Architecture Canada

Journal RAIC/La Revue de l'IRAC: October/Octobre 1967

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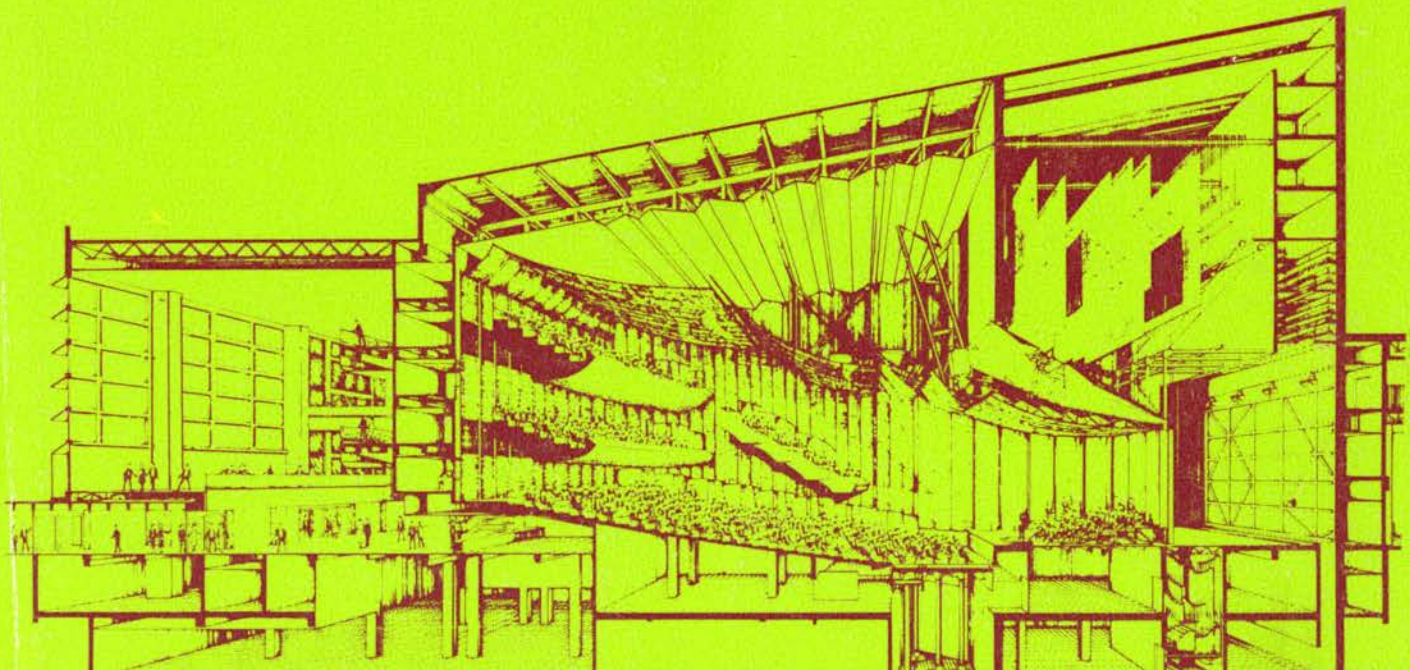

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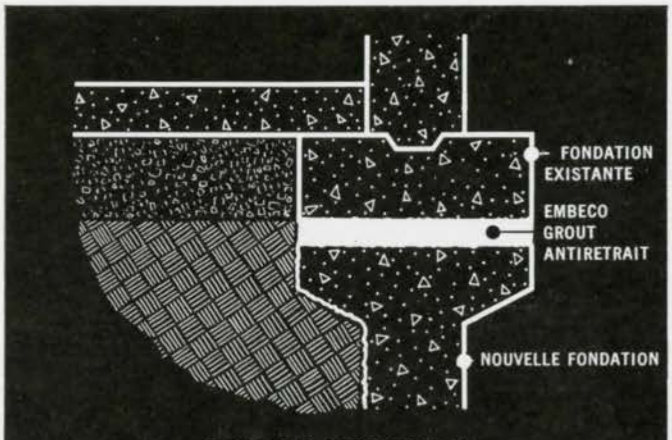

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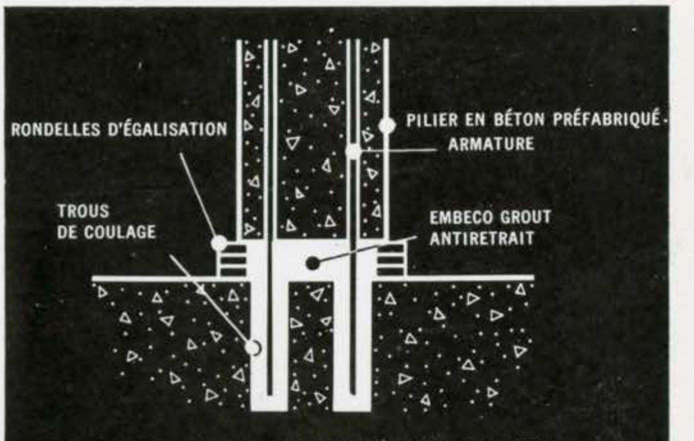

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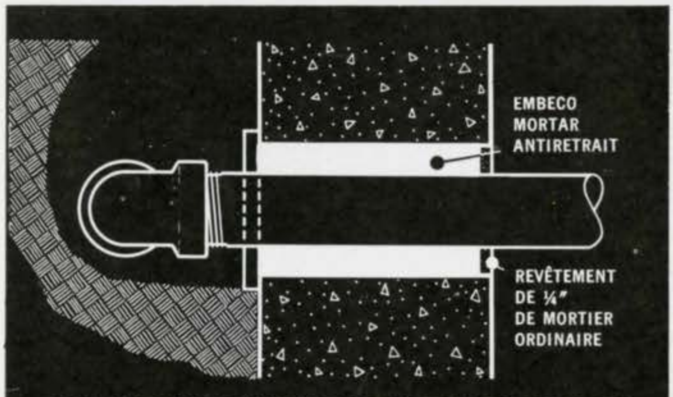

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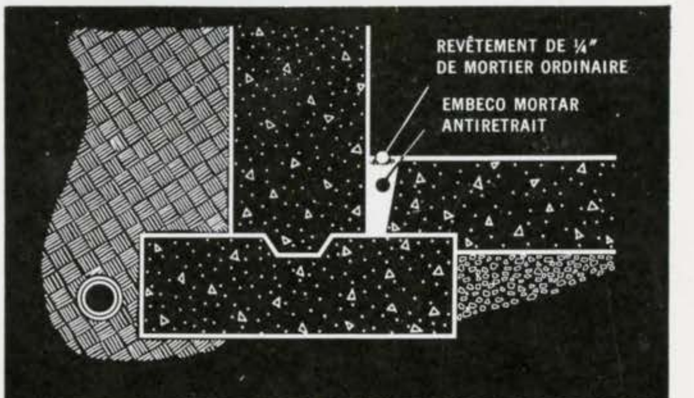

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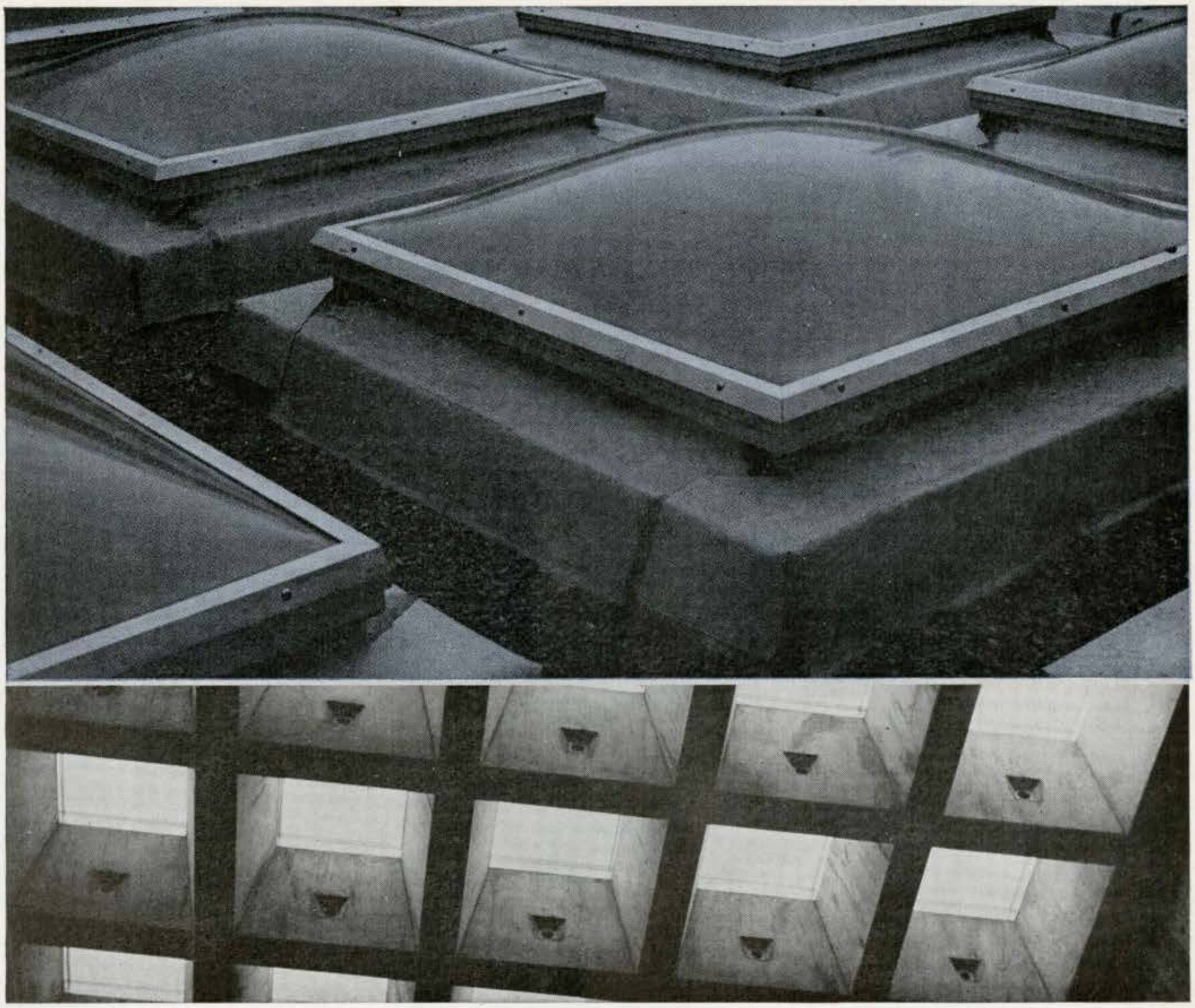

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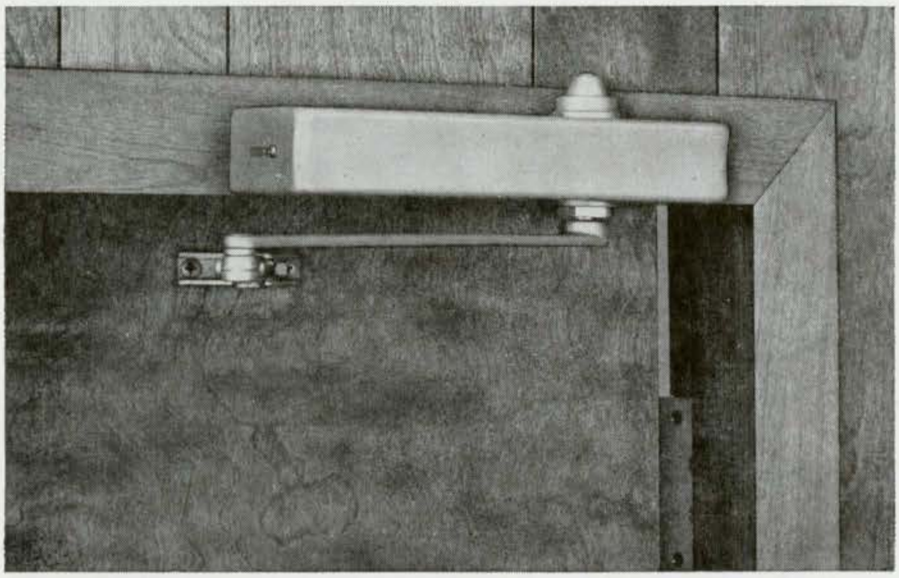


News
Nouvelles

1

Maurice Holdham

Earl Mayo

RAIC Headquarters Staff Reorganization

Following the resignation of Fred W. Price as Executive Director of the RAIC, Maurice G. Holdham who has been at Institute Headquarters for six years has been appointed to the senior staff position at Institute Headquarters as Executive Secretary. On October 16, Wing Commander Earl C. Mayo, joined the staff of the RAIC as Assistant to the Executive Secretary. W/C Mayo has served continuously in the RCAF since 1939, having attained the rank of Wing Commander in 1960. He completed a tour of operations as a pilot in the European Theatre during the Second World War and was awarded the Distinguished Flying Cross. Since the War he has completed tours with 414 Photographic Squadron and 412 Transport Squadron, and since 1950 he has served in a number of administrative positions. He is retiring from the position of Commandant of the Administrative Unit at Canadian Forces. Originally from Toronto, W/C Mayo now resides in Ottawa with his family.

University of Waterloo Appointment

Professor Hanoch Sharon has been appointed Chairman of the Bachelor of Environmental Studies Program Class of '70 Committee, the first graduating architectural class at the University of Waterloo. He was educated in Bucharest, Romania, and has been a practicing architect and town planner in Tel Aviv, Israel, since 1958. The Chairman of the Class of '71 Committee will be Professor Tore Bjornstadt of Norway.

RAIC Committee Chairman and Special Representatives

The Institute announces the following Committee Chairmen and Special Representatives:
L'Institut annonce la nomination de comités, animateurs et représentants suivants:

Standing Committees / Comités Permanents

Architectural Education — L'enseignement de l'architecture *J. L. Davies, (F)*
Research — La recherche *Prof. Henry Elder*
Presidents — Présidents *James E. Searle, (F)*
Scholarships and Awards — Bourses d'études et prix *Earle C. Morgan, (F)*
Legal Documents — Documents juridiques *Robert E. Briggs*
Public Information — Information publique *Paul-O. Trépanier, (F)*
Architectural Competitions — Concours d'architecture *George D. Gibson, (F)*
Publications Board — Commission des Publications *W. N. Greer*

Special Committees / Comités Spéciaux

Massey Medals — Médailles Massey *Dr T. Howarth, (F)*
Preservations of Historic Buildings — Préservation des édifices historiques *W. S. Goulding*
Salaried Architects — Architectes salariés *Arthur W. Davison*
RAIC-CMHC Housing Design — Comité de l'IRAC et de la SCHL sur les modèles de maisons *James A. Murray, (F)*
National Joint Architect-Engineer — Comité national mixte d'architectes et d'ingénieurs *James E. Whenham*
Canadian Joint Council on Construction Materials — Conseil national mixte sur les matériaux de construction *James Girvan*
National Joint Committee on Winter Construction — Comité national mixte sur la construction en hiver *J. Malcolm McLean*
Architect-Engineer Advisory Committee on Winter Employment — Comité consultatif d'architectes et d'ingénieures sur l'emploi en hiver *W. E. Fancott*
Institute Headquarters — Siège de l'Institut *J. W. Strutt, (F)*
Assembly Planning — Organisation des assemblées annuelles *W. G. Leithead, (F)*

Special Representatives / Représentants Spéciaux

Technical Council of Canadian Standards Association — Conseil technique de l'Asso-

Hanoch Sharon

ciation canadienne des normes *James Craig*
Canadian Conference of the Arts — Conférence canadienne des arts *Norman H. McMurrich, (F)*
Advisory Committee on Building Research of the NRC — Comité consultatif en batiment du Conseil national de recherches *Watson Balharrie, (F)*
Commonwealth Association of Architects — Association des architectes du Commonwealth *John L. Davies, (F)*
International Union of Architects — Union Internationale des Architectes *Joseph Pettick, (F)*
CMHC House Plans — Plans de maisons de la SCHL *Jerome Markson*
Emergency Measures Organization Advisory Committee — Comité consultatif près l'Organisation des mesures d'urgence *D'Arcy Helmer, (F)*

9th IUA World Congress

The main mission of architects is to "take care of the cultural plane and give a humanitarian sense to the development of the material world" resolved architects from 70 countries attending this year's International Union of Architects Congress held at Prague, Czechoslovakia, July 1–7. 2,500 architects explored the theme "Architecture and the Environment of Man" in working sessions under five subheadings: The Organization of the Settlement Pattern, Historical Heritage and the Present, Living Environment, Industry and the Environment for Work, Man and the Landscape. The following resolutions were felt to be of special interest.

1 The environment in which humans live at present is characterized by economic and social changes, rapid urbanization and the evolution of civilization and technology. Improving this environment is one of the most important tasks for all mankind, since mankind's very existence is endangered not only by hunger and war, but also by the rapid deterioration of the living environment.

2 The situation cannot be improved by measures which are non-coordinated and therefore of little efficiency. In respect of settlement as well as urbanization, such measures must become an integral part of, as well as one of the main tasks of, national and physical planning, and all natural resources must be utilized in a rational manner.

3 Urbanization creates conditions in which a satisfactory human environment can be attained; obviously this environment must be based on a comprehensive and far-seeing program for agglomerations, regions, countries and groups of countries. Only on this scale is it possible to design a better pattern of settlement and to determine residential areas with a limited population density, proportional to controlled production. Land, which is the raw material of settlement and urbanization, must be controlled strictly by the use of legislation. Scientific analyses should be carried out in order to improve the utilization of land and to protect it.

4 Settlement is influenced by local conditions: but it must be stressed that excessive growth of agglomerations must be limited, and the agglomerations must be integrated into a coherent flexible system capable of evolution. The multitude of different, mutually complementary centres is evidence of the necessity of an efficient transport system. Cities and centres of production, which today are hypertrophic, will become truly human only after they have stabilized and passed through a period of internal change, which will allow them to be integrated into an overall system. Moreover it appears to be essential to develop small and new towns up to the optimum size.

5 The historic heritage of architecture enriches our living environment. This heritage is of inestimable cultural value, and is evidence of the continuity of life and of the creative spirit of different nations and periods. Respect of historic monuments ranges from the protection of individual monuments to protection of the entire historical environment.

6 Survival of monuments depends on their preliminary listing and the way in which they are integrated into contemporary life, since their maintenance is a matter of moral responsibility towards the heritage of our ancestors.

Lack of Housing Unsolved Problem

7 The lack of housing is the most important, as yet unsolved, problem and is becoming more and more pressing throughout the world. There is an omnipresent conflict between the quality and quantity of housing: between individual needs and the possibilities available to society. Searching for a solution to this problem is a basic and lasting task for architects, but at the same time — and this is most important — it is a task for all those who, in the name of society, have the right to take decisions and are responsible for satisfying the needs of the population.

8 The growing complexity of structures, and their economic and technical sophistication, makes it essential to coordinate housing with the other elements of the living environment. This creative activity demands various forms of housing, and the possibility for each person to select the type of dwelling best suited to his needs. There is a need for psychological stability and for the possibility of functional adaptation to every individual's needs, and this includes persons handicapped in different ways. The individual needs and the demands of family life must be harmonized with the efficient social organization of housing units, to which purpose complete facilities are a prime necessity.

9 The living environment is influenced by industry, on the one hand by working conditions in centres of production and factories, and on the other hand by the effects that factories have on their surroundings. The influence of industrial investments on the pattern of settlement, transportation network and facilities indicates the significance of decisions concerning the location of industrial installations: such decisions should be taken by the highest possible authorities. This problem is of special importance in developing countries.

10 The role of the human factor in modern production processes, as well as in work in general, demands from Man the utmost in respect of professional qualification as well as of mental qualities. These are the reasons for which it is essential to investigate carefully the needs of working people and to satisfy them in the field of industrial architecture.

11 The eternal struggle between Man and nature leads today, in many countries, to the interference of civilization in nature, in such a way that the basic substances of nature and the landscape are disregarded.

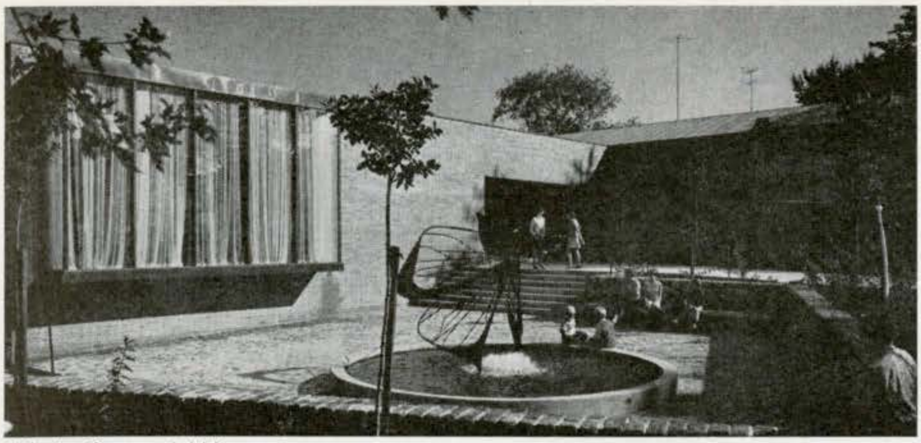
Nature Should be Jealously Guarded

12 Although the intervention of modern technology may even lead up to the creation of artificial landscapes, nature is nonetheless of such basic importance to Man, both with respect to its potential resources and the essential equilibrium with residential areas, that it should be jealously guarded. It is obvious that apart from this, natural elements in industrial regions and agglomerations should be maintained and multiplied.

13 Although the conditions of the future development of the living environment are not known with certainty, it should be our aim to harmonize this development, considering also the continuity between the past, present and future. It must be stressed that it is essential to consult architects and their professional organizations on all levels of decision-making and preparation of programs. Experience gained in the different countries of the world must be utilized and the results made accessible to professional bodies, as well as to the general public on a world-wide scale.

14 The application of architecture and its development also depends as much on the understanding and participation of the public and the maturity of the responsible authorities, as on the tools which society forges by means of flexible legislation and by founding the appropriate professional institutions.
It is necessary to educate the public in order to allow it to take part in political life in respect of the structure, form and content of the living environment which is being created for it. The architect in co-operation with many partners has a great variety of tasks. Nevertheless his main mission is to take care of the cultural plane and give a humanitarian sense to the development of the material world.

Two papers were given by Canadians. Dr Thomas Howarth, *(F)*, Toronto, chairman



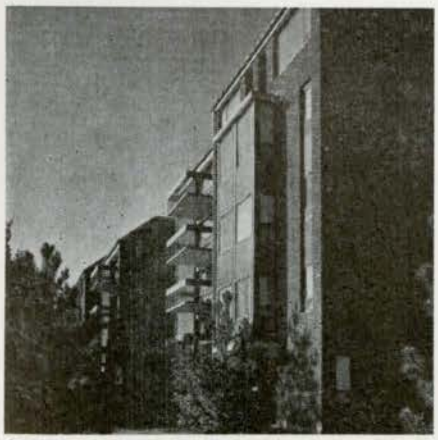
Mimico Centennial Library

Lecture Hall, No 1, York University

Donwood Foundation Hospital and Rehabilitation Centre, Leaside

Richview Branch, Etobicoke Public Library

St Joan of Arc Church, Toronto



McKay Hall Women's Residence, McMaster University

Pen Centre, Cinemas 1 and 2 St Catharines

of the working session on Man and the Landscape, spoke on that aspect of the theme. Henry Elder, Vancouver, spoke on Living Environment.

Four RAIC delegates, John L. Davies, (*F*), Vancouver; Hazen Sise, (*F*), Montreal; Thomas Howarth, (*F*), Toronto; and Joseph Pettick, (*F*), Regina, attended the Assembly preceding the Congress. Other Canadians in attendance included Glen Creba, Toronto; Wilfred Buttjes, Vancouver; and student representation from the University of Montreal and the University of Toronto. Buenos Aires, Argentina, was named site for the Tenth Congress; the 11th will be held in Bulgaria and Hungary.

1967 Ontario Masons' Council Awards

The Mimico Centennial Library designed by *Banz-Brook-Carruthers-Grierson-Shaw*, Toronto, has won this year's Ontario Masons' Relations Council's fourth annual Award of Excellence.

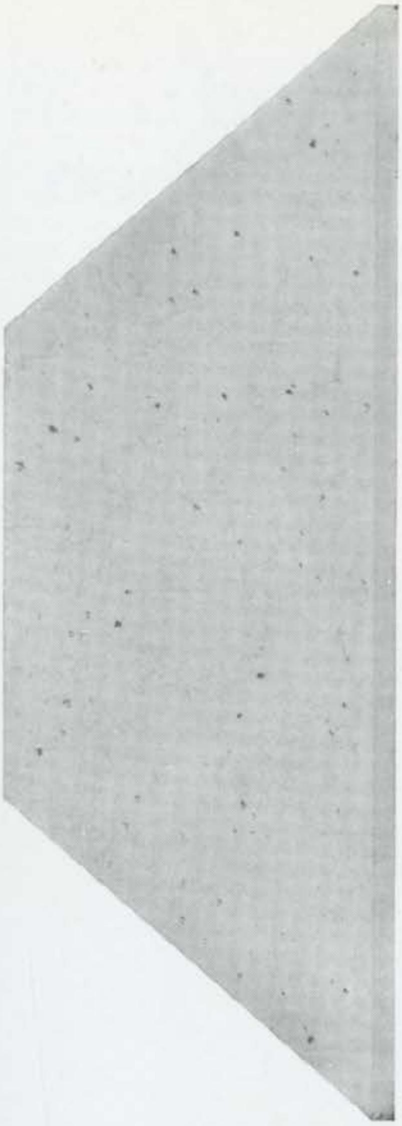
The following six buildings were given Awards of Merit: Lecture Hall No 1 at York University, North York, *Gordon S. Adamson & Associates, John B. Parkin Associates,* and *Shore & Moffat and Partners*, architects; Richview Branch, Etobicoke Public Library, Etobicoke, *Dunlop, Wardell, Matsui, Aitken*, architects; McKay Hall Women's Residence, McMaster University, Hamilton, *McIntosh & Moeller*, architects; Donwood Foundation Hospital and Rehabilitation Centre Leaside, *John B. Parkin Associates*, architects; St Joan of Arc Church, Toronto, *William Saccoccio*, architect; and Pen Centre Cinemas 1 & 2 St Catharines, *Mandel Sprachmann*, architect.

The judges were A. J. Diamond, MRAIC and E. H. Zeidler (*F*). Professional adviser was George D. Gibson (*F*).

Of the 94 buildings entered by 48 firms the judges stated in their report that "The standard of the projects submitted was quite exceptional – many displayed a high level of integration between purpose and plan, material and structure, design objectives and usage in reality, and above all a refreshing concern for good neighbourliness" and "that the best buildings in Canada more than measure up to any international standards of design used to judge modern architecture, therefore, it is not surprising to find a correspondingly high standard in the use of structural clay products in Canadian building."

NSAA Change of Address

The Nova Scotia Association of Architects' office has been moved from 5230 Tobin St., Halifax, to the British American Oil Building, 7th Floor, 6009 Quinpool Rd., Halifax. The telephone number 423-7607 remains unchanged.



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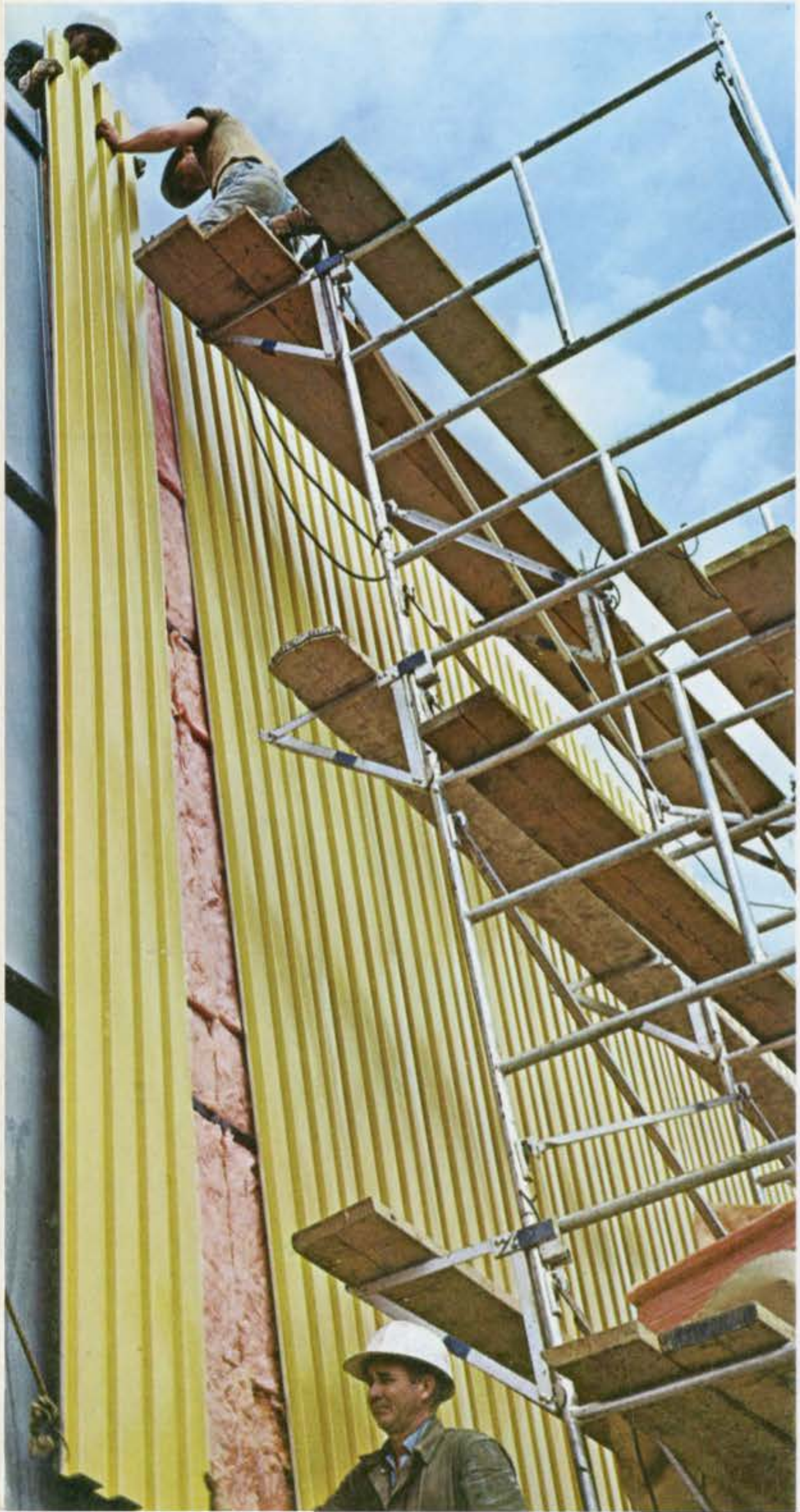

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Production inspection ↑ at Armco Drainage & Metal Products of Canada Ltd. new roll-forming equipment.

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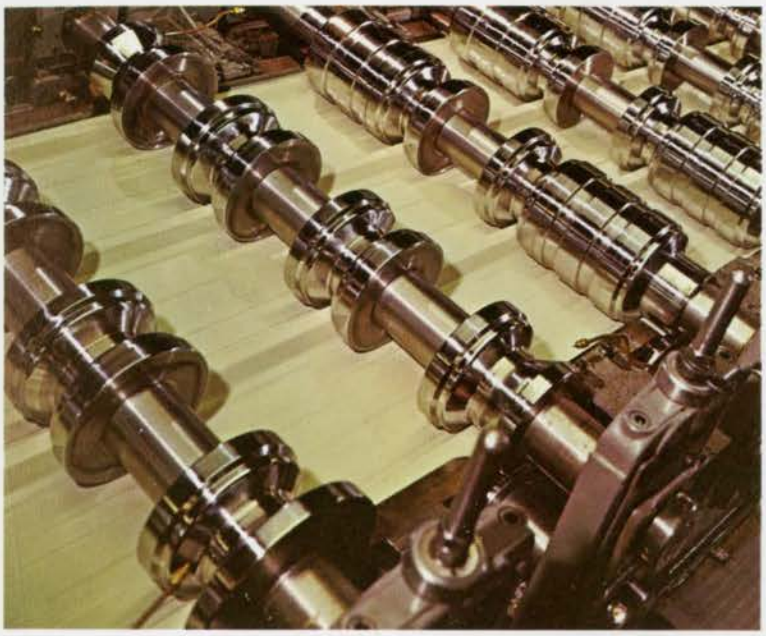

Roll forming at Butler Manufacturing Company (Canada) Ltd. ↑

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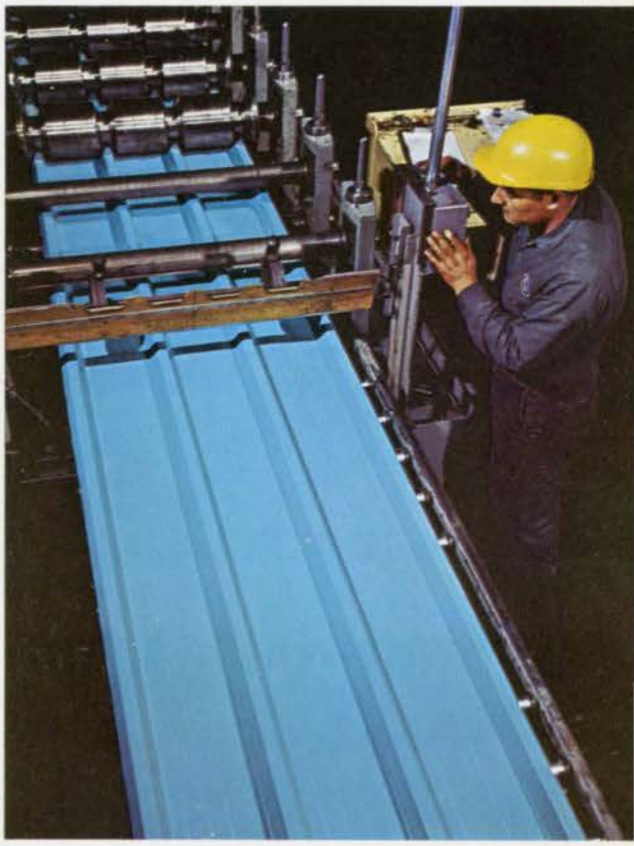

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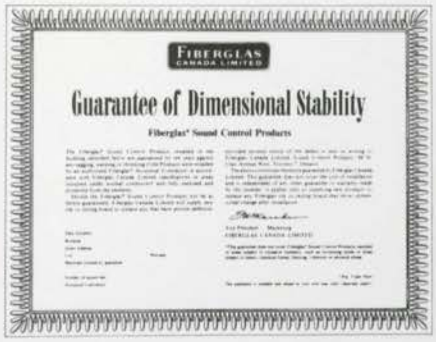

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Communiqué 2

RAIC Council

RAIC Council met in Winnipeg September 8–9, with the President, James E. Searle (*F*) in the chair. One of the main items of business was the matter of the attitude of the Province of Quebec Association of Architects towards payment of RAIC per capita dues. It was decided, on a motion by D'Arcy Helmer (*F*), seconded by Jean Ritchot, that the PQAA Council be required to state its attitude for consideration at the next meeting of RAIC Council in Toronto on November 24th. (Following the Council meeting in Winnipeg Mr Searle went to Montreal to explain the Council's views personally to the PQAA Council. At this meeting he repeated the willingness of the RAIC Officers to meet with the PQAA Council in Montreal as often as was necessary to assist in finding a solution to the problem.)

The reorganization of RAIC Headquarters staff in Ottawa with Maurice Holdham as senior officer with the title of Executive Secretary, and the pending appointment of an assistant for him, was announced by the President.

Gordon Arnott, the Honorary Treasurer, reported on preliminary plans for the next Annual Assembly, to be held at the Hotel Saskatchewan in Regina May 29th–June 1st, 1968. The host committee is planning a four-part Assembly program, with good speakers for each topic, rather than a program built around a single theme, as is usually the practice.

The President reported that he and the Vice President, N. H. McMurrich (*F*) had held a meeting in Toronto in August with the President and other representatives of the American Institute of Architects to discuss arrangements for the joint AIA-RAIC Convention/Assembly in Chicago in 1969.

RAIC Officers planned to meet AIA officers in Washington Oct. 3, 4, 5 to explore the possibilities of closer liaison between the two institutes, including exchange of information on procedures and documents and on the contents of surveys and studies, where such information would be pertinent to the problems and practices of the other organization. The RAIC officers are particularly interested in evaluating the structure of the AIA and in the services it provides to its members in comparison with the structure and practices of the RAIC. The evaluation will include AIA-state architectural associations relationships in comparison with RAIC-provincial association relationships.

The chairman of the RAIC Publications Board, W. N. Greer, was invited to the Saturday morning session of the Council Meeting to discuss the activities and responsibilities of the Board and what new or enlarged services might be provided for the RAIC membership. In addition to publishing the 35-year-old Journal of the Institute, *Architecture Canada*, the Board also produces the *Architectural Directory Annual* (the 1967-68 issue of which was just off the press) and the *Allied Arts Catalogue*, and it has now been asked to produce a handbook of architectural practice for Canadian use.

Progress on the development of the National Architectural Archives for Canada was reported by Managing Editor Walter Bowker, who is secretary of the RAIC Advisory Committee on the Archives. The Canada Council had provided a grant of $5,000 for a research program and report on organization, procedures and methods of operation; the research should be completed by spring and it was then hoped to have an organization and policy setting meeting of the national Advisory Committee.

The meeting coincided with the official opening of the new offices and lounge of the Manitoba Association of Architects, which are shared with the provincial Association of Consulting Engineers, and the Council members were guests of the MAA at the opening reception.

Le Conseil de l'Institut

Le Conseil de l'IRAC s'est réuni à Winnipeg avec le président James E. Searle (*F*). La question à l'ordre du jour était l'attitude de l'AAPQ au sujet du paiement de l'échéance de l'IRAC. Il fut décidé, sur une proposition d'Arcy Helmer, appuyée par Jean Ritchot, que le Conseil de l'AAPQ donne son avis à la prochaine réunion du Conseil qui aura lieu à Toronto le 24 novembre prochain.

M. Searle s'est rendu ensuite à Montréal où il a soumis les vues du Conseil à l'AAPQ et a exprimé le désir des membres de l'IRAC de renconter ceux de l'AAPQ à Montréal afin de trouver une solution à ce problême.

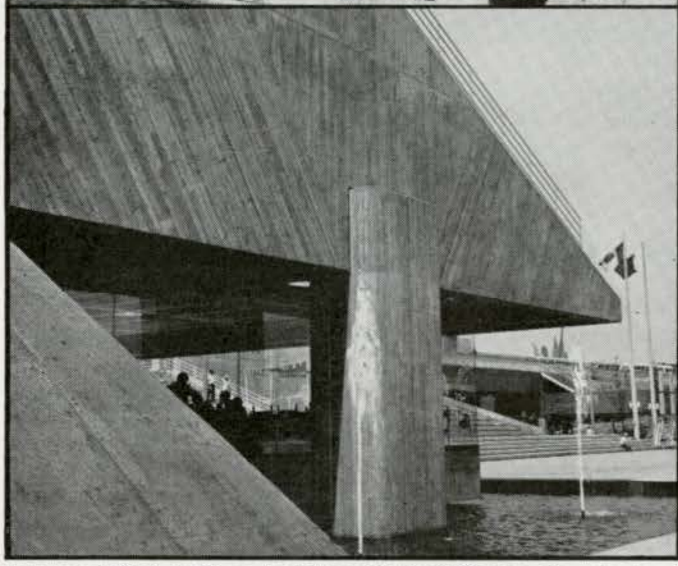
La réorganisation du personnel au siège de l'IRAC avec Maurice Holdham comme secrétaire administratif et la nécessité d'un adjoint furent annoncées à cette occasion.

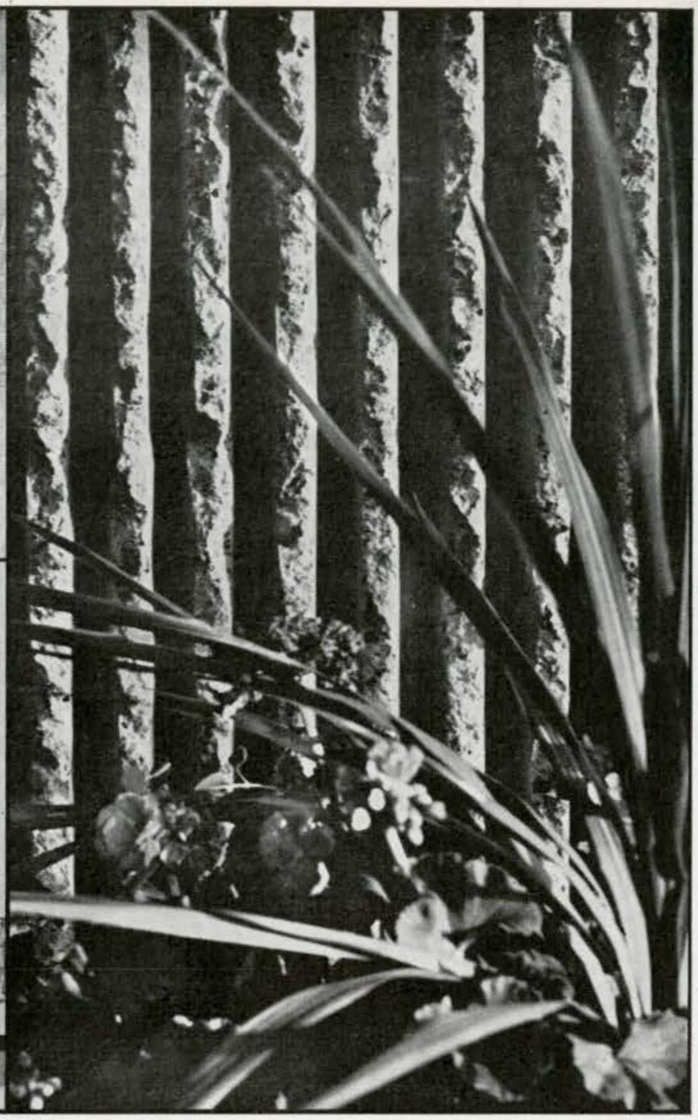
Gordon Arnott, le trésorier honoraire a soumis les plans préliminaires pour la prochaine assemblée annuelle qui aura lieu à l'Hôtel Saskatchewan à Regina du 29 mai au 1er juin 1968.

Le président a donné un compte rendu de la conférence avec N. H. McMurrich, vice-président et le président de l'AIA ainsi que d'autres membres de cette association en vue d'une conférence-assemblée jointe à Chicago en 1969. Les officiers de l'IRAC et de l'AIA se réuniront à Washington entre le 3 et 5 octobre prochain afin d'étudier la possibilité d'une coopération plus étroite entre les instituts. M. W. N. Greer, président de la Commission des Publications a assisté à la réunion du samedi matin qui délibérait sur les activités et responsabilités de la commission. En plus de la publication du Journal, la commission produit l'Annuaire et le Catalogue des Arts Connexes; elle fut sollicitée à publier un Manuel professionel pour le Canada.

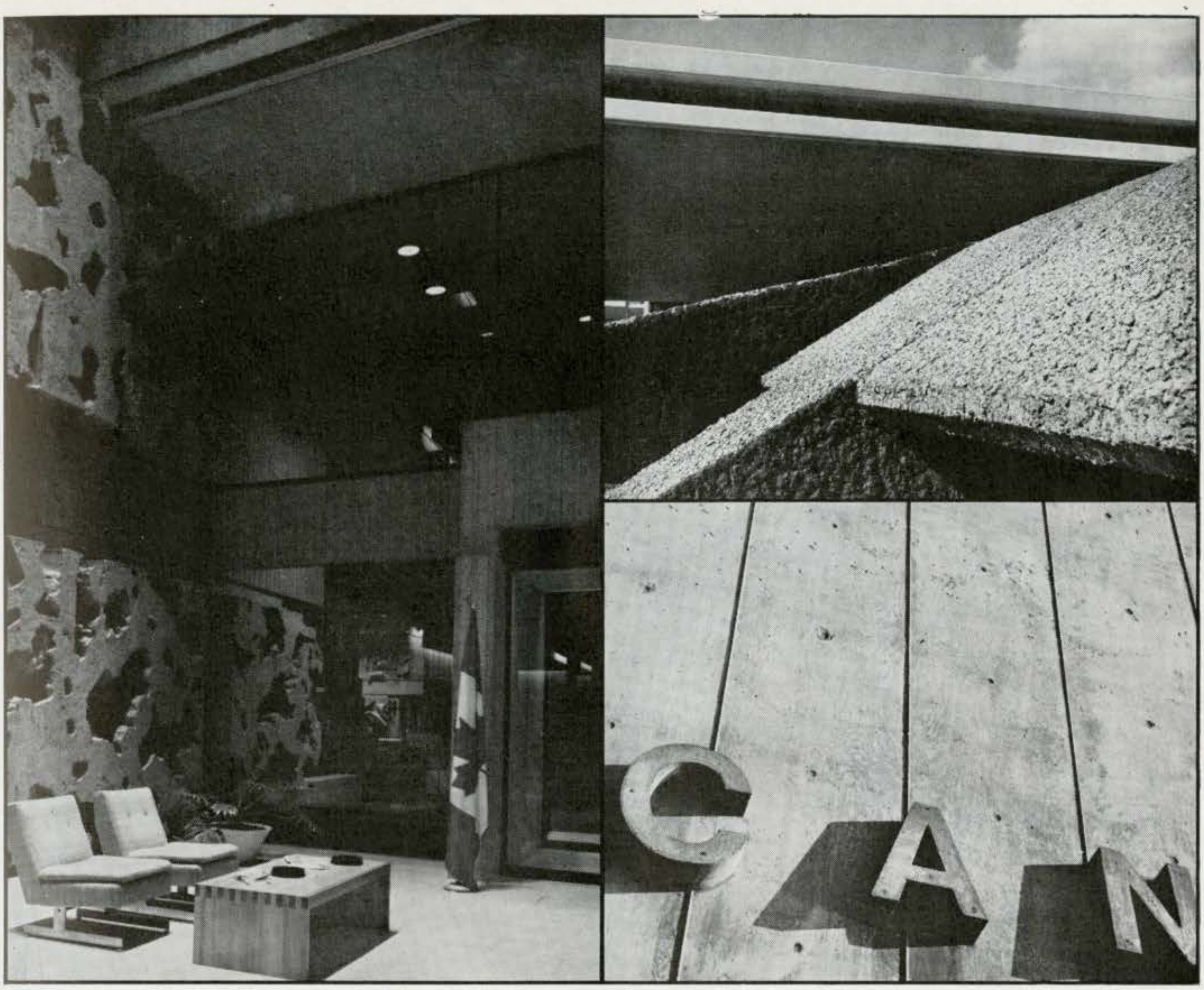
M. Walter Bowker, secrétaire du Comité Consultatif a fait un rapport sur le développement des Archives Nationales d'Architecture. Le Canada Council lui a accordé une subvention de $5,000 permettant la mise en route d'un programme de recherches qui sera terminé au printemps.

La réunion coincidait avec l'inauguration des bureaux et du foyer de l'AAM en cohabitation avec l'Association provinciale de l'Ingénieur Conseil.





Left top: British Pavilion. Architect: Sir Basil Spence, Bonnington & Collins, London
Left below: Place des Nations. Architect: André Blouin, Montreal
Left center: Montreal Aquarium. Architect: George F. Eber, Montreal
Right center: Administration Building. Architect: Irving Grossman, Toronto
Right top: Italian Pavilion. Architect: V.F.L. Passarelli, Rome
Right below: Montreal Aquarium



Concrete surface textures add interest to Expo 67 architecture

Architects and contractors from all over the world have developed bold modern uses of concrete for Expo 67. Concrete surface textures in new and interesting forms are applicable to small jobs as well as big ones, from patios to Pavilions. Expo 67 has proved an excellent showcase for the variety of concrete surface textures available to every builder and architect. Included here are some particularly outstanding examples of surface texturing which offer a simple and economical way of making structures more distinctive. Concrete's versatility, as demonstrated at Expo, assures its position as truly the building material of the future.

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An Absent Minded Attitude and Events

Absent Minded? Who? – You? Me?

Many events in Centennial Year afford, on reflection, guidelines for future aesthetic relationships. There are signs that the artist (and some architects) are emerging out of a period of introspection to one of social responsibility. How conscious are *Your* attentions these days? Your comment is invited on the following evaluations. . . .

Summer Song for High Park

"Where have all the craftsmen gone?"
. . . To the factories – Sculpt-in, High Park, Toronto
. . . To Kingston – The Canadian Craftsmen's Conference

Sculpture Symposium, August 1967

The Centennial, if nothing else, must have by now (after nearly overpowering promotion from Expo, Vancouver to Toronto) forced even the most desultory eye to notice that sculpture, here there and everywhere, is now revitalized, aggressive and above all ready to confront on a monumental scale.

The Sculpture Symposium in High Park, promoted by that "Barnum and Bailey" of Canadian sculpture, Gerald Gladstone (a non-performer this time), has by its very shortcomings provided the most valuable guidelines for training, as well as for other procedures for the building and acquiring of monumental sculpture for today's society. This symposium provided a very real laboratory to produce large scale sculpture in and for Toronto – all else is just history.

I doubt that the generous donors and patrons will understand the significance of their contributions. A public thank you to them all. Patterned on previous symposiums, the 1967 one only highlighted the fact that an "On-the-spot-do-it-while-you-watch *sculpt-in*" is an outmoded and slightly ludicrous method of getting public sculpture. We ought to be glad of the sharp reminder that we have been a bit slow in promotion and that, in the meanwhile, time and sculpture methods have changed.

Today in art and architecture the creative

William Koochin and stone "Hippy"
William Koochin et "Hippy" sculpture de pierre

2
Schottlander's Monument, High Park
"Monument", sculpture de Schottlander,

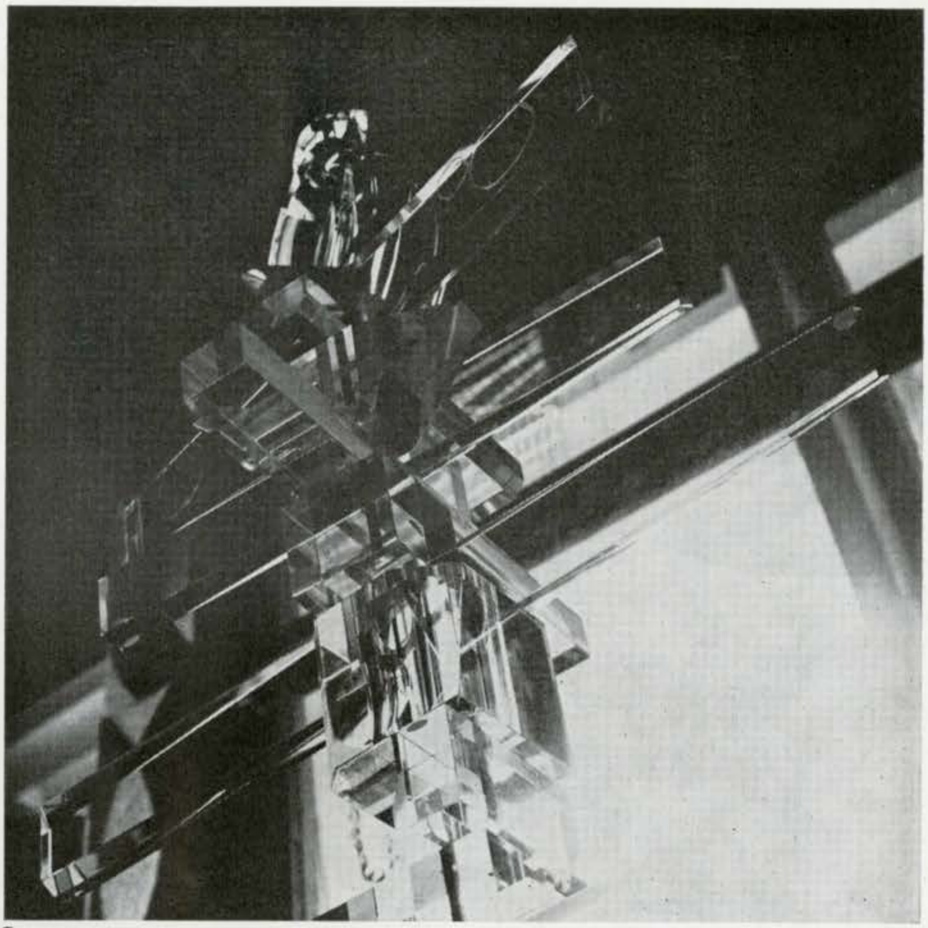
3
Glass sculpture by William Hesson, Leerdam, The Netherlands
Sculpture de verre par William Hesson, Leerdam, Pays Bas
4
22-foot cast and fabricated lighting fixture, by Freda Koblick, San Francisco
Structure illuminée de 22 pieds de haut, par Freda Koblick, San Francisco

designer is an "idea" man. The man who materializes the image can be found as the "artisan" in the "factory" of an architect's office – a draftsman; or in the halls of the industrial factory. The "hand made" or personal achievement in monumental art or architecture is a rarity. Educationists please note: Schools of Art and Architecture are training students by the hundreds to perform as "designer-creators" in both fields, as if the need for this role alone was in greatest demand. Nothing could be further from the truth. In the field of large scale projects, at the top level, there is only room for a few creative minds guiding the production of others, whether fully trained as artists or architects. Make no mistake about it, the leaders in the future will have to be good, really good. Timorousness or amateurism will find a place only in small scale works or personal ineptitudes. What we must watch is that there is a constant dialogue between all participants in the new production role and relevant education to perform competently.

I wish to bypass all extraneous criticism of the symposium. Enough of that has been heard already to put any interested party on the track. The work is there to view and evaluate from time to time. What the Toronto public got out of the adventure is some permanent sculpture and 1967 images, good bad and indifferent. It was ever thus – employment of "international" (?) stars may ensure a certain professional efficiency but beyond that you just cannot make masterpieces to order either in Art or Architecture. They arrive out of continued effort and soul searching by the individual. The kids climbing on Schottlander's monument of modulated forms are hardly aware of aesthetics, but "climbing the pyramid" of High Park is already part of Centennial memory for youth.

The "Scene"

Pauta and Koochin, both Canadian, archaic representatives of the "hand tool" era (a little license given to the ubiquitous power tool), diligently fought their happy duel with recalcitrant stone to impose their irrelevant "images" of "Hippy" or "Polar Bear" on monumental material. Their labors thus served the curious public witnessing the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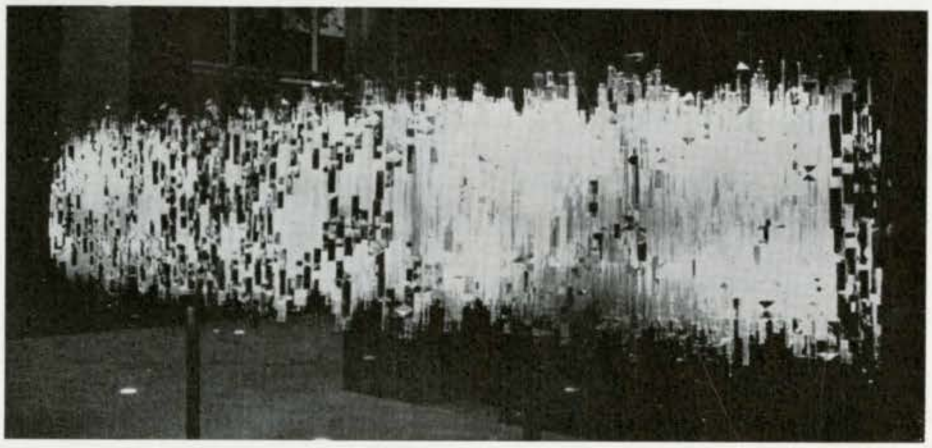
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deed. Elsewhere, diligent as I was (four visits over four weeks), to take photographs or interview the performers, all I ever saw was a few disconsolate artists sitting around waiting for their work to arrive from the "factory" or in happy exasperation experimenting and creating in material other than that originally envisaged and requested for the project. More sensitive operators corralled themselves inside rooms away from the madding crowd or only emerged from shelter as "night" workers when the public was abed. I doubt whether without a press card I would have escaped the vigilance of the self-appointed small guards (the artists' children) who discouraged questions or entrance to the working shrines. Being allowed a "hi-hello", let alone a question or two, was lucky. What all this means is that the *modus operandi* of the contemporary sculptor works against the idea of him being a friendly, gregarious educator-in-person to the public. His craft performance is more or less allied to being the idea man and designer-foreman to the factory artisan who, in actual practice, proves an able and sympathetic producer of his work. Few artists have the talent or personality equal to Armand Vaillancourt, that most professional, indefatigable French Canadian, with his portable foundry, to stage a "love in" for sculptural education. The factory hand and the crane operator as "team mates" in real work have proved easier to educate than forcing an intimacy based on little else but idle curiosity or an earnestness to be "in" with the latest.

Finally, this symposium marks clearly that the artist's "friend" and patron for large scale production is more likely to be big industry and not the art lover or parlor patron of the past. This is the biggest single directive worthy of note to the architect and artist seeking ways and means for inclusion of big sculpture in future programs.

Taking the Lead

Canadian Craftsmen's Conference

While our sculptors were engaged with "feasibility" and the "factory", another small, hardy but determined band of creative artists of Canada had at last organized themselves into a national body for the sake of identity. After much argument the group dubbed itself The Canadian Craftsmen's Association ("Environmental Arts", a first choice, was discarded). Artist directed and conceived, it was brought into being by a very small group of determinedly professionally minded people, namely Merton Chambers (artist-craftsman), George Shaw (Saskatchewan Arts Board), Sheila Stiven (Craft Liaison Centenary Commission). This conference, unobtrusive and treated with little ballyhoo, got down to facts. It can be guaranteed to be one of the best and most valuable (and least costly!) to the professional artist and also to promote service for the architect from that field, yet staged in this country.

Hitherto the craft field, so called, has been the province of the adult educator or the leisure time dilettante and preserver of archaic custom. This orientation made it of little use to the architect. However, the new group, while not excluding these other activities, has forced attention on to the changing nature and growing body of artist-designers who defy categorization and mean by education and professional practice to elevate their status to one of economic reality and social responsibility.

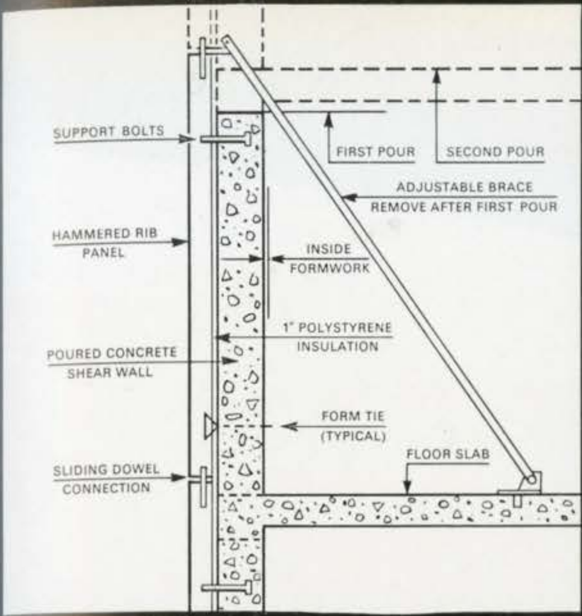
All aspects were carefully examined in sessions of theory and application. Throughout, the practical application of notions promulgated in philosophy were constantly manifested in the results exhibited in the workshop sessions. Such men as Arthur Hald, Design Director for Gustavsberg Ceramics, Sweden, and Anton Nilsen, personal representative for Per Tannum of famed PLUS organization, were timely and welcome visitors to this country.

Both men in detail outlined their countries' intelligent use and absorption of the sensitive artist-designer-craftsman into commercial enterprise. They outlined his role, both as an individual creator and catalyst in the industrial machine even to custom-made architectural work. Their guidance and ready offers to help in organizing our artists in the business of "know how" is an invaluable liaison which must pay off. Credit goes to the organizer of the program in knowing where to look for top guidance. In this matter, Canadian entrepreneurs, in aiding the arts, need to reassess some of their redundant programming and invitees and consult some of the more perceptive of the art world practitioners for guidance. The architect, had he been present, would have seen workshop artists Freda Koblick (plastics), William Hessen (glass), and our own Charlotte Lindgren showing their application to industry and architecture, as well as the wealth of idea already being used in other countries in the architectural and industrial development . . . which brings me to the real point of issue.

High Time

It is high time a *Real* seminar of this type was held between top professional artists and architects and also their educators (who were conspicuous by their absence when they of all people needed to attend). *How About it* . . . shall we . . . the artists and you, the architects, start right now to organize one for 1968-9 to coincide with an architectural exhibition at present under discussion in Toronto?
Do *You* . . . (who *me*?) want it?
Will *You* (who *me*?) support it?
Reaction to this column please . . .

Over to you for 1968 . . . *Anita Aarons*



Luxury hotel features precast walls

The impressive hammered-rib precast concrete panels used on the new Sutton Place Hotel meet all conditions for economy, insulation and ease of construction.

Used as formwork in the construction of the poured concrete shear walls the floor to floor panels are placed by tower crane in the same manner as normal formwork. They are braced to the floor slab, one inch insulation applied to back, reinforcing steel placed and formwork bolts attached before concrete is poured.

ADVANTAGES:

- ☐ Placing cost same as normal formwork.
- ☐ Finished wall – no formwork stripping required.
- ☐ Economical – $2.50 per sq. ft.
- ☐ Complete insulation of building's structural frame improves stability – eliminates need for flexible partitions.
- ☐ Improves building technique – no lintel angles required, meets all by-law requirements.

Spandrel panels are in plain form finished precast concrete complementing the texture of the end wall panels.

The Sutton Place Hotel, 955 Bay Street, Toronto
Architects: Webb, Zerafa, Menkes

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Two universities demonstrate the versatility of Electric Heating

Two new universities being built in Ontario have chosen all-electric heating. They are Brock University at St. Catharines, and Trent University at Peterborough.

Any university is a complex heating project. The environment to be controlled extends from small residential units to auditoriums and sports arenas. The scale of these two undertakings is impressive; between them, Brock and Trent Universities will accommodate nearly 12,000 students when they are completed. Since each has been planned with the aim of providing the best possible working and living conditions at the lowest possible cost, it is especially interesting to see how the designers have used electricity to meet the heating demands of two very different structures.

Brock Tower. The heart of a new University. Gordon S. Adamson & Associates, John B. Parkin Associates, Shore & Moffat and Partners; Architects and Engineers. *A joint venture to carry out architectural and engineering commissions on projects managed by U.P.A.C.E. Limited.* Consultants (site services) H. G. Acres & Co., Ltd.

At Brock University

the 14-storey Brock Tower is complete, and a cluster of buildings at its foot is under construction. The campus is expected to be completed by 1980. Both central and localized conditioning systems are being combined for maximum efficiency.

Chilled water for cooling every building is produced in the Central Utilities Building, located off-campus in a disused quarry. Electric power at 13.8 KV is also distributed from there; but each building has its own transformer room, heating plant, and ventilation system. Brock Tower, the only building presently in use, has a hydronic system fed by two 750 KW boilers in the basement. Hot water from this plant—or chilled water from the Central plant—is piped to sill units, where ventilating air is blown over the coil to maintain comfortable room temperatures. Heating or cooling is therefore available in all parts of the building, at all times. Larger rooms receive additional heat from resistance coils in the air ducts.

All buildings on the Brock campus will not necessarily use the same heating techniques. The designers will select whichever electric system is best suited to the needs of each separate building—taking full advantage of the versatility of electric heat. There are other good reasons why electricity was chosen in the early planning stages. One was electricity's cleanliness, which will help reduce the cost of internal and external maintenance on the campus, and avoid air pollution. Others were aspects of electric heating's simplicity. Competitive systems would have required a central boiler house, an extensive steam supply and condensate return system, together with a specialist staff to maintain them. Electricity needs none of these, and is therefore simpler, and cheaper both to install and to maintain. The ease with which electric heating can be added, phase by phase as the campus grows, was another sound reason for its choice.

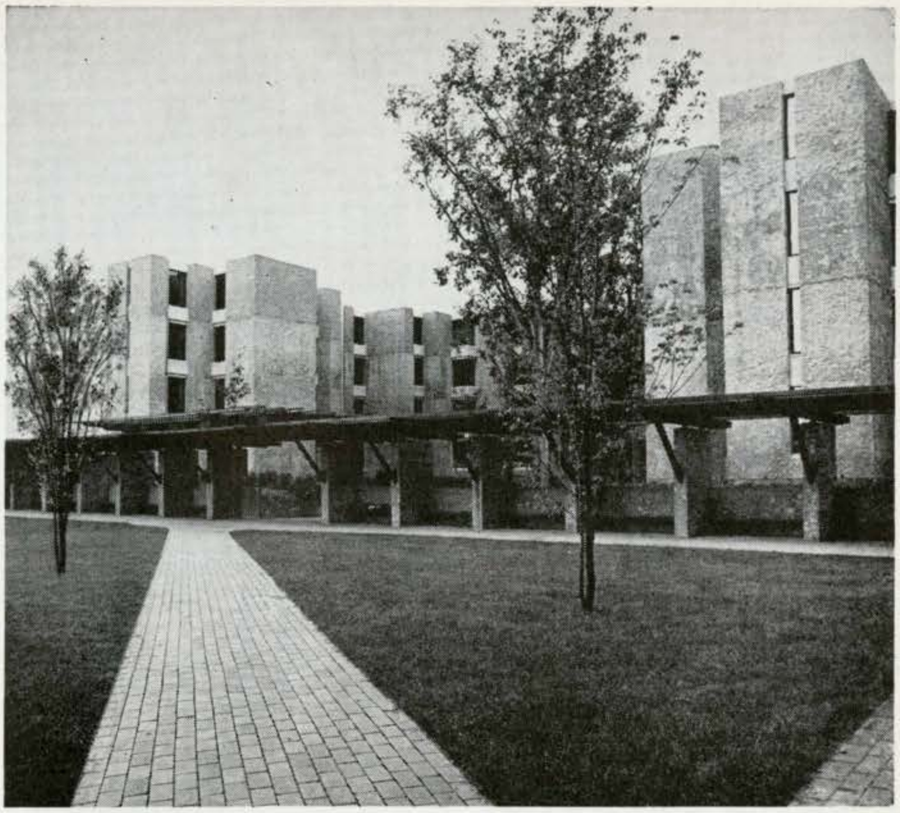
Brock University; model of the projected campus.

1-7-2037 REV.

Trent University

is very different in concept from Brock. At Trent, the University Planning Committee chose the residential college system, in which the student body is divided for social and study purposes into groups of about 300. Eventually the campus is expected to contain fourteen colleges; the first, Champlain College, is complete and occupied.

Champlain College at Trent University is a structure so complex that six different electric heating methods are used within its walls. The complexity arises from the way so many student activities are accommodated in a small area. The college has study bedrooms for about 200 undergraduates, apartments and housing for graduate teachers, a separate house for the Master; library, cafeteria, squash court, lecture rooms, social and meeting rooms for staff and students, changing rooms, kitchens, and the Great Hall.



The South Block, Champlain College, Trent University. Architect: Ronald J. Thom of Thompson, Berwick, Pratt & Partners. Engineers: R. E. Crossey and Associates, Ltd.

The Great Hall, Champlain College.

As at Brock, the basic heating system is hydronic, with seven immersion-type electric boilers totalling 750 KW. Most rooms throughout the college have *finned-tube convectors* in floor or sill units to provide basic warmth. Larger rooms have additional heating from *warm air ducts.* Air supply for these is warmed at the intake point by a hot water coil. The lecture room, the Great Hall and the squash court are among the larger rooms heated this way. These ducts will eventually accommodate a cooling system. Utility rooms and passages use *fan-forced unit* heaters suspended at strategic points. Since the kitchen has its own ventilation system, its air supply can vary between 100% recirculated and, with the aid of an in-duct *resistance coil,* 100% outdoor air. *Electric cable* is embedded in concrete landings where the staircases lead outdoors. Finally, *resistance convectors,* mainly of the baseboard type, are installed throughout the Master's house, further demonstrating the versatility of electric heating.

Despite the differences in appearance, layout, and style between these two new universities, Trent's reasons for choosing electricity for heating are very similar to Brock's. A painstaking analysis of five possible systems at Trent proved that electricity would be most *economical in terms of owning and operating costs.* Operating the system is simple, since minimum maintenance staff is required, and a high degree of both central and localized automatic control is possible. Finally, alternative systems required a central boiler plant, which would have interfered with the appearance and organization of the campus.

Electric heating provides both these universities with *the kind of heat they need, where it is needed, economically.* Designers and owners of many other buildings in Ontario find electricity the most practical answer to their widely differing heating problems. Write to Ontario Hydro for copies of Electric Heating Reports, which describe recently completed installations. Advertising Dept., 620 University Avenue, Toronto 2.

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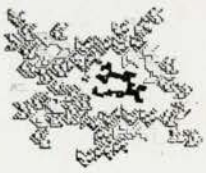
Review
Revue

4

L'Architecture d'aujourd'hui, with its usual wide coverage, has produced an issue on "urbanisme" – by architects. These range from articles and projects by Anger to Woods and from Canada (Montreal) to Japan. Among the most interesting are schemes by Josic for Aveyron, France (**1**, **2**) and the renewal of lower Manhattan (**3**, **4**) by Wallace McHarg Roberts & Todd Whittlesey, Conklin and Rossant.



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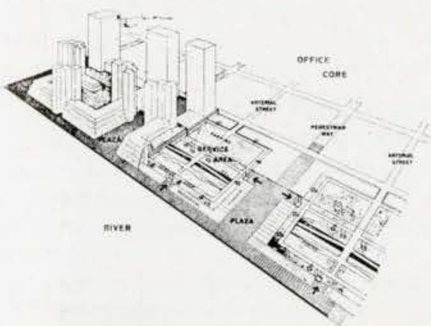

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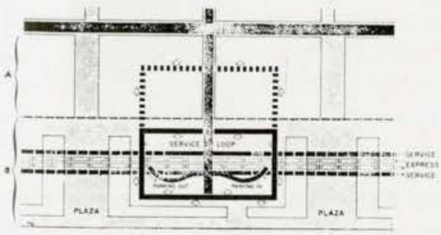

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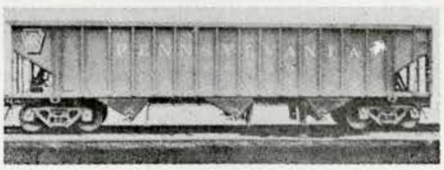
"(**5**) Railroad hopper cars are exposed to the atmosphere and because they are continually loaded with abrasive materials it is impractical to protect them against corrosion with paint. The railroads asked the steel industry to develop a material to withstand these conditions. It did so and the result was a family of steels designed to meet an American Society for Testing and Materials specification called A-242. These steels have come to be called the weathering steels. The ASTM specification requires that steel conforming to it have a resistance to atmospheric corrosion equal to or greater than that of carbon steel with added copper. Weathering steels for architecture are manufactured by a number of producers; they are marketed as type A-242 steel, but in most cases their corrosion resistance actually considerably exceeds the required minimum, some manufacturers claiming corrosion resistance better than twice that set forth in the specification.



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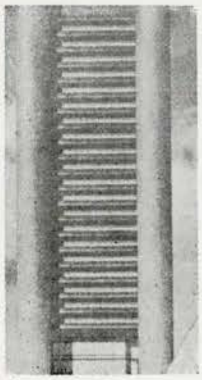
"Recently two buildings have been designed for which the architects have contrived ingenious structural systems that include exposed, unpainted structural steel members with no external fireproofing. Both are within code jurisdictions that normally would demand fireproofing. The buildings are these:

". . . The Knights of Columbus building (**6**), a 23-story insurance building for New Haven. The architects are Kevin Roche, John Dinkeloo & Assoc., of Hamden, Conn.; the structural consultants, Henry A. Pfisterer & Associates, of New Haven, Conn.

". . A triangular, 65-story building for United States Steel Company in Pittsburgh, Pa. (**7**) The architects are Harrison, Abramovitz & Abbe, of New York; the structural consultants, Skilling, Christianson, Helle & Robertson of Seattle, Wash.

"For the Knights of Columbus building,



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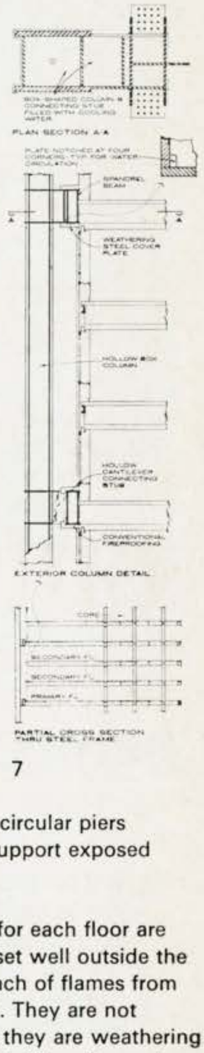

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New Haven, Conn., four circular piers surfaced in silo tile will support exposed floor framing.

"Primary support beams for each floor are 30-inch-deep spandrels set well outside the glass line, beyond the reach of flames from a fire within the structure. They are not fireproofed and, because they are weathering steel, they are not painted either. Secondary floor supporting steel is un-fireproofed too.

"In the United States Steel Headquarters: Massive, box-section columns and the cantilevered stubs that connect to the spandrel beams have no externally applied fireproofing. Instead, they are filled with water that would serve as a heat sink to prevent excessive temperature rise in case of fire." *PIA September 1967*

A.J.D.

Speedwalk shrinks the distance between plane and baggage claim at Dorval Airport.

The Main Terminal Building and Aeroquay at Dorval are 600′ apart. This passage beneath the tarmac connects them.

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Résumé

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Les Acoustiques des Salles de Théâtre Leslie L. Doelle, Ing. M.Arch., Conseil Acoustique, Montréal.

Considérations architecturales
Le dessin des divers types de Salles (théâtres, amphithéâtres, églises, salles de concert, opéra, cinéma, etc.), est devenu un problème extrèmement complexe pour l'architecte contemporain. En plus des diverses exigences esthétiques, fonctionelles, techniques, artistiques et économiques qui sont souvent discordantes, une salle doit souvent contenir un auditoire de grandeur sans précédent. Souvent, par nécessité (1) le même espace doit remplir plusieurs fonctions (salles à usages multiples) et (2) la capacité de la salle doit être facilement réglable aux besoins temporaires (salles à formes multiples), problèmes graves car, lorsque l'auditeur entre dans une salle, il a droit au confort, à la sécurité, bonne illumination, bonne vue et bonne réception de son.

Les exigences nécessaires aux conditions d'audition dans une salle sont les suivantes: une sonorité adéquate partout, surtout aux places les plus éloignées; l'énergie du son doit être distribuée (diffusée) uniformément; des caractéristiques de réverbération optimum, afin de permettre l'appréciation la plus favorable du programme par l'auditoire et la présentation la plus favorable par les acteurs; la salle doit être exempte de défauts acoustiques tels qu'échos, réflexions différées de long delai, échos oscillants, concentrations de son, déformations, ombres de son, etc.; les bruits et vibrations pouvant nuire à l'audition ou à la performance doivent être exclus ou réduits raisonablement dans chaque partie de la salle.

Le problème de la provision d'une sonorité adéquate, surtout dans les salles moyennes et grandes vient des pertes d'énergie des ondes sonores (Fig. 1), par l'amortissement excessif par l'auditoire et par l'ameublement de la salle. Ces pertes d'énergie de son peuvent être réduites et remplacées par les moyens suivants: la torme de la salle doit être établie de façon à ce que l'auditoire soit le plus près possible de la source de son (Fig. 2 et 3). Dans les plus grandes salles, un balcon est souhaitable; l'auditoire doit être sur un plancher incliné correctement; la source de son doit être soulevée autant que possible; la source de son doit être bien entourée de grandes surfaces réfléchissant le son (plâtre, contreplaqué, plexiglas, etc.). Le plafond constitue toujours une surface convenable pour l'installation de réflecteurs de son. Pour l'architecte, le problème du plafond exige sa coopération étroite avec les conseils structuraux, mécaniques, électriques et acoustiques. (Figs. 4, 5, 6, 7, 8); la superficie de plancher et le volume de la salle doivent être restreints afin de raccourcir la distance que les sons ont à traverser (voir Table 1); il faudrait éviter les surfaces parallèles réfléchissant le son soit horizontales, soit verticales, surtout près de la source de son; le placement de l'auditoire devrait prendre en considération la vue la plus avantageuse aussi bien que l'écoute. Il vaudrait mieux éviter les grands blocs de sièges. Aucune allée ne devrait être placée sur l'axe longitudinale; si d'autres sources de son (orgue, choeur, etc.), existent ailleurs dans la salle, ces sources doivent être aussi entourées de surfaces réfléchissant le son.

Les mésures citées ci-dessus peuvent améliorer la sonorité d'une salle de manière adéquate, même surprenante, mais il ne faut pas attendre des miracles. Un conférencier ou un acteur pourront parler si doucement que même les auditeurs les plus proches auront du mal à les comprendre. On ne peut pas espérer que l'intensité de cette voix basse puisse être augmentée par des moyens acoustiques naturels. Une bonne sonorité ne peut pas être accomplie si le son n'est pas émis convenablement à la source.

Si les mésures citées n'ont pas été considérées dans les salles de dimensions moyennes et grandes, les conditions d'écoute ne seront pas satisfaisantes. Dans ce cas, et aux – amphithéâtres en plein air, l'installation d'un système électrique est presque toujours obligatoire pour avoir une sonorité adéquate et une bonne distribution de son. Un système sonore dans une salle bien conçue du point de vue acoustique sera nécessaire si le volume de la salle dépasse 75,000 pi.cu. et si la voix doit traverser plus de 80 pieds pour atteindre l'auditeur. Au cas où la salle est chargée de matériaux absorbants et la distance dépasse 40 pieds, un tel système sera nécessaire lorsque le volume est supérieur à 15,000 pi.cu. D'autre part, étant donné un théâtre bien traité acoustiquement, un acteur n'aura pas besoin d'un système sonore à moins que le volume dépasse 200,000 pi.cu. et 1,500 places.

Si la pression sonore est à peu près la même partout dans la salle et il est probable que les ondes sonores directes et réfléchies vont dans toutes les directions, la distribution uniforme existera dans cette salle. Cette diffusion est une caractéristique importante d'une salle car en plus, elle accentuera les qualités naturelles de la parole et de la musique et empechera des défauts acoustiques divers, tels que l'écho, l'oscillation, etc. On peut créer la diffusion sonore de plusieurs façons, telles que (1) par l'application généreuse d'irrâgularités de surface ou (2) par l'application alternée de surfaces réfléchissant et absorbant le son (Fig. 9, 10). Les orateurs, musiciens, etc., s'attendront à ce que les sons générés à la source ne disparaitront pas ou ne diminueront pas trop vite, mais persisteront. Autrement dit, la salle devrait réagir aux sons tout comme un instrument de musique, prolongeant et mettant en valeur le son original. Cette prolongation de son, résultant de réflexions succesives dans un espace clos s'appelle "réverbération", et elle a un effet distinct sur les conditions auditoires. La réverbération excessive dans une pièce créera une condition acoustique sous laquelle les sons réverbérés, précédant ceux sur lesquels l'attention est fixée momentanément, resteront perceptibles, rendant inaudibles et chevauchant les sons subséquents. Les conditions acoustiques souvent désastrueuses des salles ayant un haut degré de réverbération sont bien connues de nous tous.

Le degré de réverbération est généralement défini en termes de temps de réverbération (T.R.), soit le laps de temps en secondes pendant lequel le son s'éteint après l'arrêt de sa source.

Le contrôle de T.R. est gouverné par la formule T.R. = 0.05 V/A, où V représente le volume de la salle en pi.cu., et A, l'absorption totale de la salle en unités de pi.ca., appellée quelquefois "Sabins". La formule montre clairement que le T.R. augmente avec le volume de la salle et diminue lorsque des matériaux d'absorption sont introduits. Lorsque le T.R. optimum a été choisi (Voir Table 11), le contrôle de réverbération consiste en l'établissement du montant de l'absorption à fournir par des moyens de finitions acoustiques, d'occupants, d'ameublement, etc., qui produiront la valeur choisie de T.R.

Puisque l'absorption des divers matériaux et finitions acoustiques varie normalement avec la fréquence, les valeurs de T.R. varient en conséquence. Donc, il faut spécifier et calculer le T.R. pour diverses fréquences représentatives de la gamme audio-fréquence. Lorsqu'on parle d'une valeur de T.R. sans spécifier une fréquence, ce sera le T.R. à 500 périodes par seconde.

En choisissant les finitions acoustiques, bon nombre d'exigences, souvent non-acoustiques, doivent être considérées simultanément, tel que: les coefficients d'absorption de son aux fréquences représentatives, l'apparence, l'espace disponible, l'épaisseur, poids, résistance au feu, entretien, les conditions de température et d'humidité pendant l'installation, etc.

Quant à la distribution des finitions acoustiques choisies, en règle générale, les matériaux absorbants le son devraient être installés sur les surfaces limitant la salle et susceptibles de produire des défauts acoustiques (voir plus loin).
Les matériaux standards de commerce sont rarement employés en pratique puisque l'architecte cherche à produire une solution unique. Les Figures 11, 12, 13, 14 et 15 montrent des exemples de traitements acoustiques "sur mésure" employés avec succès.

En plus des attributs discutés plus haut, il est également essentiel d'éliminer les défauts acoustiques éventuels d'une salle. Les défauts les plus connus sont énumérés ci-dessous: l'écho (voir Fig. 16), qui est la répétition distincte et indésirable d'un son original; la réverbération est la prolongation désirable d'un son; la réflexion différée de long delai est semblable à l'écho sauf que le delai entre la perception de sons directs et refletés est un peu moins (Fig. 18). Un écho oscillant consiste d'une succession rapide de petits échos perceptibles. L'élimination de parrallèlisme entre surfaces réfléchissantes opposées est un bon moyen d'éviter les échos oscillants. Ces trois premiers défauts pourront être évites par l'installation de matériaux absorbants le son sur les surfaces réfléchissantes produisant les défauts. Si l'usage de finitions acoustiques n'est par réalisable aux surfaces indiquées, elles doivent être rendues diffusives en les inclinant (Fig. 17).

Les concentrations de sons, appelées souvent "hot spots" sont le résultat de réflexions de son par des surfaces concaves aux dépens d'autres endroits qui deviennent des "dead spots". La présence d'endroits "hot" et "dead" crée une distribution de son non-uniforme dans la salle et l'élimination de ce phénomène est un but important de l'acoustique. Il faudrait, dans ce cas, éliminer les grandes surfaces concaves ou les traiter de matériaux absorbants. Au besoin, on pourrait les placer en dehors ou au dessus de l'auditoire. Un système sonore électrique bien choisi et installé pourra réduire, mais jamais guérir, les défauts nuisibles des échos, réflexions de long delai, les échos oscillants et les concentrations de son.
La distortion est un changement indésirable dans la qualité de sons musicaux due à une absorption inégale ou excessive des surfaces entourantes aux différentes fréquences. On peut l'éviter si les finitions acoustiques appliquées ont égalé les caractéristiques d'absorption sur la gamme entière des fréquences.

La résonnance des salles, appelée quelquefois la "coloration" se produit lorsque certains sons dans une certaine fréquence ont tendance à se faire entendre plus que sur d'autres fréquences. L'élimination de ce défaut acoustique est surtout importante dans les studios de la radio et d'enrégistrement.

Le contrôle des bruits dans une salle doit débuter avec un plan de situation raissonable séparant l'auditoire de tout bruit intérieur et extérieur et des sources de vibration, telles que la circulation véhiculaire bruyante, l'équipement mécanique, etc., ce qui s'avère la méthode de contrôle la plus économique. Une zone protectrice de salles entre les bruits extérieurs et le théâtre rendra possible l'usage de parois moins isolantes et moins chères. Ces salles (restaurants, bureaux), doivent avoir des plafonds amortissants et des portes les séparant du théâtre. Si un théâtre est à côté d'un autre, un mur ou un plancher isolant doivent les séparer.

L'usage de bruits de fond continus et pas trop forts comme bruit couvrant est souvent souhaitable pour le contrôle des bruits dans les résidences, hôpitaux, bureaux, etc.; il n'est pas souhaitable dans une salle. Les systèmes de ventilation et climatisation doivent opérer de façon; à ce que le niveau de bruit créé soit de 5 à 10 décibels en dessous du niveau de bruit de fond normalement spécifié.
Un problème en contrôlant les bruits dans les salles est créé par les salles divisibles et à usages multiples. Si la salle est destinée à l'instruction verbale seulement, un degré moyen d'isolation sonore s'y impose. Si un équipement sonore électrique doit être installé, un système de cloisons plus efficace acoustiquement devra être trouvé.

Les salles divisibles (Figs. 19 et 20) posent d'autres problèmes d'acoustique tels que le contrôle simultané des réverbérations dans l'espace divisé et non-divisé; provision pour la sonorité dans l'espace non-divisé par la hauteur limitée de l'ouverture de la cloison amovible; le contrôle des voix entre les pièces divisées par les espaces aux plafonds et les gaines de ventilation.
Une des raisons d'être de ce résumé des principes de l'acoustique était d'illustrer que les conditions acoustiques sont affectées considérablement par les considérations apparemment pûrement architecturales quant à la forme de la salle, ses proportions, le placement des parois périmétriques, la distribution des éléments structuraux et mécaniques, les accessoires, etc. Nous avons voulu montrer aussi que la solution qui satisfait les demandes acoustiques ne restreint en rien les conceptions de l'architecte. Tout problème acoustique peut être abordé de différents points de vue. La pratique contemporaine en construction et en décoration permet la traduction satisfaisante des principes et des exigences acoustiques dans le langage de l'architecture contemporaine.

Auditorium Acoustics

Features
Projets

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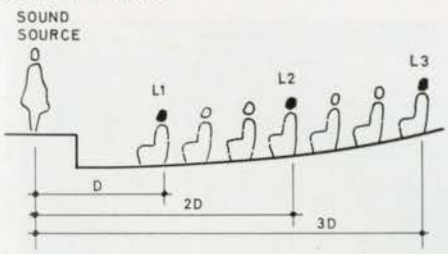
Architectural Considerations

The design of the various types of auditoria (theatres, lecture halls, churches, concert halls, opera houses, motion picture theatres, etc.) has become an extremely complex problem in contemporary architectural practice. The reason for this is that in addition to the various, sometimes even conflicting, aesthetic, functional, technical, artistic and economical requirements, an auditorium often has to accommodate an unprecedentedly large audience. Furthermore, present day standards will often necessitate (1) that the same space be used for various types of programs (multi-purpose auditoria), and (2) that the audience capacity of the room be easily adjustable to momentary needs (multiform auditoria). These are serious problems for the architect and his technical advisers, because it must be remembered that when the audience enters an auditorium, it has the right to expect – apart from the satisfactory quality of the program itself – comfort, safety, pleasant aesthetics, good illumination, proper sight and good sound.

Acoustical Requirements in Room Design

The following are the requirements for good hearing conditions in an auditorium:

A There should be adequate loudness in every part of the auditorium, particularly at the remote seats.



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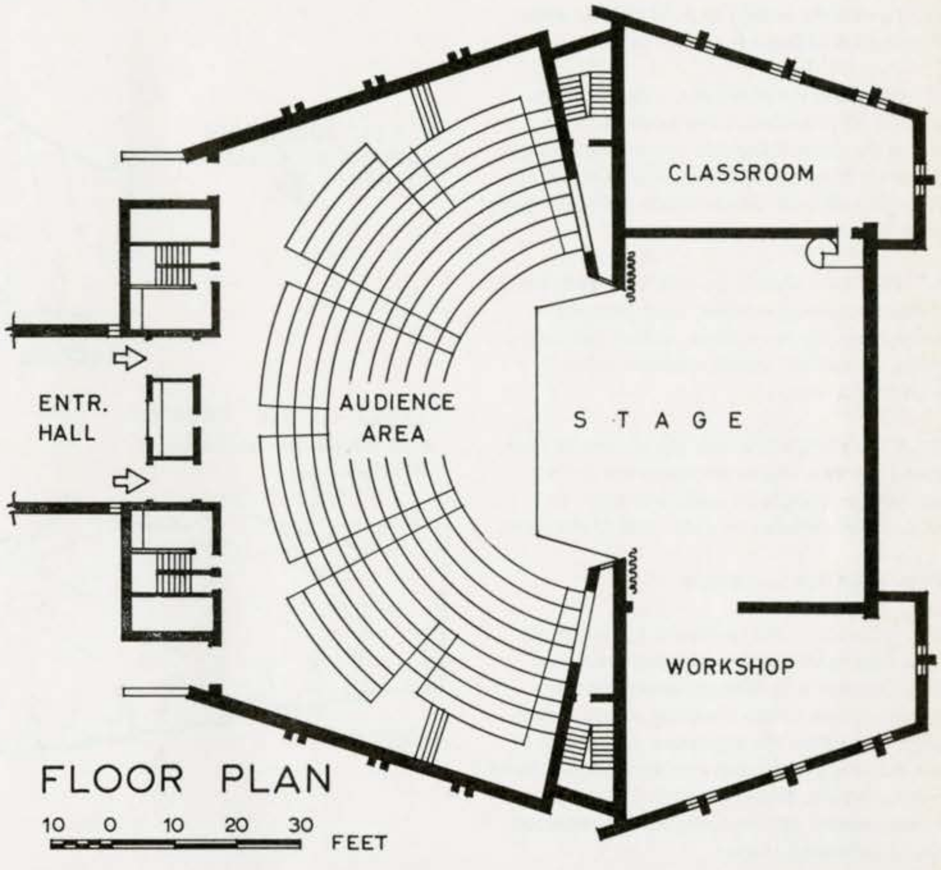
The decrease of sound intensity with increasing distance between sound source and listener (inverse square law). If sound intensity at position of listener L1 is I, then, this will drop at positions L2 and L3 to 1/4 and 1/9 respectively.

La diminution de l'intensité du son relative à l'éloignement croissant entre l'origine du son et l'auditeur (loi de fonction carrée inverse). Si l'intensité du son à la position de l'auditeur L1 est I, celle-ci baissera aux positions L2 et L3 à 1/4 et 1/9 respectivement.



2, 3

In the 770-seat theatre auditorium for Bishop's University, Lennoxville, no member of the audience is further than 42 ft from the stage. Bolton, Ellwood and Aimers, architects.

A la salle de 770 places du théâtre à Bishop's University, Lennoxville, aucun membre de l'auditoire est plus éloigné de la scène que de 42 pieds. Bolton, Ellwood et Aimers, architectes.

B The sound energy should be uniformly distributed (diffused) in the room.

C Optimum reverberation characteristics should be provided in the auditorium to allow the most favorable appreciation of the program material by the audience and also the most efficient presentation of the program by the performers.

D The room should be free from acoustical defects, such as, echoes, long-delayed reflections, flutter-echoes, sound concentrations, distortion, sound shadow, room resonance, etc.

E Noises and vibrations which would interfere with listening or performance in the auditorium should be excluded from, or reasonably reduced in, every part of the room.

Provision for Loudness

The problem of the provision for adequate loudness, particularly in medium size and large auditoria, is brought about by the energy losses of the traveling sound waves (Fig. 1) and by the excessive absorption of the audience and room contents (upholstered seats, carpets, draperies, etc). These sound energy losses can be reduced and replaced in the following ways:

a The shape of the auditorium should be established such that the audience be located as close to the sound source as possible, thereby reducing the distance the sound has to travel (Figs. 2 and 3). In larger auditoria the use of a balcony brings more seats closer to the sound source.

b The audience should be located on a properly ramped or raked floor because sound is more readily absorbed when it travels over the audience at grazing incidence.

c The sound source should be raised as much as feasible in order to secure a free flow of the direct sound waves (those traveling directly from the sound source without reflection) to every spectator.

d The sound source should be closely and

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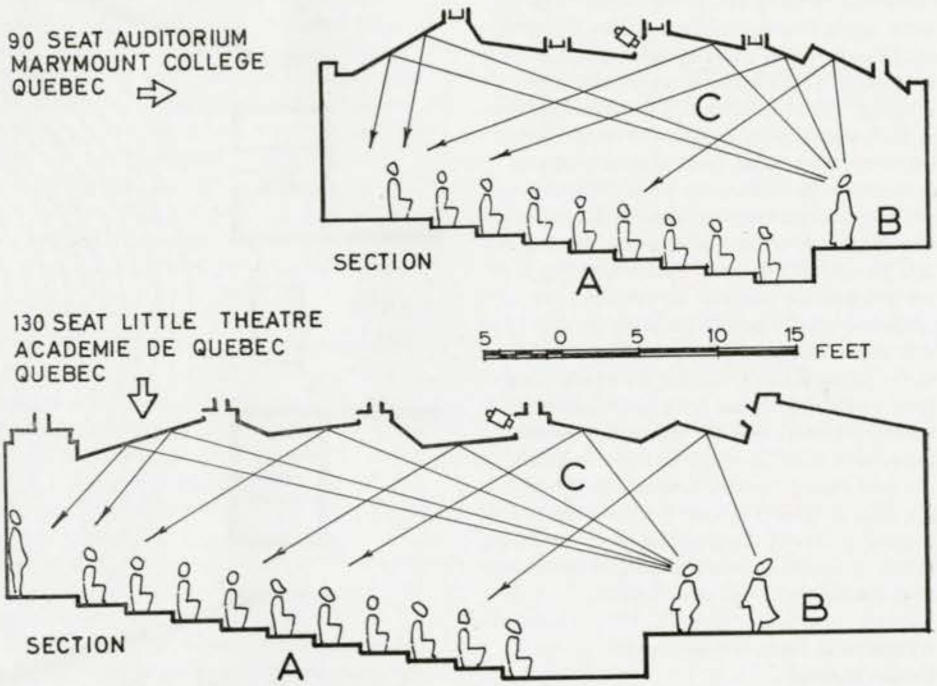
The provision for adequate loudness in auditoria. A: Stepped audience floor beneficially reduces audience absorption. B: Raised "sending area" increases the amount of direct sound supply. C: Uniformly distributed reflected sounds from the ceiling will reinforce the direct sounds.
Les provisions pour une sonorité adéquate dans les amphithéâtres. A: Le plancher échelonné réduit efficacement l'absorption pour l'auditoire. B: Une "source émettrice soulevée" augmente la projection directe du son. C: Les sons renvoyés du plafond distribués uniformément renforceront les sons directs.

5
Side view of the auditorium of Marymount College, Quebec, with the sound reflective ceiling as shown in Fig. 4. Fiset, Deschamps and Bartha, architects.
Vue de côté de l'amphithéâtre de Marymount College, Québec, avec le plafond renvoyant le son tel que montré à la Fig. 4. Fiset, Deschamps et Bartha, architectes.

6
Front view, with the sound reflective ceiling, of the auditorium of Marymount College, Quebec. Fiset, Deschamps and Bartha, architects.
Vue de face, avec le plafond renvoyant le son de l'amphithéâtre de Marymount College, Québec. Fiset, Deschamps et Bartha, architectes.



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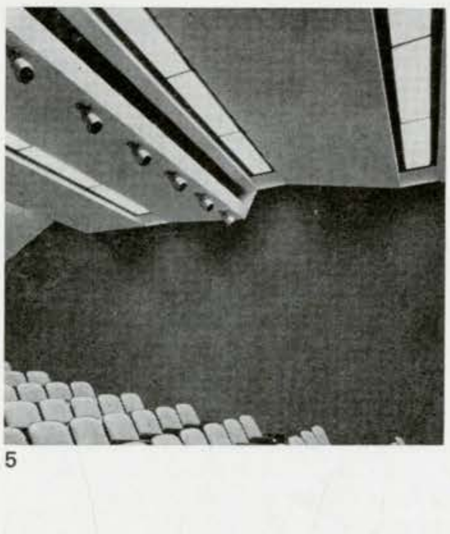

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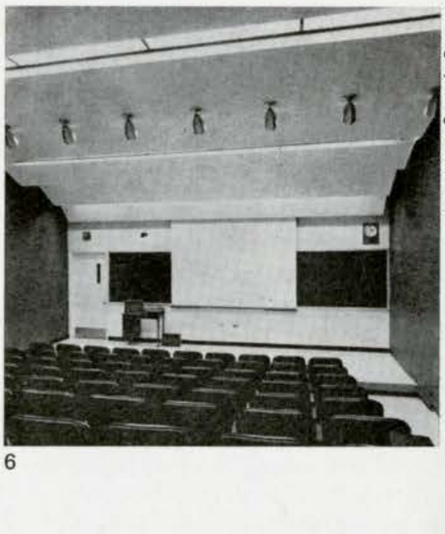

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PRECAST CONCRETE WALLS – A NEW BASIS FOR DESIGN

by J. K. Latta

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A new approach is required for the design of walls incorporating precast concrete panels. Conventional design calls upon the precast panel to form the external facade and the rain and airtight barrier. The panel also supports the other components of the wall and carries wind loads, but in most cases it does not form part of the structural system of the building.

In trying to fulfil these various functions, conventional design encounters problems that are inherent in the basic concept. Some can be overcome by an exceptionally high standard of detailing and workmanship, but the prudent designer will call for only a normal standard of skill. A new basis for design, based on sound scientific principles that make abnormal skills unnecessary avoids the problems by eliminating their causes.

What Is Required of a Wall?

It was shown in CBD 93 that many troubles stem from a failure to control temperature and water, which can enter a wall from two principal sources — water vapour inside, and rain and snow outside the building.

1. The chief mechanism carrying water vapour into the wall is air movement. This movement may take place through the wall or it may be a convective movement into cold spaces in the wall that returns to the inside of the building. Since with conventional methods of construction it is not reasonable to expect to eliminate all spaces within the wall, it is necessary to separate these spaces from the air within the building. In so doing, through-wall air leakage will also be stopped. Thus, one requirement of the wall is an air barrier on the warm side of the insulation.

2. To prevent rain penetration, it is necessary either to have a completely impervious outer skin over the whole surface of the wall or to control the forces that can move the water from the face into the wall. It is possible to make individual parts of the outer skin impervious, but again it is not realistic to expect that this can be achieved over the entire surface. Thus at any line of potential leakage, such as a joint between panels, it is necessary to control the forces. This can be done most readily by providing an air chamber behind the wetted face and ensuring that the air pressure in this chamber is always equal to that on the face of the wall. For this balance of pressures to occur it is essential that there is a good air seal on the building side of the chamber and suitable openings to the outside. In addition to controlling wind forces, which move water into the wall, this air chamber will stop capillary movement by providing a space larger than capillary size. Gravity flow inward is usually checked by a suitable overlapping of components, but should there be an unintentional path permitting water to enter the wall the space provides a path for drainage. Water entry caused by the momentum of the rain drop can be prevented by a baffle, which does not have to be watertight since the other forces have been controlled.

A second requirement of the wall is, therefore, that on any line of potential leakage there must be an air chamber, sealed on the building side and provided with suitable openings to the outside.

3. Windows and window frames suffer from condensation and glass breakage. Both problems are accentuated when the wall element that supports the window is cold and thus cools the window frame. If the window can be incorporated in a warm component rather than a cold one, heat will be supplied to the frame and the problems will be reduced. The window must, however, be supported by the element of the wall designed to carry the various loads applied to the wall, and thus it follows that this element must be kept warm. Hence, a third requirement of the wall is that the insulation must be placed outside the structural component of the wall.

How Are These Requirements to be Met?

The most satisfactory way to solve wall problems is to eliminate their causes and this will be achieved if the above three requirements can be met. The one basic change of using a concrete panel as the *inner* component of the wall, with insulation applied on its *outer* face, makes it possible to achieve two of the three requirements. The concrete panel itself forms a good air (and vapour) barrier so that this problem is confined to the joints. As the panels are now on the warm and thermally stable side of the insulation movements between them will be minimized. The sealant material or gaskets will also be warm and will be able to respond more readily to such movements as do take place, making it easier to achieve and maintain the necessary air barrier. Items such as window frames that are carried by the panels will be in good thermal contact with a warm, massive and conductive component and thus will have heat fed to them.

It remains for an external cladding to be provided to shed the rain, to protect the insulation, and to give a satisfactory aesthetic treatment to the wall. Subject to the requirements of fire regulations, this cladding can be made of any of a wide range of materials and the choice can be based very largely upon aesthetic requirements coupled, as always, with economics. There are, however, some technical features that must be considered and these will often simplify the design.

The cladding panels can be made relatively thin since they do not have to be designed to carry the full wind load. Equalization of the air pressure in the space behind the cladding, with wind pressure on the face, relieves the cladding of all major wind loads. Only where the wind pressure varies across the face of one panel is special consideration needed. Corners of buildings and projections that deflect wind blowing at an angle to the wall will produce such differences in pressure between adjacent points. These conditions will make complete pressure equalization difficult, induce air flows behind the cladding, and subject the cladding to some measure of wind load. Much can be done to control these effects, however, by suitably dividing the air space and reducing the size of the panel.

If, on the other hand, the cladding panels themselves can be relied upon to be impervious, then the need for special measures to control rain penetration is confined to the joints. The panel can, therefore, be placed tightly against the insulation and this, if rigid, will transmit the wind loads on the panel to the structural inner component of the wall. In either case, the thickness of the cladding will be determined principally by the handling stresses induced by the method of manufacture and assembly.

Thus relieved of all major loads other than the weight of the panel and related earthquake loads, the connections that secure the cladding panel to the main inner panel can be relatively light. Allowance must be made for the considerable expansion and contraction of the cladding, for it will be subjected to a full range of air temperatures plus the effect of solar radiation. With the new design, this movement can easily be accommodated because a perfect seal is not needed at joints and a connection need be provided at only one point for each external panel. If more than one connection is used, suitable allowance for movement must be made.

In this way a new approach to wall design is developed in which the main structural element of the wall is located on the warm side of the insulation, with a relatively light external cladding (Figure 1). The main element supports all other components of the wall and thus provides a path whereby heat can be fed to them under winter conditions. The smaller range of temperature to which the main panel is subjected makes it easier to provide and maintain the necessary air barrier on the warm side of the insulation. All the factors that led to the types of problem described in CBD 93 can, therefore, be overcome.

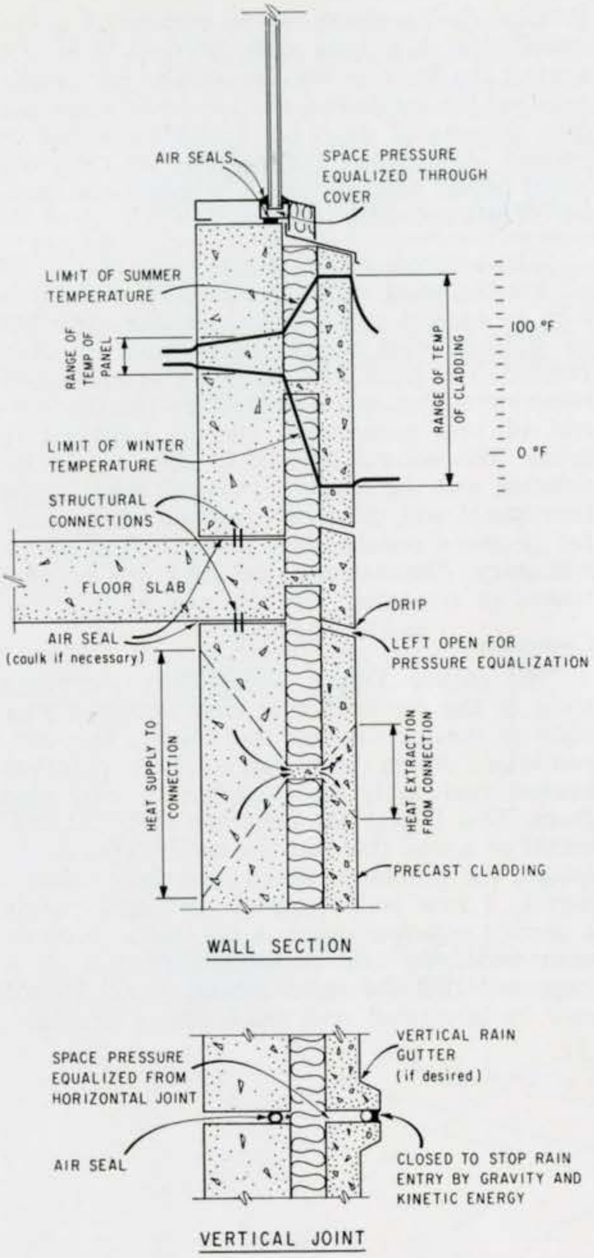

Figure 1 Schematic arrangement of wall.

Corrosion of Connections

With the new approach, it may be thought that there will still be a problem of corrosion of the connections supporting the external skin. These connections, however, are working under vastly different conditions from those that prevailed in the old design.

If a member that conducts heat readily passes through the insulation and links an internal component with an external one, it forms a thermal bridge (CBD 44) whose temperature will lie somewhere between those of the internal and external components. The higher rate of heat flow through the bridge, relative to that through the insulation, will draw heat from the inner component and supply heat to the outer at the points of contact, promoting a lateral heat flow in these components. The conditions will stabilize when the rates of heat flow into and out of the bridge are equal, and the mean temperature of the thermal bridge will be biased toward that side which has the easier condition of heat flow.

With a conventionally designed wall there is bound to be an easy path through the massive cold panel for heat to flow away from the connection. With the new approach, the situation is reversed. The massive, conductive component is now on the warm side feeding heat into the connection, with a comparatively thin component on the cold side to extract heat from it. This is shown diagrammatically in Figure 1. Thus, in the first place, the connection will be warmer than is the case in current practice and more adverse conditions will have to prevail before condensation will occur.

In the second place, the possibility that these conditions will prevail has been reduced. The improved air barrier on the warm side of the insulation will reduce the possibility that moist air from inside the building will flow over the connection. Convection from the building is very unlikely, since this would require two holes in the inner air barrier and an air barrier in the outer skin; this would be contrary to the requirements for rain penetration control.

It is also possible to provide ventilation with outside air should this be considered desirable round the connection. Any air leakage from the building would then be carried away rapidly. Also, should the connection ever become wet from water penetrating to the back of the cladding panel this ventilation would help to dry it quickly. Under winter conditions, the connection will always be warmer than the outside air so that condensation of moisture in the outside air on the connection is impossible.

A Suggested Wall System

In the design and detailing of a wall there is much scope for initiative, ingenuity and individuality. Many types of wall are possible and all will perform satisfactorily provided the basic requirements are met. One possible solution is as follows:

The principal structural wall element will be a quality product of precast concrete. In conformity with the new, scientifically sound approach to the design of walls it will be located on the inside of the total wall complex. Any minor surface blemishes can be touched up either before or after erection to provide an internal face acceptable for decoration. Painting with a heavy-bodied paint or papering the inner face will further increase the airtightness of the panel itself so that the problem of producing an airtight and visually acceptable internal face to the wall will be confined to the joints.

Now that this main element of the wall is located in a warm and thermally stable environment, it is possible to integrate it with the structural system of the building. It is beyond the scope of this Digest to discuss the methods of doing so, but some possible systems can be mentioned briefly. With office-type buildings lateral stability can be obtained from a cast-in-place central elevator core. The wall panels can be stabilized from this core by means of the floor, which can be either cast-in-place or precast. With apartment-type buildings, stability can be obtained from the interior walls, which can be precast as is done in many European types of "system" building. Moment connections between precast elements are more difficult to achieve, but are used in some cases.

The external cladding can be made of thin precast concrete panels of high quality, with possibly only a single connection projecting from their inner face. This connection passes through the insulation to be embedded in the concrete of the main wall panel as it is cast against the back of the insulation. Air spaces between the insulation and the main panel are thus eliminated and no special adhesive is needed. Assembling the cladding on the main panel before erection also minimizes the number of site activities required.

The external cladding panel can be free of all but the most minor cracks and, since it is free to expand and contract, stresses will not be induced that might cause these to open further. The panel can be taken as essentially impervious and special measures for the control of rain penetration can be confined to joints. The natural lack of fit between the insulation and the roughly screened back of the face panel will, however, provide some space for pressure equalization, and for drainage if necessary. Alternatively, the back can be contoured in sympathy with the external face.

Conclusion

An earlier Digest (CBD 93) described some of the problems that have occurred with walls of precast concrete and showed that conventional design and construction practices cannot reasonably be expected to overcome them. This Digest has identified three requirements of a wall that must be met in order to eliminate the problems. Based upon these requirements, a new wall layout is developed using a precast concrete panel as the inside element, with insulation and cladding outside it. It is suggested that the main precast panel should now be integrated with the building structure.

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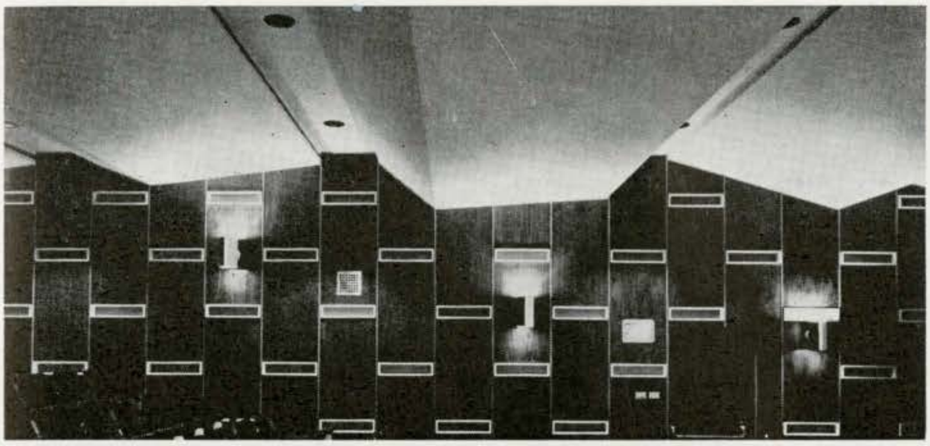
7
The directional ceiling of the Little Theatre, Quebec (shown in Fig. 4), has been designed to provide sound reinforcing reflections. O. G. Vagi, architect.
Le plafond orienté du Petit Théâtre, Québec. (Voir Fig. 4) a été conçu pour fournir les réflexions renforcant le son. O. G. Vagi, architecte.
8
Good integration of mechanical, electrical and acoustical requirements in the ceiling of the lecture hall of the Social Sciences Building, Laval University, Quebec. Fiset, Deschamps and Bartha, architects.
Bonne intégration des exigences mécaniques, électriques et acoustiques du plafond de l'amphithéâtre de l'édifice des Sciences Sociales, Université Laval, Québec. Fiset, Deschamps et Bartha, architectes.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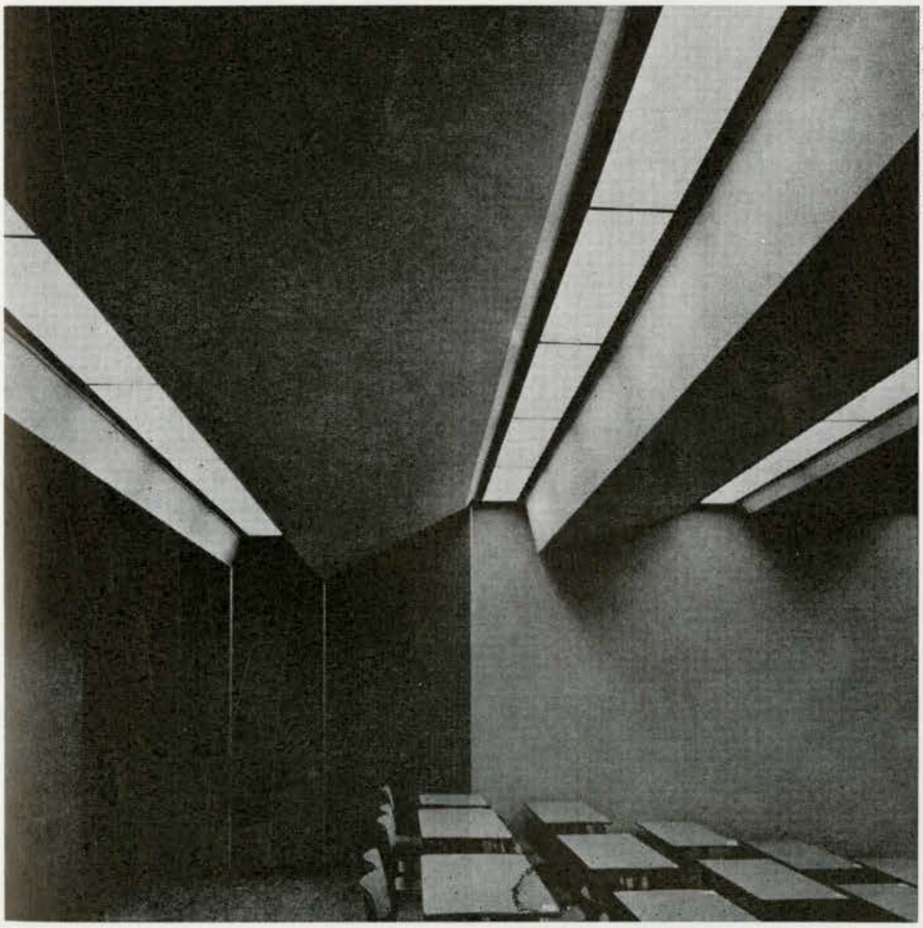
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Photographs Légaré and Kedl

abundantly surrounded with large sound reflective surfaces (plaster, gypsum board, plywood, plexiglass, rigid plastic boards, etc.), in order to supply additional, reflected sound energy to every portion of the audience area but particularly to the remote seats. The ceiling of the auditorium always constitutes a suitable surface for the accommodation of sound reflections. In practice, the successful integration of an acoustically efficient system of ceiling reflectors into the overall architectural, structural, mechanical and lighting layout of the ceiling is one of the most challenging problems in contemporary auditorium design. It will certainly require full attention from the architect and his close cooperation with structural, mechanical, electrical and acoustical consultants will be particularly important (Figs. 4,5,6,7,8).

e The floor area and volume of the auditorium should be kept at a reasonable minimum, thereby shortening the distance the direct and reflected sounds have to travel. Table I lists recommended volume per seat values for various types of auditoria.

f Parallel sound reflective boundary surfaces, particularly close to the sound source, should be avoided, both horizontally and vertically.

Table I *Recommended volume per seat values for various types of auditoria*

	Volume per seat, ft^3		
Type of auditorium	*Min.*	*Opt.*	*Max.*
Rooms for speech	100	130	175
Concert Halls	230	275	350
Opera Houses	140	160	200
R.C. Churches	200	300	420
Protestant Churches, Synagogues	180	255	320
Multi-Purpose Auditoria	175	250	300
Motion Picture Theatres	100	120	150

g The audience should occupy those parts of the seating area which are advantageous from the point of view of both viewing and hearing. Excessively wide seating areas should be avoided. No aisle should be located along the longitudinal axis of the auditorium, since seeing and hearing conditions are most favorable along this line. The advantages offered by continental seating are quite obvious.

h If besides the primary sound course, normally located at the front part of the auditorium, additional sound sources exist in other parts of the room (e.g. church organ or choir gallery opposite the altar end of the nave), these sound sources have to be surrounded by sound reflective surfaces as well. It is essential that in every auditorium a condition be created under which the greatest possible amount of sound energy is emitted from all "sending" positions to all "receiving" areas.

The measures listed so far will adequately, sometimes surprisingly, improve the loudness in auditoria; however, they will not perform miracles. A lecturer or an actor may talk in such a subdued voice that even close-by listeners face difficulties in understanding him. It will then be unreasonable to hope that the intensity of his low voice can be raised by natural acoustical measures (without the use of an electric speech reinforcement system) to such an extent as to make his scarcely audible voice intelligible. The first step in the provision for adequate loudness in an auditorium must come, therefore, from the performer himself: he must talk loudly and understandably, that is, with syllables uttered as evenly as possible. Proper loudness cannot be provided in the auditorium unless the sound has been properly emitted at the source.

In medium size and large auditoria even if attention has been given to the points discussed so far, speech level will be often too low for satisfactory hearing conditions. In such cases, and obviously in outdoor locations where no room enclosures exist to provide sufficient reflected sound energy, the installation of an electric speech reinforcement system is nearly always necessary to secure adequate loudness and good distribution of sound. Since the detailed discussion of sound systems is beyond the subject matter of this paper, this point will be just briefly dealt with.

In an acoustically well designed auditorium, a sound system will be needed normally if the room volume exceeds 75,000 ft^3 and if the voice must travel more than 80 ft to the listener. However, in certain cases, a sound system may be required in rooms having a volume greater than about 15,000 ft^3, if the room is heavily treated with sound absorbing finishes, and the distance between sound source and listener exceeds 40 ft. On the other hand, in acoustically successful theatres, trained actors will not need a sound system unless its volume exceeds 200,000 ft^3 with a seating capacity of about 1500.

Provision for Sound Diffusion

If the sound pressure is just about the same in all parts of an auditorium and it is probable that direct and reflected sound waves are traveling in all directions, a uniform distribution of sound, in other words sound diffusion, will prevail in the room. Adequate sound diffusion is an important acoustical feature of auditoria, because in addition to its aforementioned characteristic, it will accentuate the natural qualities of speech and music, and will prevent the rise of various acoustical defects, such as, echo, flutter echo, etc.

Sound diffusion can be created in several ways, such as, (1) by the generous application of large size surface irregularities, e.g., boxes, pilasters, exposed beams, coffered ceilings, serrated enclosures, deep window reveals, large size fixtures, sculptured surface decorations, etc., or (2) by the alternate application of sound reflective and sound absorptive surface treatments (Fig. 9). Figure 10 illustrates the front of the theatre auditorium of Académie du Québec, with details providing abundant sound reflection and diffusion.

Reverberation Control

Orators, actors, musicians, singers, in fact all performers in an auditorium will expect that the sounds generated at the source will not die away or diminish quickly, but will persist in the space for some time. In other words, the auditorium should react to the desirable sounds just as a musical instrument would, enhancing, prolonging the original sound. This prolongation of sound as a result of successive reflections in an enclosed space, after the source of sound is "turned off", is called reverberation, which has a distinct effect on hearing conditions. Excessive reverberation in a room will create an acoustical condition under which reverberant sounds, preceding the ones upon which momentary attention is focussed, remain perceptible, masking and overlapping subsequent direct speech or musical sounds. The unfavorable, often disastrous, acoustical conditions prevailing in highly reverberant auditoria are well known to everybody. Speech intelligibility is practically non-existent in those spaces.

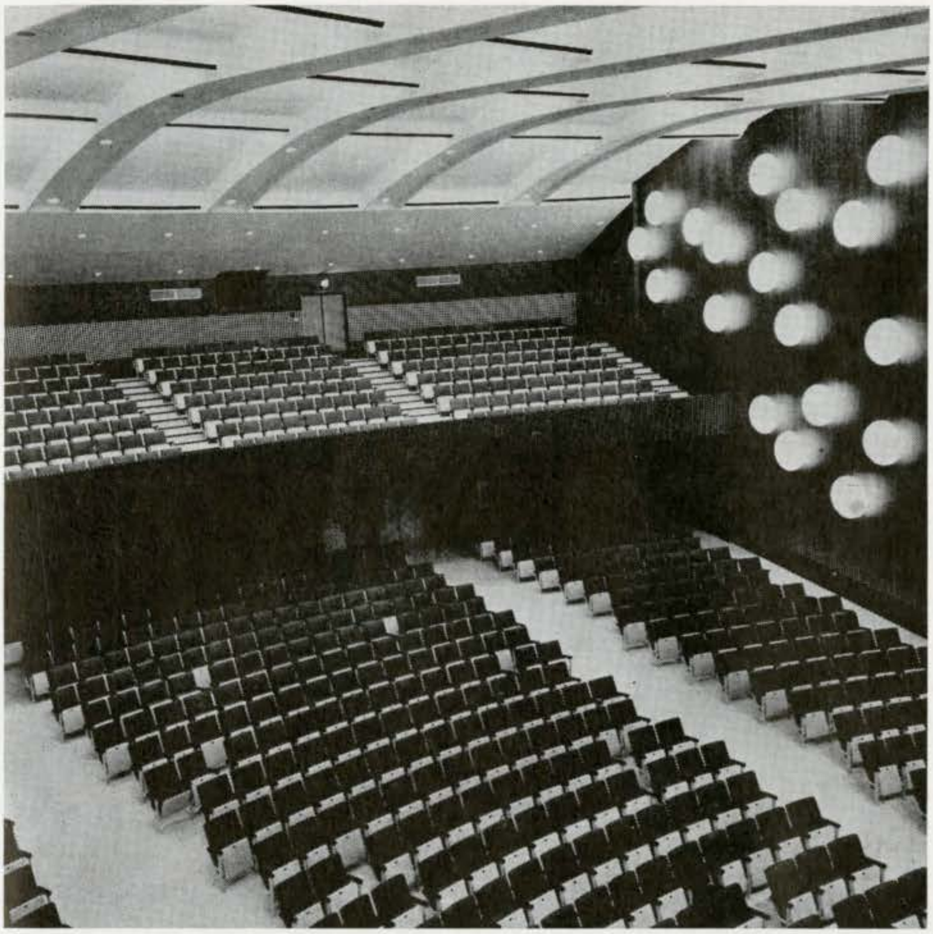
The amount of reverberation is usually defined in terms of reverberation time (R.T.) which, in a simplified definition, is the time (in sec.) taken for the sound to die away after the source has stopped.

The control of R.T., an important step in the acoustical design of auditoria, is governed by the simple formula $R.T. = 0.05\ V/A$, where V is the volume of the auditorium in ft^3, and A is the total absorption of the room in ft^2 units, sometimes referred to as "Sabins". The method of calculating the R.T. is dealt with more fully in several publications listed in the selected bibliography. The reverberation formula distinctly shows that the larger the room volume, the longer will be the R.T.; and the more absorption is introduced into the room, the shorter will be the R.T. Once the optimum R.T. (Table II) has been selected, then, the reverberation control consists of establishing the total amount of room absorption to be supplied by the acoustical finishes, occupants, room contents, etc., that will produce the selected value for the R.T. Table II clearly indicates that rooms used for speech require a shorter R.T. than rooms of the same volume used for musical or vocal purposes.

Since the absorption of various materials and

9
Large size (3 ft diameter) lighting fixtures along the side walls and a sculptured ceiling profile provide the desirable sound diffusion in Académie de Québec's 1,000-seat theatre auditorium. O. G. Vagi, architect.
Les appareils d'éclairage de grandes dimensions (diamètre 3 pi.) sur les murs de côté et un profil de plafond sculpté fournissent la diffusion de son voulue au théâtre de 1,000 places de l'Académie de Québec. O. G. Vagi, architecte.

10
Generously applied sound reflective and diffusive details characterize the front portion of the theatre auditorium of Académie de Québec. O. G. Vagi, architect.
Les détails de diffusion et de réflexion de son généreusement appliqués caractérisent l'avant de la salle de théâtre de l'Académie de Québec. O. G. Vagi, architecte.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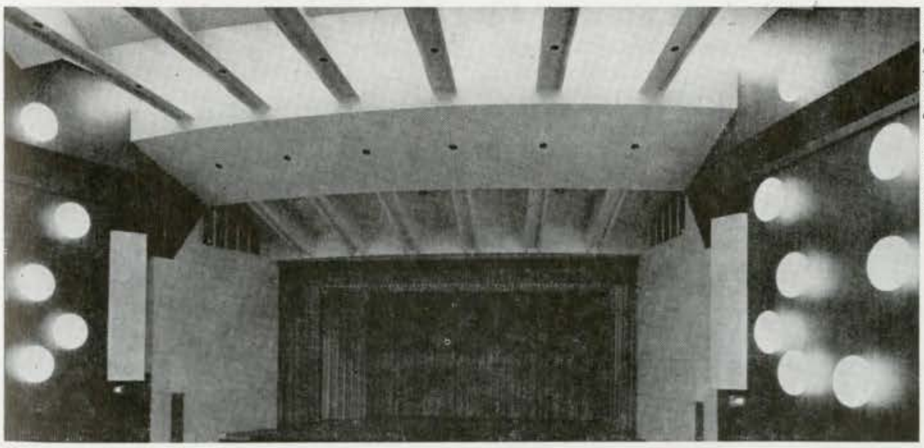
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Table II *Optimum reverberation times of auditoria at 500 cps*

Type of auditorium	*Reverberation time (sec) if volume of auditorium is: under 25,000 ft^3*	*25,000 to 250,000 ft^3*	*over 250,000 ft^3*
Rooms for speech	0.3-0.75	0.6-1.0	0.95-1.2
Legitimate Theatres	0.5-1.0	0.9-1.1	—
Music Halls	1.0-1.4	1.3-1.8	1.6 or more
Catholic Churches	—	1.4-1.8	1.7 or more
Protestant Churches, Synagogues	—	1.1-1.6	1.5 or more
High School Auditoria	0.8-1.1	1.0-1.6	—
Motion Picture Theatres	0.6-0.8	0.7-1.0	0.9-1.3

finishes used in the design of auditoria normally varies with frequency, naturally the R.T. values will also vary with frequency. It is, therefore, essential to specify and calculate the R.T. for a number of representative frequencies of the audio-frequency range. If reference is made to a R.T. value without referring to any particular frequency, then, this is generally agreed to be the R.T. at 500 cycles per second.

In the selection of acoustical finishes a number of considerations, often non-acoustical, must be taken into account simultaneously, such as: sound absorption coefficients at representative frequencies,

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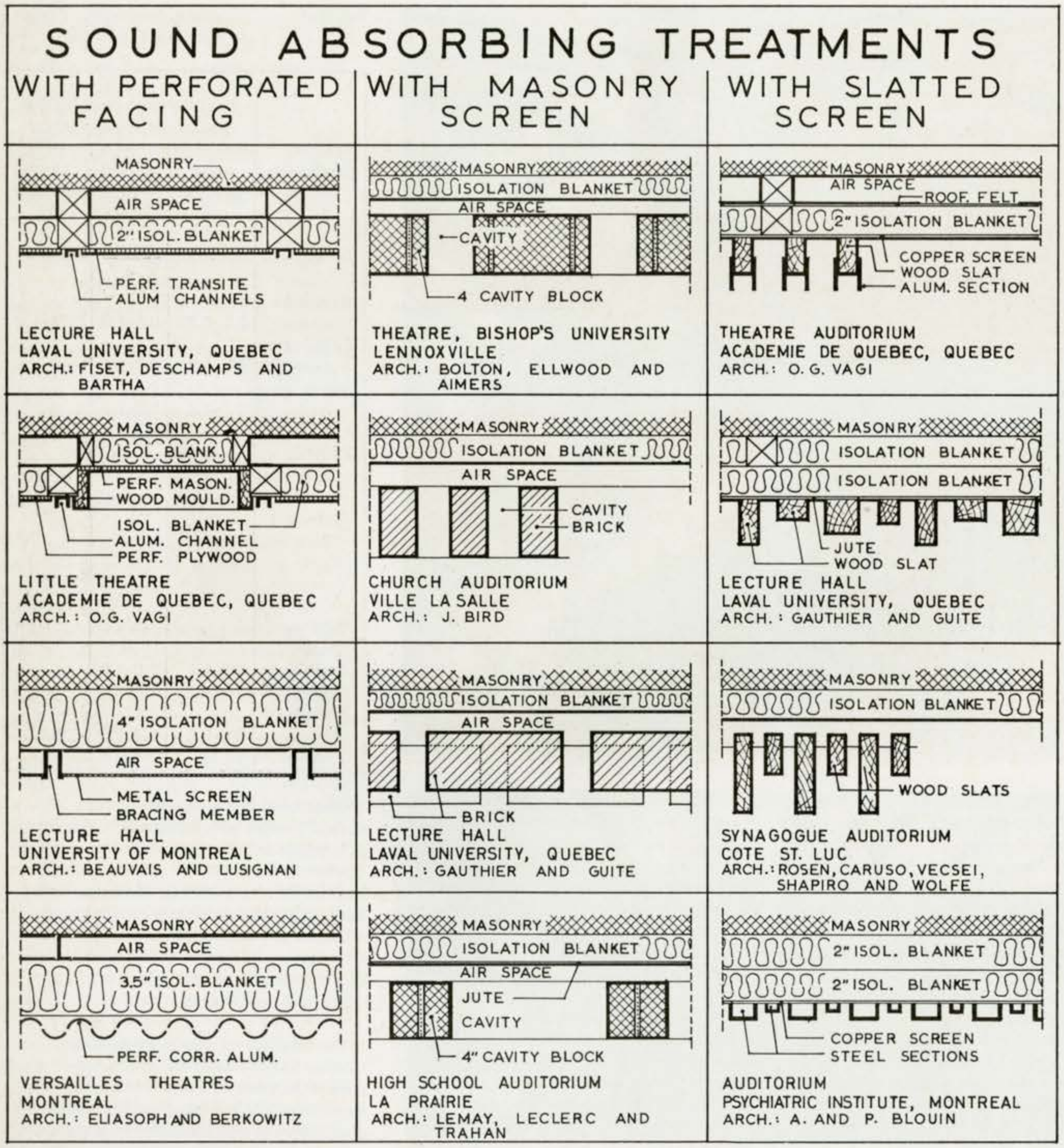
Examples of sound absorbing treatments used in various auditoria.

Exemples de traitements d'absorption de son en divers amphithéâtres.



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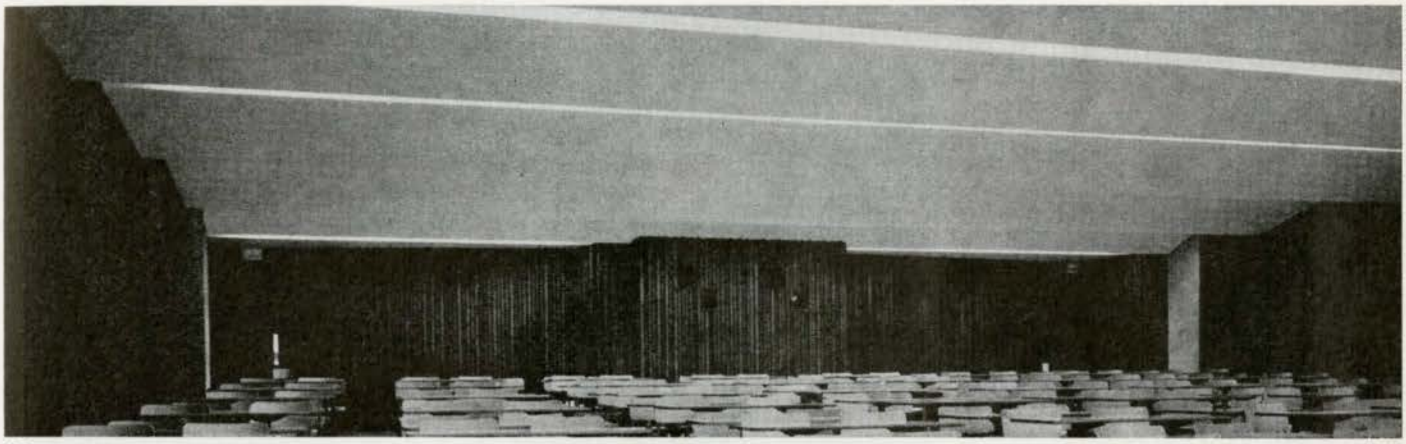
Sound absorbing rear wall of a lecture hall at Laval University, Quebec. Gauthier and Guité, architects.
Mur de fond absorbant le son d'un amphithéâtre à l'Université Laval, Québec. Gauthier et Guité, architectes.

13
Close-up of the wood slatted acoustical treatment along the rear wall (Fig. 12) of the lecture hall of Laval University, Quebec, detailed in Fig. 11. Gauthier and Guité.
Traitement acoustique en lattes de bois au mur de fond, vu de près (Voir Fig. 12), amphithéâtre à l'Université Laval, Québec, détaillé à la Fig. 11. Gauthier et Guité, architectes.

14
Acoustical treatment in the 770-seat theatre of Bishop's University, Lennoxville, detailed in Fig. 11. Bolton, Ellwood and Aimers, architects.
Traitement acoustique du théâtre de 770 places de Bishop's University, Lennoxville, détaillé à la Fig. 11. Bolton, Ellwood et Aimers, architectes.

15
Acoustical treatment of the 150-seat lecture hall, Laval University, Quebec, detailed in Fig. 11. Gauthier and Guité architects.
Traitement acoustique de l'amph théâtre de 150 places, Université Laval, Québec, détaillé à la Fig. 11. Gauthier et Guité, architectes.



Bowe Studio

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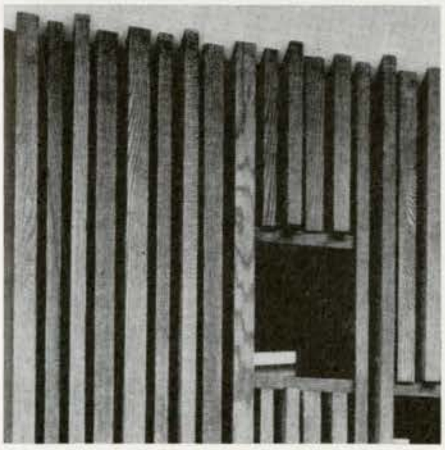

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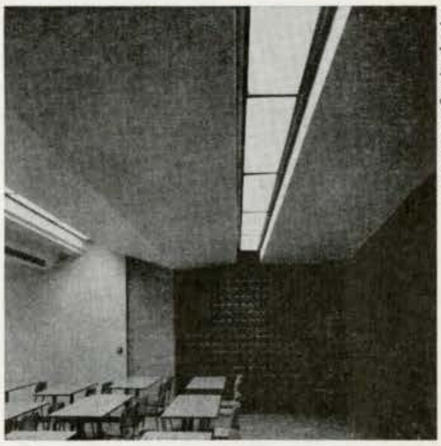

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13, 14, 15, Légaré and Kedl

appearance, available space, thickness, weight, fire resistance, light reflectance, maintenance, temperature and humidity conditions during installation, resistance to impacts and abrasion, moisture and condensation resistance, need for access to suspended ceilings or furred spaces, thermal insulation value, attraction for vermin or dry rot or fungus, probability of removal in the future (for later tuning purposes) and, last but not least, installation and maintenance cost.

Regarding the distribution of the selected acoustical finishes, as a general rule, sound absorbing materials should be installed along those boundary surfaces of the auditorium which are liable to produce acoustical defects (discussed later), such as: echoes, flutter echoes, long-delayed reflections, sound concentrations, etc. The acoustical treatment should go first on the rear wall (opposite the sound source), then on those portions of the side walls which are furthest from the source or the ceiling margins, and last of all on the centre of the ceiling.

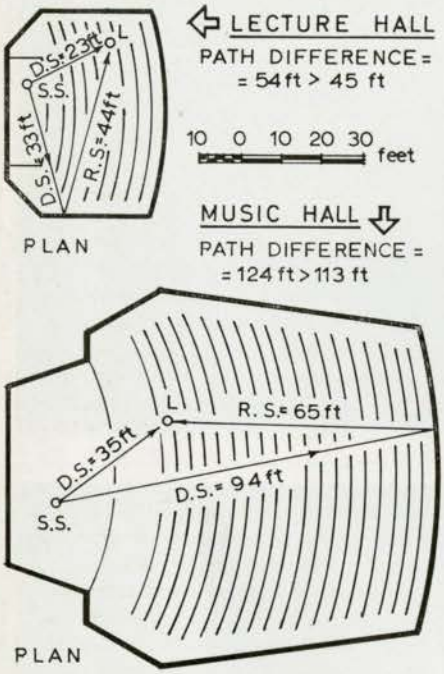
The reverberation calculations, the selection and distribution of acoustical finishes, depending on the degree of importance attached to acoustical considerations, normally call for the services of an experienced acoustician, if money is not to be wasted on inefficient and ill-sited acoustical finishes.

Since in the design of any auditorium the architect will normally strive for an individual solution, consequently, standard commercial sound absorbing materials are seldom used in contemporary practice. Figures 11, 12, 13, 14 and 15 show examples of "custom designed" acoustical treatments used successfully in various auditoria.

Elimination of Room-acoustical Defects

Besides the provision for positive acoustical attributes in an auditorium, such as, adequate loudness, uniform distribution of sound energy, and optimum reverberation time, as discussed so far, it is essential, too, that

16
The rise of echo in auditoria. If a time interval of min. 1/25 sec (for speech) or 1/10 sec (for music) elapses between the perception of direct and reflected sounds, corresponding to 45 ft and 113 ft respectively, there is a good chance that echo will be noticeable in the room. (S.S. = sound source; D.S. = direct sound; R.S. = reflected sound; L = listener).
La progression de l'écho dans les amphithéâtres. S'il y a un intervalle de min. 1/25 sec. (paroles) ou de 1/10 sec. (musique) entre la perception de sons directs et renvoyés, correspondant à 45 pi. et 113 pi. respectivement, il est fort probable qu'un écho sera entendu dans la salle. (S.S. = source de son; D.S. = son direct; R.S. = son renvoyé; L = auditeur).
17
Sound reflective rear wall (A), liable to produce echoes, should be treated acoustically (B), or rendered diffusive (C), or tilted, to produce beneficial short-delayed reflections (D).
Mur de fond renvoyant le son (A), susceptible de créer des échos, devrait être traité acoustiquement (B), ou rendu diffusif (C), ou incliné, afin de produire des reflexions différées de court delai (D).
18
The elimination of long-delayed sound reflections by the use of Geocoustic tiles in the 130-seat lecture hall of the Social Sciences Building of Laval University, Quebec. Fiset, Deschamps and Bartha, architects.
L'élimination de réflexions de son différées à long délai par l'usage de carreaux Géocoustiques dans l'amphithéâtre de 130 places de l'édifice de Sciences Sociales, Université Laval, Québec. Fiset, Deschamps et Bartha, architectes.



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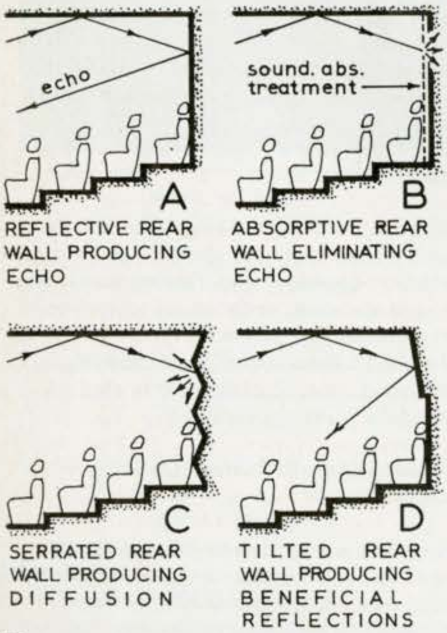

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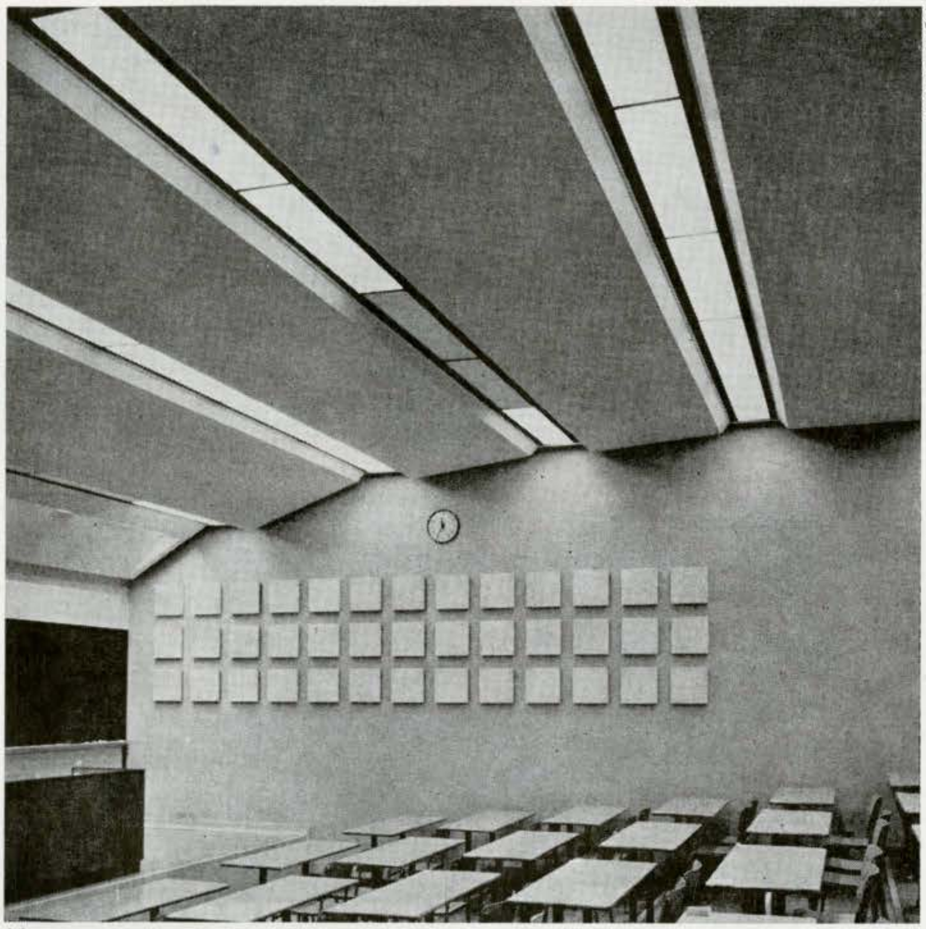
Légare and Kedl
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potential acoustical defects should be eliminated from the room. The most common acoustical defects which can impair, sometimes even destroy, otherwise acceptable acoustical conditions in a room will now be touched upon briefly.

Echo, probably the most serious acoustical defect in a room, will be noticeable when the sound is being reflected from any boundary surface with sufficient magnitude and delay to be perceived as a sound distinct from that which travels directly from the sound source. Echo occurs if a time interval of min. 1/25 sec (for speech) or 1/10 sec (for music) elapses between the perception of the direct and reflected sounds originating from the same source. Since the speed of sound is about 1130 ft per sec, the above specified critical time intervals correspond to path differences of min. 45 ft. (for speech) or 113 ft (for music) between direct and reflected sounds (Fig. 16). A sound reflective rear wall, opposite the sound source, is a potential echo-producing surface in an auditorium, unless this rear wall is under a deep balcony.

Echo should not be confused with reverberation. Echo is the distinct and highly undesirable repetition of the original sound; reverberation is the beneficial extension (prolongation) of the sound.

Long-delayed reflection is a similar defect to echo, except that the time delay between the perception of direct and reflected sounds is somewhat less (Fig. 18).

A flutter echo consists of a rapid succession of noticeable small echoes. It will be observed if a short burst of sound, such as a clap or shot is produced between parallel, sound reflective surfaces, while the other pair of opposite surfaces in the room consists of non-parallel, or absorbent, or diffusive surfaces. Elimination of parallelism between opposite reflecting surfaces is a good way to avoid flutter echoes.

Echoes, long-delayed reflections and flutter echoes should be prevented by the installation of sound absorbing materials along the defect-producing reflective surfaces. If the use of acoustical finishes along these critical areas is not feasible, they should be rendered diffusive, or tilted, to produce beneficial short-delayed reflections (Fig. 17).

Sound concentrations, often referred to as "hot" spots, are caused by sound reflections from concave surfaces. The intensity of sound at these "hot" spots is unnaturally high which always occurs at the expense of other listening areas, called "dead" spots, where hearing conditions are poor. The presences of "hot" and "dead" spots creates a non-uniform distribution of sound energy in the room and the elimination of this phenomenon is an important goal of room acoustics.

Large, unbroken concave enclosures, particularly those having large radii of curvature, should be eliminated from auditoria, or treated with efficient sound absorbing materials. If the application of large concave surfaces cannot be avoided or their acoustical treatment is not feasible, then these concave surfaces should be laid out in a manner such that they focus in space outside or above the audience area.

A suitably selected and properly installed electric sound amplification system will reduce, but never entirely remedy, the detrimental acoustical effects of echoes, long-delayed reflections, flutter echoes, and sound concentrations.

The phenomenon of sound shadow is noticeable under a balcony which protrudes too far into the air space of an auditorium. Such under-balcony spaces, with a depth exceeding twice the height, should be avoided, since they will prevent the remote seats underneath from receiving an adequate amount of direct and reflected sounds, creating thereby poor audibility in this portion of the listening area.

If an auditorium is connected to an adjacent reverberant space (such as, a foyer, stair-hall, corridor, stage tower, baptistry, etc.) by means of open doorways, the two rooms will form coupled spaces. As long as the air spaces of the coupled rooms are interconnected, an inflow of reverberant sound into the main auditorium from the adjacent space will be noticeable, although reverberation might have been properly controlled in the main room. This phenomenon will particularly disturb the audience seated close to the open doorways, no matter how much consideration was given to the reverberation control of the main auditorium.

The undesirable effect created by coupled spaces can be overcome either by adequate acoustical separation between the coupled spaces or by providing approximately the same reverberation time in both spaces.

Distortion is an undesirable change in the quality of musical sounds due to the uneven or excessive sound absorption of the boundary surfaces at different frequencies. This will be avoided if the applied acoustical finishes have balanced absorption characteristics over the entire audio-frequency range. Room resonance, sometimes called "coloration", occurs when certain sounds within a narrow frequency band tend to sound louder than other frequencies. The elimination of this acoustical defect is of particular importance in the design of radio and recording studios.

Noise and Vibration Control of Auditoria

Since this point was included in the May 1966 issue of *Architecture Canada*, it will not be dealt with in detail; only a few reminders will be touched upon.

The noise control of auditoria must start with sensible site planning, by separating the auditorium from all exterior and interior noise and vibration sources, such as, noisy vehicular traffic, air traffic, underground lines, parking or loading areas, mechanical equipment or electrical rooms, workshops, etc. The importance of locating the auditorium as far away as possible from all potential (exterior and interior) noise sources, cannot be stressed enough, because this has always proved to be the most economical noise control measure, as well as the most efficient.

The design of a protective (buffer) zone of rooms between exterior noise sources and auditorium will enable the use of less insulative, i.e., less expensive boundary enclosures around the auditorium. Rooms located in the buffer zone (lobbies, vestibules, circulation areas, restaurants, bars, offices, etc.) should have sound absorbing ceilings and should always be shut off from the auditorium with doors. If one auditorium is located next to another (horizontally or vertically), a wall or floor of adequate acoustical performance must be provided between them to permit their simultaneous use.

Whereas in the noise control of residences, offices, hotels, hospitals, restaurants, etc. the use of a continuous, unrecognizable, and not too loud background noise as a masking noise is not only permissible, but often even desirable, in auditorium acoustics the presence of a masking noise is in most cases undesirable. The ventilating and air conditioning system for an auditorium should be so designed that the noise level created by the system should be 5 to 10 decibels below the permissible background noise level, normally specified in noise criteria (NC) levels. This is necessary in order to avoid interference of mechanical noise with the intelligibility of speech or with the enjoyment of music.

The problem of noise control in auditorium acoustics is associated with the provision

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Floor plan of the divisible auditorium in the Regional High School of Vaudreuil, Quebec. The serrated side walls and splayed movable partitions provide short-delayed reflections, eliminate parallelism between opposite surfaces and increase diffusion. Labelle, Labelle and Marchand, architects.
Plan de plancher de l'amphithéâtre divisible au Lycée Régional à Vaudreuil, Québec. Les murs de côté en dents de scie et les cloisons amovibles évasées fournissent des réflexions différées de court délai, éliminent le parallèlisme entre les surfaces opposées et augmentent la diffusion. Labelle, Labelle et Marchand, architectes.

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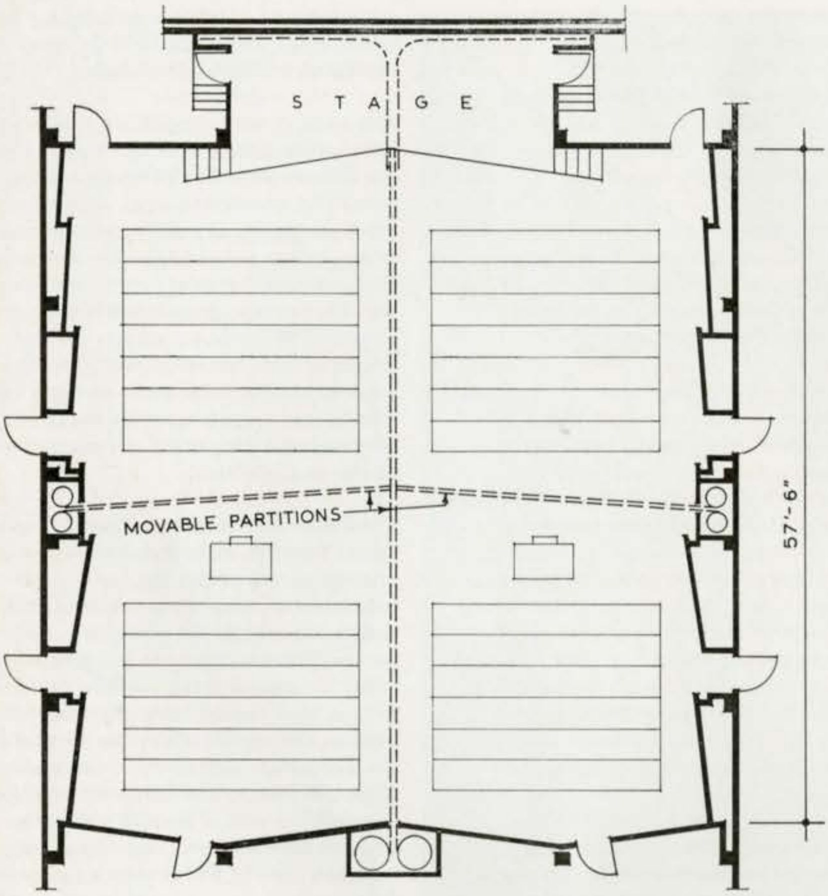
The divisible auditorium in the Regional High School of Vaudreuil, Quebec. Labelle, Labelle and Marchand, architects.
L'amphithéâtre divisible du Lycée Régional à Vaudreuil, Québec. Labelle, Labelle, et Marchand, architectes.



GROUND FLOOR PLAN

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for adequate loudness because each time that the background noise level has been successfully reduced in the room by a certain number of decibels, the subjective loudness of the program material will be automatically increased to the same extent.

A common noise problem in room acoustics is created by the increasingly frequent design of divisible and multi-purpose auditoria. Before the design and selection of the movable (operable) partitions of a divisible auditorium, the purposes of the subdivided instructional spaces have to be determined in order to establish the predictable intensity of the various sound sources. If the rooms are to be used for verbal instructional purposes only, a moderate degree of sound insulation will have to be accomplished by the selected movable partitions. If audio equipment or loudspeakers will be used, an acoustically more efficient partition system will have to isolate the sounds which will be of a greater volume and also of a different quality. And if any section of the divisible space is to present live music, a still higher degree of sound insulation will be needed. In the particular case of divisible auditoria, noises created by the ventilating or air conditioning system can be used as masking noise to drown out undesirable sounds penetrating through the movable partitions, thereby reducing the sound insulation requirements.

Divisible auditoria (Figs. 19 and 20) pose additional acoustical problems, such as: simultaneous reverberation control in the divided and undivided space; provision for loudness in the undivided space through the limited height of the movable partition opening; elimination of harmful reflections between the untreated movable wall surfaces and opposite walls; the control of cross-talk between divided rooms through ceiling spaces and ventilating ducts.

Conclusion

One purpose of this brief review of acoustical principles in auditorium design was to illustrate that hearing conditions in every auditorium are considerably affected by seemingly purely architectural considerations, with regard to room shape, room proportions, layout of boundary surfaces, distribution of structural and mechanical elements, fixtures, seating layout, audience capacity, surface treatments, decoration, etc. Practically every minute detail within the enclosed space will contribute to a greater or lesser extent to the acoustical performance of the room.

Another object was to show that the satisfactory solution of acoustical requirements does not curtail or even restrict the architect's design freedom. Every acoustical problem can be attacked in a number of ways. Contemporary constructional and interior decorating practice permits that acoustical principles and requirements be satisfactorily translated into the language of contemporary architecture. ☐


20

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**Compiled by Mrs Eva Doelle,
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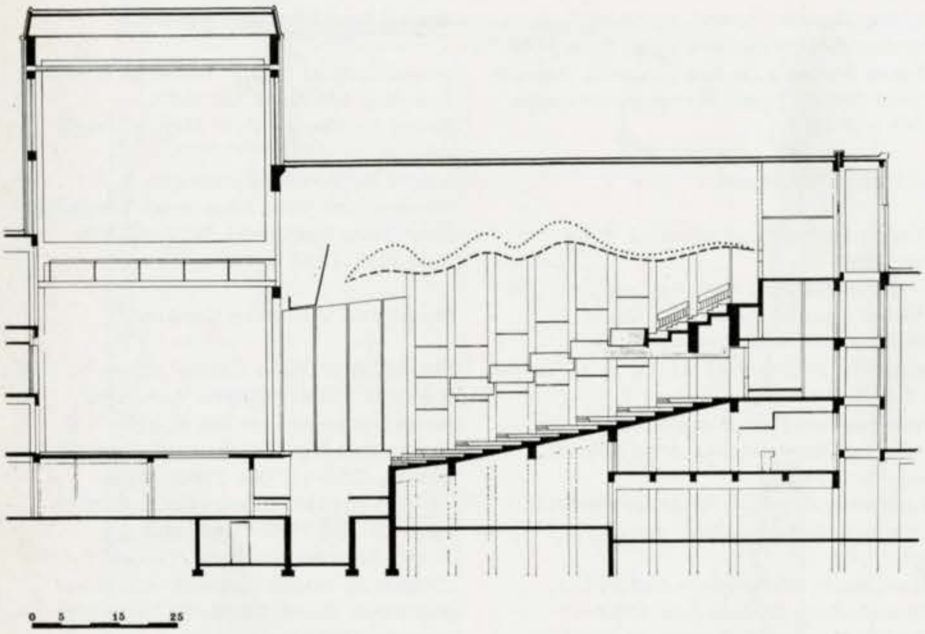
Arts and Culture Centre, St. John's

Affleck, Desbarats, Dimakopoulos, Lebensold, Sise, Architects

1
Longitudinal Section
Coupe longitudinale
2
Mezzanine Plan
Plan de mezzanine
3
Upper Concourse Plan
Plan du foyer supérieur



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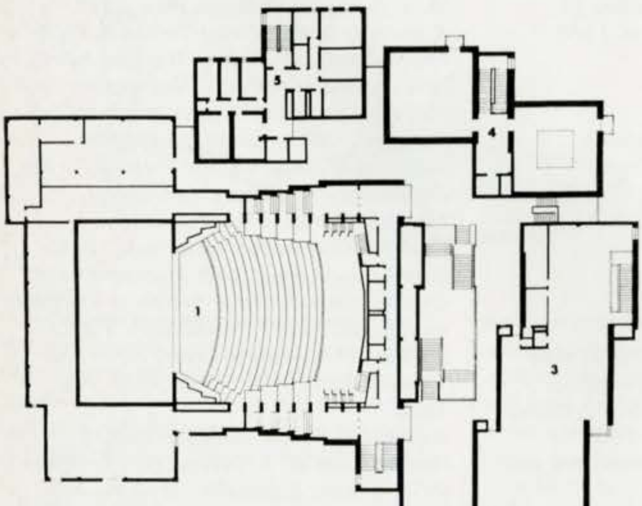

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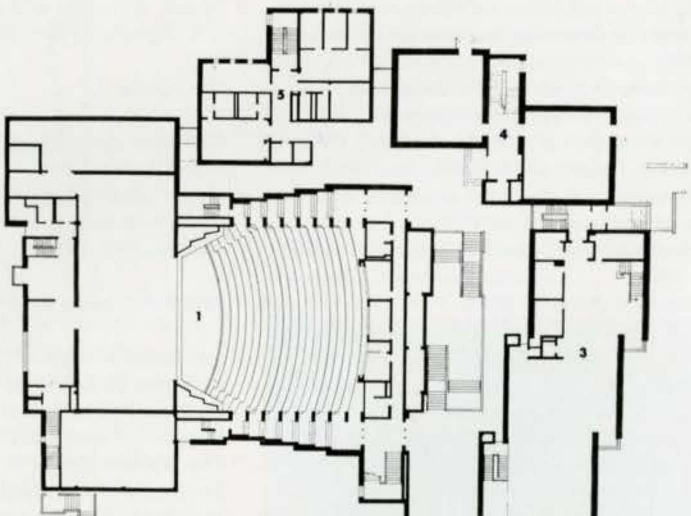
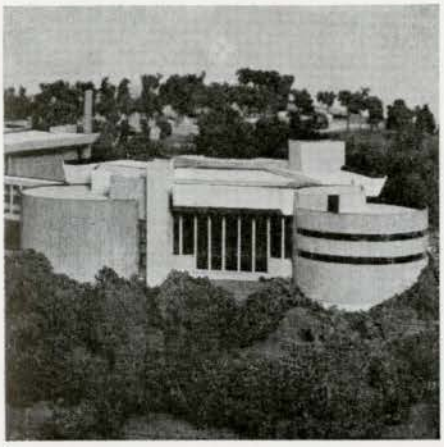


3

Centennial Centre of Science and Technology, Toronto

Raymond Moriyama, Architect

1
Model showing theatre, a circular mass without windows. Theatre is intended primarily for speakers
Maquette du théâtre, une masse circulaire sans fenêtres. Discours Le Théâtre sera utilisé particulièrement pour les discours
2
Plan
3
Section
Coupe



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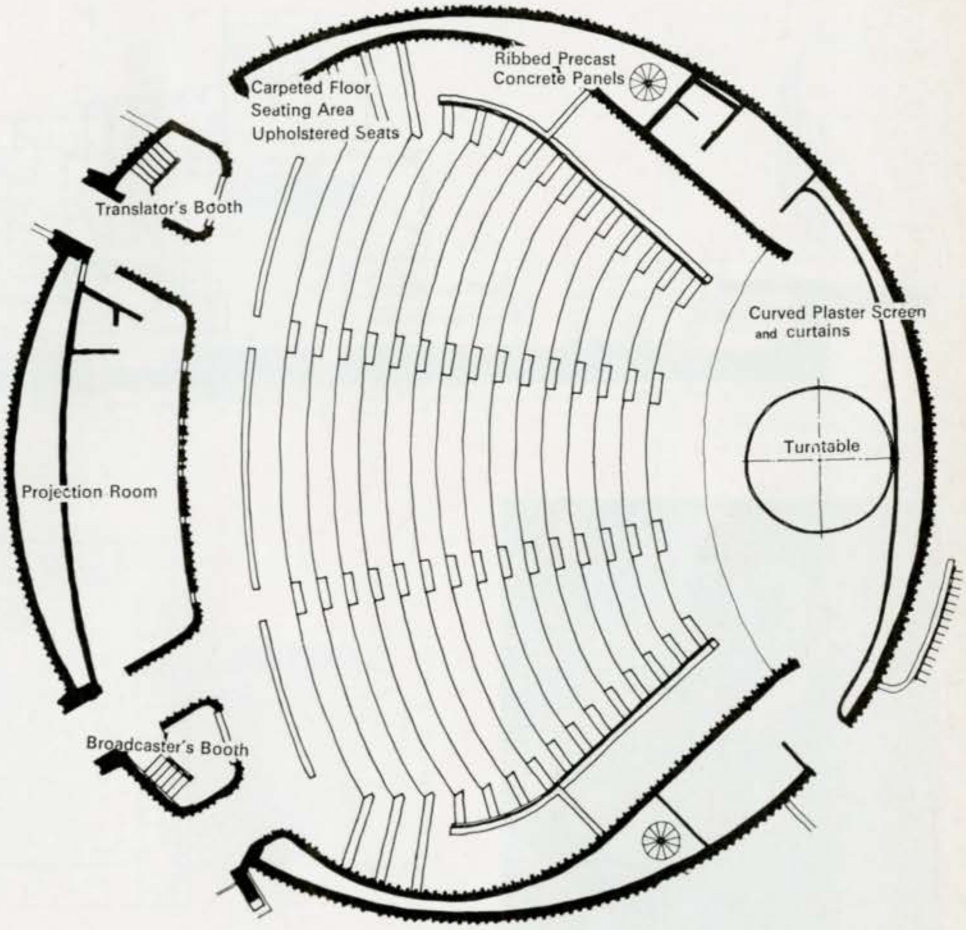

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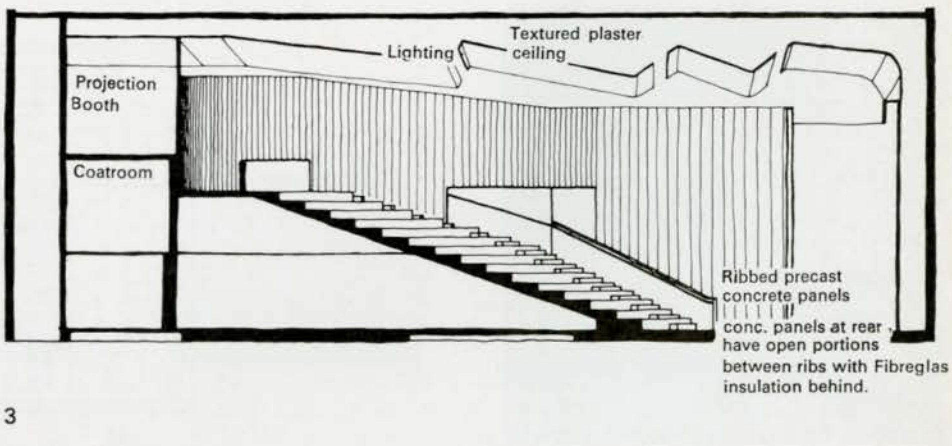

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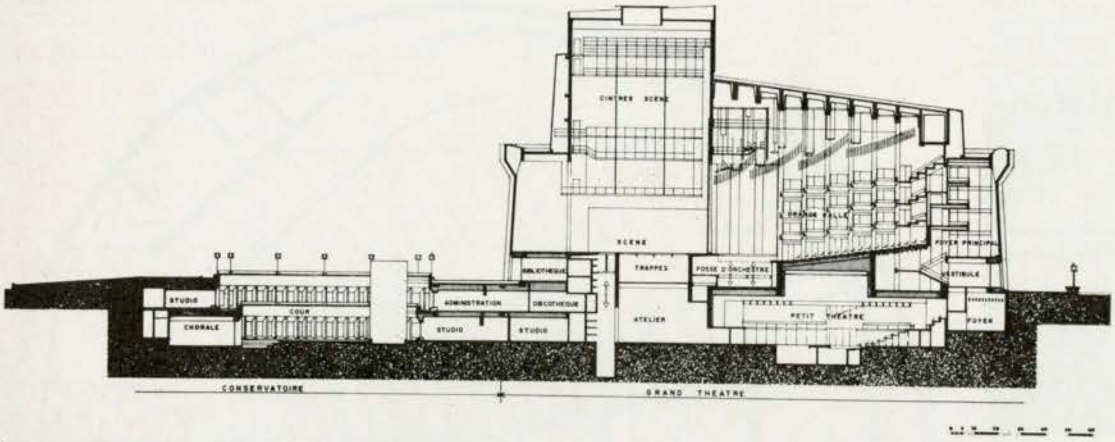
Le Grand Théâtre de Québec

Victor Prus, Architect

1
Section
Coupe
2
Vue générale, du jardin du Conservatoire est l'avant plan
General view, Conservatoire Garden in foreground
3
Entrée du Boulevard Ste Cyrille
Approach from Boulevard Ste Cyrille

4
Premier Sous Sol
First Lower Floor Plan
5
Deuxième Sous Sol
Second Lower Floor Plan



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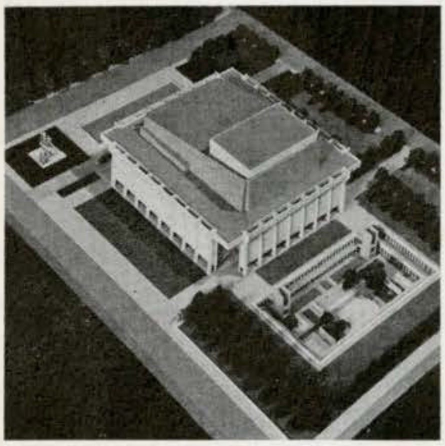

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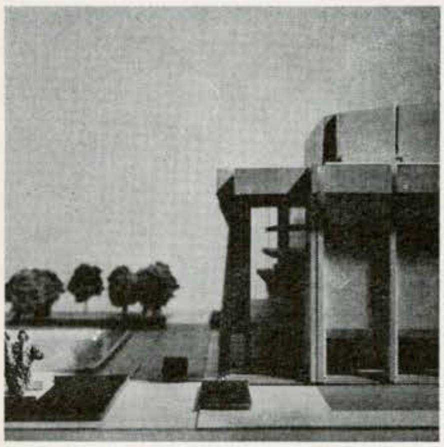

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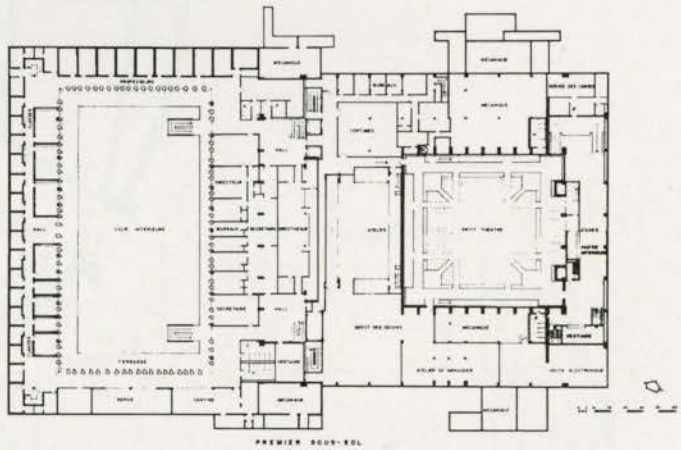

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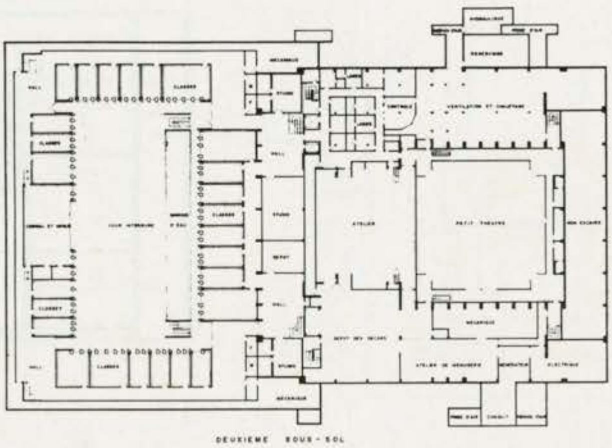

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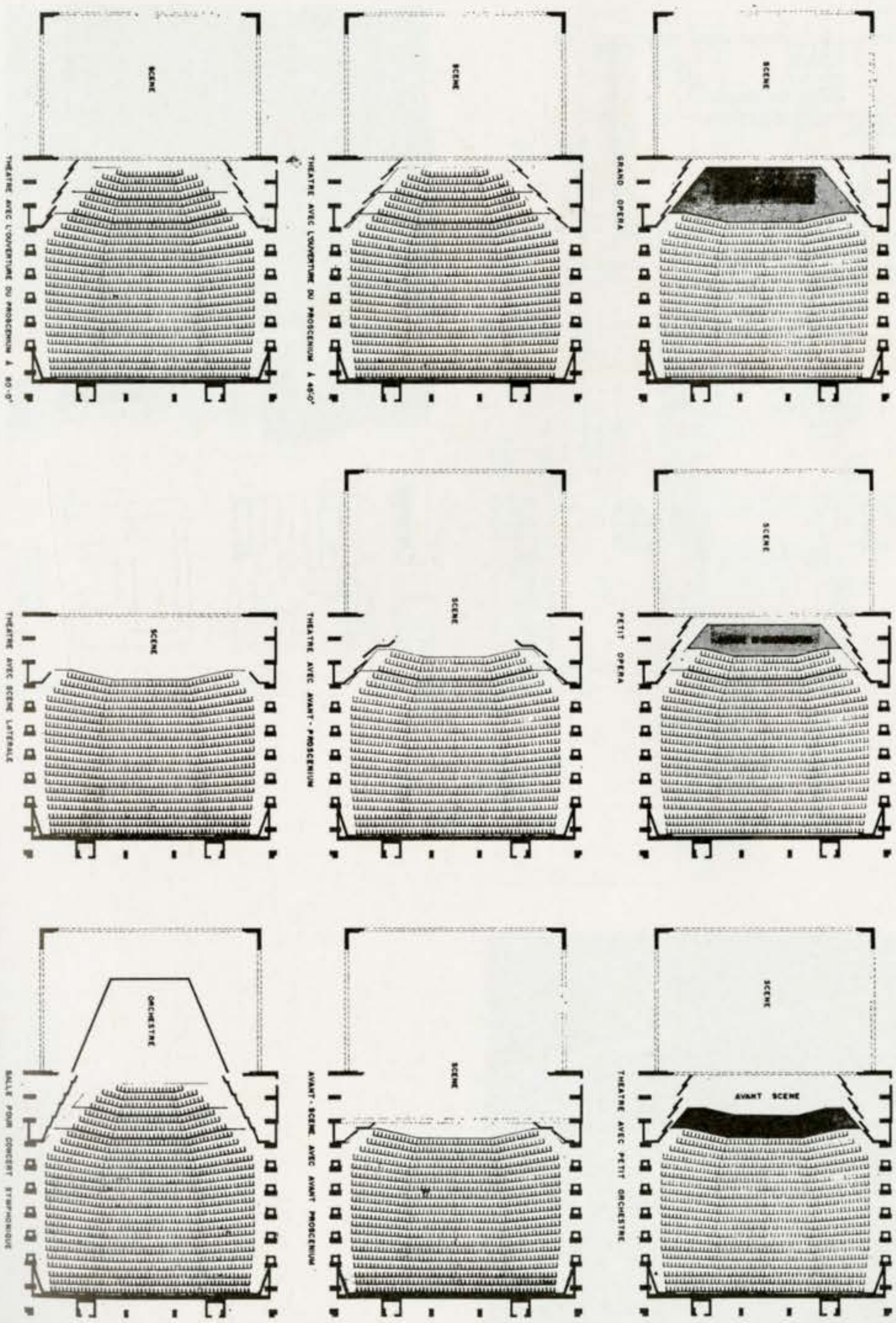
6
Divers types d'aménagement de la Grande Salle
Different arrangements of the large auditorium

7
Divers types d'aménagement du Petit Théâtre
Different arrangements of the small auditorium



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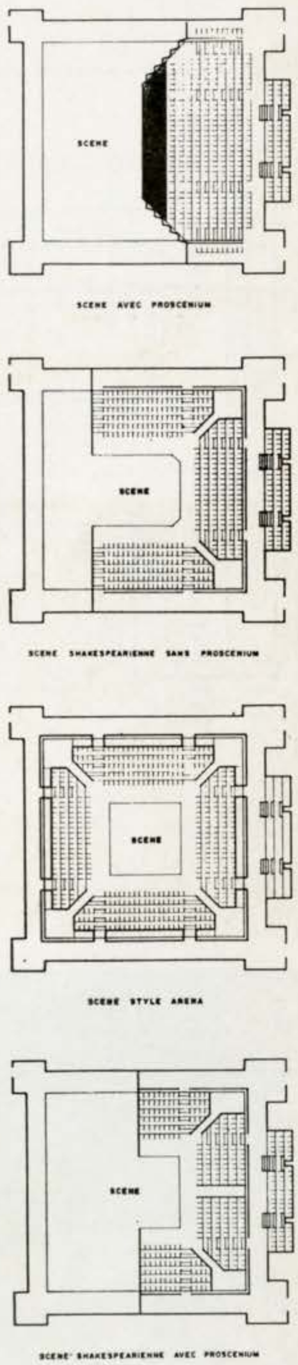
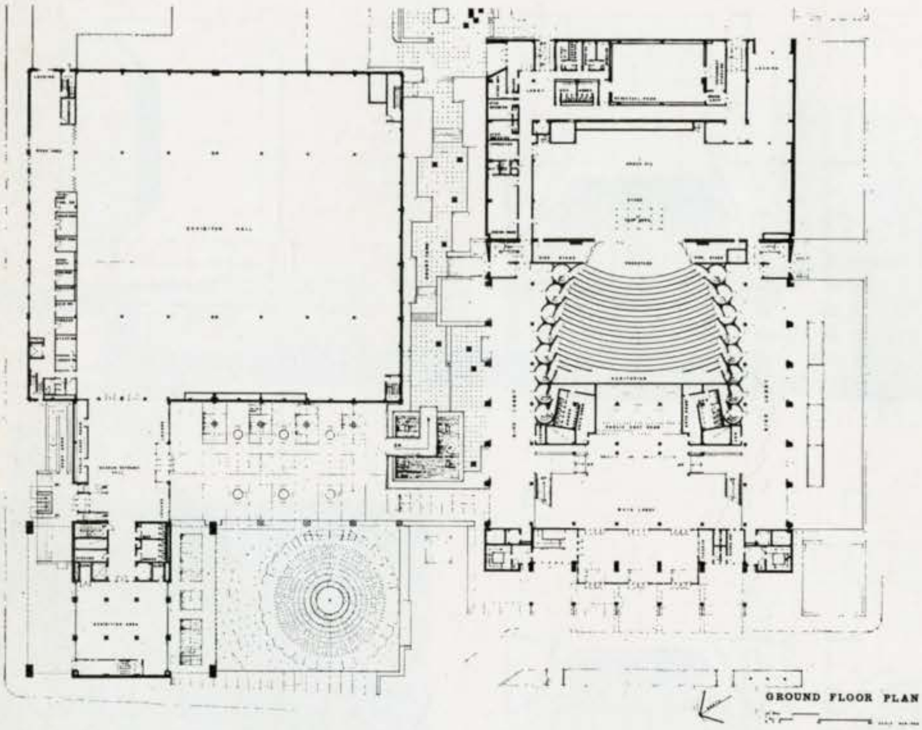


7

The Manitoba Centennial Project Winnipeg

1
Ground Floor Plan
Plan du rez-de-chaussée
2
Perspective
3
Site Plan
Plan d'emplacement

Associated Architects, Green, Blankstein Russell Associates, Moody Moore and Partners, Smith Carter Searle Associates



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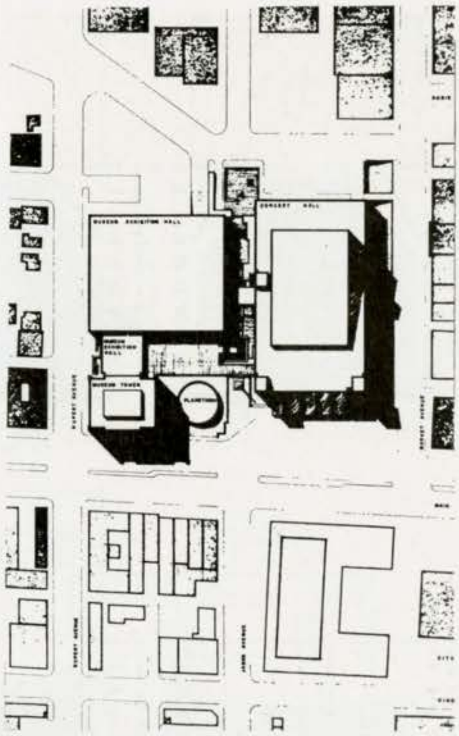
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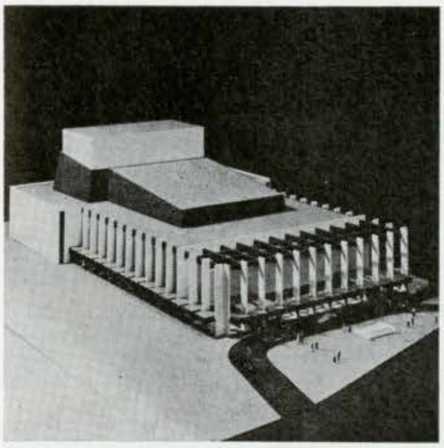
2

Saskatoon Centennial Auditorium

Kerr Cullingworth Architects

1
Model
Modèle
2
Section Through Auditorium
Coupe sur la salle
3
Main Floor Plan
Plan du rez-de-chaussée
4
Third Floor Plan
Plan du deuxième étage



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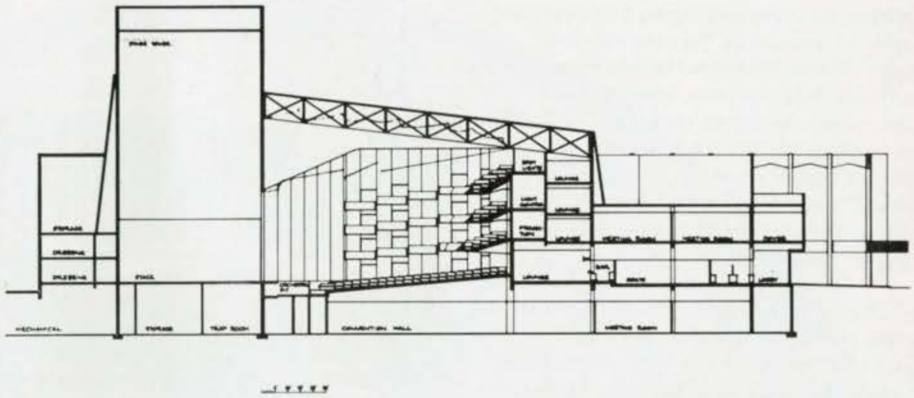

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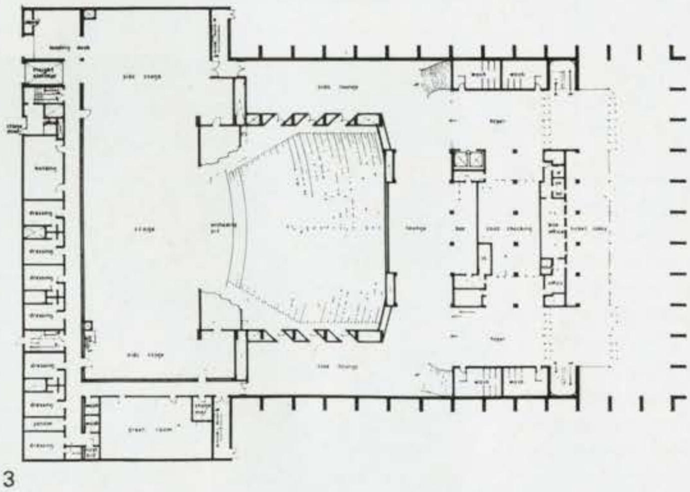

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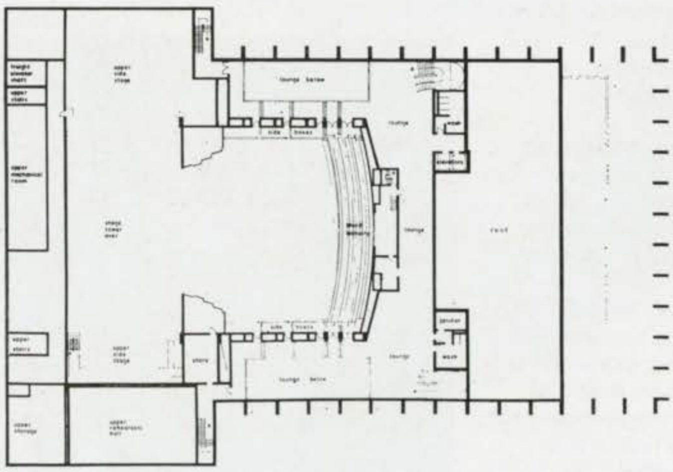


4

Psychedelic Experience Without LSD

"Kaleidoscopic space can't be measured by a tape, but can be determined with an optical rangefinder."

We present on these two pages, Kaleidoscope, at Expo '67, created by Toronto industrial designer Morley Markson. He was asked by the University of Waterloo, Institute of Design, to take complete responsibility for the total physical aspect of the pavilion for the six largest chemical producers in Canada. The comments which follow are some of Markson's thoughts on the concept of this color "happening".

"The pavilion is round, like a carousel, with 112 fins painted vivid colors covering the circular steel frame. As the Expo visitor looks at the pavilion, either from the Expo Express, the Monorail, or from the ground, he will see a constantly changing spectrum of color on the fins." (**1**)

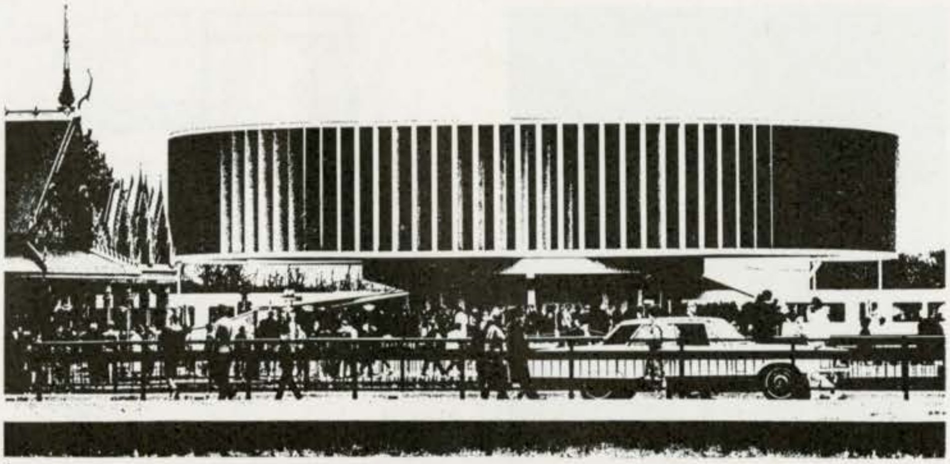
"The film is divided into three parts one to be shown in each of three chambers. In the first chamber, the emphasis is on the natural effects of the out-of-doors.

"When people enter the chamber, all they'll see are sparkling, twinkling effects on a huge panorama that appears to stretch for about 400 feet. Then the screen fills up with light, effects of light and color on water suffuse the room. You'll see a beautiful girl, and at the same time, many beautiful girls, running through fields of pink and white blossoms, then suddenly her motion is translated into the color of soldiers marching, marching in all directions, unfolding (from zero) like a Kaleidoscope.

"The second chamber, huge infinite spaces of receding columns, delves into the mechanistic images of the world of machines, foundries and computers. (**2**)

"The third chamber (**3,4**) is much more abstract, really a sensual experience in moving form and color. You are confronted by a sphere, hanging in space, swollen with frantically changing patterns, about 500' in diameter.

"We created all kinds of very beautiful geometric systems – moving from a simple linear curved strip in chamber one to the highly complex and broken-up images of huge columns and space in chamber two to an enormous globe which you look at from the outside in the third chamber."



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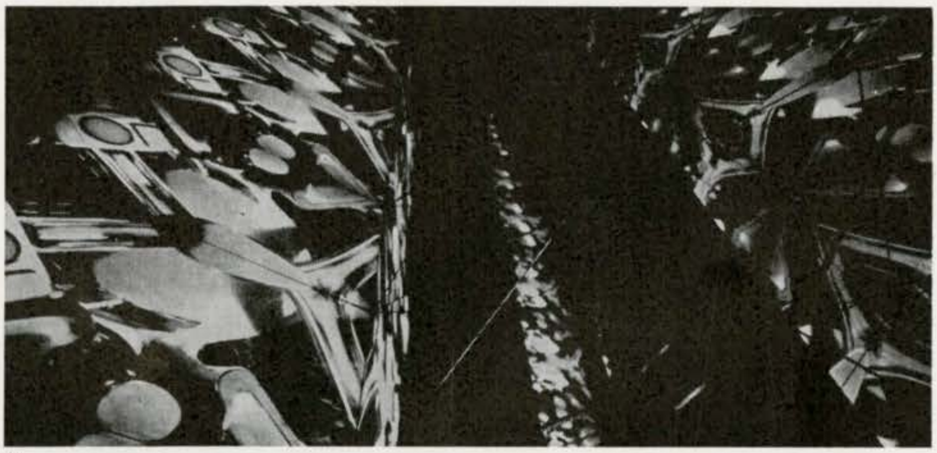

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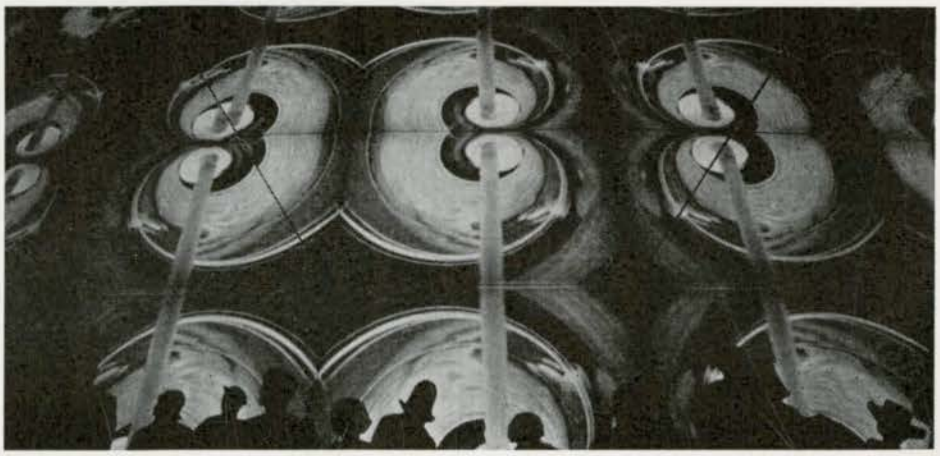

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"We conceived it as an abstract impression of the world of color which is around us in our daily lives – instead of just looking at color, or being told about it, you experience color."

"One shouldn't look for a literal theme and message. The message is color and motion."

"Have you ever seen yourself from three sides at once? In retrospect, that's the soul-core of Kaleidoscope."

4

"Symmetry is a subject which had interested me for some time – how people relate to all aspects of symmetry – not only in design . . . but in literature and music"

Pella

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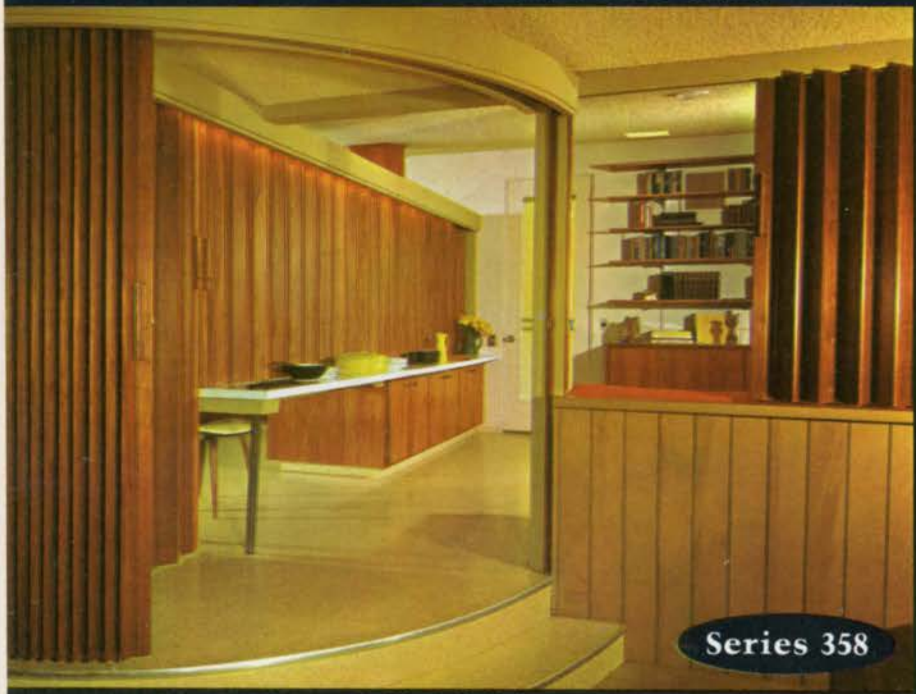

Architect: Paul S. Hoag • Builder: L. M. Clark

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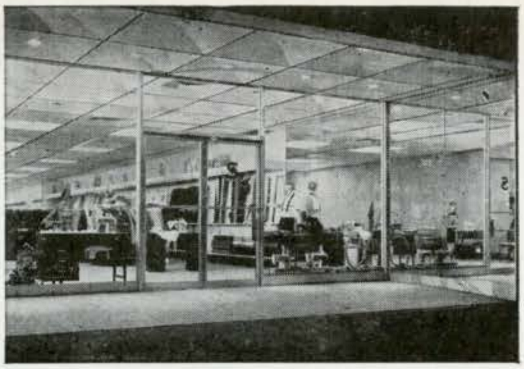

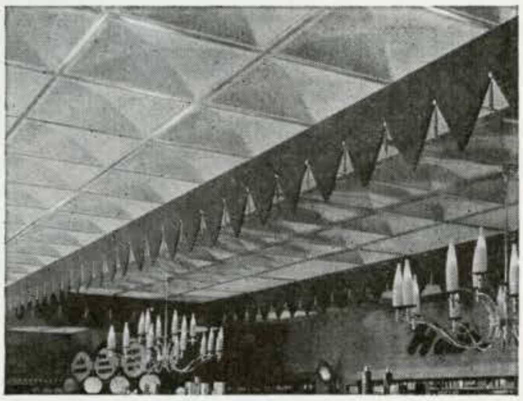

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Mechanical Services

David B. Leaney, P.Eng.

Mr Leaney is Director and Chief Engineer of D. W. Thomson and Co. Ltd., Vancouver. He is a Past President of the B.C. Branch of the American Society of Heating, Refrigeration and Air-Conditioning Engineers.

Each day, the concept of integration of engineering services in building structures becomes more complex. The only approach that can create a real practical result is the team approach with the architect acting as the chairman co-ordinator to ensure that the client's requirements, design requirements, structural requirements and environmental requirements are understood by the whole team of experts. The design of the whole building aesthetically and engineering-wise involves the team being system oriented. All parts of the program for the job must be considered of the same importance to achieve the most acceptable and economical solution to the problem.

Construction costs continue to rise and new techniques must be developed to eliminate finishing labor on the job-site. Items such as suspended ceilings must be reconsidered and more use will be made of acoustically treated structure that is arranged in a pattern that will allow for space division without losing an acoustic separation at the walls, no matter where they are placed. These concepts bring about new engineering solutions to the mechanical problems, for the structure must include the spaces for running the piping and ductwork systems that previously were housed above the ceiling. This example of design change is being repeated in many areas of the building. The air conditioning and ventilating ducting systems require the largest spaces to be provided both horizontally and vertically. These spaces must be integrated with all the other requirements and the resulting forms must be orderly and repetitive in design, able to satisfy all the criteria set for the problem and be pleasing to the eye. These forms generally will integrate at least two of the engineering design fields, namely the air conditioning and the lighting. The piping systems associated are usually more easily accommodated with housings on the perimeter walls and within the core. The best solutions are always cognizant of the possibilities of future change, organized to a pattern but not so rigidly executed that adjustment or alteration cannot be considered.

This idea of total system is very apparent in new office structures. It is not yet as evident but is most necessary in the laboratory buildings where rapidly changing technological and new research programs bring about the instant need for change. The school is rapidly changing from a series of general rooms of the same shape to major areas that can be organized and regularly altered for team teaching, special coaching, project work and planning. The rigid forms of the past, which allowed a place for everything on its own, are not adaptable to the present criteria that accept change as inevitable.

Together with this idea of systems, we are creating a new field for experts to advise all of those presently practicing in the engineering and architectural disciplines. These are the most inspired members of all the present teams who have the best ability when working closely together to search out the real requirements to satisfy the client. These men are systems keyed and oriented to need, economics, area and form. Their special ability can be best seen in the design of laboratories, hospital departments, kitchens, laundries and research facilities. They are best able to determine the capacities of equipment needed, the methods that will be applied to its use, the total environment in which it should be used and the services that must be planned for. They can give guidance on planning for changes that, with little alteration, will allow more sophisticated equipment with greater capacity and flexibility to be installed at a later date. These people are well trained in statistics and are able to establish the numbers of items needed, and their location relative to the numbers and placement of the users. These people are also user oriented with sensitivity to the physiological and psychological requirements and possess the ability to analyze the functions involved and plan for the optimum number of users working together.

The advice of these system planners provides much better criteria for the present breed of engineers and architects than either the owner or users or they themselves are able to provide. It provides the building design team with a well defined and documented series of facts and layouts that lets each discipline sort out its phase of the problem and establish the overall criteria for each phase of the design. At this stage the total program can be prepared as the basis for the integrated design solution that is to be researched and executed.

With the systems approach, all design must take place at the preliminary design stage. All components must be planned for route, shape and capacity and then be integrated into the overall scheme. All the details that set the limitations and the integration must be worked out completely and may require models or mock-ups to ensure that all the participants of the team have a complete appreciation of the overall solution. This is the stage where adjustment can be made to any and all disciplines to achieve the best total solution. With all the design completed at the preliminary stage, it is then possible to study vibration analysis of equipment locations, acoustic separation of equipment rooms, acoustic control of piping and ductwork before the working drawing stage and to prepare the design criteria for the effects of the environmental plant on the structure and walls before the final design working drawings are started.

The systems team approach requires an organization that is arranged to speedily establish and transmit information to all those who are working together. It needs a very strong personality in the driver's seat who has the facility to weld the work of all the participating disciplines at the preliminary stage. It allows for better control of timing and provides a framework upon which the design can be frozen. The working drawings stage then can be reduced in time as it becomes a disciplined recording of fact rather than a continuous evolvement from improperly studied changes.

As integration of all phases of design becomes a more used form of building design concept, as compared with the present general method of applying disciplines to a frame, it is evident that it will become necessary to resort to different methods of presenting the design information to the user and the contractor. As integration becomes better conceived, it becomes more necessary to be aware of the complete order of things that regular plans, elevations and sections do not completely establish. It is possible that the use of multi-color prints, transparent overlays and photographs of models will be regular components of contract documents.

This difference in the presentation of the construction information will need to be supplemented by written material and lectures that will acquaint the tendering contractors with the basis of design and familiarize them with the form, order, methods, procedures and schedules that have been planned and designed for the construction. This early communication with the builder will be comparable with the preliminary planning stage and will be the vehicle for drawing the builder into the team. With early knowledge of the concepts of design, the contractor can establish an appreciation of his problems before the prices are submitted and the total economics for the projects should involve less gambling by the contractor, resulting from his greater knowledge of the work.

With more integration of design, the job inspection becomes more critical. The order of arrangement of parts and the timing for setting requires more detailed scheduling for proper execution. Where field problems occur, the solutions must not be snap judgments but rather they must be tempered by a full knowledge of the final placement of all parts in order that a progression of changes does not result from a quick decision. The quality of workmanship and finish must be of a higher order and more closely controlled because many of the components will be exposed to view and concealed only by the level of lighting or the final color that is applied. When the integration involves providing a designed space for every part, the tolerances of installation for the parts must be maintained. All systems are planned with a wide range of adjustment and the mechanical features that allow this adjustment must be checked before they are installed and then placed in location, positioned with full knowledge of how they will be used when they are needed. Where job work such as insulation of piping is required, much of this will be done before the piping is installed to minimize the extent of the in-place labor and also to increase the quality of the finished work.

With more of the entrails of the building, the engineered environmental systems subtly exposed, it will be essential that cleanliness of the construction job be given more importance. Much of the exposed equipment will be the building finish and as such will be subject to damage from the dirt generated by the construction procedure. New methods of protection of the work as it proceeds will evolve so that clean up will be regular as the work is done, rather than as a difficult final procedure.

As the building is being completed, it is essential to add one more group to the team. These are the users or owners-operators. It is possible that they may have been conditioned to the design while it was in preparation or while the building was being constructed; however, based on the general state of things today, this usually is not the case. Too often, the job performance is seriously prejudiced by the fact that the operating and management staff are handed a complex machine to operate and control. They frequently receive no instruction into the philosophy of the planning, the expected performance, or the planned manner for the controlled operation. Those charged with the operation must be properly trained with respect to all equipment and systems. They must know the design philosophy in order that they may interpret it to the users. They must understand all manner of the adjustments available to allow them to be sympathetic to the feelings and needs of the users and able to tune the systems to provide the environment desired. The instruction of the operators can be started at any time during the planning and construction stages but they must be ready to be on hand when the systems are started and when the systems performance is adjusted and balanced to the programmed design criteria. With this exposure to the initial start-up of the systems and by association with the skilled staff of the contractor and designers as they make the adjustments that set systems in operation to the required job performance, the operators gain experience and confidence. This training prepares them to make the routine adjustments that are required to satisfy the greatest percentage of users.

Our whole design procedure is controlled by economics. With costs continuing to rise, we will be faced with old problems requiring new and more adept solutions. There will be new materials, new equipment and new concepts of building structure to attempt to control cost. However, the greatest advances in controlling costs will be made by the design teams that are best able to integrate the job requirements using systems analysis and come up with better total solutions to satisfy the design criteria. ☐

Estimating

It is hard to imagine that anyone would seriously disagree with the foregoing article because those involved in the construction industry from architect to mechanic are aware of existing problems.

If those involved in the design and preparation of tendering documents worked closer together in a more integrated manner as suggested a lot of problems would be eliminated, which would eventually help to reduce overall cost.

However, integration can only be achieved when parties, motivated in opposite directions, have the intelligence to realize that a common goal and team effort are essential in attaining total success.

With a greater understanding of total concepts each member of the design team would be able to produce more specific information to tendering contractors and, therefore, reduce the grey areas on which the contractor must gamble.

The sensible contractor is forced to include allowances to cover himself for these general clauses that are so indefinite and consequently his price is higher than would be anticipated.

The modern architects appear to be aware of the situation and more than ever are trying to assemble their team of experts as early as possible.

The following is an example of a Mechanical Cost Plan produced by a cost consulting firm recently, for an engineering building at a university in Ontario.

It should be noted that the elements of the cost plan form a basis for cost control, and therefore, one has more chance to control the overall budget in that he can control each element.

This information is produced before working drawings are started, usually from owners brief, flow diagrams, etc.

Air conditioning (50% area) $439,550.00

Special exhaust $86,262.00

General exhaust $266,904.00

Engwall exhaust $26,752.00

Refrigerated area $5,500.00

Plumbing $188,295.00

Heating $225,087.00

Controls $165,000.00

Insulation $220,000.00

Lab area hook up $110,000.00

Site service (tunnel) $38,500.00

Site service (water, gas, drains) $179,346.00

Sanitary exhaust $8,350.00

Dust collection $19,835.00

Design contingency $100,000.00

Master control $50,000.00

Total $2,129,281.00

Based on gross square feet area this total mechanical estimate worked out to $10.50 per square ft.

This cost per square foot would be a good average figure to use for preliminary budgets in University Engineering Buildings where air conditioning is required in major areas.

E. Thornley, President, Thornley & Haynes Ltd, Electrical Mechanical, Construction Cost Consultants


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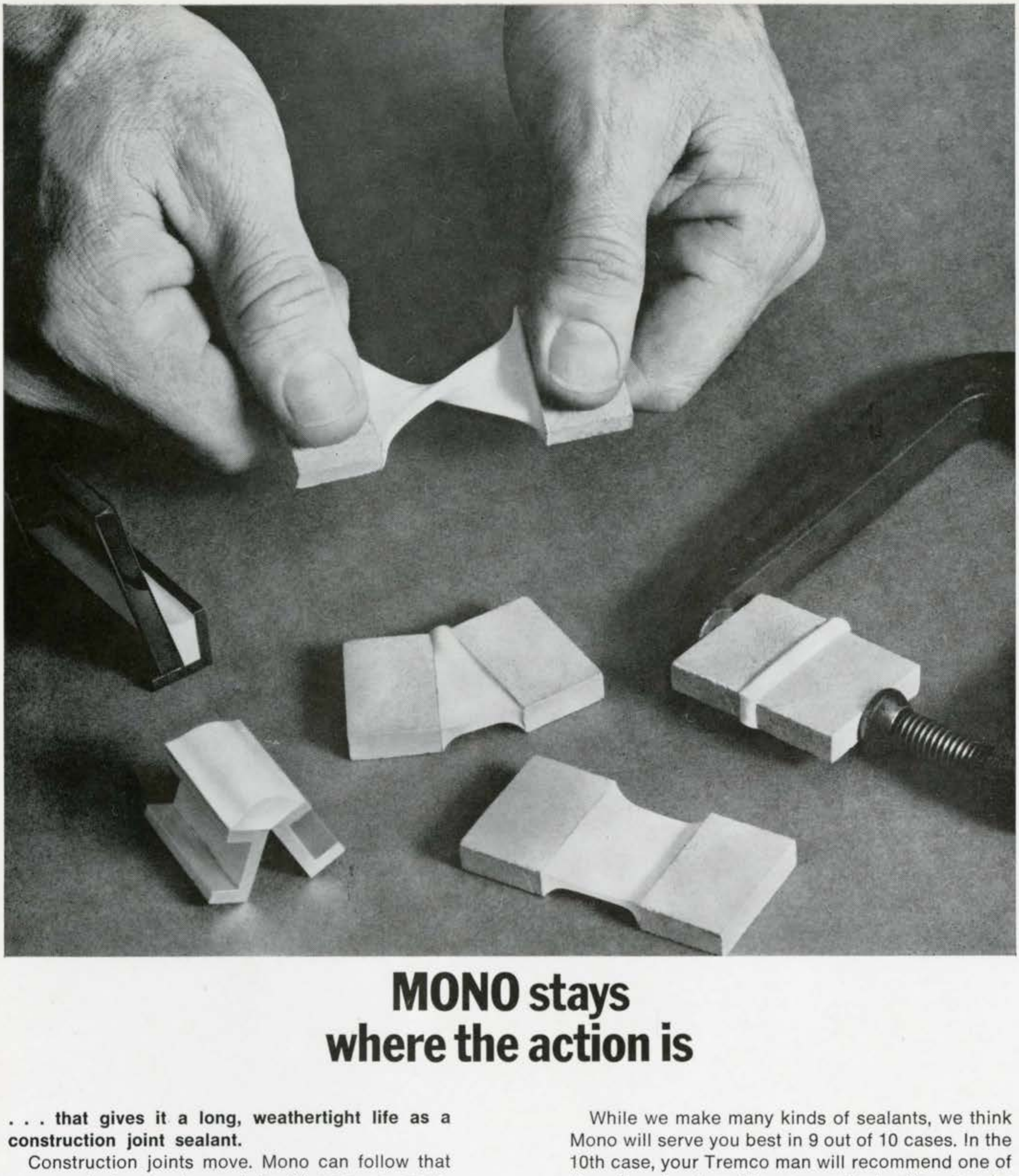

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If you'd like to know more about Mono and the other Tremco sealants, please see Sweet's or write us for additional information.

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Lead frame surrounding the photo of a staircase in Montreal's Chateau Champlain symbolizes the role of lead in modern buildings as a barrier against moisture, noise and vibration.

Lead - the barrier metal

In a hundred different situations, lead is the most effective barrier against vibration, noise, water, weather and radiation. Pools and planters become impervious when lined with lead; machinery and entire buildings rest on cushions of lead which absorb vibrations; silence prevails where doors, ceilings and partitions are lined with thin lead sheet; lead roofs and flashings lock out wind and rain, and lead shields "X" and gamma radiation in industrial and medical environments.

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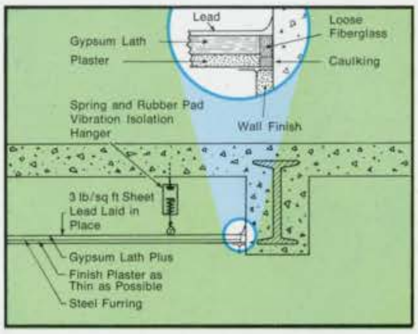
Yorkdale Shopping Centre
Simpson's Courtyard

John B. Parkin Associates, Architects.
Victor Gruen Associates,
Interior Designers.

Keeping the water *in* ornamental pools and planters and indoor swimming pools is a job for lead, and the *really sure* way to provide *permanent* protection for surrounding areas and lower floors.

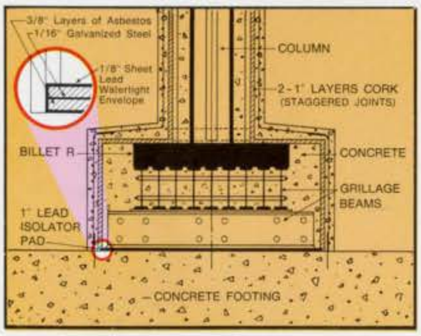
Le Chateau Champlain
D'Astous & Pothier, Architects.

Guests in Montreal's new 600-room luxury hotel enjoy complete quiet even on floors immediately below mechanical service areas, thanks to the intervention of lead. The schematic drawing below shows typical floor-ceiling construction in these spaces.



Montreal General Hospital
Robert P. Fleming, Architect.

Recent alterations to The Montreal General Hospital, Radiology Dept., involved lining 7 rooms with lead sheet as a radiation barrier. Lead glass, lead-cored doors and lead window frames were also specified to shield hospital staff and patients from "X" and gamma radiation.



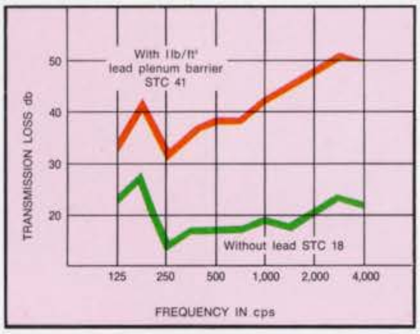
Place Ville Marie
I. M. Pei & Partners, Architects.
Affleck, Desbarats, Dimakopoulos, Lebensold, Sise, Associate Architects.
Bolt, Beranek and Newman, Inc., Acoustic Consultants.

Development of Montreal's large downtown projects proceeds above a network of railway tracks and subway tunnels, existing and proposed. Isolating buildings from street and railway vibrations is a job that must be done well — and it's a job that's regularly entrusted to lead asbestos antivibration pads.

Sun Life Building
John B. Parkin Associates, Architects.

Weather-proofing modern office buildings is one of the important architectural uses of lead sheet. Lead is both highly durable and capable of retaining a quality appearance over a long period of atmospheric exposure. It is especially valuable for keeping costly, difficult maintenance to a minimum.

Flashings on Toronto's Sun Life Building will undoubtedly pay off in terms of long life and low maintenance costs.



Toronto Dominion Centre
John B. Parkin Associates and Bregman & Hamann, Architects.

Ten tons of lead sheet have already been installed as plenum sound barriers in tenant space at Toronto Dominion Centre. Other uses of lead sheet are for filler panels, for interior partitions, for vertical sound barriers in the plenum, for special acoustical doors and for convector barriers. The effectiveness of lead in this application is shown in the graph above.

For design and specification information regarding lead sheet in particular applications, contact Cominco Ltd./Marketing Services/630 Dorchester Blvd. West/Montreal 2.

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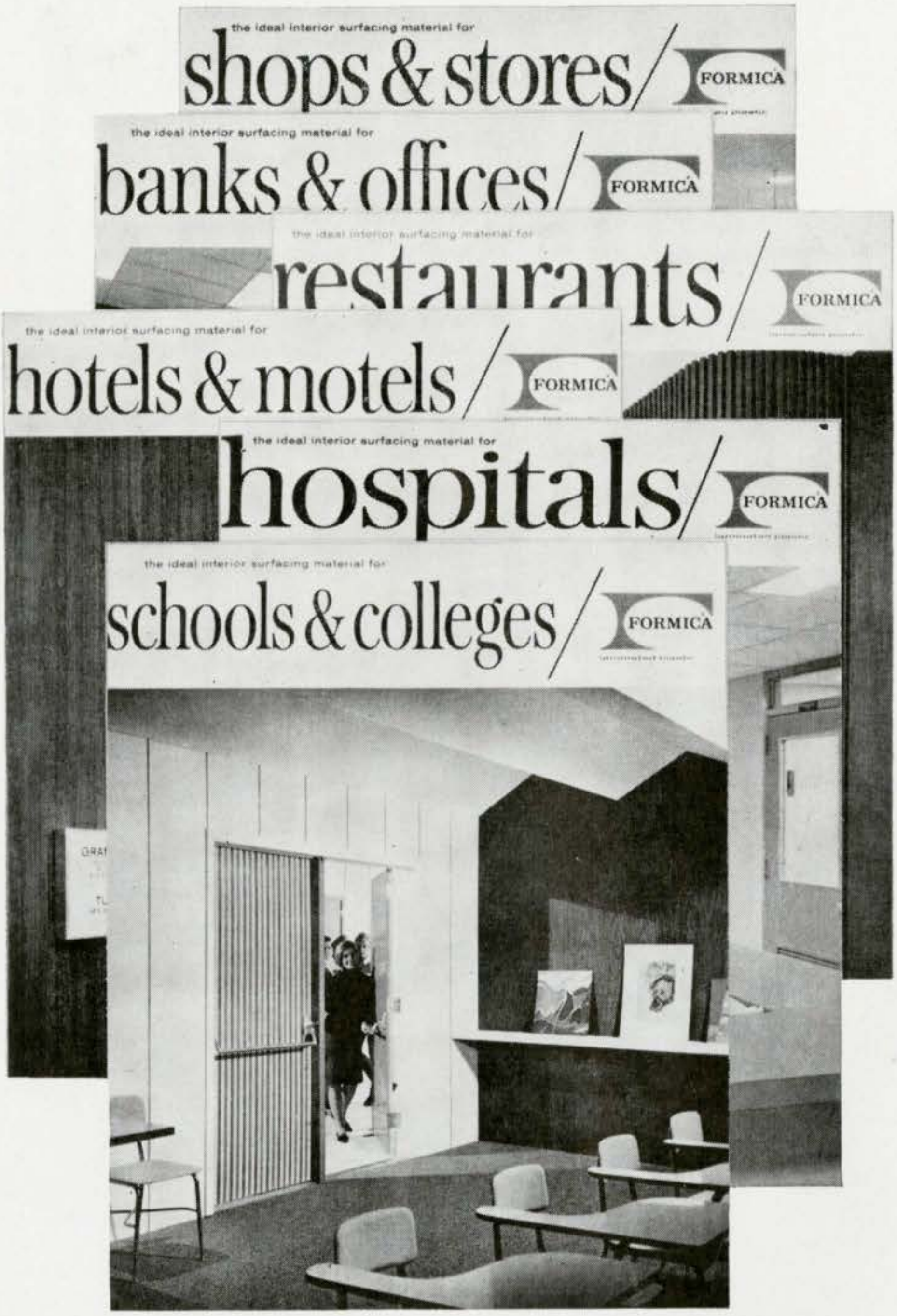
Ideas anyone?



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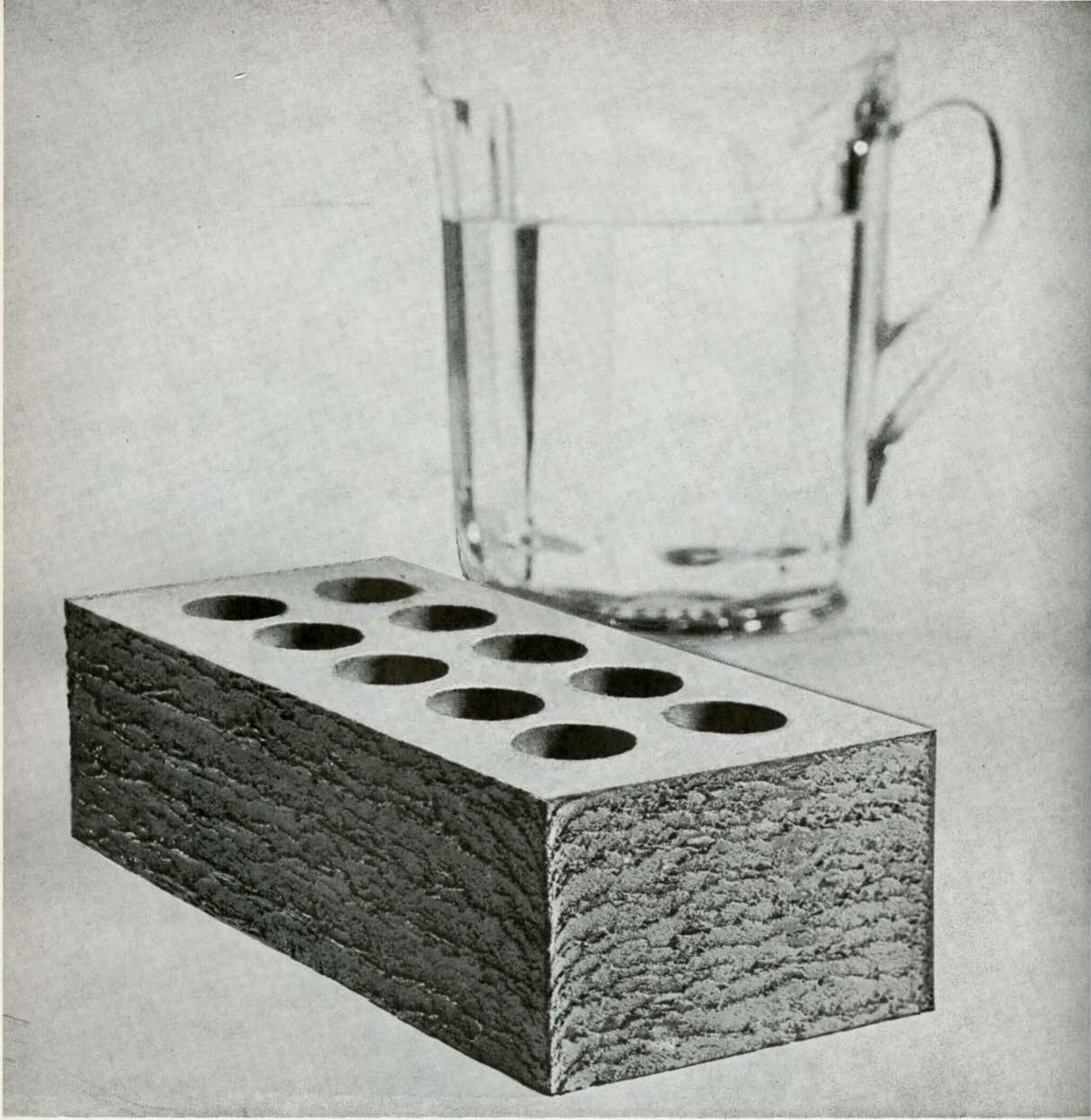


Schools
Ecoles

7

1967 Graduates

University of British Columbia

Graduates: Thomas S. Annandale, Robert D. Hassell, Brian W. Kilpatrick, Kenneth W. Morris, Ludwick Papaurelis, Herwig Pimiskern, Edward P. Ratsoy, Sidney C. Suen, David N. Spearing

Principal Scholarship and Prize Winners: Thomas S. Annandale, RAIC Medal; Edward P. Ratsoy, Architectural Institute of British Columbia Book Prize; David N. Spearing, Alpha Rho Chi Medal

The University of Manitoba

Graduates: David Brown, Robert Carson, Edmund Cybulski, Daniel Ezinga, Robert Goodall, Thomas Kinrade, Marvin Kirby, Edward Kneider, Orin Krivel, Manfred Linnemann, John MacPherson, Howard Mark, Denis Matisz, Leslie Mazer, Lewis Morse, Hubert Nijssen, Francis Prevost, William Rankin, Dallard Runge, Clive Russell, Montgomery Samson, Herbert Schuman, Sheldon Silvert, Peter Stechishin, Abraham Suderman, Gordon Thorkelson, Richard Tomczyk, Kenneth Trueman, Kenneth Tymchak, Michael Wong

Principal Scholarship and Prize Winners: M. Robert Kirby, RAIC Medal, Bachelor of Architecture Thesis Prize; E. George Kneider, Alpha Rho Chi Medal; Lewis Morse, Pilkington Travelling Scholarship; Clive L. Russell, Skidmore, Owings and Merrill Prize

University of Toronto

Graduates: R. Adlaf, C. E. Anderson, T. Altossaar, W. H. Bexton, C. Cansfield, D. Clark, A. M. Clarke, J. B. Davidson, A. V. Dean, K. Farkaschidy, J. Galdins, E. J. Gordon, G. S. Grice, J. C. Hackett, J. P. Hoemberg, J. H. Jorden, Z. I. Kapsa, E. R. Kisman, D. Monsen, R. W. Murray, W. D. Newman, C. A. Paginton, S. A. Schmidt, R. N. Seligman, J. Shack, R. L. Stevens, R. B. Stiff, T. Tamm, A. G. Vinters, A. S. Volgyesi

Principal Scholarship and Prize Winners: J. B. Davidson, Anaconda American Brass Scholarship, Specification Writers' Association Scholarship, RAIC Medal; J. H. Jorden, Jules F. Wegman Fellowship, Toronto Architectural Guild Medal (Gold)

McGill University

Graduates: James D. Belisle, John P. Billick, G. Thorburn Brown, Hebert S. Chien, Clifton G. Chin, André Clavel, Jacob Fichtenbaum, Patrick Gauthier, Phillip W. Gooch, Alex K. Lam, Peter Lawton, Ara Megrian, Keith Oliver, Stephen Propst, Ian Ritchie, S. J. Stein, George P. Steiner, Michael Sternthal, John Surridge, Margaret M. Stovel, Tso Siew-Nung, S. R. Winter, Shun-Kuen Wong, Robert J. Woodman.

Principal Scholarship and Prize Winners: Sixth Year: Clifton Chin, Dunlop Travelling Scholarship, Turnbull Elevator Prize; Ara Megrian, RAIC Medal; Margaret Stovel, Quebec Minister of Education Medal for the Second Highest Standing in the Final Year; Ross Winter, Quebec Minister of Education Medal for the Highest Standing in the Final Year, McLennan Travelling Scholarship. Fifth Year: Jean Pierre Gadoury, Turnbull Elevator Prize; William Hulme, Canadian Pittsburgh Industries Scholarship, Central Mortgage and Housing Corporation Travelling Scholarship; James Waugh, Formica Travelling Scholarship.

Ecole d'Architecture, Université de Montréal

Gradués: Pierre Beaupre, Jacques Beique, André Boudrias, Hubert Chamberland, Martin Fiset, Gilles Hamel, Renata Jentys, Yves Laliberte, Yvon Marchand, Robert Masson, Ronald Melanson, André Ostiguy, J.-Lord Perreault, Jean Vincent, Yves Woodrough

Principaux Prix et Bourses: Pierre Beaupre, Bourse d'étude André Francou; Gilles Hamel, Médaille de l'IRAC; Yves Woodrough, Medaille du Lieutenant-Gouverneur et le Prix de l'Ecole

Université Laval

Gradués: André Blanchet, Michel Boivin, Benoit De Montigny, Jean Guy Duquet, Marcel Emond, Michel Gallienne, Roger Gingras, Roger Richard, Yvan Rodrigue, Serge Viau

Principaux Prix et Bourses: 5e année: Michel Gallienne, Médaille de l'IRAC; 4e année: André Cardinal, Bourse Ernest Wilby; Henri Durand, Prix de la Compagnie Domtar; Guy Poulin, Bourse de la Corporation Central Mortgage and Housing

Nova Scotia Technical College

Graduates: Azier Atela, George E. C. Brown, Robert Day, Alfred Ellis, William P. Lydon, Andrew Lynch, Mark McBurney, Reno Soucy, Finn Stokkland, John Craig Waddell, James M. Wright

Principal Scholarship and Prize Winners: John Craig Waddell, RAIC Medal

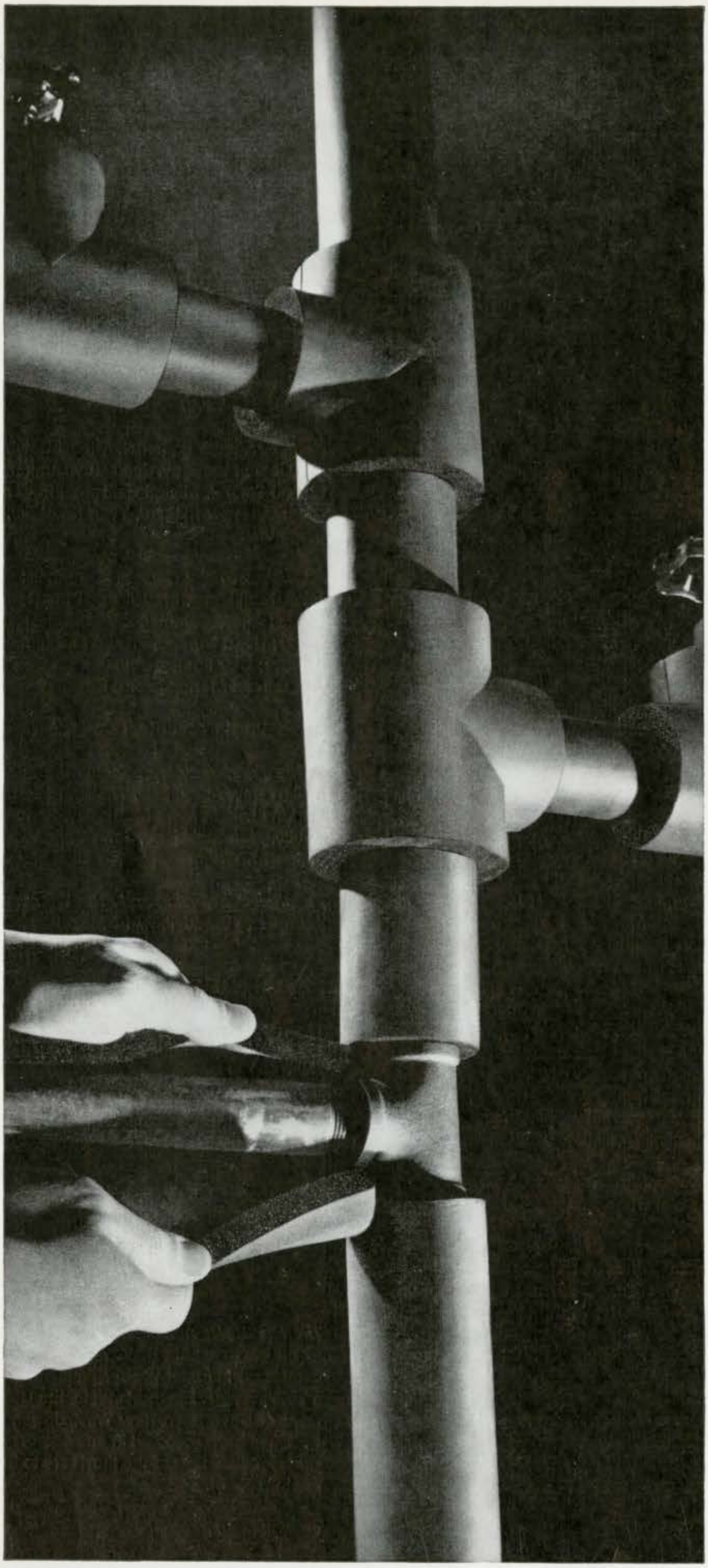
RAIC Medal Winners 1967

The following graduates from the seven schools of architecture were this year's recipients of RAIC medals.

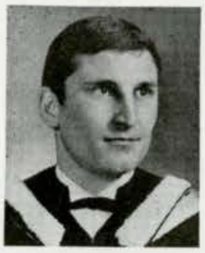
Tom Annandale

Thomas Stuart Annandale, the University of British Columbia RAIC medal winner, completed his final year of architecture with a 75% average. His thesis topic, the Development of Downtown New Westminster, B.C., has been accepted in one aspect and some ramifications of the thesis are to be put into effect.

continued on page 71



Schools, continued from page 69


Robert Kirby

M. Robert Kirby, the University of Manitoba RAIC medallist, has received a number of awards while an undergraduate, the Manitoba Association of Architects' Book Prize for four years, the Western Gypsum Products Bursary in 1965 and 1966 and the CPI Scholarship in 1966. Mr Kirby is currently in Europe.


John Davidson

John Barrett Davidson of the University of Toronto has stood first for four out of five years of architecture. In addition to the RAIC medal this year he received the Specification Writers' Association Scholarship and the Anaconda American Brass Scholarship. He was an honor graduate of St Thomas Collegiate Institute in 1962.


Ara Megrian

Ara Megrian, 1967 RAIC medal winner from McGill University, was born in Cyprus of Armenian parents. He came to Canada in 1957 and attended high school in Montreal. Mr Megrian is fluent in Armenian and English and also speaks Greek, Turkish and French.


Gilles Hamel

M. Gilles Hamel, licencié de l'Université de Montréal, est le gagnant de la médaille de l'Institut pour l'année 1967. En 1966 il a reçu le prix Concordia. Son projet de finissant, réalisé en équipe, s'intitule "Architecture Press-bouton" et explore la possibilité d'une cité sous-marine dans l'Arctique. Présentement M. Hamel est à l'emploi de M. Lapierre, arch. où il complète sa cléricature.


Michel Gallienne

M. Michel Gallienne, gagnant de la médaille de l'IRAC en 1967 de l'Université Laval a été Membre exécutif de l'Association des Etudiants en Architecture de cette université. Dans le cadre d'un échange universitaire sous l'égide du groupe "France Canada" il a effectué un stage à la Société Publicité, Art et Technique de Montreuil. En tant que Boursier de la Société Centrale d'Hypothèques et de Logement il a fait un voyage d'études aux Etats Unis et au Canada. Actuellement M. Gallien est à l'emploi de l'étude d'architecture St Gelais Tremblay Tremblay & Labbé de Québec.


John Waddell

John Craig Waddell, RAIC medal winner from the Nova Scotia Technical College, was born in Halifax but has been living in Montreal. He commenced his studies in Architecture at McGill University and transferred to the Nova Scotia Technical College in 1963.

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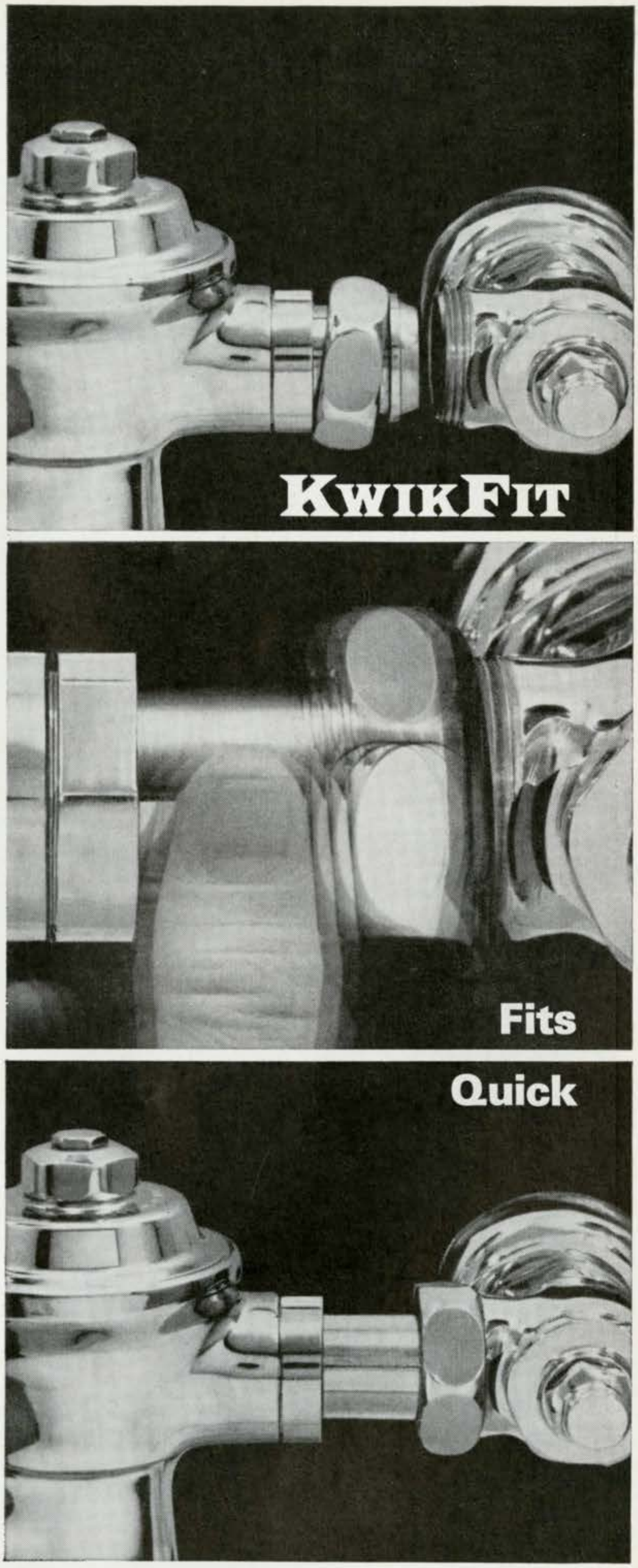

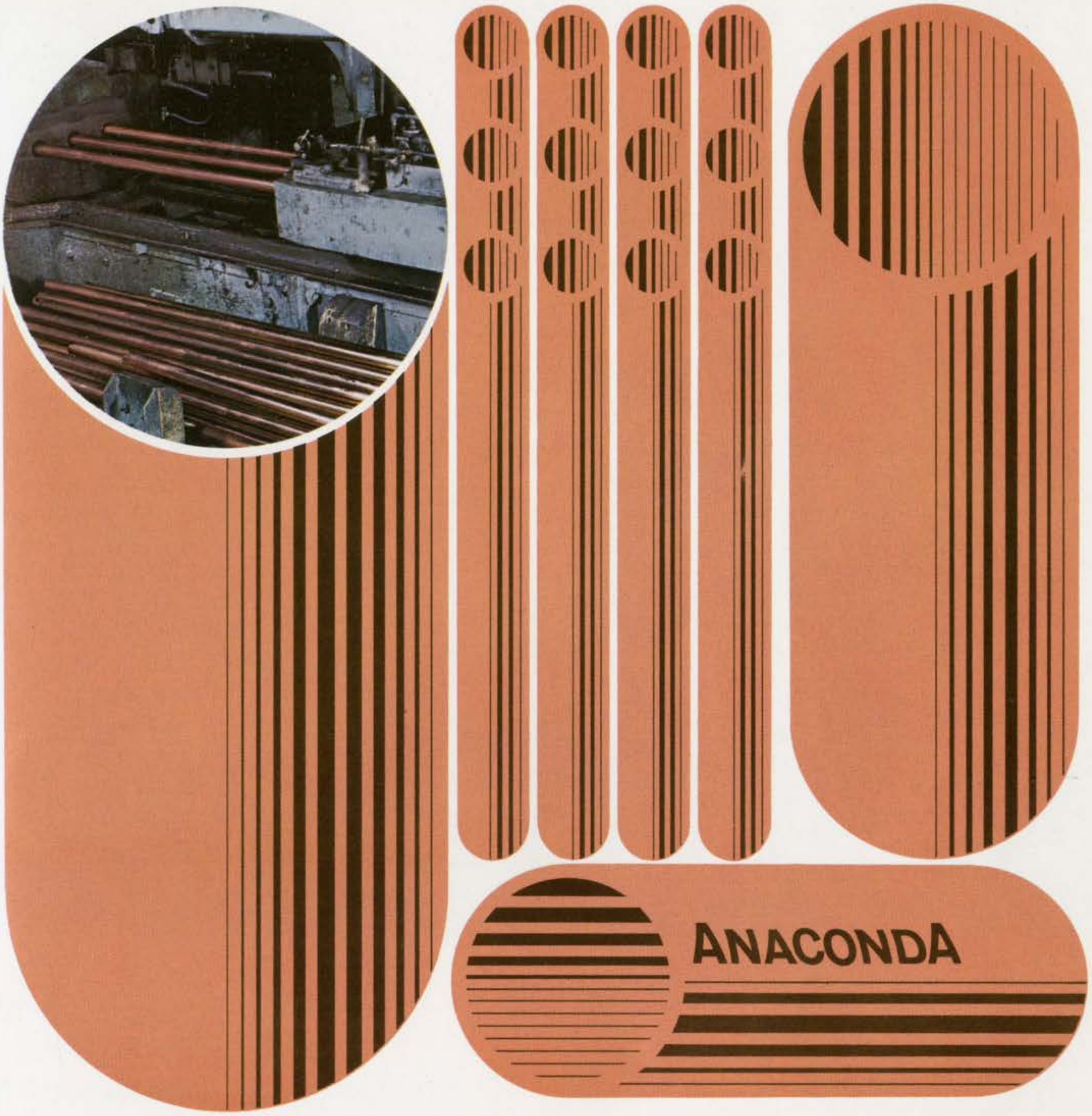

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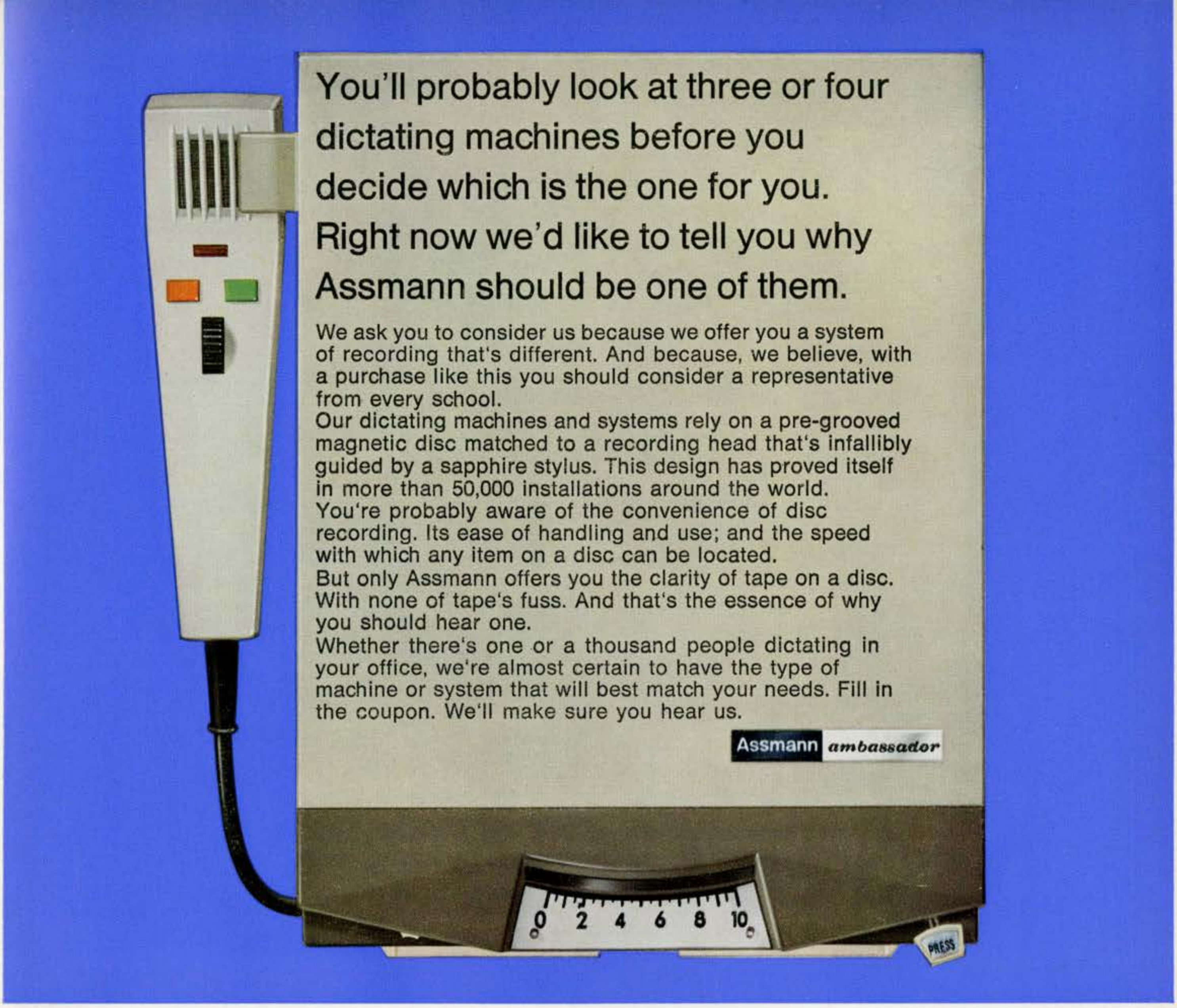

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Mr. Harold Martin,
Assmann Dictating Systems of Canada, Limited,
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Don Mills, Ontario.

Dear Harold:

Many thanks for your letter. We would be pleased to put on paper our views on Assmann equipment and the service provided by your company.

As you know, following your original study of our needs in 1963, we installed four master recorders in our typing unit which were served by twenty-five dictation points. A number of our executive staff have become satisfied users of separate Assmann machines.

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Yours very sincerely,

Geoffrey Riggs
Office Manager

/hbj.

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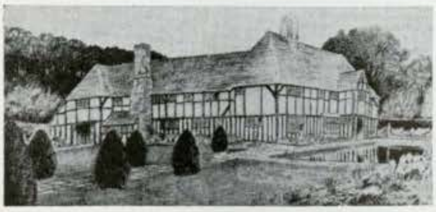
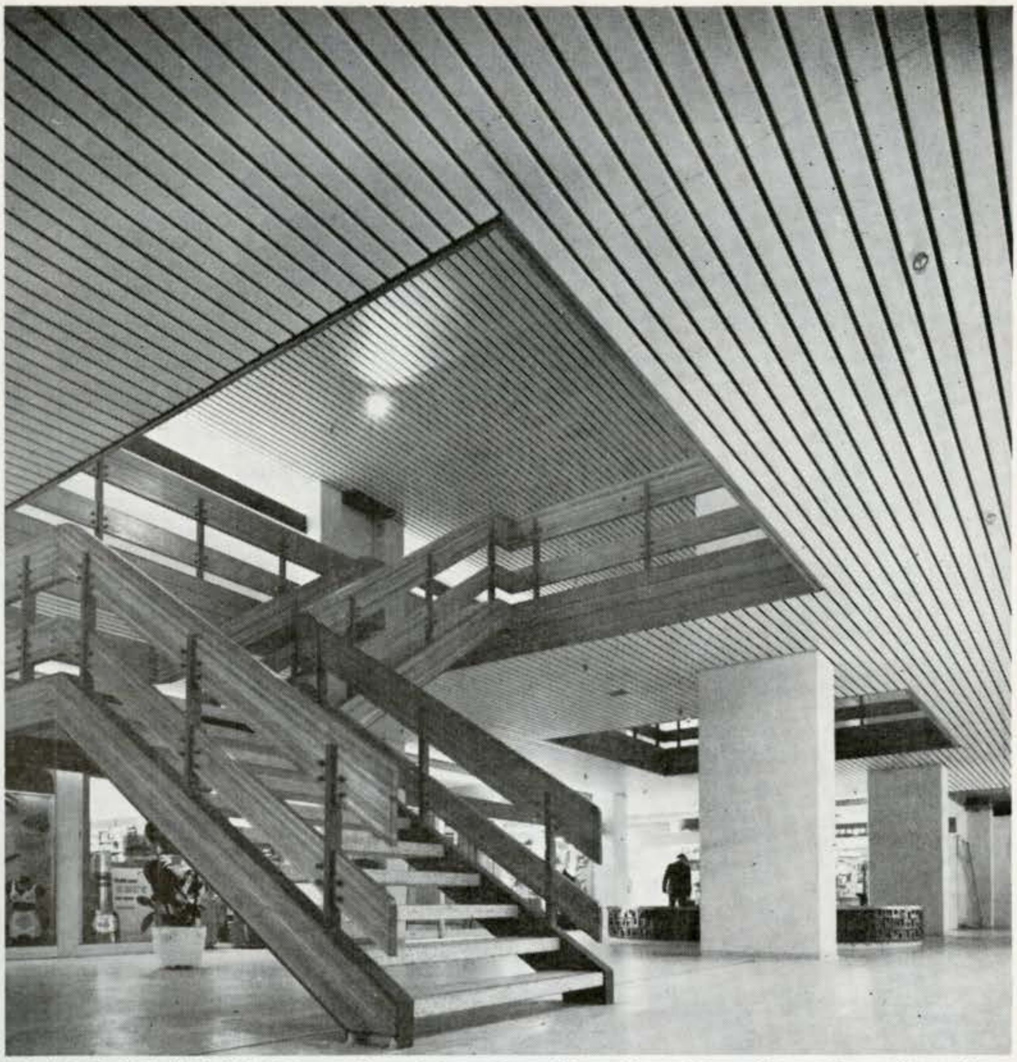
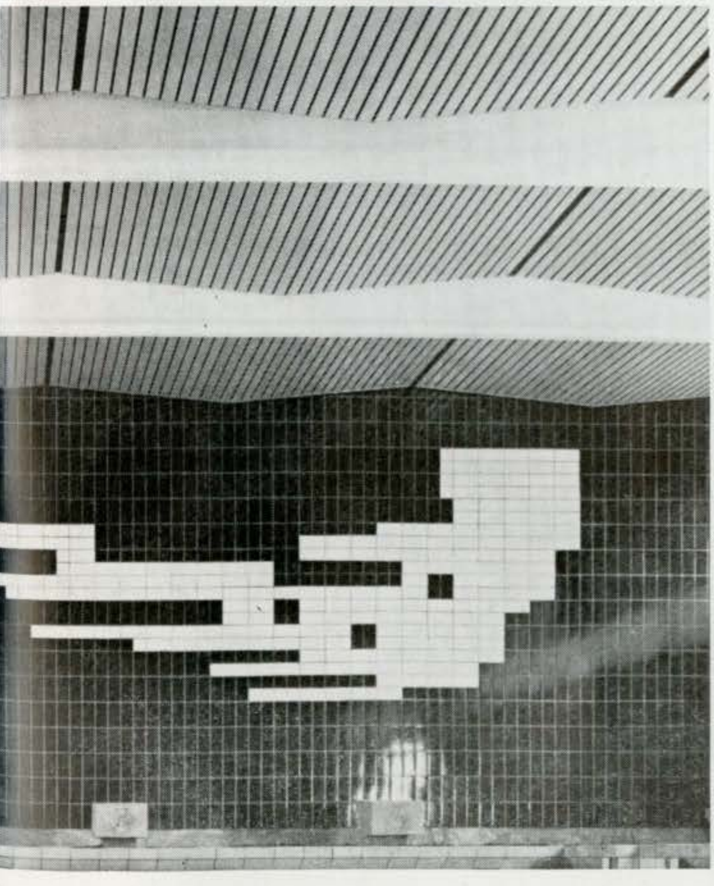
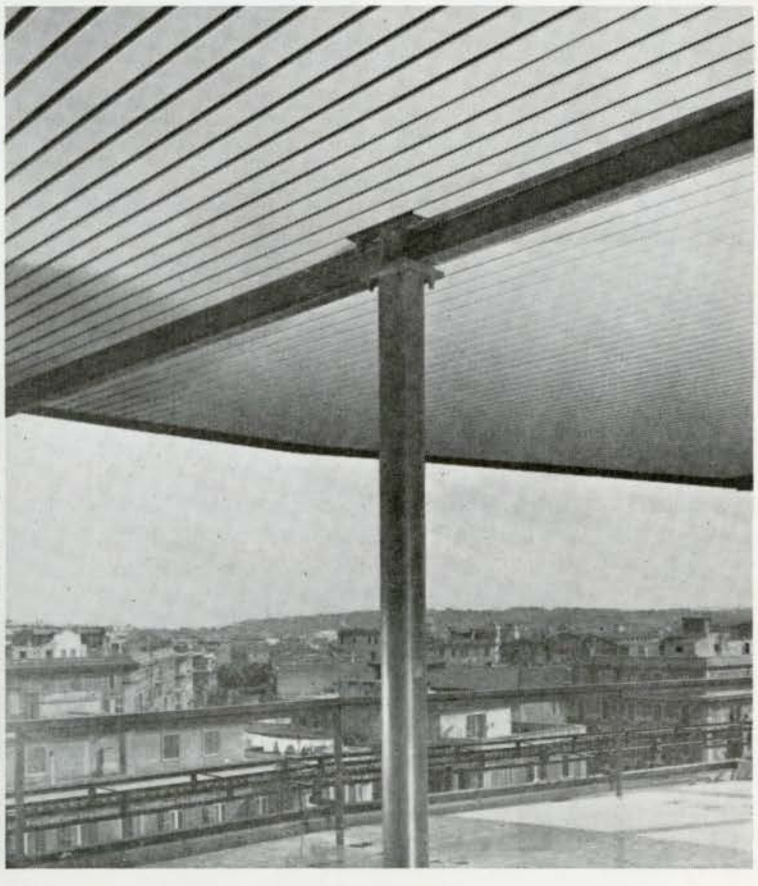


The Editors:
I am preparing a biography on the architect M. H. Baillie Scott for the Ph.D. at the Courtauld Institute. Scott designed a house for a site in Canada c. 1914, and I have been unable to locate this and write on the chance that you may be able to help. I cannot, unfortunately, tell you where the house was built, nor if it was built, because nearly all of Scott's papers were destroyed when his office was bombed in 1942. I would, in fact, not know of the commission had it not been published in *The Studio Yearbook of Decorative Art*, 1913, p. 67, and again, in *The Builder*, Vol. 118, 1920, p. 462.
The house is half-timbered in the traditional manner with a rather steeply pitched hip-roof. It is a largish house and is captioned as "A Country House in Canada". I thought its chances of being in or near Toronto were better, perhaps, than elsewhere. If you have any suggestions about this difficult enquiry, I shall be most happy to have them.
James D. Kornwolf
Above, a photograph of the house. If you can help, please write Mr Kornwolf at 14 Carlyle Square, London S.W. 3. Ed.

The Editors:
ADA is first rate! The inclusion of Architectural Practices Listing will be a boon (as well as being interesting information). Congratulations.
Siddall Dennis & Associates Architects, Victoria







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Advertisements for positions wanted or vacant, appointments, changes of address, registration notices, notices of practices including establishment or changes in partnership, etc., are published as notices free to the membership.

Practice Notes

Vernon G. MacFawn, B.Arch, MRAIC, and George W. Rogers, B.Arch, MRAIC, have opened an office for the practice of architecture, MacFawn and Rogers. Their address is 6436 Quinpool Road, Halifax, Nova Scotia. Telephone 423-6378.

Hart Massey, MRAIC, has taken John Flanders, Dipl. Arch., ARIBA, MRAIC, into partnership. Mr Flanders received his architectural education in England and has been with the firm since 1957. The name of the practice has been changed to Massey and Flanders and will continue at 33 Somerset Street West, Ottawa.

William Noel Thomas, MRAIC, ARIBA has been made a partner in the Toronto architectural and engineering firm of Shore & Moffat and Partners.

Warnett Kennedy who has recently resigned as Executive Director of the AIBC is now in private practice at 567 Burrard Street Vancouver.

Changes of Address

Webb, Zerafa, Menkes Architects Toronto office is now located at 95 St Clair Avenue West, Toronto 7, phone 929-3321.

Bernard Gillespie, ARIBA, MRAIC has moved from his Thorncliffe Square address and is now practicing at Suite 2802, P.O. Box 85, The Toronto-Dominion Centre, Toronto 1, Ontario.

New Practice in Landscape Architecture and Urban Design

Emile Van der Meulen formerly associated with Richard Strong Associates Ltd, Landscape Architects, Site Planners and Planning Consultants, has established a private practice as Consultant in Landscape Architecture and Urban Design, 64 Silverbirch Ave, Toronto 13, 614-699-1358.

Registrations

The following have been admitted to membership in the Ontario Association of Architects: Donald J. Bielesch, B.Arch., Miss Agnes Boros, Dip.Arch., Irving Caruso, B.Arch., Lionel L. Ferguson, Dip.Arch., Robert Frew, ARIBA, G. K. H. Haas, Dip.Arch., Peter J. Haensli, B.Arch., Robert Johansen, B.Arch., James A. Kennedy, B.Arch., Leon T. Kulynych, Dipl, Eng.Arch., Jerry A. Kurland, B.Arch., Dharam P. Malik, M.Arch., Tawfik K. Nassim, B.Arch., Joseph Pacek, B.Arch., Bernard Rosen, B.Arch., Yani Sakiris, Norbert J. Schuller, B.Arch., Ihor Stecura, B.Arch., James G. Sykes, B.Arch., Peter Tutton, Dip.Arch., Austin W. Uiska, B.Arch., Andrew Vecsei, B.Arch.

Positions Wanted

German architect, Dipl.Ing. Designer, 30, seeks position in Toronto in office (October '67), educated in Vienna (Austria), Munich, graduated in 1965, working since 1962 continually in architectural offices, industry-works, home-building, competitions. Jürgen H. Rust, Ulrich v. Hasselstr. 21, 8026 Ebenhausen, Western Germany.

Graduate Architect, 32 years old, 3 years European and 5 years Canadian experience on design, planning and working drawings. Experience: commercial, industrial, residential, administrative, institutional buildings. Capable in all phases of architectural practice. Desires interesting and responsible position in architectural firm. Résumé available upon request. Spencer M. Ayhan, 141 Erskine Ave, Apt. 1110, Toronto 12, Ontario.

Graduate of Dept of Architecture, Seoul, Korea, 1964, with degree of Bachelor of Engineering, two years' experience, now landed immigrant in Canada, seeks position with architect. Oh Eung Chong, 544 Huron St, Toronto 4, telephone 921-8693.

Architect-planner, B.Arch. Calcutta 1957; DTRP, Calcutta 1959; associate Indian Institute of Architects, ten years' experience in head office industrial concern in India, wants suitable position in Canada. Write D. N. Das, 12A, Thakur Das Chakravorty Le, Calcutta 6, India.

Qualified Indian architect, residing in U.K., seeks a position as architectural assistant in Ontario. Passed Government Diploma in Architecture in 1964. Associate of the Indian Institute of Architects. Practical experience of eight years in drawing offices. Age 27, married. Write B. N. Gujar, 56 Cranbourne Gardens, London N.W. 11, U.K.

23-year-old Indian Architectural Graduate seeks employment. Experience – three years architectural practice, teaching in Academy of Architecture, Bombay. Associate of Indian Institute of Architects. Contact Anil Bhagwat, 4/13 Shah Building, Lady Hardinge Road, Bombay 16, India.

Young Architect, B.A. M.Sc from American university, three years practical experience in architects' offices in Africa, U.S.A. and Britain, interested in the effects of climate on architectural design, seeks good employment opportunity. Please contact Mr O. Bolarinwa, c/o Department of Building Science, University of Sheffield, Sheffield 10, U.K.

27-year-old Dutch Architect seeks a job in Canada as architect or assistant architect in architectural or constructional engineering offices. Completed higher technical school in 1961 and the Academy of Architecture in 1965, experience in the field of designing and drawing, houses and apartment buildings and supervising construction work. George Takacs, Gildemeestersplein 214, Arnheim, The Netherlands.

Australian architect, 34, ARAIA, ARIBA, seeks position in Canada. Eleven years practical experience in all phases of architecture in Australia and Malaysia. Write John Y. F. Lim, 55 Langridge St, Albert Park SC 6, Victoria, Australia.

Young architectural assistant arrives in Vancouver late October. Nine years experience (including 1½ years with Sir Basil Spence). Student ARIBA with three years at Belfast School of Architecture. Roderick H. Hughes, 9d Belvoir House, Belvoir Park, Belfast 8N., Ireland.

Graduate from Ryerson Institute of Technology with diploma in Architecture in 1962 seeks position. Studied Town Planning at Finland's Institute of Technology, Helsinki, Finland, 1964, 1967, experience in Canada and Finland. Write Henry I. Hollo, 168 Briar Hill, Toronto. Phone 481-8188.

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