning of the main banking hall and tower core and would have resulted in an approximate loss of 2,500 sq. ft of rentable space. Large condenser water piping would have had to be run through the building to the cooling tower on the roof. The number of operators required can be reduced if the refrigeration plant is located adjacent to the boiler room. These considerations, compared to the cost of pumping oil to the roof and the additional electrical distribution for the refrigeration machines, dictated the choice of refrigeration and boiler plant at the roof level.

Numerous reasons influenced the final position of mechanical rooms. Co-ordinating the main air conditioning systems with other services such as house tanks, electrical transformer rooms, elevators, the outward aesthetic effect of mechanical rooms and outside air louvres, headroom, and the obtaining of the best net-to-gross rentable had to be considered. But in a building extending 600 feet, items such as stack effect in winter, static head, and outdoor temperatures varying 15°F. from top to bottom, are equally important. To combat these effects the air conditioning for the building was zoned vertically as well as for exposure. From the 16th floor, one set of apparatus serves the 2nd to 14th floors, and another set feeds floors 17 to 28. Apparatus on the 43rd floor serves the upper 13 floors. Similarly the 1st floor is served from apparatus on a mezzanine, above the elevator lobbies, and the basement areas from a mechanical room under the plaza. The apparatus is located within the zone it serves. This keeps the number of openings, passing from the bottom of the building to the top, to a minimum and helps reduce the stack effect. The system for the main foyer, capable of handling all outside air, is automatically controlled to give a pressure inside positive, relative to outdoors. Similarly the upper systems maintain the tower floors at a positive pressure. This is essential if the ground floor is to be comfortable and free from drafts.

The 15th floor, with 6 feet of clear height, is used as a return air plenum and for the running of ducts and pipes serving the floor below. Outside air is brought in at this level and mixed with return air before rising to the apparatus above, thus helping to avoid stratification of air in winter. The elimination of large return ductwork in the mechanical room reduced the overall headroom required to a minimum. This space also acts as a sound and vibration attenuator between equipment above and occupied space below.

Flexibility was incorporated for tenant requirements. Diffusers were selected on the basis of a wide open floor, but were connected to flexible ducts for relocation in the metal pan ceiling when the final layouts were known. The ceiling space was utilized as a return air plenum so that grilles could also be "clipped-in" anywhere without duct changes. The ceiling plenum on typical floors effects a large capital cost saving as well as providing an incidental benefit of removing a portion of the heat from the lighting fixtures at the source. The main typical floor structural beams were "haunched" for the running of mechanical services. This facilitated the placing of tenant washrooms anywhere on the floor and the running of mechanical services in the future without expensive field cutting of structural members. Ducts were provided in shafts for special exhaust requirements and a supplementary condenser water system included from top to bottom to accommodate heavy air conditioning loads such as computer installations or 24-hour occupancy. The equipment for the air conditioning system was selected at optimum rating for the nominal level of illumination of 50 foot candles. By changing fan speed, a general overall load increase of 10% for tenant requirements can be accommodated.

Since most partitioning occurs at the perimeter, the treatment and number of induction units is critical for both comfort and budget. The largest manufactured unit has sufficient capacity for a ten foot expanse of wall and glass. This also coincides with two 5 foot modules, the structural column spacing, and a typical office size. It is the cold downdraft at the ends of the unit, however, that is of particular concern. In lieu of additional units on 5 foot centres, causing a substantial increase in cost, the top grilles were carried across the entire length of the enclosure and the bottom of the enclosure baffled. This creates sufficient negative pressure to carry any downdraft into the top of the enclosure and prevents spill-over onto the floor. Should tenant partitioning be required on window mullions, rather than on column centres, the enclosure and services have been designed to permit the addition of units.

The design of the Bank premises, on the 1st floor, commenced after the main building construction was nearly completed. To gain the desired effect, from the type of luminous ceiling proposed, the electrical lighting loads were increased by 120 kilowatts over the original, conventional design. This implied an increase in mechanical room area to double that provided, and lowering ceilings to accommodate the increased ductwork; but neither one was acceptable to the architects.

It was decided that to reduce the supply air to a manageable quantity, heat would be removed at the source. The portions of perimeter strip line diffuser not employed for supply were utilized as openings to the lamp plenum formed by the plastic panels below and the metal reflector pans and fixtures above. Air is drawn across the lamps, extracting heat, and returned to the equipment for conditioning. In this way extremely high loads were handled.

Electrical

by B. Rubin, P.Eng.
Jack Chisvin & Associates

BECAUSE OF THE BASIC core layout, every effort had to be made to conserve space and still make provision for the following services: 12,000 volt distribution cables, Bell Telephone Company risers and equipment, secondary voltage bus ducts, control wiring, signal and intercom systems, AM, FM, and TV antennae systems, emergency power feeders and tenant metering and distribution equipment.

All these services were combined within one small electrical room per floor, confined between the stairwells, elevator shaft and washrooms. The header ducts for the underfloor duct system were installed through the main landings of the stairwells and overhead services installed through the suspended ceilings at the stairwell landings. An additional cupboard for Bell Telephone equipment was provided in the core wall.

The Quebec Hydro service supply of 12,000 volts was used as the main distribution system with high voltage cables installed to unit substations in the basement, 16th floor and 42nd floor levels. Five riser cables were contained within a small fireproof shaft of approximate dimensions 30″ x 8″ with space left for a future cable. These primary cables were looped through high voltage switches at the various substations to permit load transfer in event of a cable failure.

It is possible to isolate any of the riser cables and still continue to maintain full service. It is interesting to note that if 600 volts had been used for the primary distribution instead of 12,000 volts, approximately five times more floor space would have been required for large capacity bus ducts. Moreover, the lower voltage distribution system would have been considerably more expensive.

Removal of large equipment from the 16th or 42nd floor for repair or replacement can pose problems. A lengthy period of time might be required to remove, repair and replace such equipment as a seven-ton transformer. Removable panels have been built into the walls at the equipment room levels with major pieces of equipment provided with aisles to the removable panels. Transformer standby capacity is neither practical from a point of view of space requirements or economics. Secondary voltage transformer ties have been provided in the event of such emergencies. By partial reduction of load, it is possible to maintain the building in operation until the necessary equipment repairs are made.

The Quebec Hydro regulations called for individual tenant metering regardless of the size of the tenant. To meet these requirements a flexible metering scheme was designed to cover a range from eight tenants on a floor to one tenant for six floors. Composite distribution and lighting panels on each floor can be altered quite readily to provide for various tenant arrangements. The tenant metering requirements of the Quebec Hydro did increase the cost of the electrical work since it was necessary to install two separate distribution systems, for owners' services and tenants.

The new IES recommendations of 100 footcandles for office lighting had been published during the design period. The question of providing this level of illumination in the building was considered, but for various reasons, the original design level of 50 footcandles was retained. The capacity of the distribution system will permit increases in the lighting level where so desired by a tenant. With a five-foot module and a 50-footcandle level, the use of four foot fluorescent fixtures would have resulted in a non-modular layout with one fixture provided for every 33 square feet. Tenant work would have been costly with the necessity to add and relocate a large number of fixtures.

The use of a three-foot fixture was the ideal solution since one fixture per 25 sq. ft would fit the module and provide the required lighting level. A large number of fixtures were required initially, but provided greater flexibility, suited the module and reduced the cost of tenant work. The only question mark was the efficiency of three foot rapid start lamps which were well below the efficiency of four foot lamps. Discussions with a lamp manufacturer resulted in their manufacturing a higher efficiency three foot lamp for use in the building. Corning #71 glass diffusers were selected for use in the fixtures over plastic diffusers because of easier cleaning and maintenance, life, economy, brightness control and colour stability. More than sixty tenants have since occupied the building. Less than 10% of the fixtures in the tenant areas had to be relocated to suit their requirements.

The underfloor duct system fits the building module with telephone, signal and high tension services provided every five feet. Most buildings have marker screws installed flush with the tile finish to locate and identify the runs of underfloor duct or cellular floor. Both the metal pan ceiling tile and floor tile have been installed to the building module. Since 12″ tiles have been used for the floor, it is only necessary to count floor tiles, and make one measurement, to locate a cell; consequently floors cluttered up with marker screws were avoided.

A 500 HP diesel electric emergency set was installed at the 42nd floor level. The building contains 19 elevators and it has been estimated that at any given moment during a normal day, if a power failure occurred, as many as 10 elevators could be stopped in the shafts between floors. A control system installed at the first floor level will permit the connection of all elevators to the emergency set for evacuation purposes. One elevator from each of the high, intermediate and low rise banks can be operated continuously on the emergency system. A complete P.A. system connects all elevators to the first floor, chief engineer's office and elevator equipment rooms. The emergency system also provides for such essential services as evacuation lighting, sewage, sump pumps and oil pumps.

Non flammable liquid filled transformers were used, providing a total installed capacity of 9,000 kva or enough power to supply a town with a population of 20,000 people.

Technical Section

Edited by Douglas H. Lee

Admixtures for Concrete

Admixtures have long been recognized by many architects and engineers as being desirable for imparting properties to concrete that improve its manufacture, performance, durability or appearance. Due to the proprietary nature of most of these materials, there has been relatively little in the way of published scientific information upon which to evaluate the claims of the manufacturers for their products. The increased use of concrete in building construction and the greater demands being placed upon it as an exposed and finished architectural material, have only emphasized the need for reliable information on the nature, purpose and performance of the various admixtures that are presently on the market. To help shed some light on the subject for its readers, the *Journal* is pleased to publish the following paper, in two parts, by Dr Richard C. Mielenz, which he presented in part at a meeting of the Joint Area Committee of the EIC, the ICE and the ASCE in Toronto, on October 18. Dr Mielenz is Director of Research of Master Builders Research Laboratories at Cleveland, Ohio, and the author of numerous technical and scientific papers on concrete, concrete aggregates, pozzolanic admixtures and soils for engineering purposes. *D.H.L.*

For requirements of admixtures the National Building Code of Canada, 1960, refers to CSA Code A23.1–1960, "Code for Concrete Materials and Methods of Concrete Construction".

Admixtures for Concrete

BY RICHARD C. MIELENZ

By definition (ASTM Designation: C 125), an admixture is: "A material other than water, aggregates, and portland cement (including air-entraining portland cement and portland blast-furnace slag cement) that is used as an ingredient of concrete and is added to the batch immediately before or during its mixing."

These materials are added to concrete or mortar to produce a wide variety of effects, both in the fresh mixture and after hardening.

Use of admixtures was widely criticized or condemned in the past and one occasionally still hears the cry, now somewhat plaintive, that "There is no better admixture than more portland cement." Actually, a good deal of this criticism was justified, especially in past years, wherein chemicals of no especial merit or possibly even harmful to concrete were sold to unwary engineers, contractors, and plant operators or when common chemicals were sold at many multiples of their fair market value. Also, there was inadequate knowledge of the effects of the admixtures, and dispensing procedures and equipment were largely inadequate.

At the present time, however, admixtures are being used at a progressively increasing rate in all types of concrete, including cast-in-place plain and reinforced concrete, prestressed and post-tensioned members, prefabricated reinforced concrete building units, dry concrete mixtures such as for building block and pipe, and in mortars and grouts for a wide variety of applications. As a class, admixtures are being received as technically and scientifically justifiable constituents of concrete for both commercial and engineering purposes. I refer here especially to air-entraining admixtures and to water-reducing admixtures, including retarders, accelerators and those that produce little effect on rate of hardening of concrete. These materials are being subjected to extensive research, both basic and applied, domestically and abroad, by manufacturers and consumers and by other research groups.

Recognition of admixtures is demonstrated by growing activity of engineering societies concerning their properties and use. ACI Committee 212 is now readying a final draft of a new report on *"Admixtures for Concrete."* The American Society for Testing and Materials has issued specifications and methods of test on water-reducing admixtures, accelerating admixtures, and retarding admixtures; specifications and methods of test for natural pozzolans and for fly ash as an admixture were issued in the recent past; and specifications and methods of test for air-entraining admixtures are being revised and strengthened. In October 1959, the ASTM Committees C-1 and C-9 jointly sponsored a symposium on effect of water-reducing admixtures and set-retarding admixtures on properties of concrete. The symposium papers and discussion are available in ASTM Special Technical Publication No. 266. Everyone interested in use of concrete should have a copy for reference and study. Since that time, numerous papers on research, properties, and application of admixtures have been published in the scientific and technical literature.

The Highway Research Board has reorganized and broadened the scope of Project Committee B-5 on Chemical Additions and Admixtures for Concrete. Task groups under this committee are now preparing recommended

practices and bibliographies on the use of water-reducing admixtures and retarding admixtures, accelerating admixtures, and air-entraining admixtures.

Admixtures can be classified into 16 groups. They are listed as follows but not necessarily in order of their importance.

1. Air-entraining admixtures.
2. Air-detraining admixtures.
3. Accelerators.
4. Retarders.
5. Pozzolans.
6. Dampproofing and permeability-reducing admixtures.
7. Gas-forming admixtures.
8. Cementitious admixtures.
9. Inhibitors of expansion caused by alkali-aggregate reaction.
10. Grouting admixtures.
11. Admixtures for coloring of concrete.
12. Biocidal admixtures.
13. Expansion producing admixtures.
14. Finely divided mineral admixtures.
15. Flocculating admixtures.
16. Water reducing admixtures.

SELECTION OF ADMIXTURE PRODUCTS

As is true for most products, admixtures should be purchased under two criteria, namely, (1) cost-performance ratio and (2) technical service and assistance provided by the seller in use of the product.

Note that the first criterion is cost-performance ratio – not cost alone or performance alone. The two items must be evaluated simultaneously.

Admixtures should be purchased under specifications that assure that the positive properties exist in the product, that deleterious effects are absent or negligible, and that shipments of the product are uniform from lot to lot. The main technical basis for evaluating admixtures for concrete is testing of concrete containing the admixture. In general, the test should be made in concrete containing the cement, aggregates and other admixtures proposed for use in the work. If adequate facilities and properly trained personnel are available, the concrete should be prepared at the concrete plant or at the site of the work, rather than in a laboratory mixer, so as to simulate as closely as practicable the conditions under which the admixture will be used. Otherwise, it is preferable that the tests be made in a properly equipped and staffed laboratory. In order to secure comparative results in tests of two or more admixtures or of concrete with and without an admixture, particular attention must be given to such features as air content, grading of the coarse and fine aggregate, sand content, yield, and slump (or other aspects of consistency). The tests should be performed according to standard procedures and should be repeated sufficiently to provide statistically valid data.

The quality of an admixture product depends upon uniformity as well as upon the average level of performance or the performance of samples provided for testing purposes. The operator or contractor should take steps necessary to assure himself that shipments uniformly meet his standards and that they are consistent in their effects on concrete.

A third aspect of quality of a product is the reliability of the manufacturer or supplier in making deliveries on schedule, properly packaging the product, and standing behind the user when questions or problems arise.

Technical service and assistance provided by some admixture producers are helpful or necessary, both to supply recommendations on use of the specific products and to aid in redesign of concrete mixtures such that full advantage in cost and performance is taken of the presence of the admixture. Such assistance may not be required by some large organizations, but such service is of great importance in the successful use of admixtures by the majority of ready-mix concrete operators and contractors. The field man should be trained in use of his products and concrete practices in general both with respect to laboratory testing and practical construction problems.

AIR-ENTRAINING ADMIXTURES

Air-entraining admixtures are substances which when added to concrete at the mixer develop in the concrete during mixing a system of dispersed air voids or bubbles which are sufficiently resistant to dissolution or coalescence to remain in essential numbers and volume within the cement paste during handling, placing, and hardening. This air void system is typically made up of nearly spherical cells between 10 and 1000 microns (0.0004 to 0.04 in) in diameter. Well air-entrained concrete contains 1,500,000 to 10,000,000 such voids per cubic inch. These voids differ from so-called "entrapped" air voids, which typically are irregular in shape, greater than 1 mm in diameter, and occur at the periphery of aggregate particles.

Air-entraining admixtures can be classified chemically as follows:

Group A – Salts of wood resins. Rate of use: Solids: 0.015 lb/sk; Solutions: ½ to 1 oz/sk.

Group B – Derivatives of synthetic detergents. Rate of use: 0.08 to 1 oz/sk.

Group C – Salts of sulfonated lignin. Rate of use: As solid 0.20-1.0 lb/sk.

Group D – Salts of petroleum acids. Rate of use: 0.25 to 0.80 oz/sk.

Group E – Salts of proteinaceous material. Rate of use: About 4 oz/sk.

Group F – Fatty and resinous acids and their salts. Rate of use: 0.05 to 1 oz/sk.

Group G – Organic salts of sulfonated hydrocarbons. Rate of use: 0.75-1.0 oz/sk.

Air-entraining admixtures are surface-active agents which are positively adsorbed at air-water interfaces, that is, they become more concentrated at the air-water interface than within the bulk of the solution. Positive adsorption of the admixture at the air-water interface effects several changes in the properties of a concrete mixture, namely, (1) facilitating bubble formation during mixing, (2) impending coalescence of bubbles, (3) decreasing the transmission of air across the interface, that is, the rate of dissolution of small bubbles and the growth of large bubbles, and (4) causing adhesion of bubbles to the surface of cement granules and of particles of aggregate.

The air-entraining admixtures producing smallest voids are those which form a gelatinous or resinous film of insoluble calcium salts of the active components at the air-water interface, thus surrounding bubbles by tough films capable of resisting stress and penetration of the film by air.

Air entrainment effects many important changes in the properties of fresh and hardened concrete. *Water requirement* for given slump is reduced,

usually at the rate of about one gallon per cubic yard per one percent of air. *Workability* is improved so that aggregates of poorer grading and particle shape can be used. *Resistance of concrete to freezing and thawing* is greatly improved, provided the proper void volume and void spacing are achieved. *Bleeding and segregation* are decreased. *Strength* is affected to minor degree; compressive strength is essentially unaffected if the slump and cement content are maintained constant by proper proportioning of the concrete mixture; at constant water-cement ratio, entrainment of recommended air content usually decreases compressive strength at 28 days 15 to 20 percent. *Other properties* are affected to minor degree at recommended air content; these properties include volume change, permeability, absorption, and unit weight.

Optimum air content is that air content which yields a practical maximum resistance to freezing and thawing with minimum loss of strength. Ranges of optimum air content for concrete of varying maximum size of aggregate are recommended by ACI Recommended Practice 613. The optimum air content decreases with increase of maximum size of aggregate because the paste-air ratio by volume must remain in the range of 3.75 to 6.0 to achieve adequate resistance to freezing and thawing under severe conditions of exposure. Tests show that if a proved air-entraining admixture is used as the only admixture to produce the level of air-content recommended by ACI Recommended Practice 613 and if the water-cement ratio and slump are maintained in the range stipulated by ACI Recommended Practice 613, the spacing factor as determined by microscopical analysis of hardened concrete will range from about 0.0040 to about 0.0080 in.

The air content and the size distribution of air voids produced in air-entrained concrete are influenced by many factors, most important among which are (1) the nature and concentration of the air-entraining agent; (2) the kind and degree of compaction applied in placing the concrete; (3) the water-cement ratio; (4) the consistency; (5) the cement content and fineness of the cement; (6) characteristics of the aggregate, especially grading, particle shape, and presence of surface-active organic impurities; (7) the mixing operation; and (8) the temperature of the concrete. If adequate air content is achieved initially, freezing and thawing durability of concrete is not reduced by the decrease of air content produced by prolonged vibration. The durability of concrete will be reduced by unusually intense compaction if the concrete initially contained less than the recommended air content.

AIR-DETRAINING ADMIXTURES

Air-detraining admixtures are compounds which reduce the air content of concrete. They can be used when excessive air content arises through gratuitous air entrainment by sands containing organic impurities, excessive air entrainment by air-entraining cements, or excessive air entrainment by other admixtures. Additional research is required to establish the effect of these admixtures on resistance of concrete to freezing and thawing.

Three patents of E. W. Scripture, Jr., issued on January 8, 1957, relate to use of higher aliphatic alcohols; esters of weak inorganic acids; and dibutyl phthalate.

ACCELERATORS

Accelerating admixtures increase the rate of hardening and development of early strength of concrete. Calcium chloride used at the rate of 1 to 3 percent by weight of the cement is the most widely used accelerating admixture. Performance of these admixtures is covered by ASTM Specifications C494.

Triethanolamine is also a common but more expensive accelerator. Other accelerators for portland cement are alkali carbonates, fluosilicates, alkali silicates, and aluminous cements.

As has been mentioned, some water-reducing admixtures are accelerators for concrete.

RETARDERS

Retarding admixtures decrease the rate of hardening and development of early strength of concrete. Water-reducing retarders were discussed previously. Requirements on retarders are set forth in ASTM Specifications C494.

Retarders which effect retardation with little or no reduction of water requirement include carbohydrates, soluble zinc salts, soluble borates, and other organic and inorganic compounds. Such admixtures are used to very limited extent in concrete construction.

POZZOLANS

A pozzolan is a siliceous or siliceous and aluminous material which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties.

Pozzolans include a wide range of natural materials, calcined natural materials, and industrial waste products. Most widely used pozzolans are fly ash and finely ground diatomite, pumicites, and calcined siliceous clays and shales. These materials usually are employed in proportions ranging from 10 to 30 percent by weight of the cement, commonly being used as a partial replacement of the cement.

Use of pozzolans in concrete can effect economy in the cost of the concrete and may induce improved ultimate strength, improved workability, improved resistance to attack by aggressive waters, and decreased permeability. Caution must be exercised to avoid increased drying shrinkage, inadequate strength development, and reduced resistance to freezing and thawing. Proper curing must be provided if the benefits of the pozzolanic activity are to be secured.

Natural pozzolans and processed natural materials can be purchased under ASTM Specifications C402. Fly ash for use in concrete can be purchased under ASTM Specifications C350.

DAMPPROOFING AND PERMEABILITY-REDUCING ADMIXTURES

Dampproofing and permeability-reducing admixtures may function under any of four principles, namely, (1) so-called water-repellant admixtures which decrease absorption of water by capillarity; (2) finely divided materials which decrease the permeability of the cement paste as well as its absorptivity; (3) workability aids which decrease permeability and absorptivity of concrete primarily by increasing the ease with which a dense, uniform, and homogeneous concrete structure is produced, free from cracks, fissures, and cold joints; and (4) finely divided, graded iron aggregate together with an agent to promote oxidation of the iron.

So-called water repellants include salts of fatty acids, such as calcium or ammonium stearate or oleate; emulsi-

fied fatty acids, such as stearic acid or butyl stearate; and various petroleum products.

Finely divided material include pozzolans and, for lean concrete, other finely divided rock material.

Workability aids include water-reducing admixtures, retarders, air-entraining admixtures, and pozzolans.

Several proprietary products are primarily graded, finely divided metallic iron together with an agent to promote oxidat. of the iron. Other constituents may be included. Use of these materials in grout, mortar, or concrete in proportions equivalent to 1:1 to 1:7 (metallic aggregate: cement) by weight decreases permeability of the mixture for water and gases.

GAS-FORMING ADMIXTURES

Aluminum powder reacts with the alkaline solution produced during the hydration of portland cement to release hydrogen gas. If such release occurs at proper time during the stiffening and hardening process, the gas decreases bleeding and settlement shrinkage of mortar, grout, or concrete. Unpolished aluminum powder generally is used in this application, usually in amounts equivalent to 0.005 to 0.02 percent by weight of the cement.

The rate, time, and degree of reaction and gas release are controlled by many factors, such as the alkali content of the cement, the proportion of aluminum powder employed and the temperature.

Zinc and magnesium powders or a mixture of hydrogen peroxide and bleaching powder also can be used for this purpose.

CEMENTITIOUS ADMIXTURES

Cementitious admixtures include natural cement, hydraulic limes, and slag cements. These materials usually are substituted for 10 to 25 percent by weight of the cement. In general these materials increase the working qualities of the concrete, decrease segregation and bleeding, decrease heat of hydration, increase drying shrinkage, and decrease strength.

ALKALI-AGGREGATE REACTION EXPANSION INHIBITORS

Several types of pozzolans decrease the expansion of concrete resulting from alkali-aggregate reaction if used in proportions greater than 15 percent by weight of the cement. The most effective types are calcined opaline shales and cherts, processed diatomites, and some pumicites. If used in proportions less than 15 percent, pozzolans can increase expansion resulting from alkali-aggregate reaction. Some pozzolanic materials release water-soluble alkalies and so increase alkali-aggregate reaction. Effects of alkali-aggregate reaction can be reduced by use of salts of lithium or barium as an admixture.

GROUTING ADMIXTURES

Admixtures are used for a variety of purposes in grouts. The desired effects are (1) control of bleeding and settlement of cement and aggregate; (2) reduction of water requirement; (3) acceleration; (4) retardation; (5) gas formation; (6) improved workability; and (7) expansion to overcome settlement and drying shrinkage.

Most of these effects are produced by admixtures employed for similar purposes in concrete. Various gels and suspending agents based upon clays, starches, methyl cellulose, or alkali silicates are used to stabilize suspensions of cement grouts. Finely divided iron aggregates with oxidizing catalyst and possibly other constituents are employed to reduce settlement shrinkage and to overcome shrinkage by oxidation of the metallic iron component.

ADMIXTURES FOR COLORING OF CONCRETE

Addition of pigments to produce color in concrete, mortar, or concrete products is one of the earliest applications of admixtures. To produce color of desirable hue and value usually requires that pigment be added at a rate equivalent to 5 to 10 percent by weight of the cement. Proportions in excess of 10 percent may decrease the strength development materially. The commonest pigments are red, yellow, brown, and black iron oxide; green chromium oxide; and white titanium oxide (anatese). Many organic and inorganic pigments produce deleterious effects on portland cement, primarily in retarding or preventing satisfactory setting and hardening and strength development. Jet black colors can be obtained only with carbon black but care must be exercised to maintain proper strength, and for exposed work, to achieve proper air entrainment.

Especial attention must be given to such properties as tinting strength; permanence of color development; wetting characteristics; effect on setting, hardening and strength development; effect on air entrainment; and the presence of water soluble salts or surface-active agents whose characteristics may be undesirable.

BIOCIDAL ADMIXTURES

Copper compounds, polyhalogenated phenols, and dieldrin emulsion have been recommended for use as admixtures to introduce fungicidal, germicidal, or insecticidal properties to concrete.

EXPANSION-PRODUCING ADMIXTURES

Certain materials are used as admixtures to produce expansion or hardened portland cement mixtures or to compensate for drying shrinkage. These materials are (1) finely divided or granulated iron, usually in combination with chemicals to promote oxidation; (2) sulfoaluminous cements; (3) mixtures of portland cement, gypsum plaster, and aluminous cement; (4) anhydrous sulfoaluminate; and (5) magnesium oxide. The effect of these materials is influenced by many factors.

FINELY DIVIDED MINERAL ADMIXTURES

Finely divided, mineral materials, such as pulverized quartz, limestone, and bentonite, are sometime used to improve workability, reduce bleeding and increase strength, especially of lean portland cement mixtures. As distinguished from pozzolanic and cementitious materials, these finely divided materials are not significantly reactive chemically. If used in proper proportions in a given concrete mixture, water requirement and volume stability are not impaired. Pozzolans may be employed for similar purposes.

FLOCCULATING AGENTS

Recent research has indicated the capacity of certain poly-electrolytes to produce flocculation of cement in pastes and thus to increase bleeding rate, decrease bleeding capacity, reduce flow of mortars, and increase green strength and cohesiveness of mortars.

CANADIAN
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Control of Condensation in Curling Rinks

by G. O. Handegord and C. R. Crocker

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The growing popularity in recent years of curling as a winter sport in Canada has led to the construction of an increasing number of new buildings for curling rinks and to the renovation and improvement of existing ones. Mechanical refrigeration equipment is now normally provided to ensure a more uniform ice surface and to extend the curling season from early fall to late spring. These changes, coupled with increased serious interest in the game, have brought about a growing awareness and concern for problems associated with the performance of curling rinks, particularly the problem of "dripping" on the ice surface.

Dripping describes the condition arising from the melting of frost that has accumulated on the underside of the rink roof or ceiling. Frost forms during the curling season and subsequently melts in mild weather, dripping to the ice sheets where it refreezes and forms undesirable "bumps." Under normal weather conditions on the Prairies the problem occurs only in the spring, but in regions of Canada having more moderate or variable winters it may occur frequently. In natural ice curling rinks the curling season was more closely related to the outside weather, and although dripping was a problem in the spring the season was almost at an end and the ice itself beginning to show other signs of deterioration.

The accumulation of frost on the ceiling of a curling rink is the result of the condensation of moisture originating from flooding and "pebbling" operations, from the curlers and spectators, and from the ice surface itself. These sources of moisture tend to produce high humidity conditions within a rink, resulting in dew-point temperatures approaching the interior air temperature. Under cold weather conditions the interior surfaces of the rink enclosure will be at a temperature lower than that of the air. If these temperatures fall below the dew-point temperature condensation results.

It is evident that any efforts to lower the humidity and hence the interior dew-point temperature will reduce the possibility of condensation. It is also apparent that raising the temperature of interior surfaces will serve a similar purpose. Consideration of these two principles is essential in any attempt to reduce or eliminate condensation.

Condensation normally occurs as frost in a curling rink because of the temperature levels involved. The frost itself is not objectionable, as it might be in other buildings, nor is the subsequent melting of the frost of concern provided that it does not fall or drip onto the ice surface. The problem is in this way unique from the practical point of view, and suggests yet another solution involving proper control of condensed moisture during the curling season.

Application of the foregoing principles may be undertaken using a number of different techniques, depending on the particular circumstances involved and the resources available. It is the purpose of this Digest to outline some of the various methods that may be used and to discuss their possible effectiveness.

The Removal of Moisture by Ventilation

Some form of ventilating system is normally included in most curling rinks as a means of removing moisture. Such systems usually rely on natural ventilation and consist of vent openings at the roof ridge with inlet air vents in or above the side walls. The size and location of these vents will have an important bearing on their performance, but their effectiveness is also largely dependent on the inside to outside air temperature difference.

Neglecting the influence of wind, the rate of ventilation will increase with increasing inside to outside temperature difference. The capacity of the ventilating air to remove moisture will also increase; at lower outside temperatures the ventilating air will have a lower initial moisture content. Natural ventilation systems have themselves an inherent moisture control feature which is most desirable. At low outside temperatures, when the potential for condensation is greatest, increased moisture removal capacity is available. Under warm weather conditions, when the introduction of moist outside air may result in fogging, the ventilation rate is reduced. The full benefits of this operating characteristic will only be realized, however, if the inside temperature of the rink is held at a reasonably constant level.

A curling rink is nominally an unheated building and the interior temperatures of a particular rink will be determined by the natural balance between the unintentional sources of heat and the cooling loads associated with the building. Heat gains will be experienced from adjacent waiting and viewing rooms, lights, the curlers themselves and solar radiation. This will be augmented or counteracted by the heat exchanged with the ice surface, the exterior walls and roof, and the ventilating air.

The temperature of the ice surface remains reasonably constant throughout the curling season as it is controlled by the temperature of the brine circulating in the pipes. During periods of cold weather the ice sheet acts as a heating panel because its temperature is above the air temperature within the rink. This heating effect is a major factor in keeping the air temperature in a well-constructed rink at a comfortable level. Observations indicate that the air temperature remains reasonably constant and seldom drops below a well defined minimum. This minimum varies with the location and design of the rink, but in the colder parts of Canada it will be above outside air temperature during most of the winter months. When this is the case, natural ventilation is most effective. It is important to remember, however, that when the inside air temperature is below the ice surface temperature, the ice is not only giving up heat but moisture as well. This increased supply of moisture will offset the increased ability of the ventilating air to remove moisture.

Mechanical ventilating systems experience the same difficulty. They have little advantage over natural ventilating systems when the outside temperatures are low, although they do provide better control during pebbling and flooding operations. Condensation control by either system will be much more effective during cold weather if some heat is introduced into the rink. The higher temperature will improve ventilation and will also reduce the moisture gain from the ice surface.

Moisture Removal by Dehumidification

Dehumidification, using mechanical refrigeration, has been used to some extent in rinks in Eastern Canada. In some cases the equipment used for ice making is adapted for the purpose, and in others a separate refrigeration system is employed. Both methods require some air handling equipment and a considerable capital investment is necessary. Operation may also be complicated by the problem of coil defrosting.

From the limited information available on air conditions within curling rinks in the colder areas of Canada it would appear that below-freezing temperatures will be experienced during most of the season. Coil temperatures for dehumidification would necessarily be considerably below freezing and some means for manual or automatic defrosting would be required. It is probable under these circumstances that the application of mechanical dehumidification in the solution of the dripping problem in curling rinks has limited application.

Another suggested means of dehumidification involves the use of the walls of the building as frost collecting surfaces. As has been mentioned, frost accumulation is usually of concern only on the rink ceiling. Frost accumulation and subsequent melting on the walls presents only a problem of snow or water removal from the walkways adjacent to them.

Following this principle the exterior walls of the curling rink might be designed with as low a thermal insulation value as possible. This is not difficult; the materials usually selected to meet the structural requirements for the wall have high thermal conductivity. Thin masonry walls, for example, act as condensing panels, especially when they face north and do not pick up radiant energy from the sun.

From a limited investigation of such a design, it appears that although the condensing wall system may not prevent ceiling condensation it is effective in reducing the amount that accumulates. The temperature difference between the wall and ceiling will promote some migration of moisture to the walls but the vapour pressure differences involved are probably not large enough to move enough moisture by diffusion alone. This might be rectified by circulating air within the rink to promote condensation on the walls. It is also possible that increasing the temperature difference between the ceiling and walls by raising the ceiling temperature would result in improved performance.

Elevation of Ceiling Temperatures

The greater the over-all insulation value of the roof-ceiling construction, the closer the interior surface temperature will be to the temperature of the air adjacent to it. It is desirable, therefore, to select materials for the roof that are inherently good insulators. Fortunately, in the design of many curling rinks the roof deck is constructed of wood planking two or more inches in thickness, an excellent choice because of its thermal insulation value.

Through metal fasteners must be avoided as their high thermal conductivity would give the nail or bolt an inside surface temperature far below that of the adjacent wood surfaces and cause condensation on the fasteners. This can occur even when the remainder of the ceiling is completely dry. Although the drip from bolts or nails might not amount to very much, any bumps formed on the ice can be annoying.

A dropped ceiling will also provide insulation, but it must incorporate a vapour barrier to prevent condensation in the attic space. Vapour barrier materials are available which in themselves have a high degree of resistance to the flow of water vapour and air, but they do not perform their intended function unless they can be applied without breaks or openings. It is almost impossible to install lighting fixtures and concealed wiring without leaving some holes in the vapour barrier, and the natural movement of moist air through these openings may easily result in condensation and subsequent dripping through the ceiling. Ventilation of the attic space provides some measure of protection, but the rate of vapour removal possible in a curling rink attic is considerably less than that in a heated building. Some rinks with this type of construction have performed satisfactorily, but only after a great deal of time and effort has been applied to ensure a tightly sealed vapour barrier.

The introduction of heat into curling rinks has been suggested as a means of improving ventilation effectiveness and of reducing moisture gains during periods when the outside temperatures are low. It may also serve to raise ceiling surface temperatures so as to inhibit condensation and aid its removal. Where cold walls serve as condensing panels and ridge ventilators are not provided, warming of the ceiling will control condensation there and allow the walls to act as dehumidifying surfaces. Where ridge vents are included in the design, the warmed air passing over the ceiling surface will also serve to carry condensed moisture from the building.

It is difficult to estimate the size or arrangement of the heater and distribution system required, but a unit with a capacity of 100,000 Btu/hr should be suitable for rinks with four to six sheets of ice. Some estimate of the requirements for a particular rink may be obtained by a simple heat balance calculation. The heating unit might well be operated on automatic controls to ensure a minimum air temperature (measured at the 5-ft level) slightly above the brine temperature, with a manual switch provided so that heat may be supplied at any time that increased moisture removal is desired.

Control of Dripping by Absorption

At some periods during the curling season condensation at temperatures above freezing may introduce a dripping problem. Under such conditions a ceiling with a surface capable of absorbing moisture would be most desirable, so that water taken up by the ceiling material would evaporate as ventilation continues. This is one characteristic of wood plank roof decking that has led to its popularity and success.

Metal roof decks, on the other hand, invariably give trouble in unheated rinks because of their inability to absorb moisture. Special materials (such as sprayed-on insulation) with a high water-absorbing capacity have been suggested as alternatives. Materials of this type, consisting chiefly of asbestos fibre and a cementitious binder, have a low conductivity when dry, but under the conditions existing in curling rinks they can be expected to become wet. The loss of insulating value is not of paramount importance, however, and their moisture retention characteristic is appealing. Ice will most certainly accumulate in the colder layer of the material during the curling season and some degree of surface condensation can also be expected. This is acceptable provided that the water is held or absorbed when melting occurs and provided also that the strength of the material and its bond to the roof are sufficient to support the increased weight. Assurance must also be given that the fibres will stay in place. Any tendency to drop to the ice surface would create serious problems.

Summary

The problem of dripping in curling rinks may be approached in a number of ways, depending on the characteristics of the particular rink and the resources available. This Digest has attempted to outline the principles involved and to discuss some of the methods that might lead to a solution of the problem.

The analysis suggests that some means of introducing heat into the building is probably the most generally applicable and effective condensation control, particularly in the colder areas in Canada. In conjunction with heating, a roof deck having some thermal insulation value should be used for reasons of heat economy and to provide maximum ceiling surface temperatures.

Ceiling finishes having water-absorbing characteristics offer considerable advantage over finishes incapable of taking up moisture. Wood roof decking is an ideal ceiling finish as it not only provides thermal insulation but is also capable of absorbing water.

L'Edifice
Canadian Industries Limited

par Claude Beaulieu

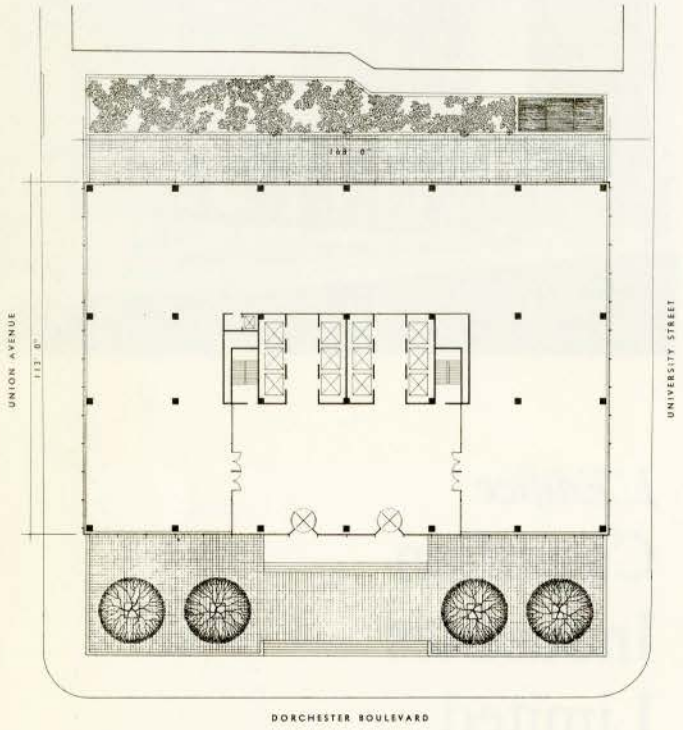
DANS DE NOMBREUX pays, la firme *Skidmore, Owings & Merrill* a signé des oeuvres d'architecture qui font son renom partout où l'on s'intéresse à l'architecture. Les solutions apportées ne remettent pas en causes les fondements mêmes du formalisme; elles sont malgré tout très audacieuses.

Mieux encore, laissant de côté les tentatives qui grossissent la liste des extravagances de la mode, les oeuvres de Skidmore, Owings & Merrill s'affirment, se précisent par le perfectionnement d'une expression toute classique où jouent d'abord l'équilibre des proportions, le jeu simple et rigoureux des volumes, la finesse des détails, la beauté des textures en utilisant evidemment les ressources les plus avancées de la construction.

Montréal se devait de posséder un exemple de cette qualité. C'est maintenant chose faite depuis que l'immeuble de Canadian Industries Limited s'élève dans cette

partie de la Ville qui fait peau neuve. Si cet édifice n'a pas l'envolée de la Chase National Bank (la construction la plus importante de New York depuis l'après guerre), il est étudié et réalisé avec le même souci de perfection dans le choix des matériaux et l'exécution du détail ainsi que dans l'agencement des travaux techniques. Matériaux choisis pour leur texture chatoyante, leurs couleurs nuancées . . . harmonies génératrices de joie.

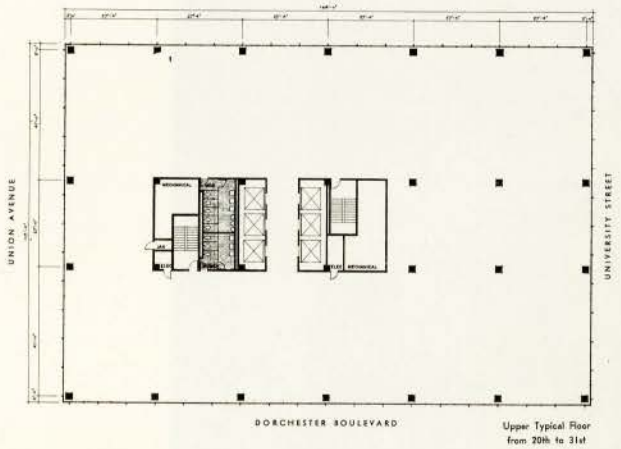
Le plan symétrique rectangulaire groupe, en son centre, tous les services: ascenseurs, toilettes et entretien. Ses quatres faces ainsi dégagées lui confèrent une sobre clarté toute classique. Aucune façade ne vient recevoir la somme des "chameaux" laissés sans solution ou gauchement camouflés.

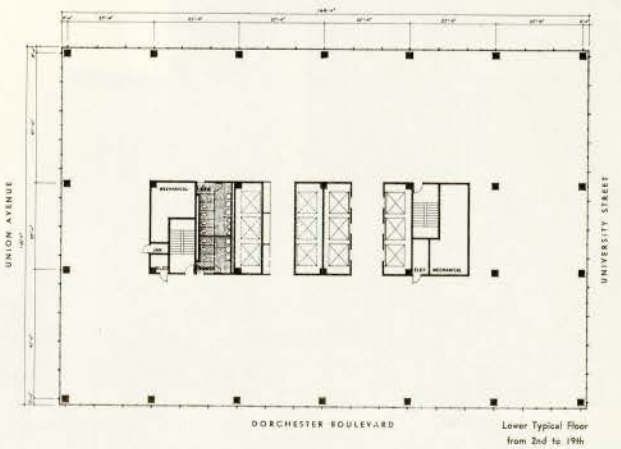


Enveloppant la structure métallique, les 33 étages de mur rideau, grandes stries horizontales alternées de verre et d'aluminium émaillé noir, qui paraissent attachées derrière la trame légère des meneaux en aluminium anodisé. Ces dernières, fines et brillantes, affirment la verticalité du volume qui sans elles serait un peu pataud. Un couronnement formant écran dans le prolongement du mur masque la sortie des réseaux mécaniques.

Le rez-de-chaussée, haut de ses 18 pieds, s'aère de l'espace d'un meneau. La transition est subtile et fait contraste avec son assiètte de granit laquelle se prolonge en terrasse dallée devant la façade d'entrée. L'immeuble ainsi tenu à l'écart de la rue se pare d'une noblesse intime quelque peu sur la réserve: celle d'une grande résidence.

La salle de conférence du Trust Royal du Canada





Skidmore, Owings & Merrill avec leurs collaborateurs montréalais *Greenspoon, Friedlander & Dunn* ont étudié tout particulièrement l'architecture intérieure et l'ameublement.

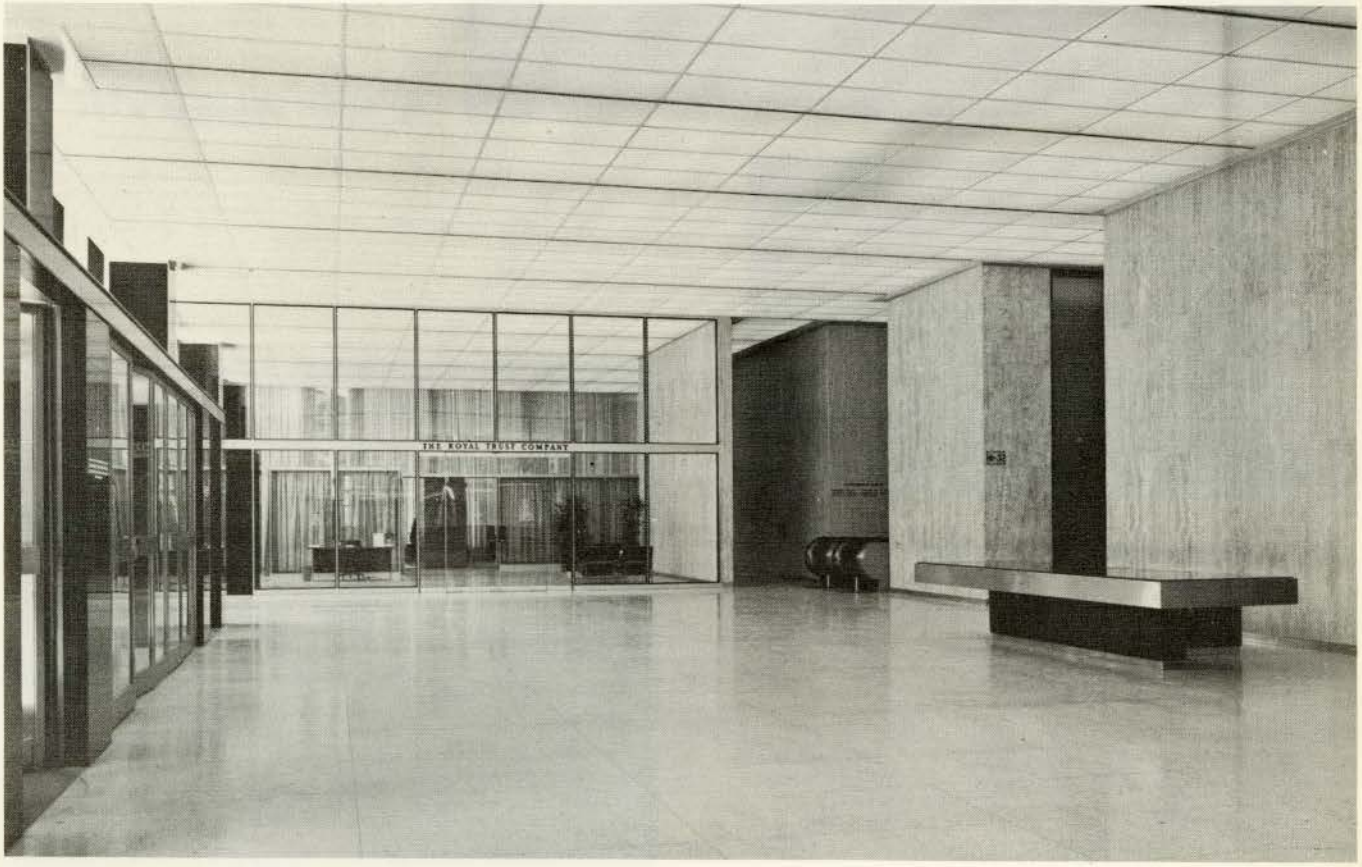
L'occupation de l'immeuble se répartie principalement entre trois sociétés: en premier lieu, la Canadian Industries Limited, qui occupe plusieurs étages, puis la Banque de Montréal et le Trust Royal du Canada. Tous les bureaux sont aménagés selon un module de panneaux fixés sur cadre d'aluminium. Les murs et les cloisons y compris les portes sont en chêne ou en noyer, en verre trempé, ou sont revêtus de formica ou encore de tissus pour vêtement.

Les meubles, de Skidmore, Owings & Merrill ou de Knoll sont fabriqués à Montréal par *la Société B. K. Johl* ou au Etats-Unis. Les éléments utilitaires en acier inoxydable, conçus pour s'intégrer à l'architecture intérieure ont été dessinés par Greenspoon, Friedlander & Dunn. Ces architectes se sont attaché également à l'étude de l'aménagement intérieur du Trust Royal tandis que le créateur de forme *Joseph Iliu* a fait l'étude d'un mur à claire-voie destiné à la grande salle de la Banque de Montréal.

L'immeuble CIL est une réussite totale. Sa vue suscite des idées lucides, nettes sans austérité, sensibles sans affectation. C'est un exemple classique vivant qui devrait se répéter.

Des bureaux généraux du Trust Royal du Canada

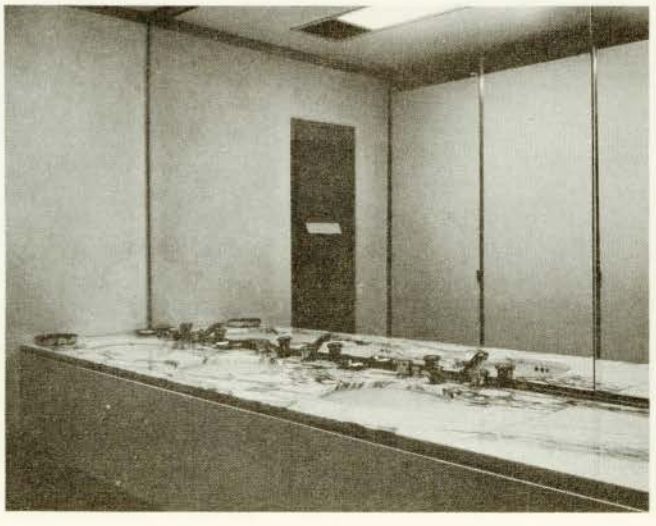
Le hall d'entrée



Un salon d'attente de la CIL

Des bureaux généraux de la CIL

Des bureaux généraux du Trust Royal du Canada



CIL lavabos

COMPETITION RESULT

Mendel Art Centre and Civic Conservatory

REPORT OF THE JURY

THE JURY commends Mr F. Mendel, the City of Saskatoon and the Province of Saskatchewan for their foresight in deciding to hold this Competition to select an architect to create what will be an outstanding building in the development of the culture of the City.

The confidence of the City and the Donor is reflected in the fine series of submissions, which show careful planning. The studies have added much to research in art gallery design in general, apart from solving specific problems.

FIRST AWARD

In the winning design, the Jury felt that the mandatory requirements of the Competition have been met with a high degree of sensitivity and competence. The scheme shows a very deep understanding for the problem and in many respects has gone beyond the requirements of the Conditions to create a most effective building.

As it will be seen from Kinsmen Park and from the University and 25th Street bridge, the building should be a scintillating form on the river bank with its glass faceted Conservatory and roof lights emerging from the strong discipline of the enclosing brick walls.

After a great deal of analysis, the Jury came to the conclusion that this solution which provides the principal public functions all on one level overcomes many of the difficulties which other competitors encountered in designing multi-level structures.

The problems of controlling the Art Centre and Conservatory together, and separately, are solved in an admirable fashion and even minor requirements such as the control of the print room, the disposition of the storage facilities, many relationships – which many competitors found hard to handle – is solved in a very simple and direct fashion.

The solution to the handling, storage and transportation of art objects is almost ideal; the lighting system for the galleries appears to be both flexible and adequate and the important principles of the display of works of art appear to have been thoughtfully handled and adequately solved.

Unlike many entries, the Conservatory was not only part of an integrated design, but was a building in which plants could be successfully cultivated.

This is a brilliant solution to the problem, possible within the limitations of the budget and the Competition conditions, and it shows every possibility of staying within the restrictions imposed by these unchangeable factors, when more detailed studies are completed.

Jury of Award

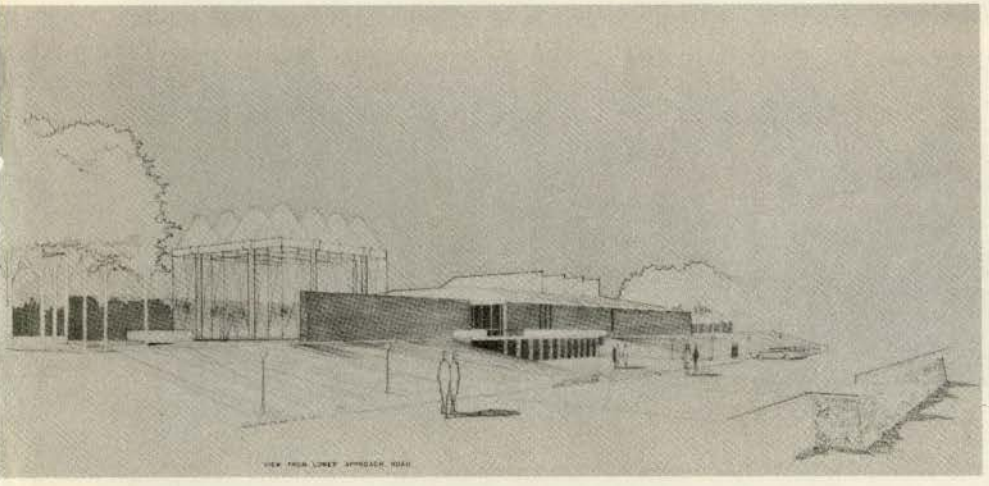
Colin Graham
Director, Art Gallery, Victoria, BC

W. Perehudoff
Artist, Saskatoon

Prof. Ralph Rapson
Minnesota

John A. Russell (F)
Winnipeg

W. E. Graham
Saskatoon—Professional Advisor and Chairman

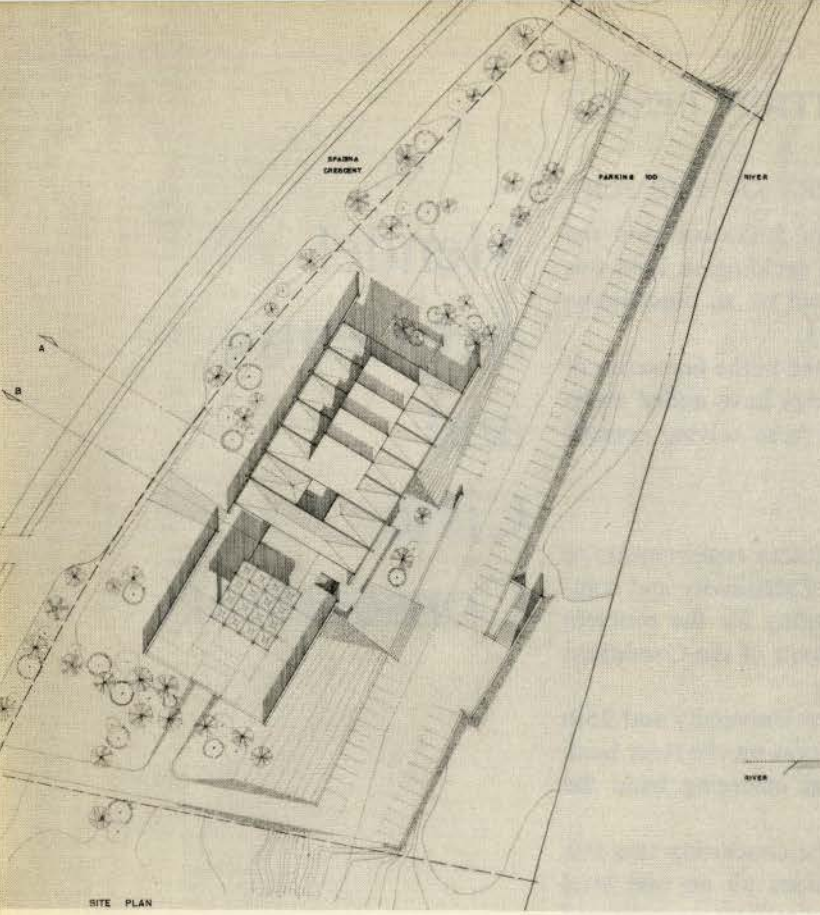


FIRST AWARD – *Entry No. 45*

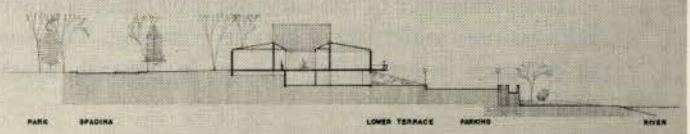
Blankstein, Coop & Gillmor.
Winnipeg

MENDEL ART CENTRE AND CIVIC CONSERVATORY

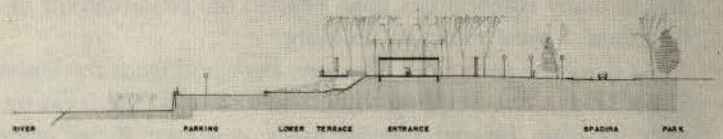
FIRST AWARD



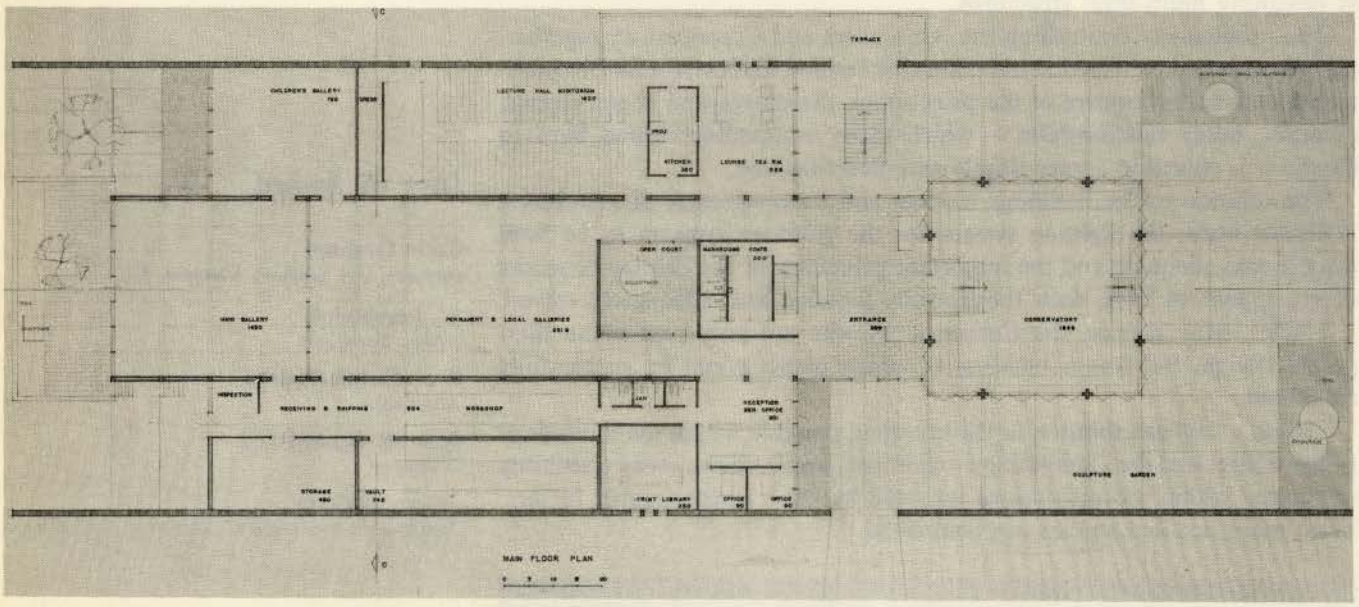
SITE PLAN



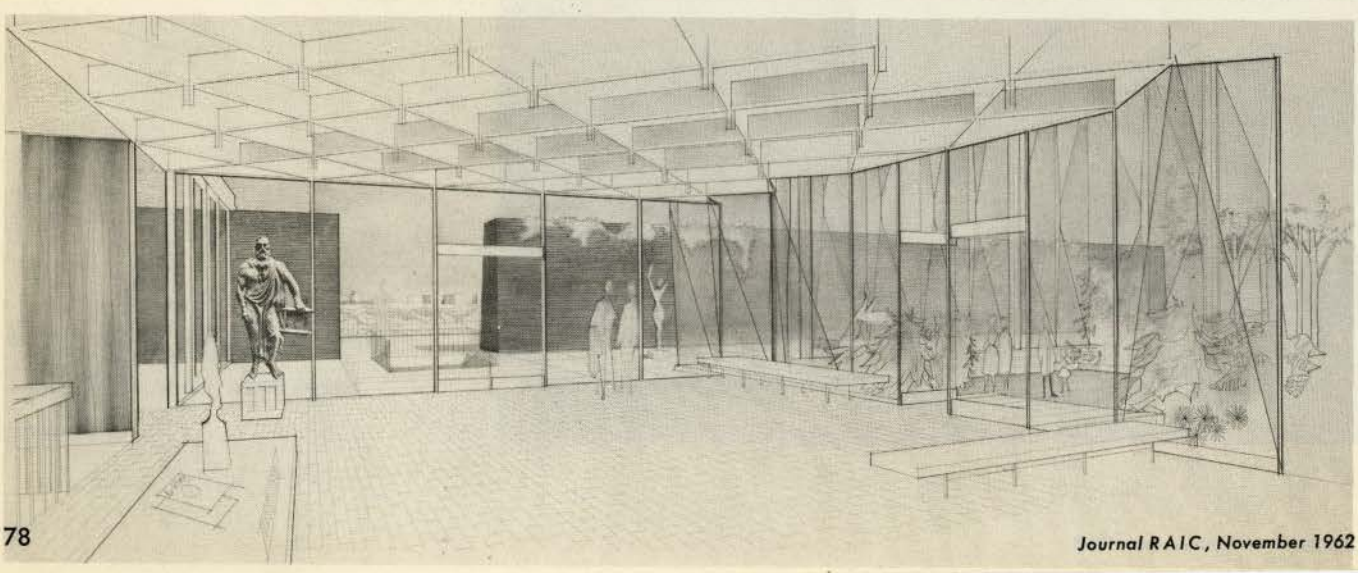
SITE SECTION 'A'

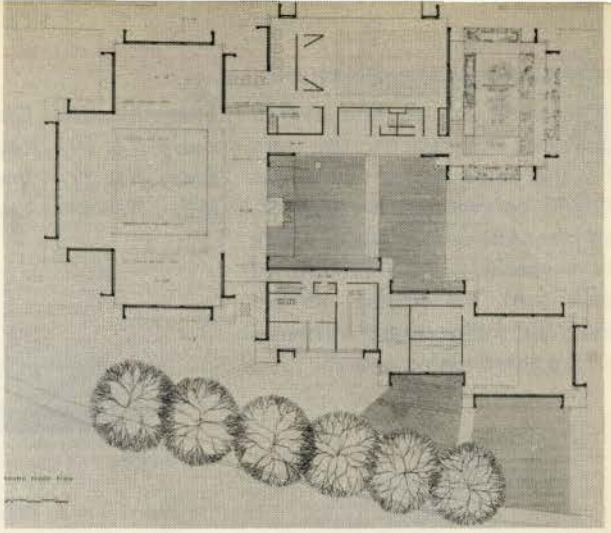


SITE SECTION 'B'



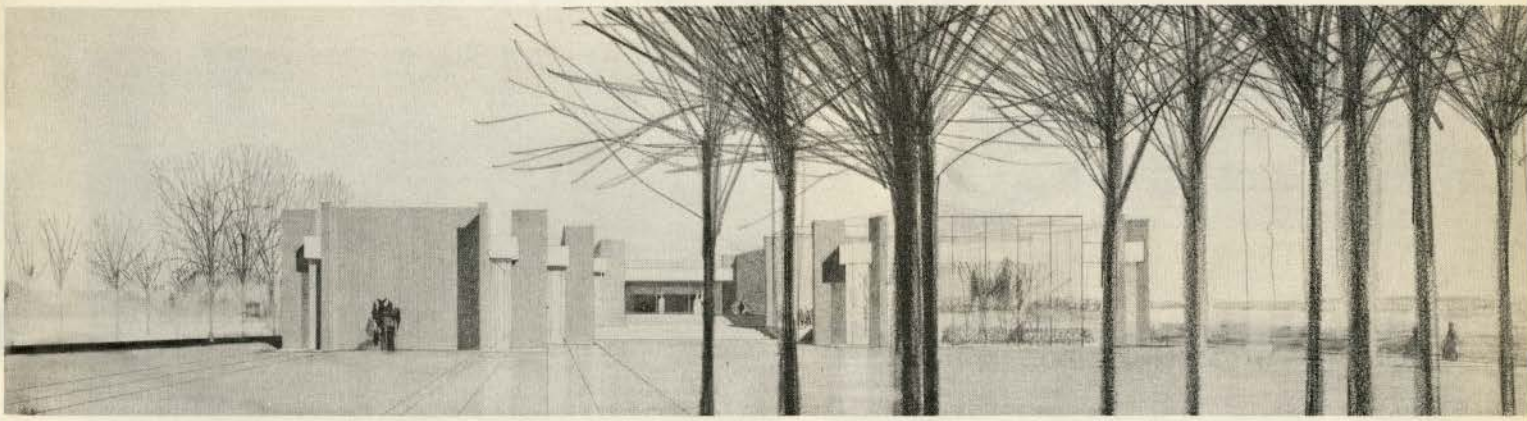
MAIN FLOOR PLAN

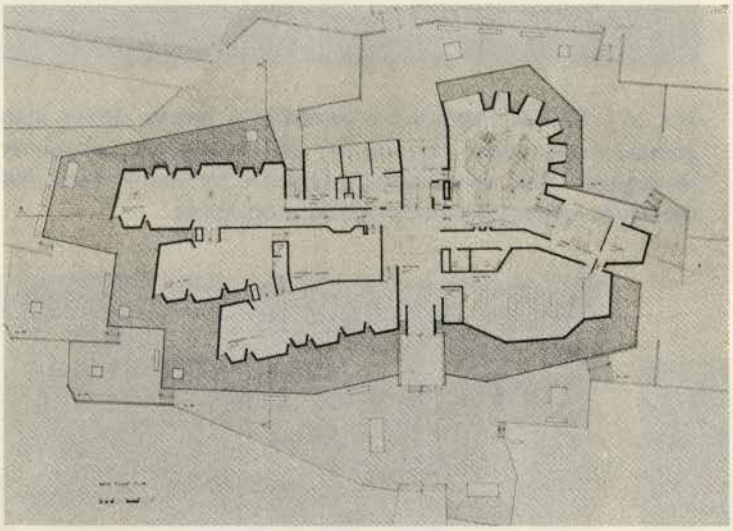




SECOND AWARD *Entry No. 38*
Michael M. Kopsa. Toronto

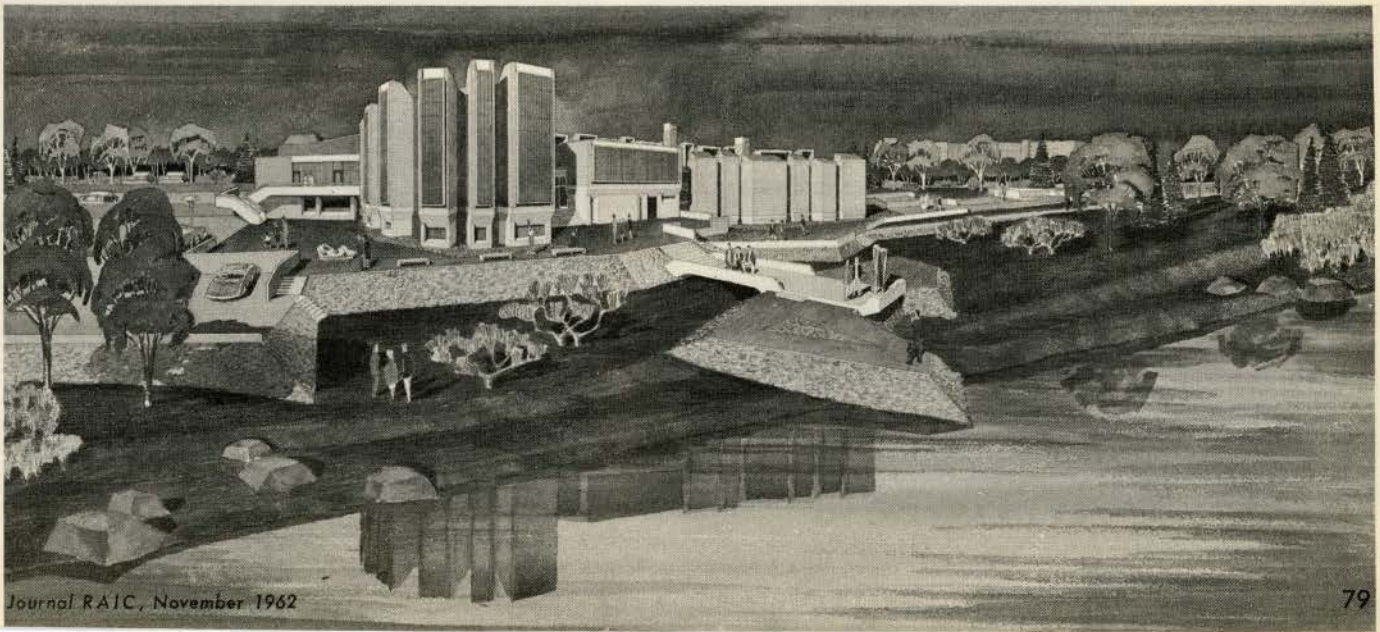
THIS DESIGN shows an equally sensitive handling of the same problem. It has dignity directness, simplicity and provides a bold conception of circulation. Other details are handled in such a way as to make this a very close competitor to the first award.





THIRD AWARD—*Entry No. 47*
E. J Gaboury and Associates.
Winnipeg

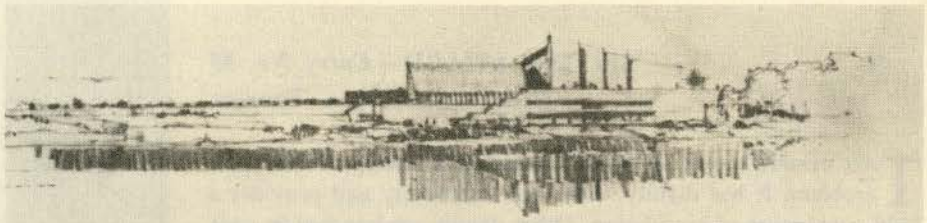
THE THIRD AWARD is an entirely different approach to the problem. It solves all the mandatory relationships with skill and imagination and results in a building complex which is highly plastic and sculptural but admittedly expensive.

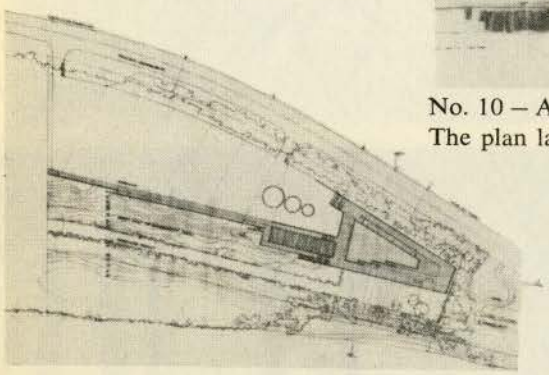


HONOURABLE MENTIONS

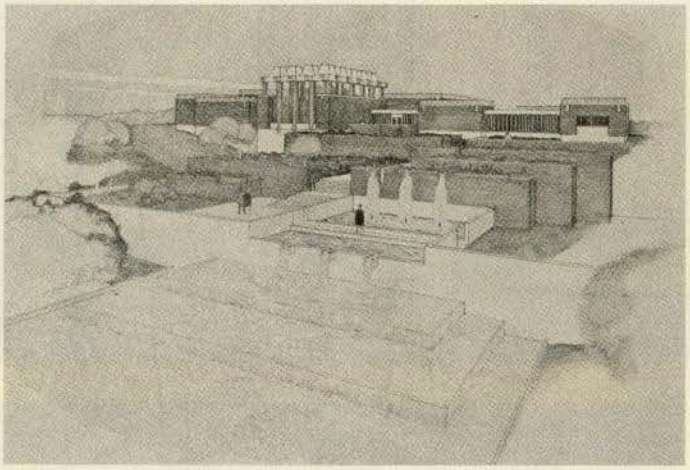
BECAUSE OF THE HIGH level of the submissions, the Jury felt that some four of the entries should be featured as good examples of designs, many of which have specific strong qualities of their own, but perhaps do not have the well-rounded attributes of the three major awards.

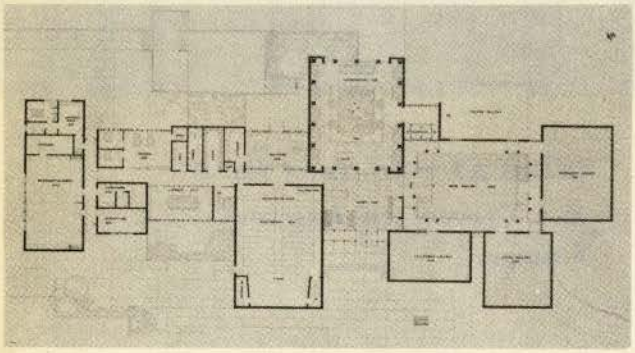
Entry No. 10 Garfield Allister Macinnis. Toronto
Entry No. 26 – Rounthwaite & Associates. Toronto
Entry No. 29 Ivan A. Marinoff. Scarborough, Ont.
Entry No. 48 Gerald Robinson. Toronto



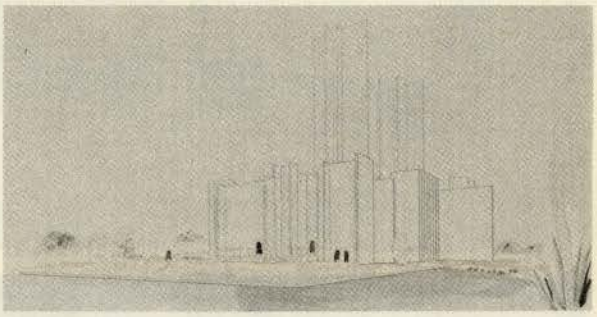


No. 10 – A brilliant exterior design with a unique external character The plan layout is, however, rather involved and tortuous.

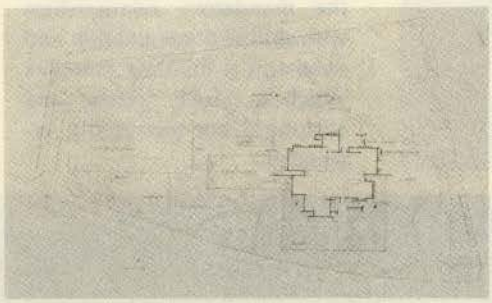




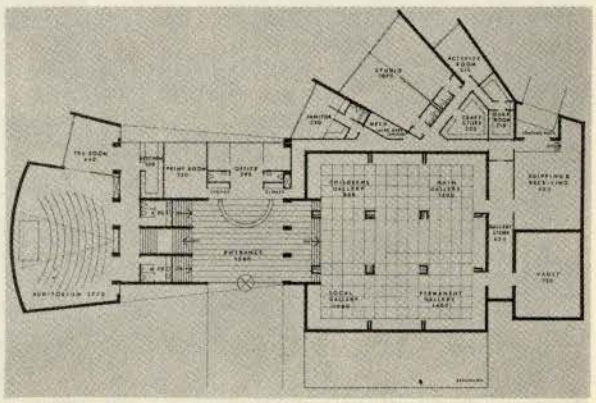
No. 26 – This competitor has produced a unique design with generally good plan organization and a consistent character throughout. The conservatory is suitable for the purpose, but the whole scheme promises to be too expensive.



No. 29 – A brilliant and monumental piece of architectural sculpture which shows a high organization and imagination. The plan is excellent, but does not have the clarity of the major awards.



No. 48 In failing to comply with an important mandatory condition, the competitor disqualifies a design which has outstanding qualities and a bold imaginative approach.



Office of the general manager, Canadian Imperial Bank of Commerce, panelled in fire-retardant, architectural, sequence-numbered Rosewood.

The warmth of wood for the Bank of Commerce

The architects, Clifford & Lawrie, for the premises of the Canadian Imperial Bank of Commerce, in their fine new building in Montreal, are to be congratulated on their discriminating use of wood panelling in major areas throughout. This panelling, as illustrated above, and also in the public banking areas is imported Rosewood, and Burma burley teak.

Patient collaboration between ourselves, as distributors, the manufacturer, and the design staff of Clifford & Lawrie was required to select and match a succession of sequenced panels for wall and table areas.

The harmony in colour and texture of the completed rooms owes a great deal also to the skilful installation work by Gillanders Limited.

Panelling of this quality will provide the owners with untold years of aesthetic and functional satisfaction.

Duffus Limited have been for many years distributors of hardwood panelling. Our mill-trained staff have unique abilities to discuss with architects application and design problems for all types of wood panelling. This is closely related to our representation of quality imported lines and association with carefully selected domestic manufacturers.

DUFFUS LIMITED TORONTO AND KITCHENER

A Building Season?

By Sidney Lithwick

WHEN HE SPOKE AT A MEETING of the Saskatoon Construction Association last May, *Mr Hugh Montgomery*, the president of the Canadian Construction Association, stated: "The wintertime construction volume in Canada is higher, on a per capita basis, than in any other country."

His statement reflects the splendid work that has been carried out by the Building Research Division of the National Research Council and the incentive provided by the Federal Government's Municipal Winter Works Program.

It also speaks well for the intelligence and willingness of today's architects and contractors to accept and put into practice the special methods and techniques of winter construction.

The *"Do It Now"* winter work promotional efforts of the Department of Labor have caught on, and it is up to those in the building industry to help this campaign gain more momentum each year.

Notwithstanding the progress that has been made, however, considerable unemployment still occurs in the construction industry during the winter months. Despite all the information that is available to support the practicability of winter construction, there are contractors who still prefer to take the easy way out and shut down operations over the winter months. They are not willing to take up the challenge of winter construction. They read about the techniques of winter construction, but make no attempt to implement them in their own work. Some bear a grudge from past winter projects in which they have suffered setbacks. They are not prepared to accept the fact that perhaps this was due to a lack of planning and an unwillingness on their part to invest sufficient thought, time, and money in order to tackle problems that might have been overcome.

On large projects the contractors who close down in winter, with the intention of picking up lost time in the warmer weather, are often faced with serious wet site conditions in the spring. These can prove to be more of an obstacle than the cold. If they are working to a tight completion schedule for, say, September or October, the slow pace of the previous winter, plus poor spring conditions, may well interfere with it. Consequently, the summer work load is increased, and the volume of work for all trades becomes such that skilled men are thinly spread out, resulting in production slow down.

As a result, the owner who sets the completion date in the first place, with a view to having certain income commence at that time, must alter his plans. This could lead to serious repercussions. The attitude of the public towards the construction industry is frequently one of doubt. The type of situation just mentioned does not help to correct such an attitude.

We now have the "know-how" to plan and build projects during the severest of winters with maximum success. The improvements in methods and techniques of winter construction make it possible to satisfy the requirements of the most demanding owner at any time of the year.

It is the responsibility of all those engaged in the construction industry to get this message across to the public. In this country we have a fishing and boating season, a hockey and skiing season. But, there is no such thing as a building season. Today it is a year-round operation and, most important, quality results are possible at any time.

Program

RAIC Journal Technical Section

Edited by
Douglas H. Lee, MRAIC

The following twenty-two topics have been selected for discussion in the *Journal's* Technical Section over the next year, and preparation has begun on a number of them.

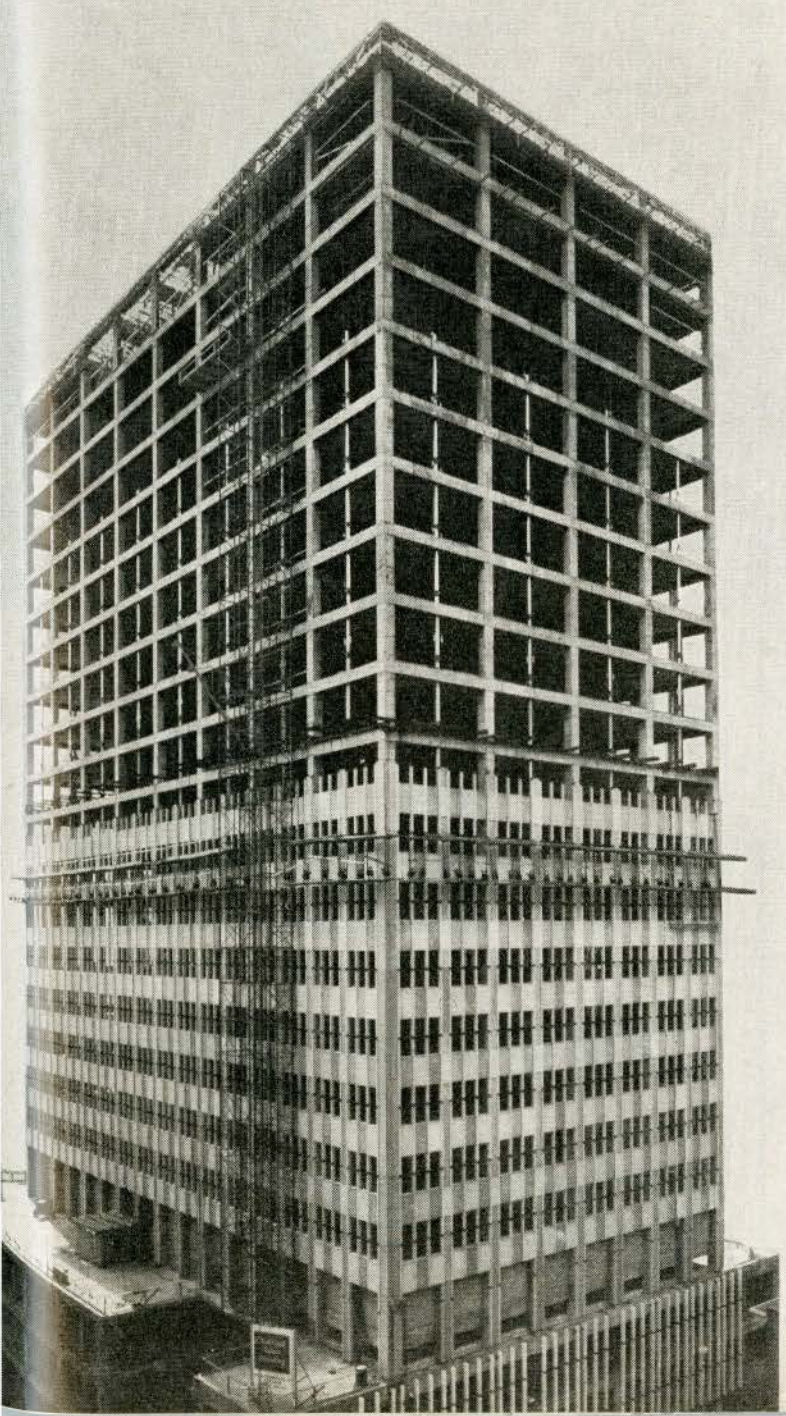
Questions, comments or contributions outlining experience with any of the materials or problems listed, or suggested additions to the list, will be welcomed.

The first part of a paper on "Concrete Admixtures" by Dr Richard C. Mielenz, Director of Master Builders Research Laboratories, Cleveland, Ohio appears on page 65 of this issue. The second and final part will be published in December.

Technical Topics

1. Shell Structures
   A report on the recent Internatonal Conference on Shell Structures, San Francisco
2. Heat Pumps
3. Caulking
4. Paints
5. Hardware
   Types and uses
6. Roofing
   Including inspection
7. Marble
   Where to use and what types
8. Hardening and Finishing of Concrete
9. Natural Finishes (Wood)
   Paint and preservatives
10. Glazing
    Problem windows
11. Double Glazing
12. Glazing
    Neoprene
13. Epoxies
14. Garden Paving, Patios
15. Plaster and Drywall
16. Vinyl Wall Coverings
    How and where to use
17. Concrete Admixtures
    November and December 1962
18. Mortar for Walls
    Ready-mix versus pre-mix
19. Checking Shop Drawings
20. Soil Tests
    Interpretation
21. Wood Windows
22. Insulation

How much do 22 storeys of structural concrete weigh?



16 storeys – if it's Haydite!

This building is the tallest lightweight concrete structure in Canada From street level up the entire frame columns, slabs, beams, shear walls all are of lightweight Haydite concrete Concrete weight is 115 p.c.f compared to 150 p.c f for standard concrete.

This sharp reduction in weight resulted in substantial cost savings Because Haydite was used, the amount of concrete needed to serve the structural function could be decreased, less tonnage of reinforcing steel was necessary, foundation sizes could be made smaller, and useful floor area increased

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Floors were monolithically cast to a steel trowelled finish, and dust coat or additional fines were not required for excel ent finishing characteristics

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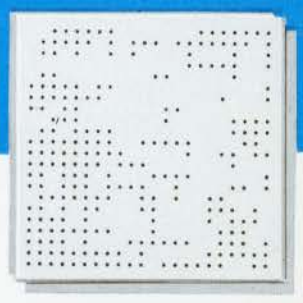

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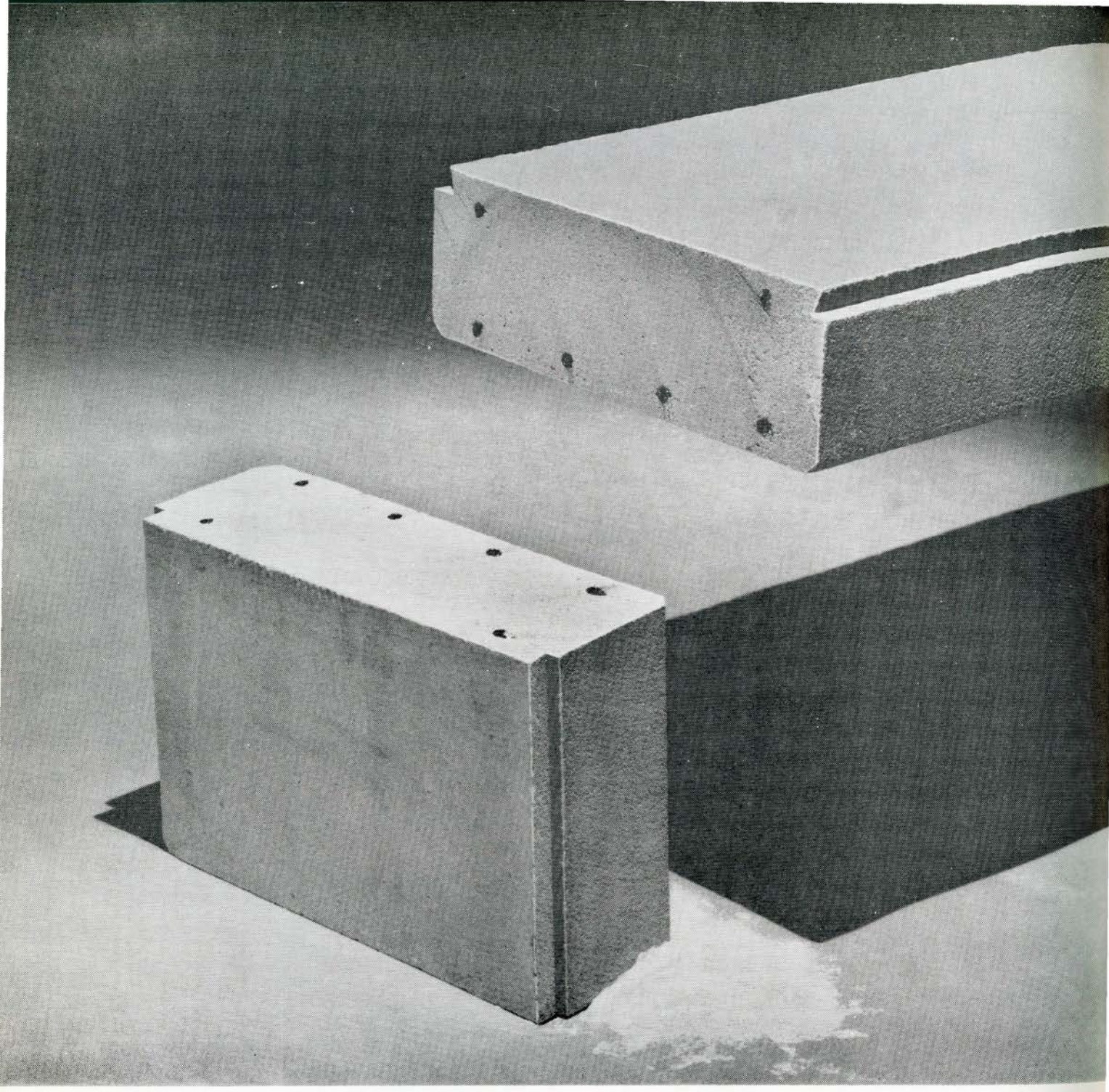

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Architects Are Welcome Allies

FOR SEVERAL YEARS NOW the Federal Department of Labour in co-operation with the National Employment Service has been conducting an intensive publicity and advertising campaign to educate the public towards more wintertime building.

Considerable emphasis has been placed on the complete practicability of interior building during the cold winter months through publicity generated by the Do It Now Campaign. At the same time, the promotion of the idea of more outside building in the winter has continued, but through different channels. It was decided at the outset that, although outside building in cold weather was also practical, it required careful planning and the application of special techniques if contractors and building owners alike were to be happy about the result.

Following this reasoning, the organizers of the Winter Employment Campaign have chosen to work largely through such organizations as the Canadian Construction Association, the National Housebuilders' Association, and other agencies who could speak with an authoritative voice on the problems of outdoor building during the cold months. This has resulted in a tremendous increase in the general knowledge of the problem of winter building and a high degree of acceptability within the construction industry of the practicability of year-round operations.

The greatest need remaining is to convince prospective owners of new buildings of the principles which are now generally accepted throughout the building industry Here the architect can play a major role. As an early consultant on the building project, he is in the very best position to overcome the effects of out-of-date thinking, and to organize the planning and schedules in such a way as to ensure an efficient winter-time operation.

Although it is generally accepted that wintertime building may be slightly more costly, these costs can be reduced to a minimum by proper planning, and prospective building owners can be encouraged to examine these extra costs against other charges which may result from his delaying the start of his new building. Savings in rents and earlier production schedules can often more than offset the additional costs of wintertime building.

The Division of Building Research of the National Research Council has prepared a booklet entitled "Better Building Bulletin – Winter Construction No. 6", containing a wealth of information on winter building techniques. This can be obtained by writing to the Information Branch of the Department of Labour, Ottawa.

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CANADIAN IMPERIAL BANK
OF COMMERCE,
Main Office, Montreal

Architect:
Peter Dickenson

Supervising architects:
Ross, Fish, Duschenes
& Barrett, Montreal

Architects and Design Consultants, Canadian Imperial Bank of Commerce:
Clifford & Lawrie, Toronto

Consulting Engineers, Structural:
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General Contractor:
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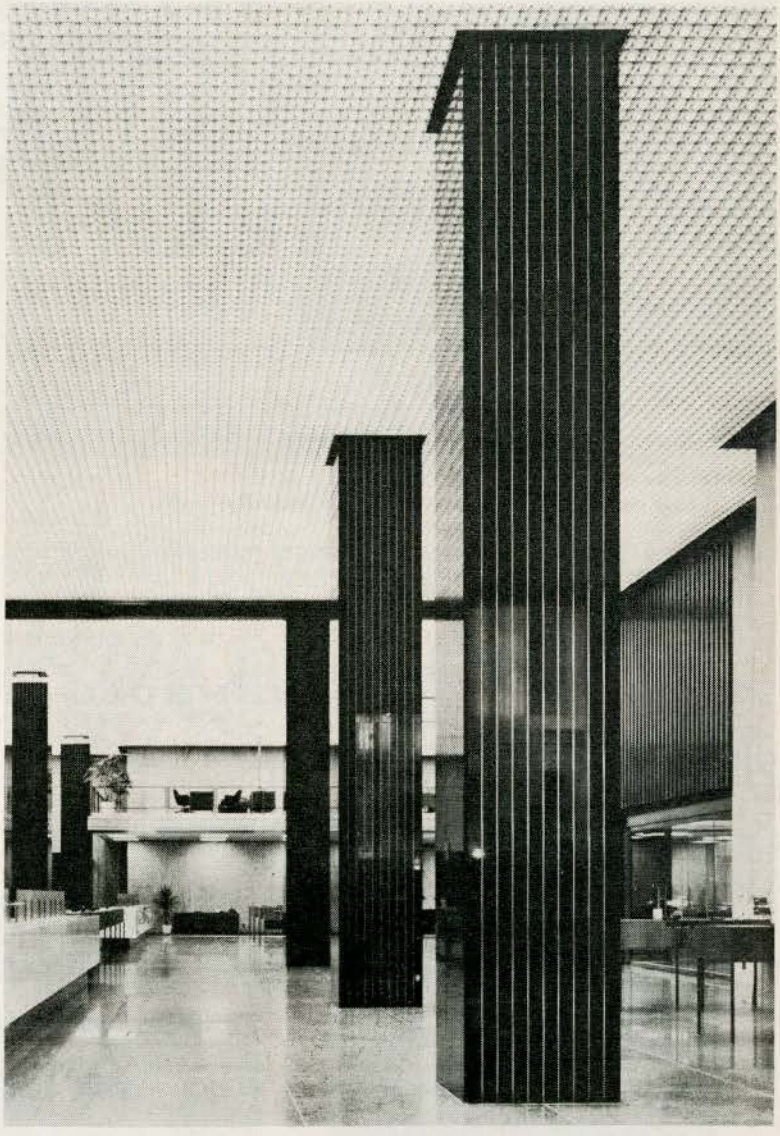

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LORNE BUILDING (NATIONAL GALLERY)—*Architect: Green, Blankstein, Russell and Associates, Winnipeg*
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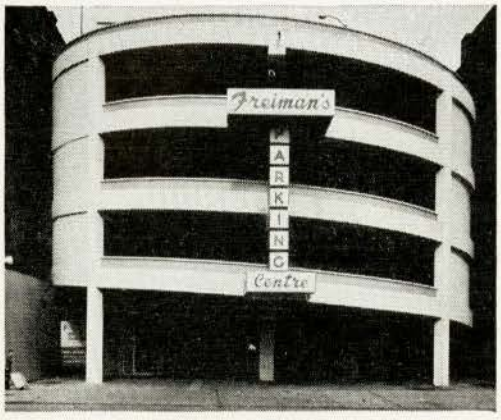

FREIMAN'S PARKING GARAGE—*Architect: J. P. Thompson Associates, Windsor*
General Contractor: Perini Limited

CHAMPLAIN TOWERS—*Architect: Bemi, Murray and Associates*
General Contractor: R. Campeau

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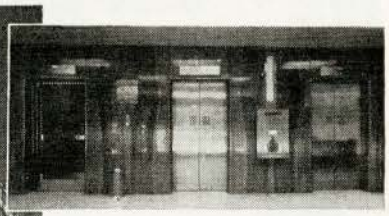

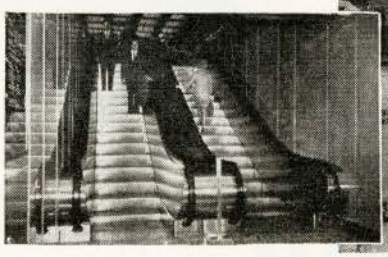

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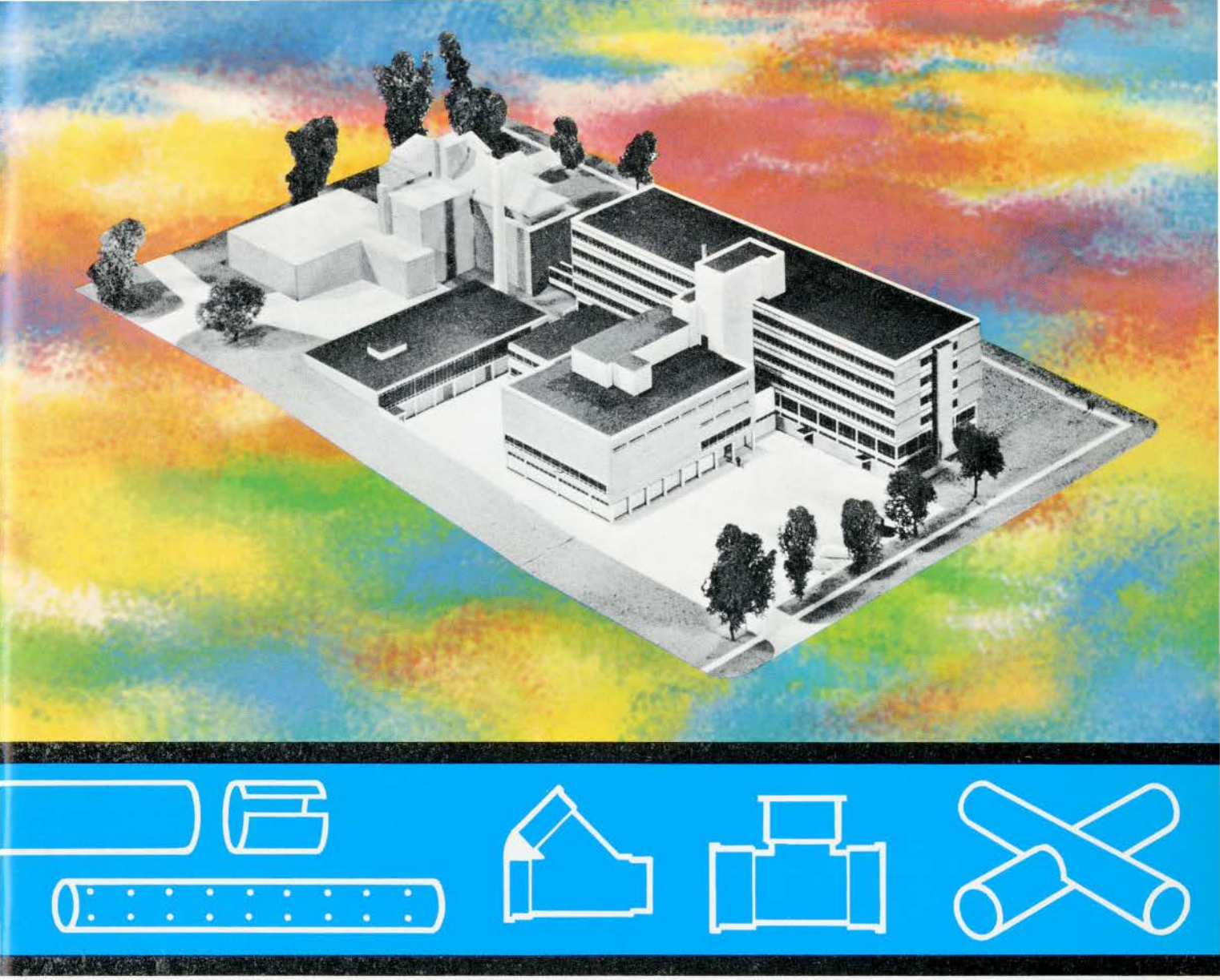

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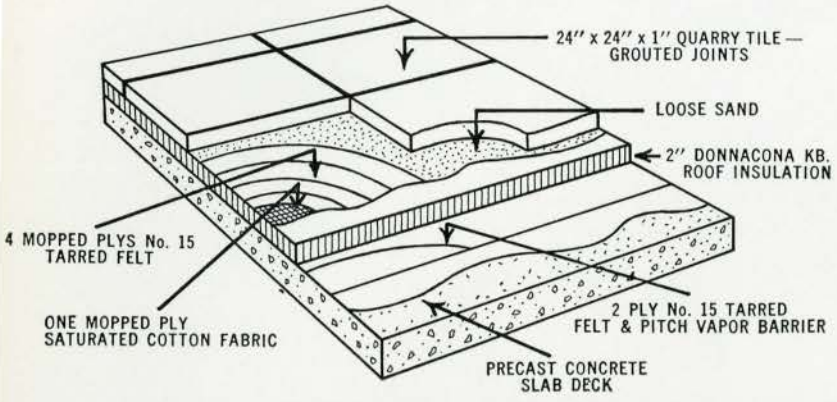

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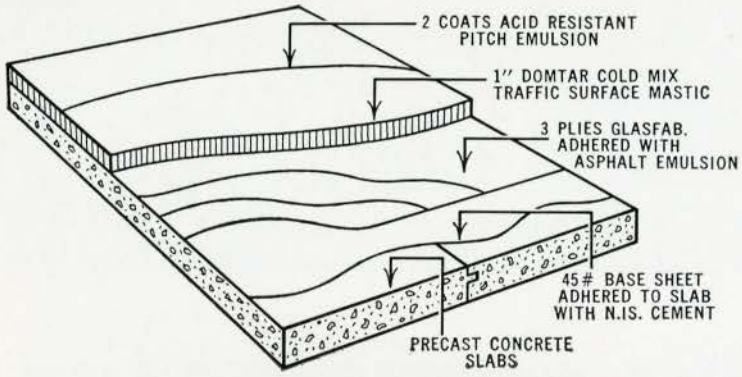
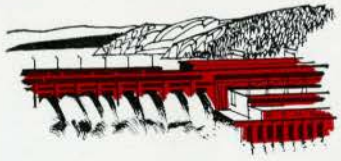
GENERAL CONTRACTOR: Damien Boileau Ltd.

ARCHITECT: Henri S. Labelle.





TO ROOF A

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Here's a section of the special traffic surface roof, also employing Murray-Brantford Built-up Roofing materials, for the hydro-Quebec Power Station, Carillon, Que.

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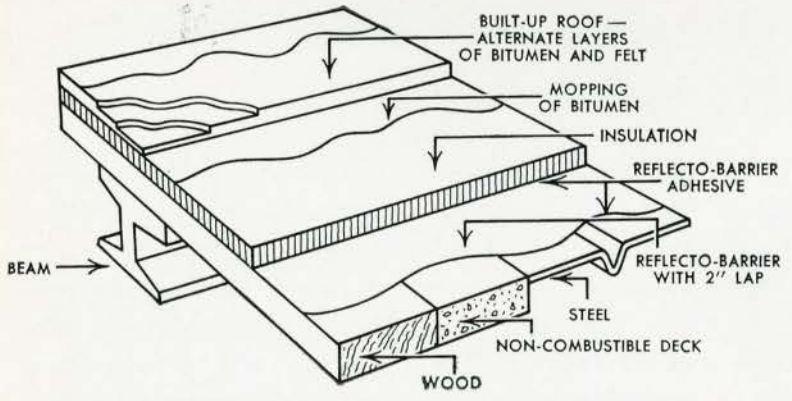

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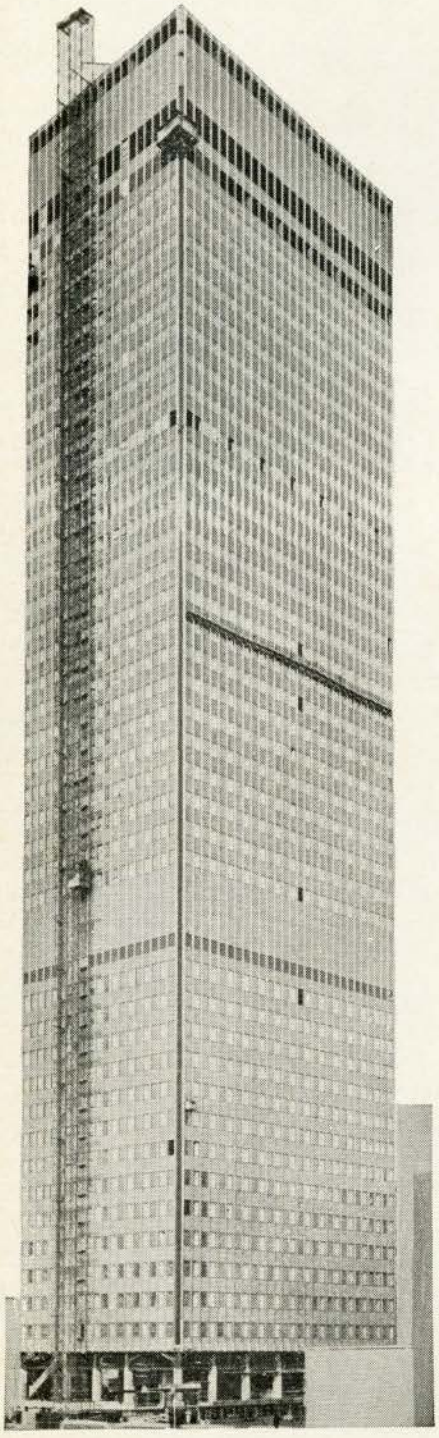

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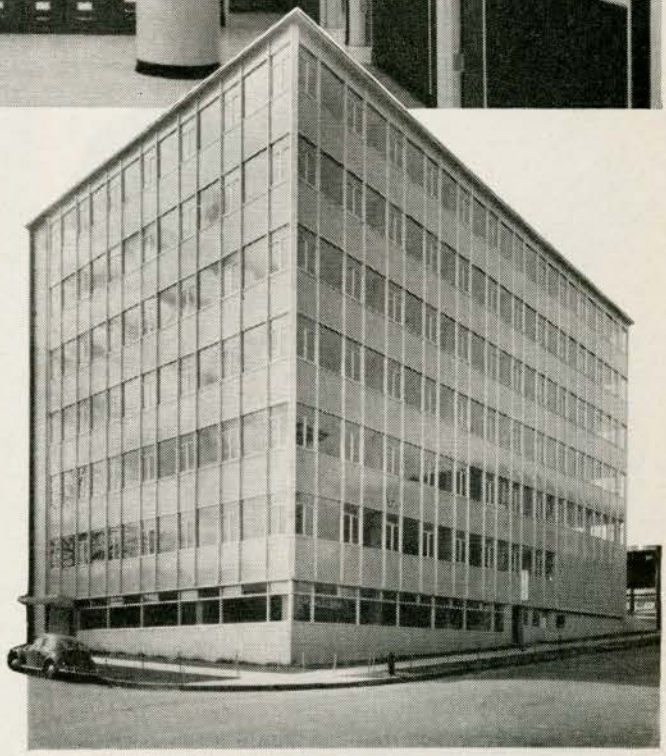

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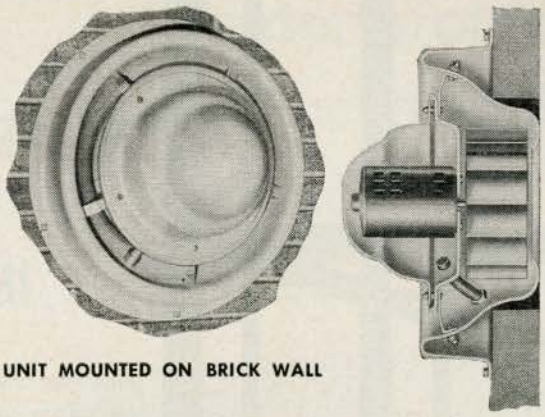
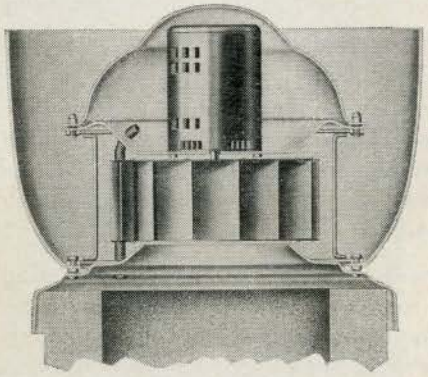


UNIT MOUNTED ON BRICK WALL



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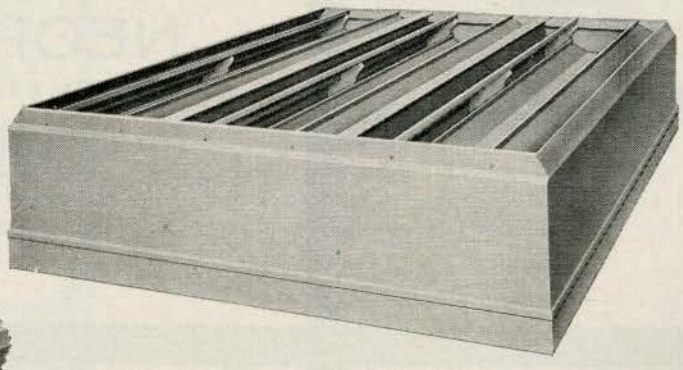
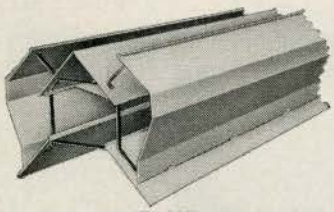
LITE-'n-AIRE AIRMOVER





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.

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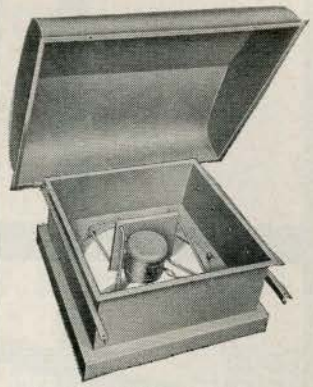
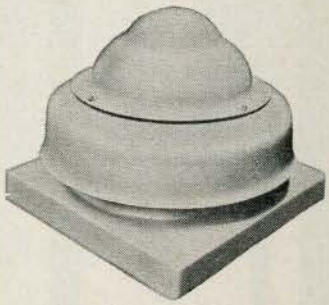


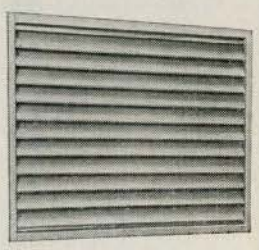
Powered Low-Line *and* **Low-Line Relief.** *Economical low contour ventilators.*

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

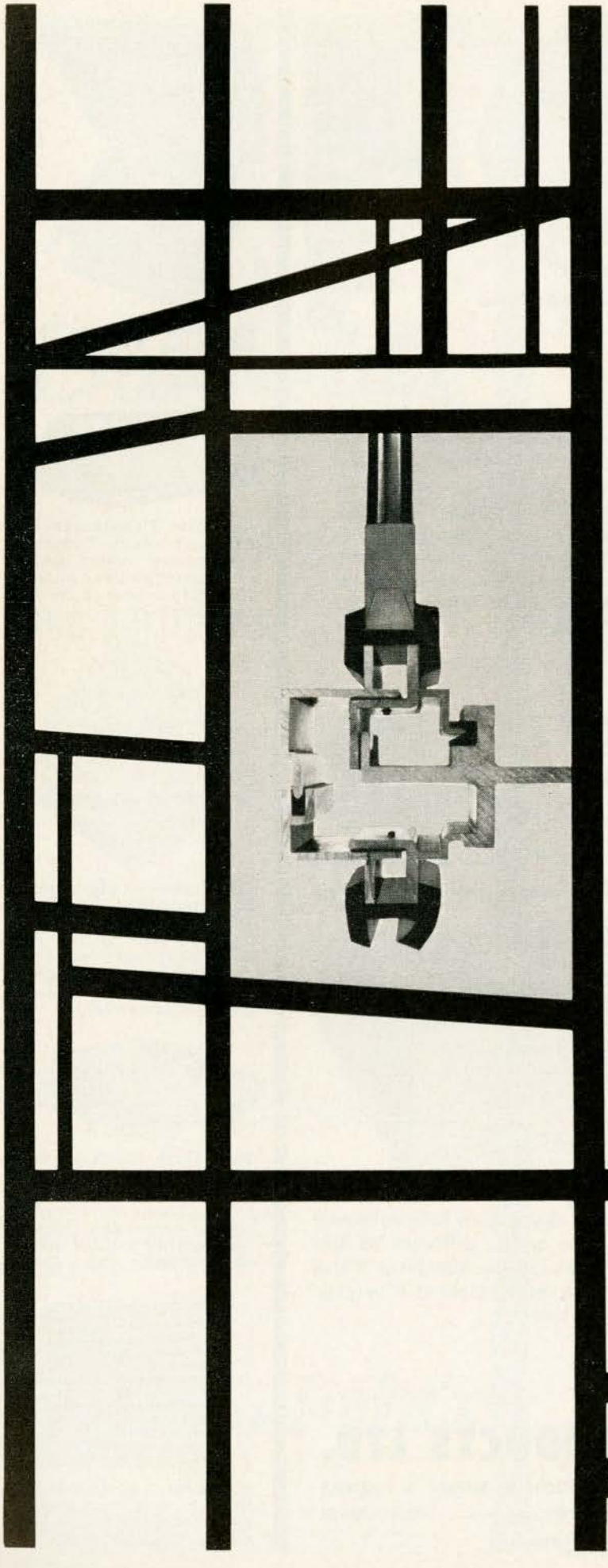


Fiber-Aire *indestructible molded-in Sky Blue Fiberglas* housing is virtually impervious to weather, salt spray, chemicals and fumes. Direct drive, belt drive and axial units available.*

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*



RELIABLE NEOPRENE GASKETS STAY WEATHERTIGHT IN ANY WEATHER

However new your curtain wall design, Du Pont Neoprene gasketing will add an element of dependability you can get with no other material. A generation of use under the most violent weather conditions has been carefully observed and recorded by Du Pont technical men.

These records prove Neoprene's permanence. A case in point· the six trouble-free winters sealing doors, windows and exterior joints on the world's most windswept permanent weather station atop Mt. Washington in New Hampshire.

Du Pont records over 25 years build an even stronger case for Neoprene. Some outdoor applications of Neoprene have been performing so well so long that we're not even sure what their durability limit is.

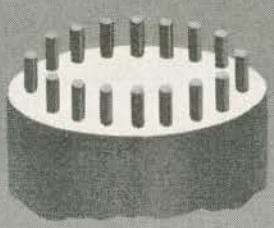
What about cost? Preformed Neoprene gasketing is quite competitive in terms of installed costs. Job-site labour is reduced to a minimum. Requires no special skills. For additional information and a list of reliable manufacturers of Neoprene gaskets, write Du Pont of Canada Limited, Elastomers, 85 Eglinton Avenue E., Toronto 12, Ontario.

NEOPRENE
ANOTHER RELIABLE
DU PONT CANADA
ELASTOMER

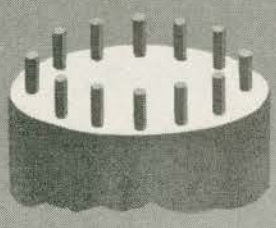
EL-2-10

Slimmer columns... less steel with NEW

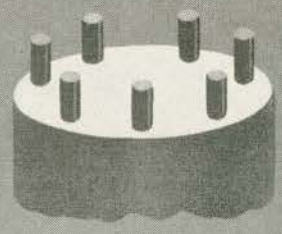
ROUND COLUMN DESIGN for a load of 1000 kips—$f'c = 3750$ psi
spirals omitted in diagrams.



Conventional Design, with CSA G 30-1 Hard
28″ column—4.28 sq. ft.
.158 cu. yd. concrete per ft.
16 No. 11 bars—85.01 lbs. steel per lineal ft.



Conventional Design with fewer A431 bars for smaller column diameter
26″ column—3.69 sq. ft.
.136 cu. yd. concrete per ft.
12 No. 11 bars—63.76 lbs. steel per lineal ft.
Savings: Concrete 14%; Steel 26%, Floor Area 0.58 sq. ft.

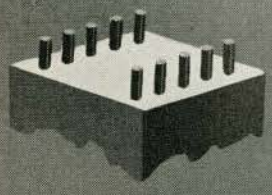


Conventional Design with larger A431 bars for smallest column diameter
24″ column—3.14 sq. ft.
.115 cu. yd. concrete per ft.
4 No. 14S bars, 3 No. 18S bars—71.4 lbs. steel per lineal ft.
Savings: Concrete 27%; Steel 16%; Floor Area 1.14 sq ft.

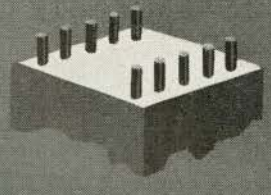
Stelco high-strength REINFORCING BARS!

New Stelco High-Strength Reinforcing Bars (A431 and A432) allow higher design stresses, to bring savings in steel, concrete and labour while providing full design strength with less dead load. Made to meet ASTM Specifications A431 and A432, the bars have minimum yield points of 75,000 and 60,000 psi respectively. Stelco will provide further information on their application to columns, girders, beams and slabs. Apply to Construction Material Sales, Hamilton or Montreal.

SQUARE COLUMN DESIGN using $f'_c = 3000$ psi with eccentricity $e = 0.1t.$ – ties omitted in diagrams.



Conventional Design with CSA 30-1 Hard
20" sq. column .103 cu. yd. concrete per ft.
10 No. 11 bars—53.13 lbs. steel per lineal ft.



Conventional Design with A432 Bars
20" sq. column .103 cu. yd. concrete per ft.
2 No. 11 bars, 8 No. 10 bars—45.05 lbs. steel per lineal ft.
Savings: Steel 15%

A431 and A432 bars can also be used for the ultimate method of design

Stelco leads in Canadian marking of grade and size on reinforcing bars!

Permanent rolled-in markings now distinguish every grade and size of Stelco Reinforcing Bars, for instant positive identification on the site. The initials SCC identify the Stelco product. Above, in the case of High-Strength bars, the figures 75 or 60 indicate the minimum yield point in thousands of psi for A431 and A432 respectively. Size is clearly shown below the initials on every bar by numbers.

STELCO THE STEEL COMPANY OF CANADA, LIMITED Hamilton • Montreal

Sales Offices across Canada, and Representatives in principal overseas markets.

6201(2)5

FRANKI FACTS

CLIENT:
City of Calgary

LOCATION:
Calgary N.W., Alberta

ARCHITECTS AND ENGINEERS:
Rule, Wynn and Rule, Calgary

CONTRACTOR:
Burns & Dutton Concrete & Construction Co. Ltd., Calgary

SOIL CONSULTANT:
Materials Testing Laboratories Limited, Calgary

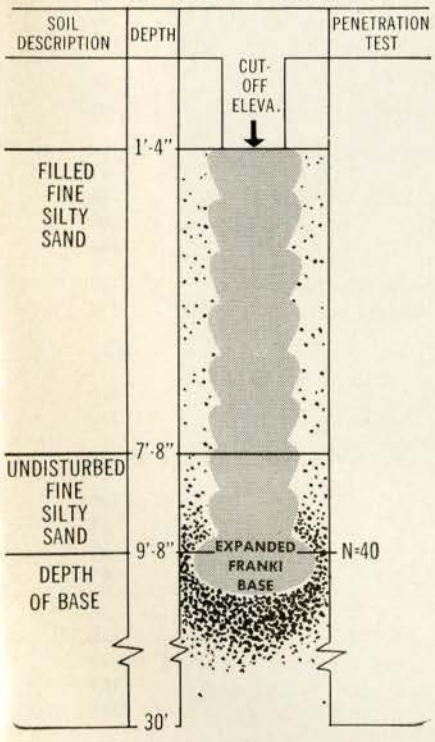
TYPE OF STRUCTURE:
Athletic Stadium

NUMBER OF FRANKI UNITS:
304 Franki Caisson-Piles

WORKING LOAD:
50 tons Maximum

DEPTH OF CAISSON PILES:
Average Driven Length 9' 8"
Average Concreted Length 8' 4"

TYPICAL SOIL PROFILE



Franki Caissons Beat Spread Footings

Problem:

McMahon Stadium in Calgary was conceived, designed and constructed in a spirit of co-operation. The designers were faced with the problem of erecting a modern athletic stadium in a few months if it was to be ready for the opening game of the 1960 WIFU Season.

The stadium site chosen had natural bowl-like contours and grading proceeded prior to completion of superstructure design. The soil profile indicated fine silty sands of medium density to at least 30 feet. Average grain size distribution was 63% fine sand, 28% silt and 9% clay sizes. Random silt lenses at shallow depths made the soil susceptible to frost action. The maximum column load was 100 kips. Allowable bearing pressure for spread footings was 4000 pounds per square foot.

Solution:

Franki was called to suggest a foundation solution providing speed, economy and guaranteed performance. Short Franki Caisson-Piles — sometimes called pressure-injected-footings — were proposed. The Franki proposal required end bearing concrete bases in the fine silty sand, 2 feet below original grade or 8 feet below finished grade, whichever was greater At these depths, the average blow count was N — 40 and the average moisture content was 5% One caisson-pile was to be used per column.

A spread footing design was studied and rejected because it did not fill the job need with regard to speed and economy because of the necessity to excavate, shore, form and backfill.

The Franki proposal was accepted. The construction period was greatly reduced, the cost of foundations was lower and carrying capacity and minimal settlement were guranteed.

As a result, Franki of Canada finished their foundations 10 days ahead of schedule and contributed to the success of the entire project, which was completed on time for the opening game.

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

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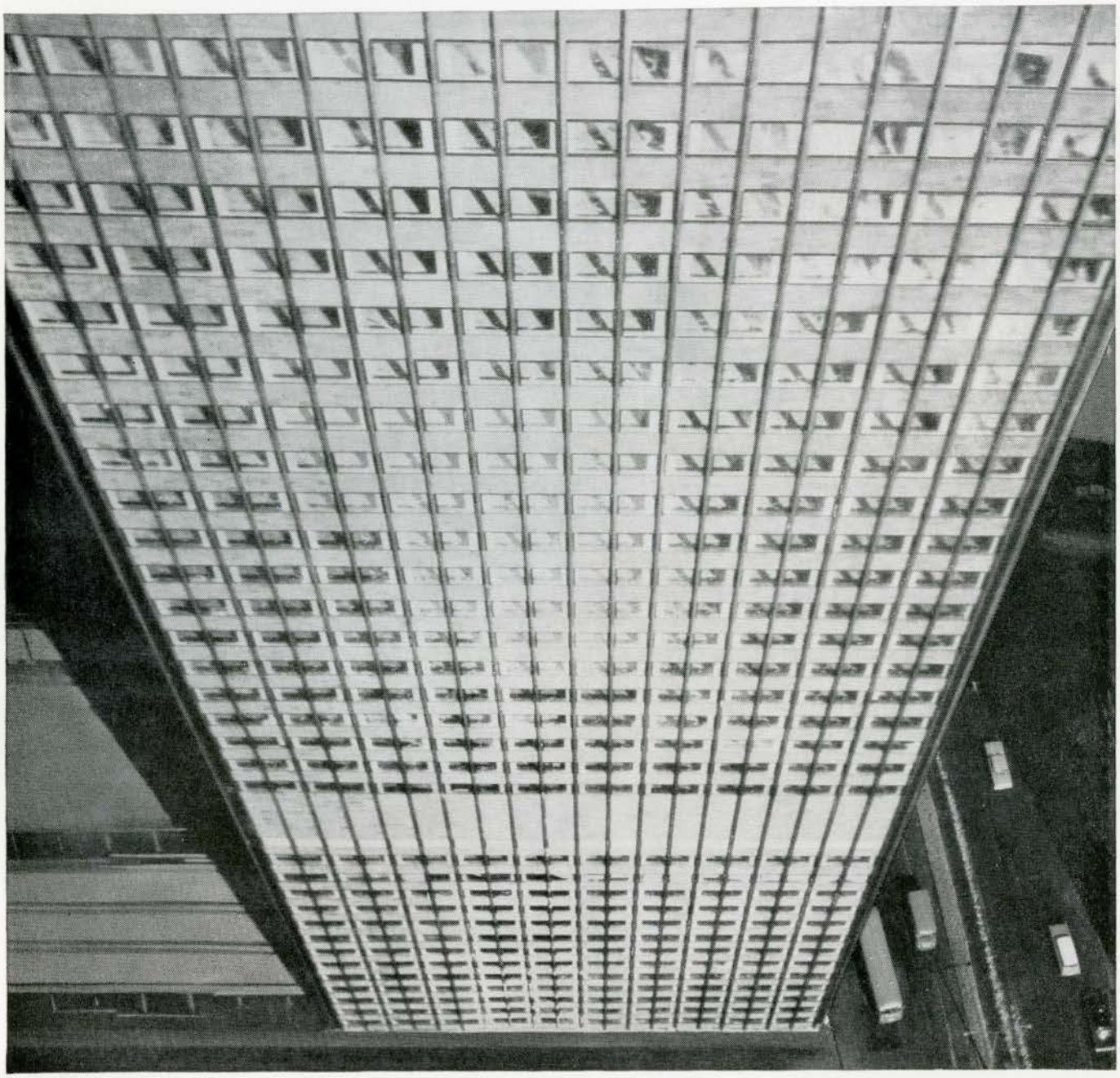

Canadian Imperial Bank of Commerce Building, Montreal. *Architects:* Peter Dickinson and Ross, Fish, Duschenes & Barrett. *Structural Engineer:* M. S. Yolles and Associates. *Contractor:* The Perini Companies. *Ready Mix Supplier* Mount Royal Paving Co.

POZZOLITH plays active role in Montreal building boom

Building is booming in Montreal. And among the new buildings so rapidly rising against the skyline is the towering Canadian Imperial Bank of Commerce structure. Here POZZOLITH played a role that fully ustified its reputation as a superior concrete admixture.

It provided concrete of good placeability and controlled setting time.

In addition to lowering water content and reducing bleeding, POZZOLITH resulted in uniformly higher strengths and better workability so important in concrete for high-rise buildings.

With these values, POZZOLITH will prove again, as it has in so many other structures throughout Canada, that it makes concrete a more durable building material, superior in performance and economy to plain concrete or concrete produced with any other admixture.

MC-6203

POZZOLITH* A Product of **MASTER BUILDERS®**

MASTER BUILDERS Field Service
Benefit by the competent, job-proven experience of your MASTER BUILDERS field man. Through him you get maximum value from the use of modern technical products. General Office and Factory—Toronto 15, Ontario. Branch offices: Vancouver Calgary, Edmonton, Winnipeg, Ottawa, Montreal and Saint John.

*POZZOLITH, *registered trade mark of The Master Builders Company, Limited, a construction materials subsidiary of* **MARTIN MARIETTA**

Dennis House, Acadia University

Wolfville, Nova Scotia

Architects: Duffus, Romans & Single, Halifax, N.S.

General Contractor: V C. Woodworth, Ltd., Kentville, N.S.

Fenestration in this women's residence was planned to provide maximum light and ventilation. The windows were assembled in metal-clad wood surrounds. Old Ivory and metallic Grey baked-on enamels were combined for pleasing contrast.