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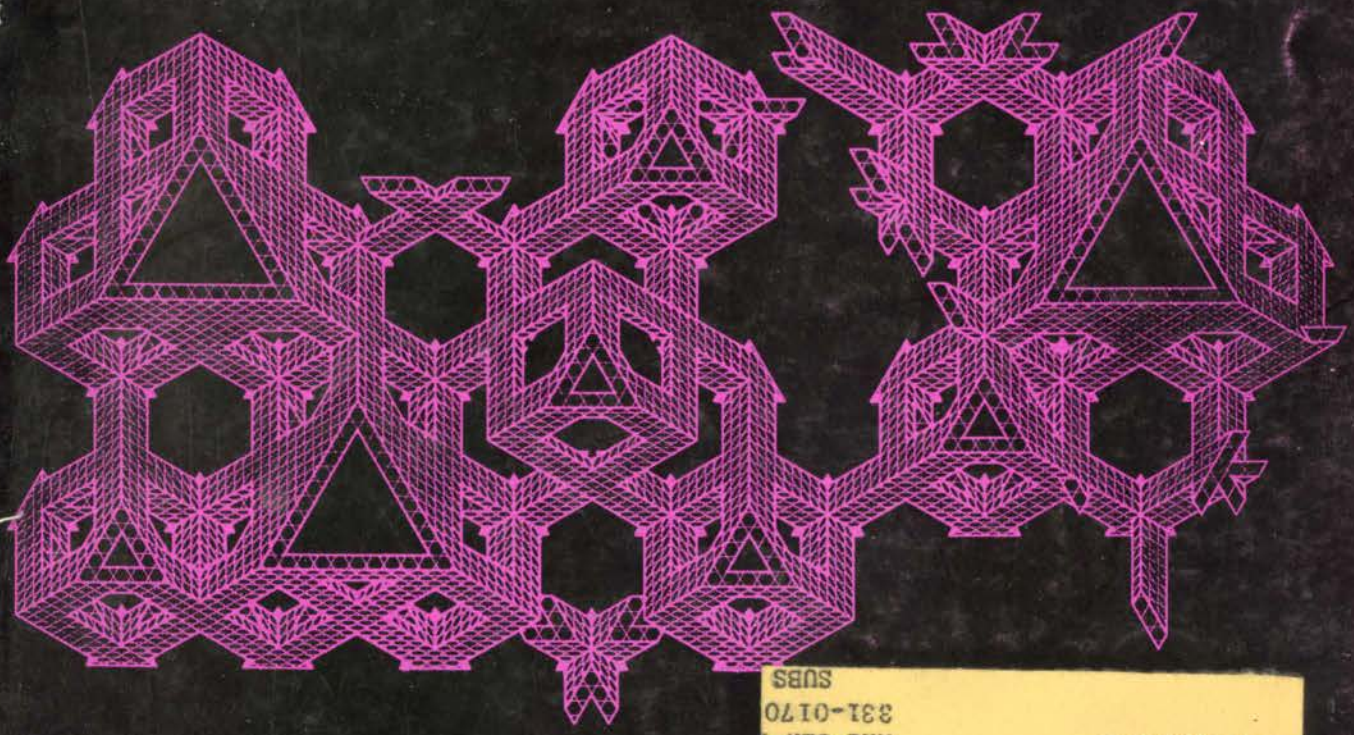

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April 1969 Avril
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Selye Joint Convention Speaker

Dr. Hans Selye, Director of the Institute of Experimental Medicine and Surgery at the University of Montreal and internationally known research authority on stress, has accepted the invitation of the Institute to be principal guest speaker at the AIA-RAIC Joint Convention in Chicago June 22-26.

Nova Scotia Architects Act Revised

Members attending the 37th annual meeting of the Nova Scotia Association of Architects in Chester February 7-9 were advised that the revised Architect's Act for the Province has been proclaimed. In addition to updating the Act to meet present-day demands on the profession, the revisions allow for incorporation of architectural practices.

Members of council elected for the coming year were President, E. Michael Byrne; Vice-President, George Rogers; Secretary-Treasurer, Charles Seamone; Registrar, Charles Cullum; Councillors, James Donahue, Robert Ojolick and Henry Romans.

Dr Peter Manning, new Director of the NSTC School of Architecture, was guest speaker at the luncheon, and dealt with the future direction of architectural practice and the consequent effects on architectural education at the undergraduate and graduate level.

The afternoon was devoted to two workshop sessions – the first on the increasingly complex design problems which are facing architects today. This discussion was led by Raymond T. Affleck, Montreal, guest for this session. A discussion on the relative merits of incorporation in light of the new Architect's Act was the subject of the second workshop.

Mr Norman McMurrich (F), President RAIC, who spoke following the evening dinner, outlined the activities during the past year of the national body. Design awards were made to members of this Association whose buildings were judged by a special jury as being particularly significant and worthy of being recognized as contributing to contemporary architecture.

1969 Alberta Association of Architects Council, left to right, H. W. R. McMillan, honorary treasurer, Michael Evamy, council member, D. L. Sinclair, council member, B. Wood, 2nd vice president, G. D. Menzies, honorary secretary, H. L. Bond, executive secretary, E. Raines, president, J. McIntosh, 1st vice president, G. W. Lord, council member, J. J. Patsula, council member, J. H. Donahue, council member.

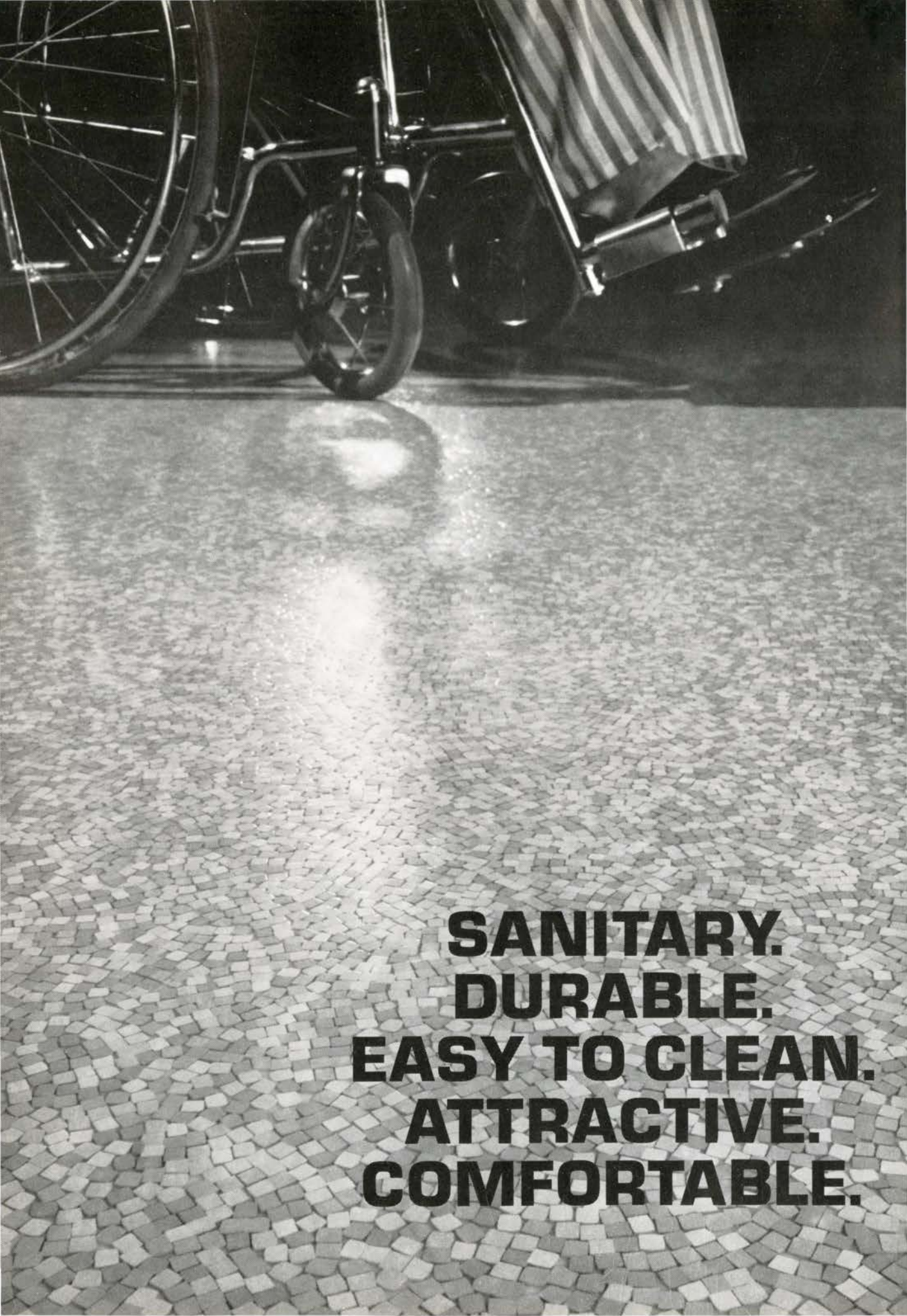
The Nova Scotia Association of Architects Council, elected February 8, at their annual meeting, front, left to right: George W. Rogers, councillor; Charles E. Seamone, Hon. secretary-treasurer; E. Michael Byrne, president; Back: Robert J. Flinn, past president; A. J. Donahue and Robert J. Ojolick, councillors, Charles H. Cullum, registrar; Henry M. Romans, councillor

Vienna Competition Deadlines Postponed

Deadlines for the dispatch and receipt of projects for the International Competition for the Design of an International Office Complex in Vienna (Donaupark) have been postponed to June 30 and July 15, 1969. The competition has attracted 645 participants from 50 countries, including 26 from Canada.

George F. Eber Honored

Montreal architect George F. Eber has received an American Institute of Steel Construction "special award for excellence" in recognition of his "outstanding achievement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At the Newfoundland Association of Architects annual banquet seated, front, left to right are: Wilson D. Salter (F), *Director of Professional Services RAIC, and NAA officers, T. Porteous Bolton, president and C. J. Congdon, sec. treasurer. Standing: C. Klein, assit. sec. treas.; Councillors, F. Noseworthy, G. W. Cummings, and W. B. Guihan, and E. A. Steinbrink, past president. Absent is Philip Greenacre, vice president. The annual meeting was held February 7 in St. John's. Special guests were Mr Salter representing the RAIC and Max Baker of the National Research Council.*

in technology and aesthetics" in the creation of the US Pavilion at Expo '67. He was associate architect with R. Buckminster Fuller, Fuller and Sadao Inc. and Geometrics Inc. on the project. Mr. Eber shared in the 1967 Reynolds Aluminum award given the Netherlands Pavilion at Expo, for which he was also associate architect.

Two Canadians Win Portland Cement Awards

Two Canadian architectural students, Brian Eldred at Manitoba and Paul Zajfen at McGill, are among eight students who have won "awards of exceptional merit" in the Portland Cement Association Architectural Scholarship Awards Program for student architects in Canada and the US. Eldred investigated the principle of linear building development and did a prototype proposal for a long span "space structure". Zajfen's project was a housing development for Westmount, P.Q.

New Brunswick Annual Meeting

The New Brunswick Association of Architects held their annual meeting January 31 and February 1st at the Admiral Beatty Hotel, Saint John. Officers and councillors elected were president John R. Disher, vice-president Cyrille Roy, *(F)*, secretary-treasurer J. R. Myles *(F)*, registrar Neil M. Stewart, *(F)*, councillors D. W. Johnsson, A. Chatwin, Robert Eaton and J. Kerr Large.

Correspondence Course on Architectural and Engineering Specification Writing

The Specification Writers Association of Canada, 57 Bloor St. W., Toronto 5, has developed a comprehensive Correspondence Course in Construction Specifications. The 75-lesson course is unique in two respects: it is the only course in North America specifically designed to improve education in construction specifications by mail; and secondly, it is the only course of its type offered not only for use by individual students, but also for the use of educational institutes and firms for in-service training.

Index of Specifications, Standards and Codes for Canada in Preparation

An Index of specifications, standards and codes for use by the building construction industry in Canada is being compiled by a joint committee of professional associations and government departments and agencies. The first phase of the Index project is compilation of a source list now being prepared jointly for publication by the Materials Branch of the Department of Industry and the Canadian Government Specifications Board. Represented on the Index Joint Committee are the RAIC, the Association of Consulting Engineers of Canada, the Canadian Institute of Quantity Surveyors, the Canadian Construction Association and the Specification Writers Association of Canada; together with federal government departments of Industry, National Defence, Public Works, Transport and the Division of Building Research, NRC.

International Exhibition at São Paulo

The tenth Bienal de Sao Paulo will be held September to December 1969 concurrently with an international exhibition of architecture. Members wishing to show work in the exhibition may obtain regulations and entry forms from RAIC Headquarters, Ottawa.

Coming Events

An exhibition of Canadian hospital architecture will be on view at the Convention-Exhibition of the Association of Hospitals of the Province of Quebec at Place Bonaventure, Montreal, May 14-16, 1969.

Canadian Institute of Quantity Surveyors, Convention. Westbury Hotel, Toronto, May 16-18

Erratum

In the January 1969 Preview Issue on page 38, Harry Heuer was credited as Chief Architect for the pedestrian bridge, Prince's Isle, Calgary. Harry Heuer was the designer for the project, the Chief Architect was Harold Hanen.

Communiqué

2

Eighteen Students to Chicago Convention

Closer student-Institute relationships, recommended at the RAIC Stanley House Conference on Architectural Education last summer, continue to develop on an increasing scale. The program includes visits to the schools by President N. H. McMurrich; appointment of student editors and development of a "Schools" section in Architecture Canada under the general editorship of Alastair Grant, MRAIC; student participation in the program of the RAIC-AIA joint convention in Chicago in June; and anticipated student participation in the RAIC Assembly in Winnipeg in 1970.

Students Conference Proposed in Montreal

In preparaton for the anticipated student participation at Winnipeg next year, and to utilize experience gained at Chicago this year, a national student conference in Montreal in the fall is now proposed. The project, which received approval in principle from RAIC Council on March 21, is in accordance with the recommendation in the report on the 1967 Stanley House Conference "that a financial subsidy be provided to assist undergraduates from schools of architecture to meet". The proposal for the conference was put forward by Jean Pierre Pelletier and Pierre Laflamme, coordinator and assistant coordinator of l'Association des Etudiants en Architecture de l'Université de Montréal.

Eighteen undergraduates, two from each of the nine Canadian schools of architecture, are now being named as student delegates to the joint convention in Chicago. Peter Dandyk, who is Architecture Canada's student editor for Waterloo and who will be a delegate from his school, attended a meeting of the AIA-RAIC Joint Convention planning committee in Chicago March 25, to meet representatives from US schools of architecture who are planning the student part of the convention program. Travelling expenses of Canadian students to the convention are very generously being met by contributions* for the purpose, chiefly from industry.

Among those who are contributing to student participation in the Chicago convention are: Crane Canada Ltd.; American-Standard (Canada) Ltd.; Fiberglas Canada, Ltd.; Dow Chemical of Canada, Ltd.; Dominion Foundries and Steel, Ltd.; MacMillan Bloedel Ltd.; Canadian Pittsburgh Industries Ltd.; Domtar Construction Materials Ltd.; Steel Company of Canada, Ltd.; University of Toronto Architecture Alumni Association.

Projet d'une Conférence d'Etudiants à Montréal

Faisant suite à la proposition de la conférence à la Stanley House, le meilleur rapport des écoles avec l'Institut se réalise rapidement. Le programme comprend la visite aux écoles de M. McMurrich, le Président; la nomination de rédacteurs – étudiants et la création de la section "Ecoles" dans Architecture Canada sous la direction du rédacteur Alastair Grant, MIRAC; la participation des étudiants au congrès conjoint à Chicago en juin; et, la participation anticipée des étudiants à la réunion de l'IRAC à Winnipeg en 1970.

Dix-huit Etudiants iront au Congrès à Chicago

En préparation pour la réunion à Winnipeg et afin de se servir de l'expérience atteinte à Chicago il est proposé d'organiser une conférence nationale des étudiants qui serait tenue à Montréal en automne. Ce projet, qui a reçu l'accord en principe du Conseil de l'IRAC le 21 mars, est en conformité avec les avis rendus par les conférenciers à la Stanley House en 1967 "qu'une subvention soit avancée pour faciliter les rencontres d'étudiants en architecture." Le projet de conférence a été présenté par Jean Pierre Pelletier et Pierre Laflamme, coordinateur et coordinateur adjoint de l'Association des Étudiants en Architecture de l'Université de Montréal.

Dix-huit étudiants, deux de chaque école d'architecture au Canada, seront délégués au congrès conjoint à Chicago. Peter Dandyk, le rédacteur-étudiant d'Architecture Canada à l'Université de Waterloo, a participé à une réunion de la commission du programme du Congrès AIA-IRAC à Chicago le 25 mars afin de faire la connaissance des représentants des écoles américaines et de préparer avec eux le programme de la participation des étudiants. Les frais de voyage des étudiants canadiens au congrès sont remboursés généreusement par des contributions* venant surtout de l'industrie du bâtiment.

Parmi ceux qui ont contribué à la participation des étudiants au congrès à Chicago: Crane Canada Ltd.; American-Standard (Canada) Ltd.; Fiberglas Canada Ltd.; Dow Chemical of Canada Ltd.; Dominion Foundries and Steel Ltd.; MacMillan Bloedel Ltd.; Canadian Pittsburgh Industries Ltd.; Domtar Construction Materials Ltd.; Steel Company of Canada, Ltd.; University of Toronto Architecture Alumni Association.

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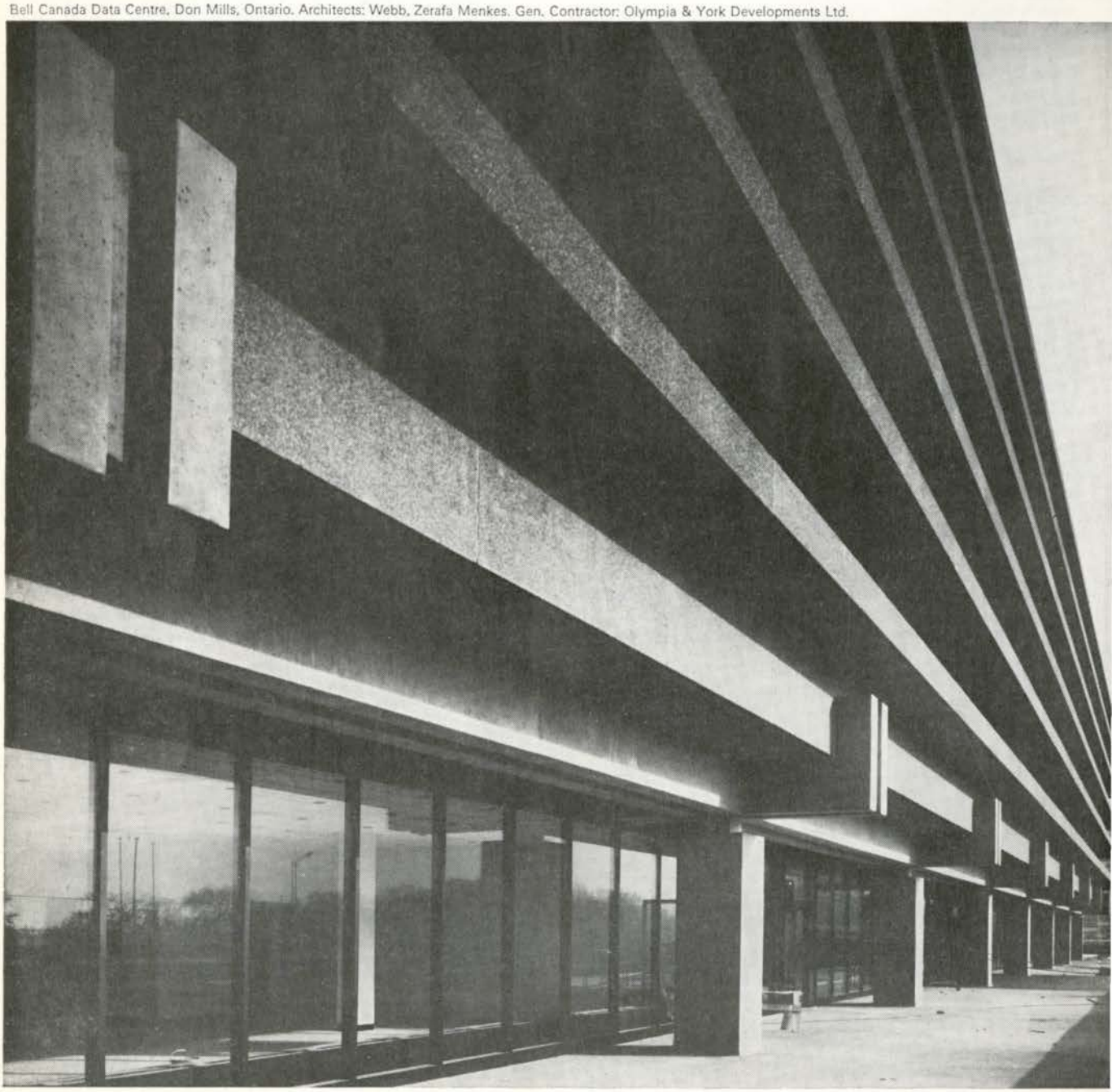
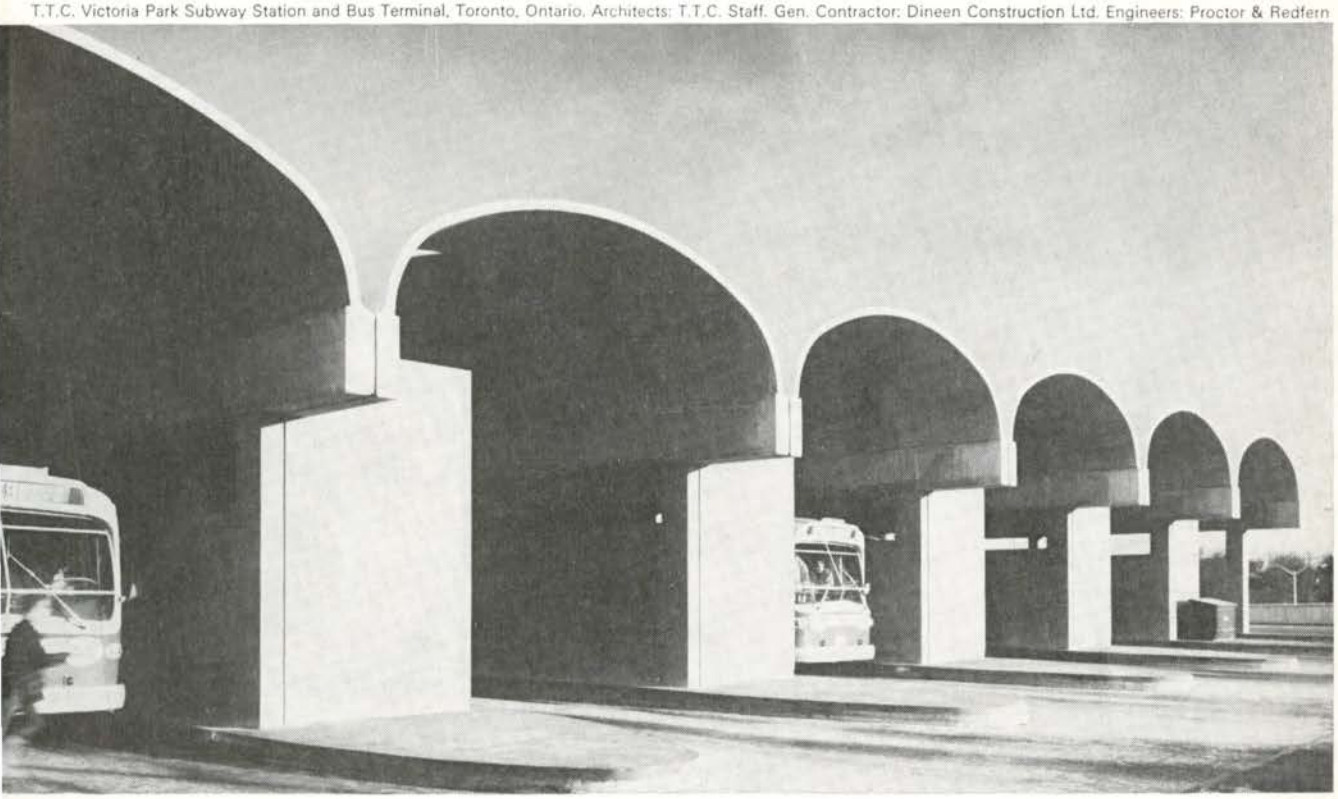


T.T.C. Victoria Park Subway Station and Bus Terminal, Toronto, Ontario. Architects: T.T.C. Staff. Gen. Contractor: Dineen Construction Ltd. Engineers: Proctor & Redfern



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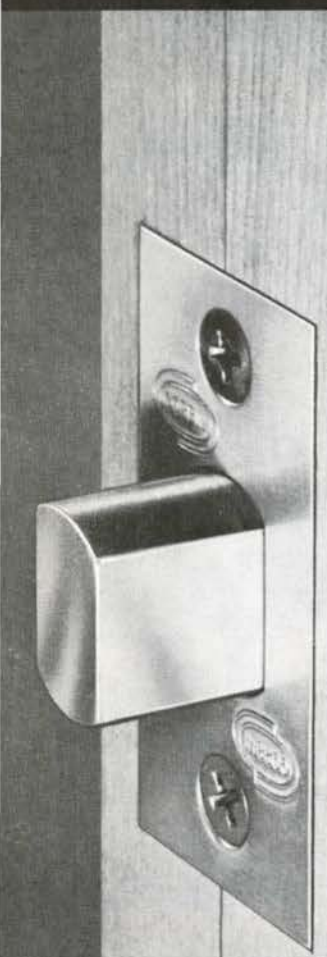

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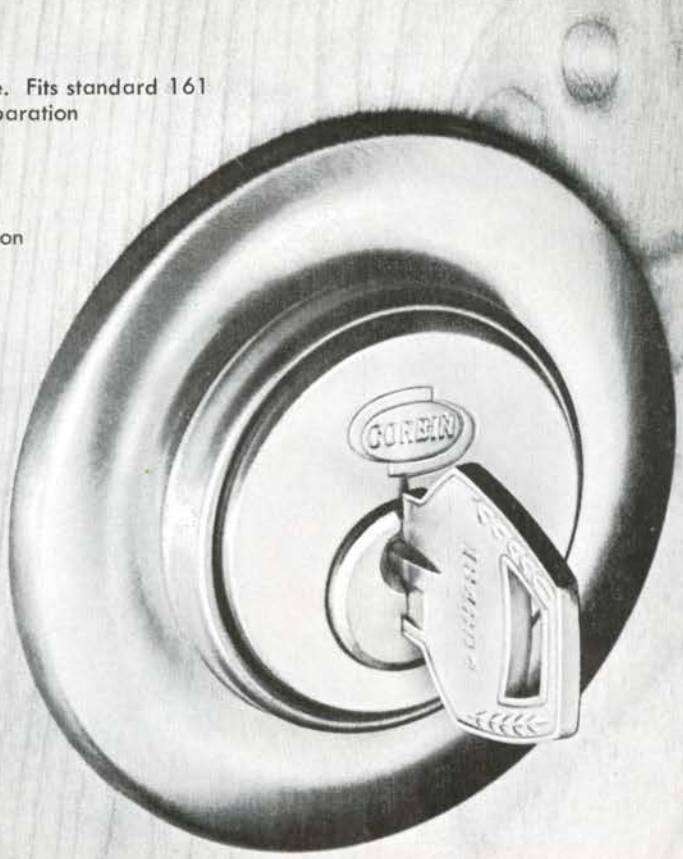

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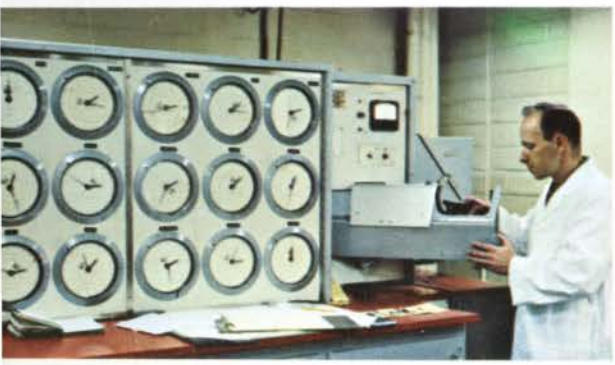

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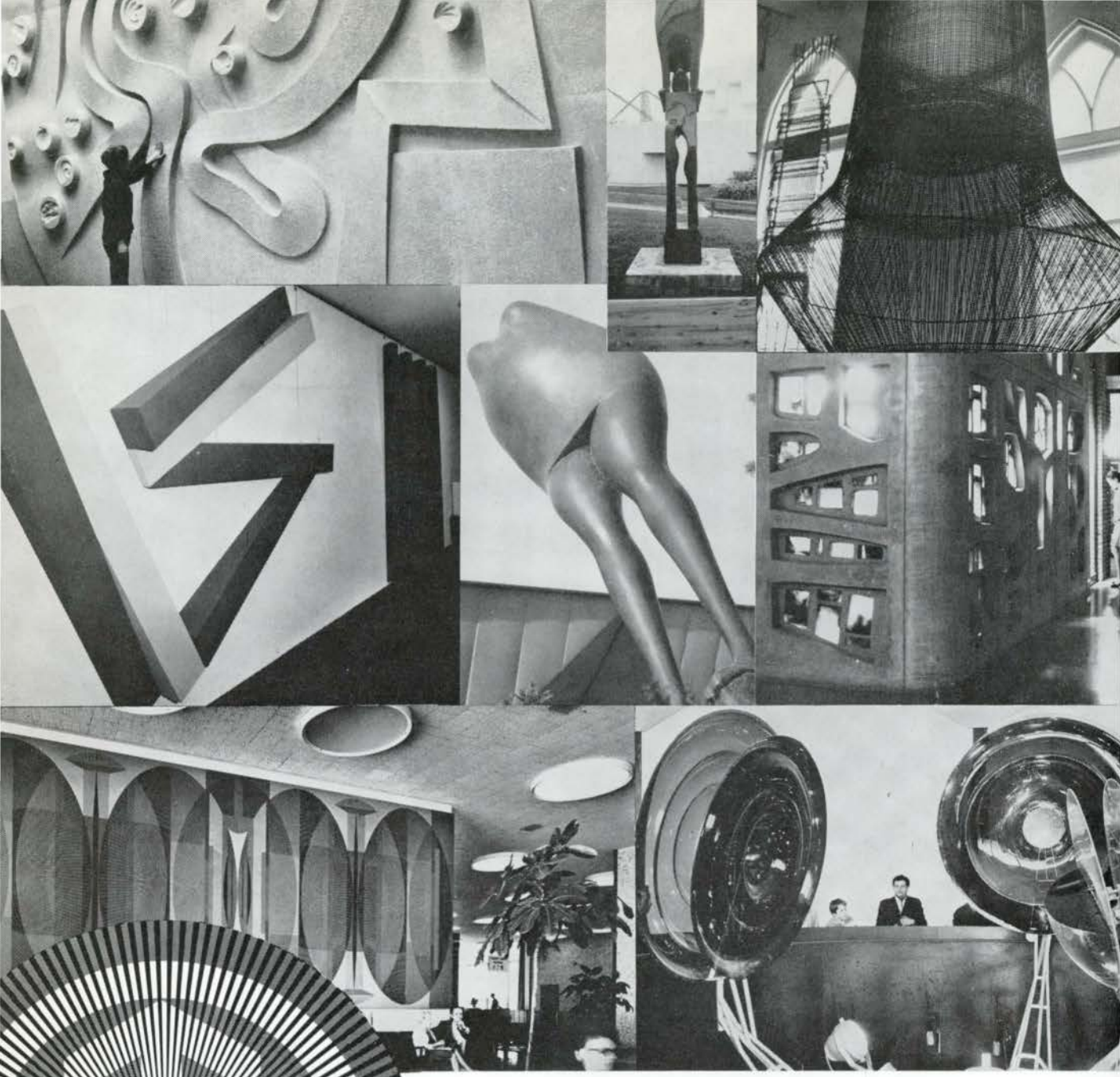
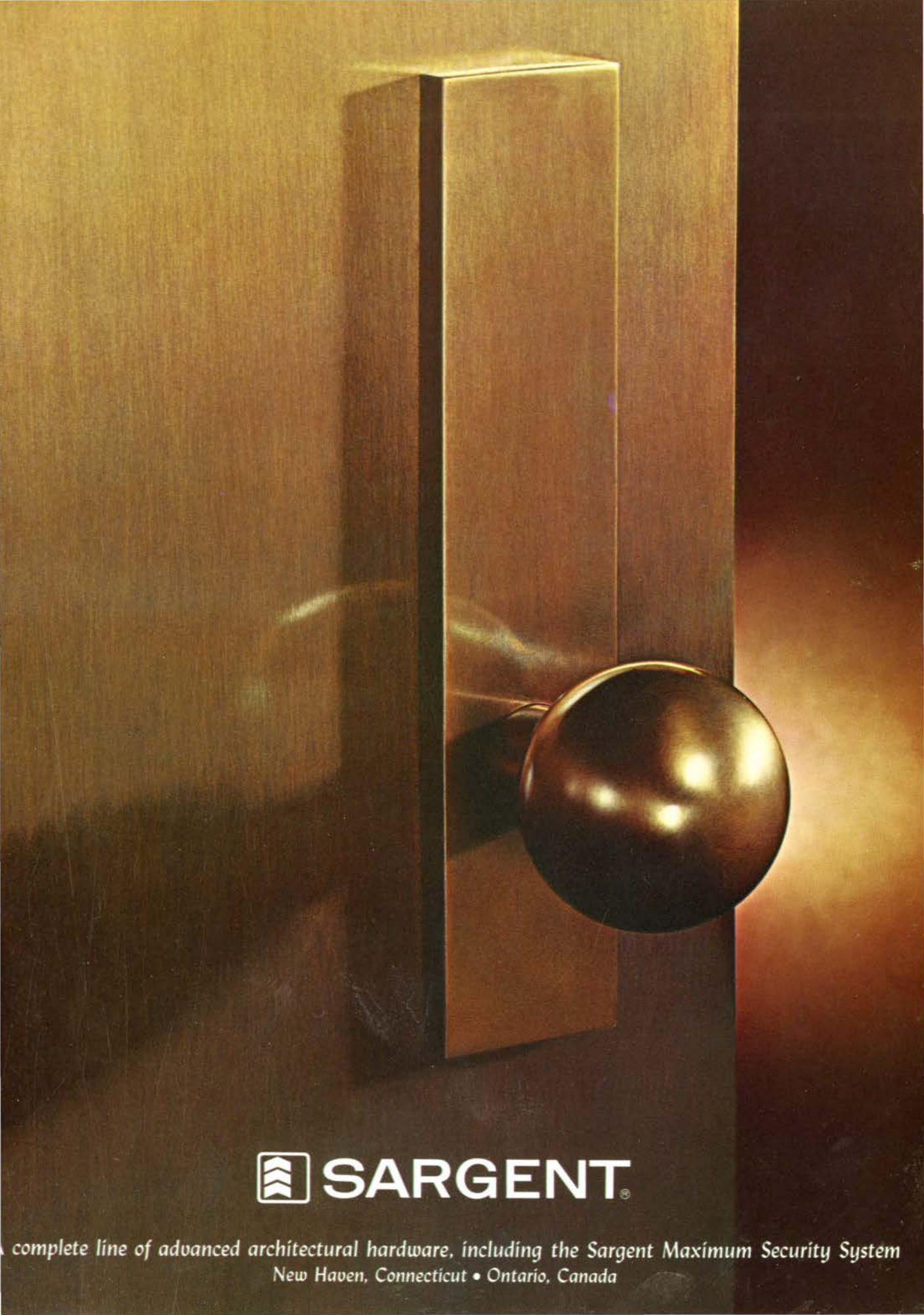


New Working Tool for Architects

Volume II of the Allied Arts Catalogue extends to 89 the number of artists included in the RAIC's continuing record of Canadians working in arts allied to architecture. 182 photographs, 14 in color, illustrate the work of sculptors, painters, ceramists, weavers, potters, artists working in metal and stained glass, and "idea" men.

This volume is a must for every architectural office – with its "op art" cloth bound cover, fine offset printing and large color illustrations it also makes a handsome gift.

Available from the RAIC Publications Board, 160 Eglinton Ave. E., Toronto 12, at $6.00 plus 50¢ postage per copy. Volume I, is still available at $3.00 plus 50¢ postage for soft bound, $6.00 plus 50¢ postage for hard bound.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Alice Through the Looking Glass

or An Artist Looks at an Architects' Convention

Alice (through the looking glass) could not have entered a stranger world of perversities than our "Alice from Allied Arts" at the architects' seminar entitled "Environmental Conditions", OAA Convention, Toronto, February 20th-22nd, 1969. Architects invited flagellation from whips administered by a panel of "invited experts" from various fields .... Stephen Dupré, political economist, Gerald Gladstone, sculptor, Michael Hough, landscape architect, James F. McCallum, barrister and solicitor, Hugh McGory, traffic engineer, Ian McHarg, ecologist and landscape architect, William Michelson, sociologist and Chairman James A. Murray, who at times became a helpless onlooker at the onslaught. Ian McHarg and Gerald Gladstone starred as twin prophets of doom tolling a bell which pronounced the imminent death of the architectural profession if it continues to follow its established line of behavior.

McHarg: A New Knox Come to Architectural Purpose

McHarg, a giant Scot, thundering and roaring in brilliant rhetoric and looking more like a MacBeth than a gentle "man of nature", battered his architectural colleagues with cold logic and erudition. Facts rather than fancy spilled out in streams like lava from an angrily erupting volcano completely immerging the history of western building processes. His verbal lava would, if it could have, petrified all action until a restatement of procedure could be made. The man, a crusader of rapier-like wit, rationally outlined the urgent need for all architects to understand ecological processes before committing rape upon the land. Predictably, he sees man as "a disease upon the planet" who will destroy himself in the cesspools of his own environments.

Gladstone: An Earthy Warning – Going down with the Ship or Swim for the Shore, Boys

Gerald Gladstone, the ubiquitous Barnum and Bailey of the art world in demand on so many public platforms, acquitted himself with an earthiness and toughness belying the stereotype of the unworldly artist. He preposterously propounded the idea that the whole seminar was an exercise in futility for the architects. As far as he could judge, by observing them in dialogue together, the picture for the profession was dismal. He castigated all for being less technologically literate than the manufacturers of refrigerators. He hit the profession on a raw nerve when he symbolized the architect as the "diver at the bottom of the sea who receives an s.o.s. from the mother ship to come up, come up – the ship is sinking". This was one more painful reminder that the storm of time is at the keel – wave upon wave of lost initiatives threaten the bulkheads.

1McHarg – a new "Knox" come to architectural purpose. Mr McHarg is chairman of the Department of Landscape Architecture and Regional Planning, professor of landscape architecture, professor of city planning at the University of Pennsylvania. Among the projects with which he has been associated are Green Spring and Worthington Valley, Baltimore County, the Lower Manhattan Plan and Town-Centre Park, Washington, D.C.
McHarg – Un nouveau "Knox" qui vise l'architecture. Président du Département d'Architecture paysagère et d'Urbanisme régional, professeur d'architecture paysagère, professeur d'urbanisme à l'Université de Pennsylvanie. Parmi les projets dont il s'est occupé il y a Green Spring et Worthington Valley, le comté de Baltimore, le plan de Lower Manhattan et le parc du centre-ville à Washington, D.C.

The Experts: Pills, Props and Palliatives

As for the other panelists, in our Alice's eyes they appeared to be cast as socio-physio-therapists gently enquiring about symptoms and sympathetically suggesting palliatives and remedies for a somewhat ailing body – some of them ruefully admitting that their own professions lacked any specific philosophy or direction to back up their own activities.

The Audience: A Mad Hatter's Tea Party

Our Alice expected a few tortured screams from the masochistic body of architects as blow upon blow fell upon its vital parts. At least she expected that half of the audience would run off prematurely to burn all drawing boards along with the projects on them, then hurry back to pass a firm resolution that a crash course in ecology (bilingual of course!) should be a requisite for professional protection. This would be followed by another resolution – to make a study of McHarg's present projects compulsory for every student architect in the country. Imagine, however, Alice's amazement when attending the "Mad Hatter's Tea Party" later, in the lounge over convivial drinks, to find the conversation the usual one of "passing the crying baby", ie, business problems and building battles of the day.

Gerald Gladstone reminded the architect that the artist has been *al corso* (on the streets) since post-renaissance times and the architect may soon join him there in that less materially rewarding world. If architects persist in being deaf to the voices of their more enlightened brothers, such as McHarg and Buckminster Fuller, then perhaps it is preferable that initiatives pass to others leaving them, within the protection of a less dynamic profession, cast in the role of "simple builders under instruction" rather than designers of environments. As Alice sees it, the needs and wants of man have become at variance. The architect is more persuaded to wants than needs. Wants are variable and are often wilfully and basely directed to nefarious purpose; needs are constant. Wants are more a sophistication – ever changing and corrupted by affluence;

2 If the ship should sink – Sea City. A model of Pilkington's design for a "Sea City" as a logical 21st century successor to the present day mainland city unveiled for its first North American showing at the Ontario Association of Architects' Annual Convention
Si le bateau devait coulé. "Sea City" est une ville en mer. La maquette de Pilkington pour Sea City, la solution logique pour la ville du 21ième siècle qui doit succéder à la ville sur terre, a été dévoilée pour la première fois en Amérique du Nord au Congrès annuel de l'Association des Architectes de l'Ontario

needs are basic and real and affect poor and affluent alike. It is high time the architect had cognizance of the circumstance in which man is plagued by his needs and wants. He then as an intelligent arbiter would be better able to create real environments.

Alice perceived that there were lifeboats and life belts within easy reach to enable the architect to swim for shore – leaving the mother ship to founder if it will. It is apparent, however, that to do this he must no longer be totally absorbed in the building of buildings but must learn to look, to listen and to swim in the sea of total environment – with the first step being a study of ecology. A good start would be to send McHarg immediately from one end of Canada to the other for students and professionals alike to absorb his "presbyterian" outlook on architectural fleshpots and to go away and sin no more. McHarg having converted our Alice to a certain attitude towards conservation, she therefore presents some guidelines from the seminar which would do no shame to grace the walls of any architectural design school.

"Sticks and Stones" Hurled by McHarg at his Colleagues

"If man succeeds in his purpose of self destruction maybe a tiny algae will survive and restart the whole life cycle and mutter to itself 'this time no brains'."

"Form and process are indivisible – there are no capricious forms in nature."

"Beauty should not be an objective. Beauty comes or is discovered *after the fact*."

"Meaningful form reveals the history of the process".

"Contemporary architecture is an illusion."

And last but certainly not the least for the profession of architecture, "Survival is the test."

Anita Aarons

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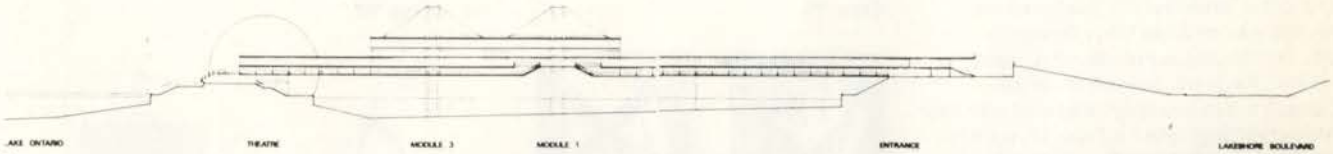
3

3 Man and His World – an underground earth box sculpture by Tony Urquhart
Terre des Hommes – boîte sculptée de Tony Urquhart, réprésentant des formes terrestres et souterraines

4



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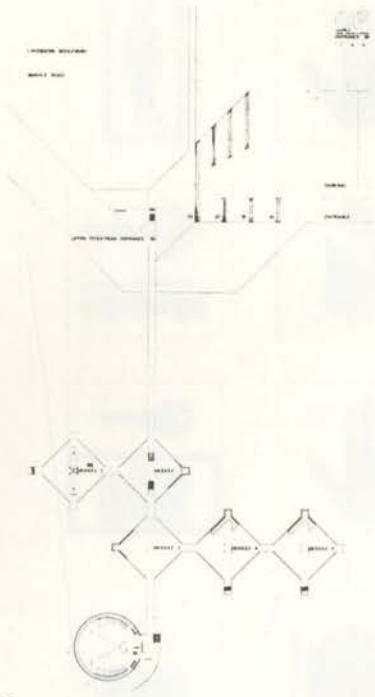

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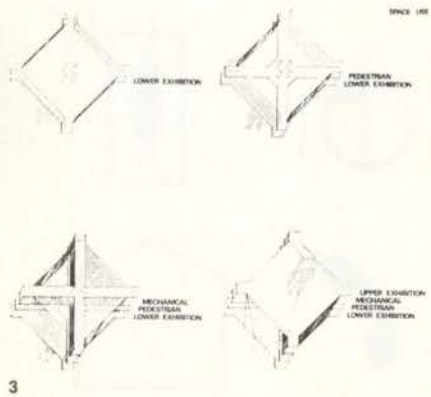

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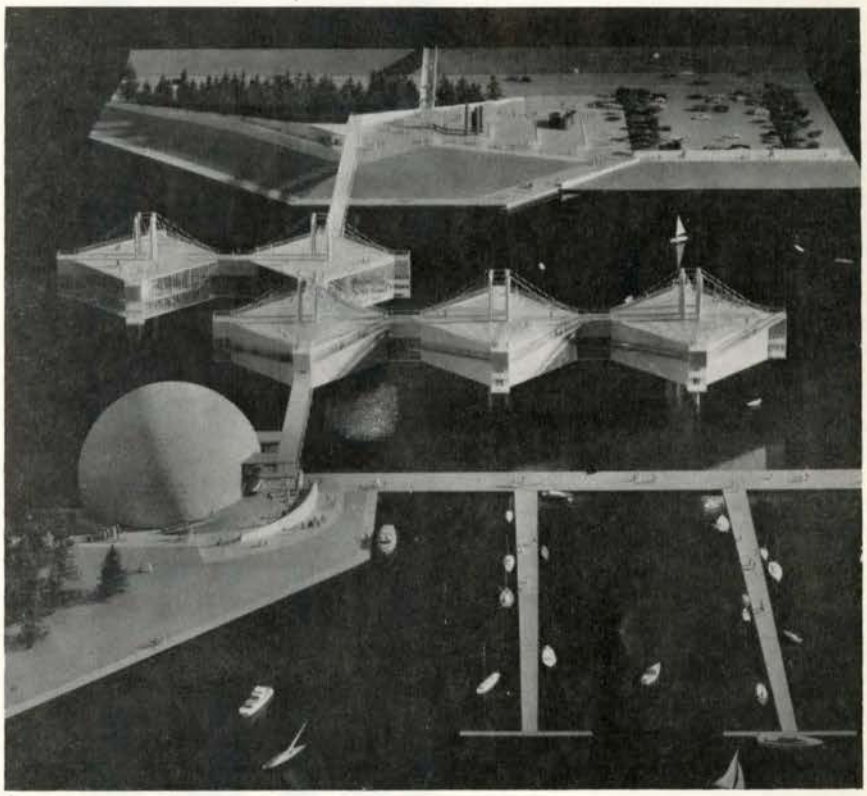

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Since Expo '67 the Ontario government has been under stronger than ever pressure to help lift the dowdy, archaic Canadian National Exhibition into the world of contemporary exhibition architecture. At last the province has obliged, and Craig, Zeidler and Strong's new Ontario Pavilion for the CNE would not be out of place at either Montreal's Expo '67 or Osaka's Expo '70 **(1-4).** The complex consists of five identical, multi-level exhibition space modules, linked to each other and to two artificial islands, all connected to the CNE waterfront mainland by a double deck bridge. A sixth element is a dome housing a total film environment. Audiences sitting on a suspended surface will be confronted by a screen curving under, over and in front.

In addition to the structures, the islands, designed by Landscape Architect Michael Hough, will offer recreational facilities, boutiques, concert and winter carnival facilities. There will also be a marina, with waterfront restaurants. The project received a suitable TV, press and radio launching, and work – fill to start building of the islands – began immediately. Almost as immediately it stopped. Metro Toronto's Chairman wouldn't let the trucks dump the fill because the province hadn't asked permission to use Metro owned waterfront land for the pavilion. Two days of Metro indignation, then sudden quiet. Turned out Metro didn't own the land. The province did. Work resumed. The pavilion will be opened for the 1970 CNE.

The Japan Architect has published the pictographs for Expo '70 in Osaka (**5**) Designer is Shigeo Fukuda, who hopes his sign language will become universal. Curious to see how they compared with Paul Arthur's pictographs for Expo '67, we dug into the files and here (**6**) is a reminder of that occasion.

Pictographs for Expo '70, left to right: No smoking, Don't touch, Stroller, Toilet (Gentlemen), Mail, Locker, V.I.P. Entrance, Press Entrance, First aid post, Lost children, Toilet (Ladies), Handicapped, Escalator, Monorail.
Pictographs for Expo '67, left to right: No fire, Lost-Found, No admission, Men's WC, Anti-littering, Bus Station, First aid, Locker, Restaurant, Coffee Shop (refreshments), Handicapped, Women's WC, Telephone, Hospital.

The Thinking Man's Art, or, Decisions Decisions Decisions

From an invitation (notice? catalogue?) to a show of the works of Lawrence Weiner at the Anna Leonowens Gallery, Nova Scotia College of Art, April 7-27:

"L.W.
"The artist may construct the piece
The piece may be fabricated
The piece need not be built

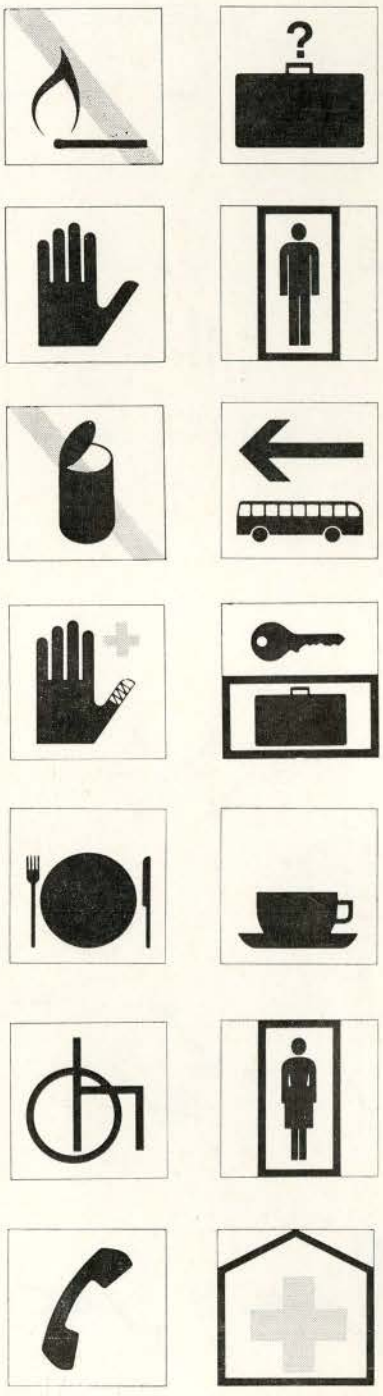
"Each being equal and consistent with the intent of the artist the decision as to condition rests with receiver upon the occasion of receivership".

The pieces?
"1 A shallow trench dug from high water mark to low tide mark upon a North Atlantic beach, 1969; Collection: Freehold
"2 A wall pitted by a single air rifle shot, 1969; Collection: Seth Siegelaub, N.Y.
"3 Five gallons water base tempera paint poured directly upon the floor and allowed to remain for the duration of the exhibition, 1969; Collection: Nova Scotia College of Art
"4 Two common steel nails driven into the floor one directly in line with the other at points determined at the time of installation 1969
"5 One quart heavy grade motor oil poured into the Gulf Stream, 1969"

Expo '70

5

Expo '67



6

Résumés

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L'Architecture et la Structure en tant que Système
L'Homme à l'Oeuvre et l'Homme Interroge l'Univers, pavillons thématiques de l'Expo '67
Guntis Plésums

Aujourd'hui professeur aux Etats-Unis, l'auteur fut coordinateur des systèmes de structure des deux pavillons cités ci-dessus. Le programme et le planning des travaux de construction ont été établis suivant le procédé d'acheminement critique. Le programme voulait que les deux structures soient semblables, avec des portées de plus de 100 pieds pour des surcharges de 125 lbs/pi.ca., afin de pouvoir servir à de grandes expositions aussi bien qu'aux petites. Les systèmes de mécanique et d'électricité devaient être intégrés au système de structure tout en étant démontables et en offrant le maximum de flexibilité pour les expositions. Le concept de la "cellule universelle" a été accepté dès le début et le tétraèdre tronqué s'est avéré la forme la plus praticable puisqu'elle offre par la juxtaposition des modules un très grand choix de composition. Une dimension de 3'-3" entre points nodaux a été adoptée donant une profondeur de 5'-3" aux éléments de structure. Les assemblages de tétraèdres tronqués ont servi de charpente pour les toits, les murs et les planchers. Les études simultanées des architectes et des ingénieurs ont déterminé que la cellule universelle ou le "bloc de construction" a certains désavantages notamment que les parties constituantes doivent être étudiées pour résister aux efforts maximums donc ils ne sont pas économiques. L'équipe d'ingénieurs a proposé l'usage de 3 charpentes Vierendeel en conservant les volumes tétraèdriques. L'analyse complète des efforts aurait été très compliquée et les méthodes d'analyse superficielle auraient porté à l'usage d'éléments très lourds afin de résister aux efforts dûs à la flexion. La triangulation de la structure l'aurait transformée en "structure spatiale". Une maquette a été faite à l'échelle de 1/6. L'assemblage par soudure a été étudié et abandonné. Finalement il a été décidé d'accepter le boulonnage des éléments sur chantier les goussets étant fabriqués et soudés en usine. Tous les élments sont fabriqués par pliages de plats de 6" de large de diverses épaisseurs entre 3/16" et 1/2". Tous les boulons sont en acier de haute résistance, 3/4" de diamètre. C'est la première fois qu'une structure spatiale constitue entièrement toute la structure d'un bâtiment. Les raccords des murs aux planchers auraient pu être plus élégants si les noeuds avaient été d'épaisseurs uniformes et si les diagonaux avaient été doublés et raccordés par des noeuds en plus. Evidemment ceci aurait couté beaucoup plus cher.

Le programme des expositions ne pouvant être déterminé l'architecte a du trouver une solution qui permet l'expansion organique des volumes. Ayant décidé que les petits volumes se rassembleraient comme cellules dans un grand volume de la même forme, le principe architectural fut établi et il a été décidé de monter les murs à chaque neuvième cellule. Les planchers et les toitures pouvant pénétrer ces murs la composition de volumes est très variée. Afin de faciliter l'aménagement des canaux, des routes, des passages de piétons et des autres activités au rez-de-chaussée de l'Homme à l'Oeuvre cinq piliers d'appui ont été supprimés et les charges distribuées aux autres piliers triangulaires par les éléments de la structure spatiale suivant les principes de la géométrie. L'intégration des expositions au système de volumes a été difficile parce qu'il n'y pas eu le temps d'établir avec entière satisfaction le meilleur rapport des expositions entre elles et avec les voies de circulation et les volumes disponibles. Heureusement, la systématisation architecturale de l'espace a évité le chaos.

La programmation des activités du bureau d'études a permis de faire avancer la construction avant que les plans soient terminés. Les problèmes du pavillon de l'Homme Interroge l'Univers ont été plus simples car le rez-de-chaussée est moins compliqué et

le programme des expositions était plus précis.

Les difficultés de fabrication et de montage étaient dûes surtout au fait que les fabricants ont choisi de varier les épaisseurs des goussets afin de réduire le poids des matériaux et ceci a écarté toute possibilité d'industrialisation telle que préconisée par les architectes. Les fabricants n'ont pas poursuivi habilement la production en série et beaucoup de temps a été perdu pour le réglage du matériel d'usinage. Ce manque d'organisation a été typique dans toutes les phases de fabrication. Plus de 200 sous – assemblages ont été réalisés sur chantier à l'allure d'un par heure, puis montés et boulonnés sans l'aide d'échaffaudage ou d'étayage. La disposition des fondations a permis le montage des murs sans étayage jusqu'à une hauteur de neuf cellules. Le montage des planchers et des charpentes de toiture a suivi. Le vide de 3'-3" entre les sous-assemblages a été comblé pour faciliter le montage donnant à la structure un aspect chaotique pendant la construction. Les pyramides composées par l'intersection des murs sur les piliers et plus haut dans le bâtiment ont des goussets constitués d'éléments de dimensions maximums et dans certains cas il y a des plats énormes qui ont 42 trous et qui ne recoivent que 4 boulons.

En conclusion, ces deux pavillons ont exploité un nouveau système de structure employant des fermes spatiales et, en dépit des difficultés de fabrication et de montage, ils ont démontré que la formation de volumes est compatible avec la discipline de la géométrie. Toutefois, l'architecte doit prendre à sa charge la compréhension des principes de la géométrie car cela n'est pas dans le domaine des ingénieurs. La source de presque toutes les difficultés de construction de ces pavillons à l'Expo '67 a été le fait que les architectes n'ont compris que partiellement les lois de la géométrie et ils ont tenté de les ignorer.

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Tour d'Allemange – 1968
William A. Strong

Sept représentants de l'IRAC ont participé à un tour d'Allemagne pour étudier les effets culturels, sociologiques et géographiques sur l'architecture et l'urbanisme. La reconstruction d'après guerre a créé des régions industrielles et des villes nouvelles dans le nord. Par contre, l'ambiance gaie et baroque de la Bavière a été reconstituée. Dans toute l'Allemagne la préfabrication et la systématisation sont les qualités dominantes. Des fonds sont alloués pour la sculpture et l'aménagement paysager dans tous les projets de construction. Le principe de la direction des projets par gérance spécialisée est moins en évidence que nous l'aurions cru et la méthode traditionnelle d'adjudication des marchés est de plus en plus en usage.

Bonn, qui devait être la capitale provisoire souffre maintenant de l'insuffisance des études d'urbanisme pour la longue durée. La cathédrale de Cologne et les églises sont un soulagement dans leurs quartiers "systématisés".

L'aérogare de Dusseldorf nous a impressionnés. L'aménagement pour 300,000 passagers vient d'être transformé pour en servir 2,500,000 et l'extension est prévue jusqu'à 9,500,000. L'aérogare de Cologne/Bonn démontre le développement organique possible dans la construction préfabriquée. L'Université "instantanée" de Bochum réunie tous ses bâtiments sous un toit. L'harmonie du nouvel hôtel de ville avec l'ancien à Bensberg nous a frappé. La ville de Hanovre, presqu' entièrement détruite a reconstruit quelques monuments historiques (Altesrathaus, Marktchirche) mais le plan d'urbanisme et l'architecture reflètent le vingtième siècle. Près du rideau de fer, les 100,000 habitants de la "nouvelle ville" de Wolfsberg dépendent surtout de l'usine Volkswagen. Les écoles, ainsi que celles de Berlin et d'Edemison insistent sur l'éclairage bilatéral et n'ont pas encore accepté le plan ouvert.

Munich sera toujours Munich car l'urbanisme se développe sans modifier ce qui existe. La préparation pour les jeux olympiques de 1972 va améliorer l'état des routes.

Berlin, toujours harcelé par l'inquiétude ne peut réaliser ses projets d'urbanisme tant que le secteur de l'Est refuse d'y participer. Les lignes de transports, les services municipaux s'arrêtent au mur infernal. Les théâtres, les musées et les galeries sont splendides mais il y a très peu d'architecture contemporaine.

Dans l'ensemble nous avons trouvé que le Canada a des bâtiments de qualités égales ou même supérieures mais nos villes manquent la liaison avec l'architecture d'autrefois. Malheureusement, l'héritage de 500 ans nous a paru plus important que la systématisation dans le bâtiment.

Page 47
University of Toronto
Department of Architecture

Il s'agit aujourd'hui du refus de la notion de l'architecture comme produit achevé. Pour que les gens puissent se sentir "chez eux" dans nos bâtiments nous devons produire une architecture qui appelle l'interpretation et la réponse. Le problème, alors, est de définir ce que nous fournissons, "le support."

Première Année

Ma tâche est de créer des "endroits" pour les gens. Analogue à la parole, l'objet bâti peut donner une réalité concrête à une idée encore inconsciente. Je cherche des situations où l'objet bâti est provocateur. Dans mon plan pour une colonie de vacances la rampe qui descend à la cuisine est percée par les tubes en acier qui soutiennent le toit de façon à en faire des points d'adhésion pour quelqu'un qui bavarde avec les cuisiniers.

Deuxième Année

"Une architecture pour les gens" suppose la possibilité pour les usagers de participer a l'élaboration de l'environnement. Nous nous interessons cette année au logement des voyageurs. Afin que la chambre reflète au maximum la personalité de l'occupant, j'exploite le peu qu'il apporte avec lui – voiture, bagages, chapeau, manteau, etc. – pour lui rendre familier ce logement étranger. En plus, des changements de niveau, un store autour du lit, et de différentes possibilités éclairage provoquent des ajustements individuels.

Quatrième Année

Il est question ici de fournir des locaux pour l'enseignement supérieur disponibles en tant que ressources pour les gens d'un certain quartier. Le bâtiment est fait comme prolongement de la rue publique. Parmi les supports les plus anciens, la rue implique la spontanéité, le divertissement, et la communication. En plus il y a une supposition fondamentale que tout le monde a le droit absolu d'y être. Quant à l'aménagement des activités spécifiques il nous faut trouver l'équilibre délicat entre une architecture trop déterminée qui limite l'interprétation et une architecture neutre, trop ambiguë pour etre utile. Dans ce plan un "amphithéatre" consiste en une série de marches à la bonne hauteur pour s'asseoir avec la possibilité d'ajouter des sièges en bois, et prévoit une adaptation spontanée lorsqu'un groupe organise l'équipement: des bancs, des plate-formes, et l'éclairage conforme à son but.

Cinquième Année

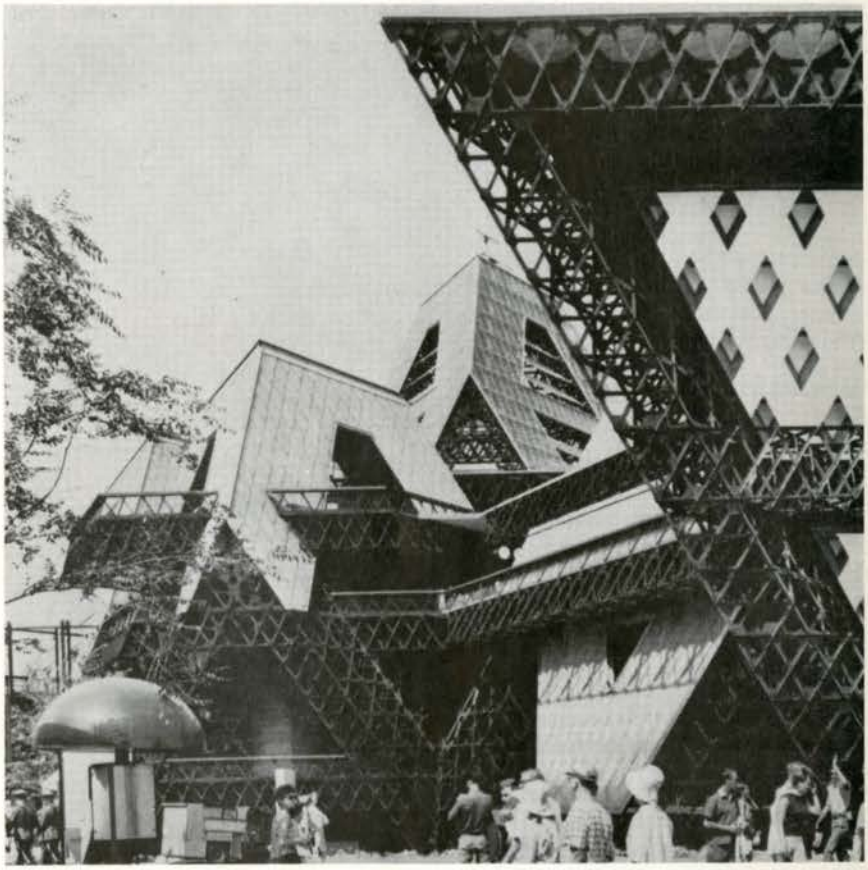
Si un banc, un arbre, ou un kiosque est capable de provoquer certaines actions à une petite échelle, de même le transport, l'éducation, la politique, la récreation, et les moyens de communication fonctionnent comme "supports" à l'echelle de la ville. A cette échelle un travail d'équipe s'impose. La contribution de l'architecte pourrait être celle d'éclaircir les conséquences humaines de l'exploitation urbaine sur le plan physique. Notre responsabilité doit être à ceux qui sont touchés par cette exploitation.

5

Architecture and Structure as a System

Guntis Plésums

Now that the excitement generated by Expo '67 has subsided, it may be permissible to return to the theme megastructures. This seemingly incomprehensible "environment" of rusty steel defied conventional architectural evaluation. It may not be presumptuous to say that many an architect and engineer have been amazed at the complexity of Man the Producer pavilion *(fig. 1)* and have wondered how so complex a structure was conceived and executed; what justifications were there for going to such extremes. The pavilion received rather limited coverage in the architectural press, as a detailed evaluation would have required intrinsic knowledge of the evolution of the structure. Evaluation is hardly the purpose of this paper. It is difficult for anyone who has been involved to render an impartial judgement. There remains, however, an obligation to those professionals who experiment with space structures and spatial systems and hence may conceivably benefit from this exercise. Thus a description of the goals, the design process and the achievements as well as the shortcomings may be in order.



1 East end of Man the Producer theme pavilion

Façade est du pavillon thématique L'Homme à l'Oeuvre

Program

The program was prepared by the owner, Canadian Corporation for the 1967 World Exhibition. A rigid schedule was enforced by the critical path network to ensure completion of the buildings and installation of exhibits in time for the opening of Expo '67. Some physical requirements were:

The pavilions should act as focal points, without being towers, to help visitors orientate themselves.

The two pavilion complexes must maintain continuity in character and a definite visual link.

The pavilions should be temporary, and, if possible, easily demountable.

The structural system must span over 100 feet with an average live load of 125 pounds per square foot.

The structural system should be able to form large, as well as small, volumes to accommodate exhibits.

The building should remain flexible and be able to change its configuration during the latter part of working drawing production, with possible minor changes even after completion or during the Exhibition.

The structure should integrate mechanical and electrical services for maximum exhibit flexibility.

Exercise in Geometry

Investigation of a number of structural systems in the early stages of design development disclosed various inadequacies in the available structures, including existing space trusses. It was apparent from the program that a satisfactory solution to the requirements could be achieved only by adopting a modular planning unit. The concept of "universal cell" or "building block" appeared as an inevitable solution for forming floors, walls and roofs. A structure based on such a modular component could, in principle, adjust to exhibit requirements.

The author at present teaches structure systems and architectural design at the Department of Architecture, Rhode Island School of Design. As job captain of Man the Producer pavilion and coordinator of the structure system of both pavilions, he was a member of the architectural team at Affleck, Desbarats, Dimakopoulos, Lebensold and Sise.

2 Geometry system of tetrahedron and truncated tetrahedron space units
Système géométrique des éléments spatiaux en forme de tétraèdres et de tétraèdres tronqués

3 Vierendeel space frame structure system composed of tetrahedron and truncated tetrahedron units
Système de structure spatiale à charpente Vierendeel comprenant des éléments en forme de tétraèdres et de tétraèdres tronqués

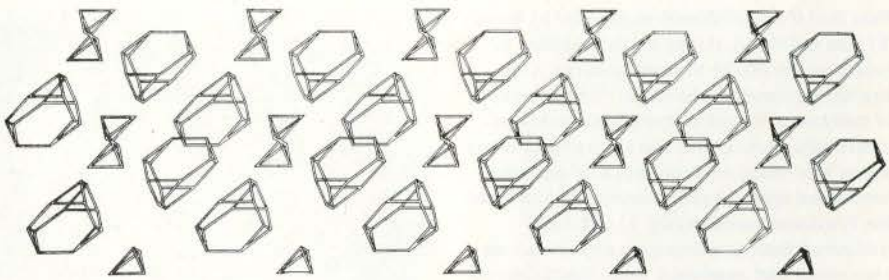
4 Planar space truss structure system composed of tetrahedron and truncated tetrahedron units
Système structural de fermes spatiales se rapportant à un plan comprenant des éléments en forme de tétraèdres et de tétraèdres tronqués

Its system of growth would create a discipline in design.

The modular "cell" that appeared to best satisfy the complex requirements is a regular tetrahedron with each of its points truncated at one-third of each edge dimension. These truncated tetrahedrons fit together to form two parallel planes, with the truncated points forming smaller tetrahedrons *(figs. 2 & 3)*. Each surface formed by these geometric units creates a pattern of regular hexagons and triangles. This combination of tetrahedrons and truncated tetrahedrons defines a three-dimensional module and a structural sytem for floors and roofs, as well as walls of both pavilions. The geometric growth of this combination of tetrahedrons and truncated tetrahedrons offered intriguing solutions to the exhibit and building requirements, and this modular unit was adopted as the governing discipline for all architectural, structural and mechanical design criteria.

Joint architectural, structural and mechanical studies established a basic modular dimension from node to node of 3'-3", which resulted in a floor or wall structural depth of approximately 5'-3". These dimensions in their various combinations provided usable ceiling heights, structural depth for required spans and loads, and sufficiently large open volumes within the structure for location of mechanical equipment, thereby establishing the basis for an integrated building system.

Early studies of this structural vocabulary disclosed that the floor and roof planes required wall, rather than point supports. Columns would create stress concentration points higher than what the preferably delicate members of the cells could resist. It was decided to use the truncated tetrahedron geometry for walls as well as floors. The characteristics of the geometry dictated 60 and 120 degree angles between walls in plan, with 70 degree 32 minute and 109 degree 28 minute angles between the floor and the wall planes. Volumes of various sizes and geometry were formed and combined, and their architectural and structural characteristics investigated. Acceptable building volumes resulted from the natural tendency of the truncated tetrahedrons to regroup themselves into larger tetrahedrons,



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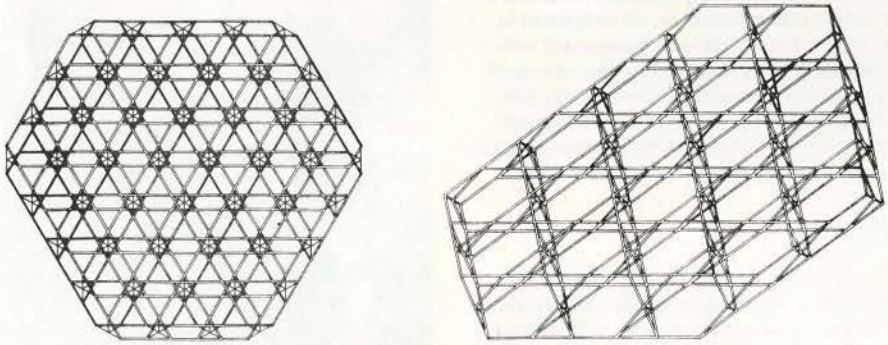

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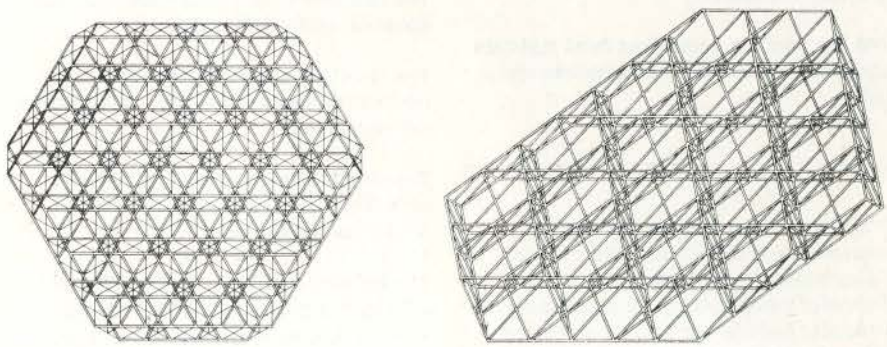

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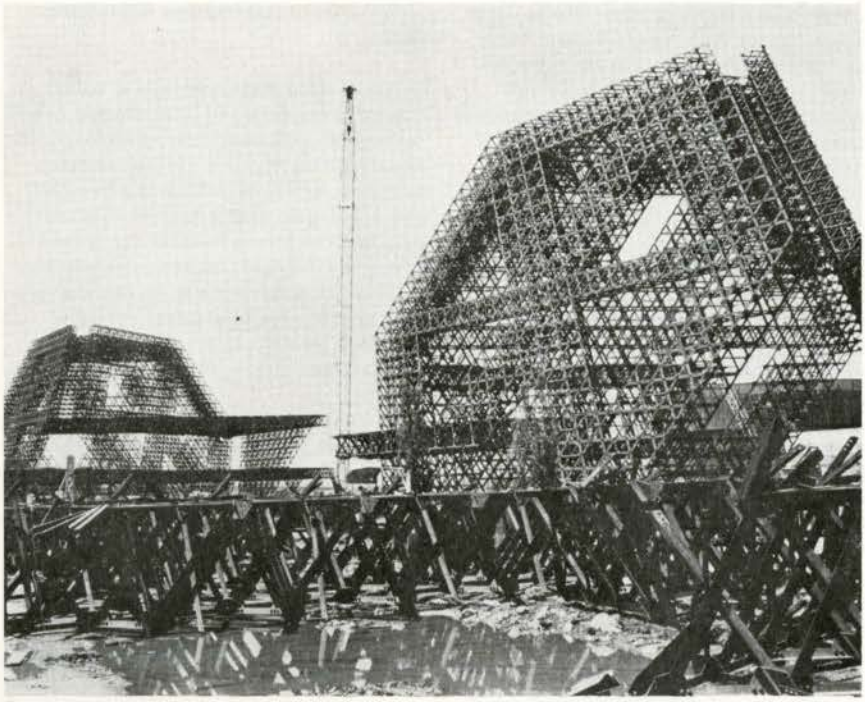
5 Structure of two of the three main truncated tetrahedron forms of Man the Explorer theme pavilion. Sub-assemblies on ground are yet to be erected
Structure de deux des trois formes principales tétraédriques tronquées du pavillon thématique L'Homme Interroge l'Univers. Les assemblages secondaires en premier plan sont prêts à monter

6 West end of Man the Producer theme pavilion
Façade ouest du pavillon thématique l'Homme à l'Oeuvre



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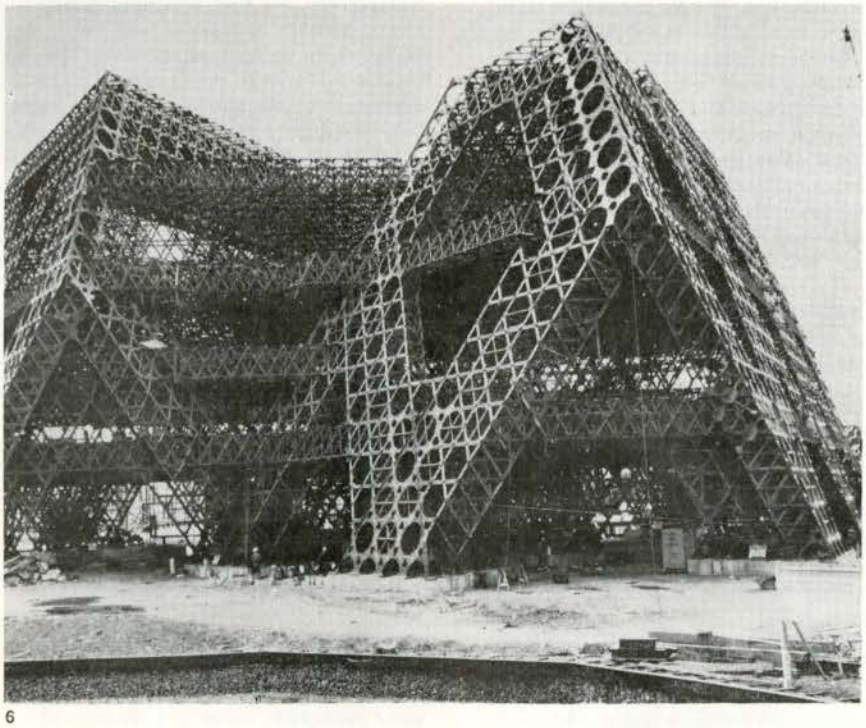

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truncated tetrahedrons, or less regular shapes of the same family. This larger discipline of forming spaces was adopted for Man the Explorer pavilion *(fig. 5)*, and was the basis for the development of a system for Man the Producer pavilion *(fig. 6 & 14)*.

Structure as a System

The structural engineering team approached the problem of preliminary analysis of typical floors and volumes to determine approximate member sizes and to establish a method for final analysis and computer programming.

Simultaneously, the architects and the consulting engineers studied methods of assembly and erection of the structure. Precast concrete was discarded because of limited flexibility due to prestressing. Cells built up from four hexagonal steel plates would present connecting and buckling problems, separate the inside volumes of the truncated tetrahedrons, making them useless for mechanical services, and would result in structurally inefficient use of material. Punching of hexagonal holes and using the removed part as a connecting plate did not eliminate the buckling of compression members and the prohibitive costs.

The difference between a "cell" or a "building block" and a space frame or a space truss lies in the method of construction and not in some intrinsic structural property. A "building block" can be defined as a universal structural unit which can be freely interchanged within the same structure or used in any number of structures. Such a unit has obvious advantages with industrialized production methods. In practice, however, structures composed of identical units or members impose severe restrictions. The components of these units must be sized to resist maximum stresses in the structure, resulting in uneconomical use of material. The members next to the supports determine the size of all components; the more lightly stressed web members are the same size as the chord members. Nodes are likewise of maximum size throughout. In many existing space structure systems the penalty paid for uneconomical use of material is more than offset by savings in labor and time during production and erection as well

as in design and engineering. Such structures are appealing because of their "universal" application within prescribed limits of span and load. Thus far, due to the large number of variables, no clear division line has been established between the economy of structures with identical elements and the structures with multiple size components. Structures composed of several "building blocks" varying in magnitude, or conversely, "building blocks" with variable components, promise to be more economical. Indeed, such a structural system would approach organic structures in nature, where members are efficiently sized to their individual tasks.

Thus a fully industrialized space frame consisting of cells with all the members of the same size was found to be highly inefficient. The first definite proposal by the structural team entirely replaced the "building block" concept with a pattern of three intersecting Vierendeel frames forming a space frame, yet retaining the geometry of tetrahedrons and truncated tetrahedrons *(fig. 3).* Opinions differ on the merits of this Vierendeel space frame. A noted authority on space frames who was consulted felt that the Vierendeel system would actually be more economical than the subsequent triangulated proposal. Member sizes are usually determined by the extreme fiber stress near the middle of the length of member with constant section resulting in extra load carrying capacity available near the ends (the inefficiencies of bolting often determine member size). Conversely, the moments developed at nodes in a Vierendeel frame quickly damp out, seldom having an appreciable effect on the member size initially selected for strength at its mid-point. Such a structure system, however, is highly indeterminate and impossible to analyze in the short time available. Superficial analytical methods would demand extremely large member sizes to counteract bending in the chords, negating the economy of the structure.

Solutions for triangulating the structure and thus turning it into a space truss (commonly but incorrectly referred to as a space frame) were investigated. A pair of diagonals in each of the hexagonal faces of the truncated tetrahedron within the structure created what one might call a lattice truss or two superimposed Warren trusses with common chords *(fig. 4).* Additional web and face bracing members transfer shear and counteract unbalanced forces. (For a more complete description of structural analysis, materials and assembly schemes, see Harris, et al., "Space Frame Exhibition Structures", *Space Structures,* ed. by R. M. Davies, New York, Wiley, 1967.) An interesting feature of this system of three intersecting trusses is that each node is a panel point of only two trusses, and that only seven (five in the Vierendeel system) members meet at a node – less than in any other applied three-way planar space truss system. Concurrently with structural investigations, the architects and the consulting engineers, in close collaboration with the fabricators, continued studies in methods of assembly. Countless wood and cardboard models of the space truss configurations and the nodes were built. Consultant Jeffrey Lindsay developed an industrialized system for a space frame of identical interlocking pieces, which were fabricated on a mass-production basis and permitted the construction of a model of a typical space at 1/6 full-size at the Université de Montréal Ecole d'Architecture. The purpose of the model was to demonstrate to exhibit designers the potential of the system and the space. It contained floors, internal and external cladding, exhibits, lighting and mannequins. Although structurally unacceptable, the model encouraged the study of the node configuration and the method of fabrication and assembly. (For photographs of the model, see Blood, T. E., "Theme Buildings/ Expo '67", *RAIC Journal,* October, 1964.)

An all-welded space truss was designed, assessed and found to be too expensive and time consuming. The concept of an industrialized structure with prefabricated components was compromised. With an oblique T section automatically welded from two plates inclined at 70 degrees for the chords, it would still take more than 75 man-years of welding to erect the two structures. Shortage of available welders and scaffolding requirements during erection made this scheme forbidding. Pre-welding of large flat assemblies in Canadian Vickers shipyards, and floating to site on barges was also investigated. Use of extruded aluminum sections was considered for the all-welded scheme, but had to be abandoned due to higher cost of material and connection details.

The final accepted solution is a bolted assembly consisting of shop-welded gusset plate nodes with bent steel plates for chords and diagonals *(figs. 7 & 8).* The truncated tetrahedron geometry dictated a pair of 70 and 110 degree angles for all chord members and the arrangement of the gusset plates. A 110 degree angle was selected for all diagonal web members. All members are bent from 6" wide steel plates varying in thickness from 3/16" to 1/2", and bolted to gusset plates with 3/4" high-strength bolts.

Undoubtedly this is the most ambitious space truss design ever attempted or executed. Never before has a space truss or frame been used as a total structural system. Emphasis should be placed on the fact that the spans and loads to be carried by this space truss are quite large. The stresses at the critical nodal points exceed the loads that can be taken by existing space structures, which have been designed principally as roof structures.

Interestingly, the final structural system approaches the concept of "building blocks" with variable components. The two exterior surfaces of the structural plane adapt to this principle. The nodes are on the three-directional grid, but unfortunately vary in thickness, and each cell is clearly outlined by interchangeable members of variable thickness *(figs. 9 & 10).* This concept, however, does not apply to the web members defining the geometry of the tetrahedrons and the truncated tetrahedrons within the structural plane. Resultant constructional and architectural difficulties become apparent at the floor or wall intersections and particularly the edges of the floor or wall structure *(figs. 6 & 10).* These problems would have been eliminated by doubling of all diagonal web members defining the geometry, and by introducing nodes at the meeting points of these members half way in the structural "slab". The nodes throughout would have to be "universal" and accept all members in the geometry. Such nodes, but larger in size, are used in the pyramids formed by the wall intersections in Man the Producer pavilion *(figs. 11 & 22),* and at floor to wall connections throughout. Some of the merits of

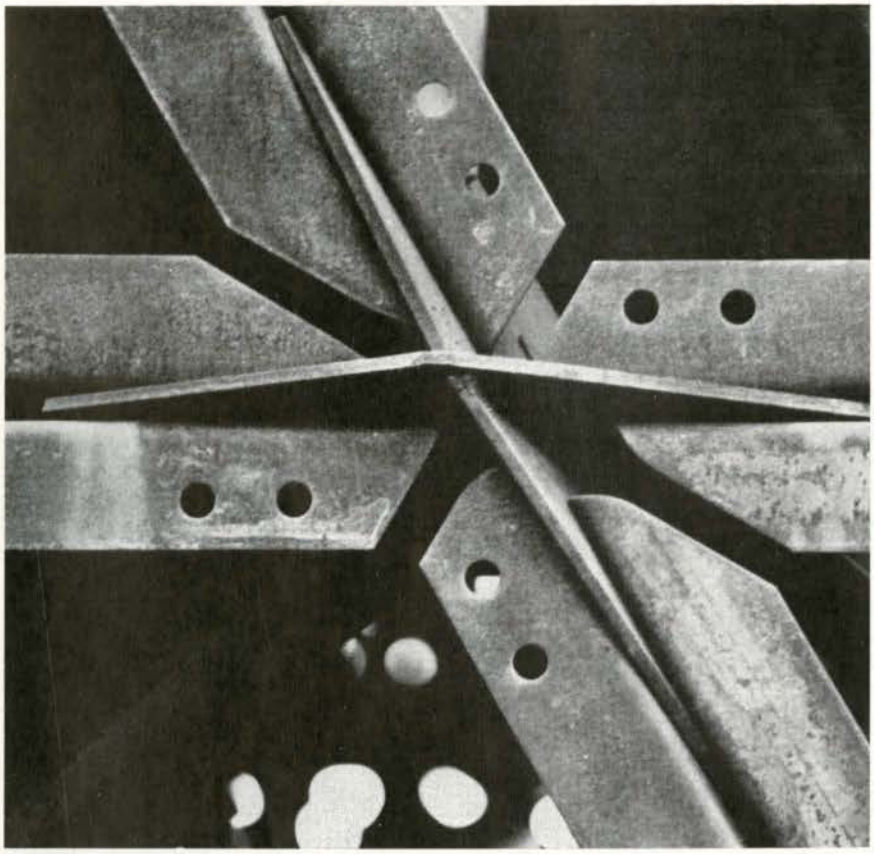
7 Exterior face of a gusset plate node. Holes in chord members within the hexagons resulted from fabricators standardization and were occasionally used for face bracing. One-inch gap between chord members assured neat appearance and permitted tolerance for fabrication and assembly
Face extérieure d'un noeud avec ses goussets en méplats d'acier. Les trous dans les membres dans l'enceinte des hexagones étaient le résultat de la normalisation imposée par le fabricant et ils servaient de temps à autres à la fixation de contreventements. L'espacement d'un pouce entre les éléments donnait une apparence propre et il a permis des tolérances de fabrication et de montage

8 Section of floor structure during construction showing face and web bracing as well as the typical gusset plates and the chord and web members. Note that end cuts of web members conform with the geometry, and the more heavily stressed diagonals forming the truncated tetrahedrons are bolted to both gusset plates of the node
Une partie de la structure d'un plancher en cours de construction indiquant le contreventement des faces et des âmes ainsi que les mésplats des goussets types et les éléments d'arbalétriers, d'entraits et de croisements. A noter que la taille des éléments se conforme à la géométrie, et que les éléments diagonaux qui subissent les plus grands efforts dans les tétraèdres tronqués sont boulonnés aux deux plaques de gousset du noeud

9 View perpendicular to wall structure, identical to floor or roof structure except for location of face bracing
Vue perpendiculaire à la structure du mur, identique à la structure de plancher ou de toiture sauf pour l'emplacement des contreventements en surface

10 Wall structure illustrating the difference in appearance between the face and edge of the structure
Structure d'un mur indiquant la différence de l'apparence de face et de côté de la structure

11 Central part of Man the Producer pavilion during construction. Horizontal bands of heavy nodes indicate floor and wall intersections. Concrete piers are hollow and accessible from above. Hexagonal concrete deck next to the canal is the main entrance and exit area for the pavilion
Partie centrale du pavillon de l'Homme à l'Oeuvre en cours de construction. Les bandes horizontales de noeuds lourds indiquent l'intersection des planchers et des murs. Les piliers en béton sont creux et accessibles par le haut. La terrasse hexagonale en béton à côté du canal est à l'entrée principale et la sortie du pavillon



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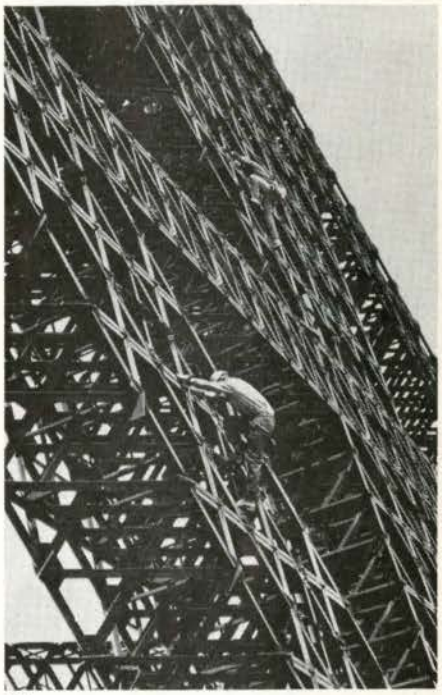

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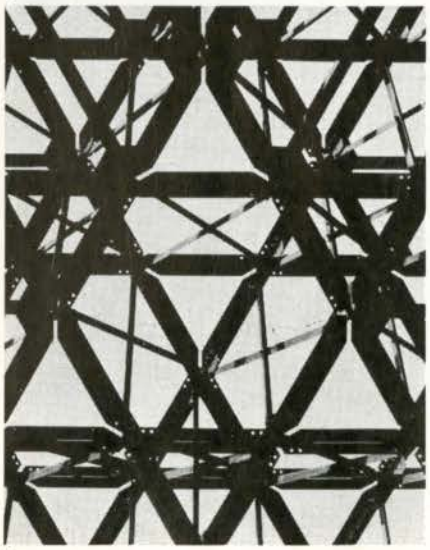

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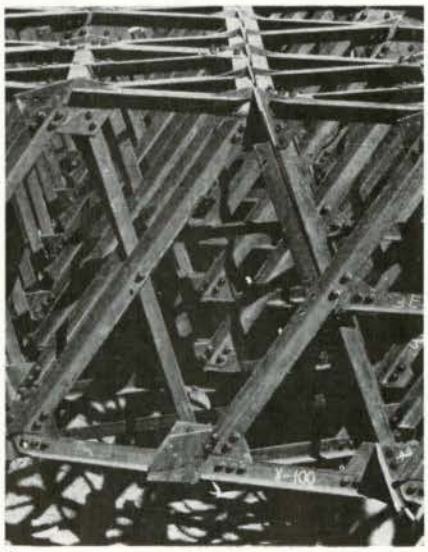

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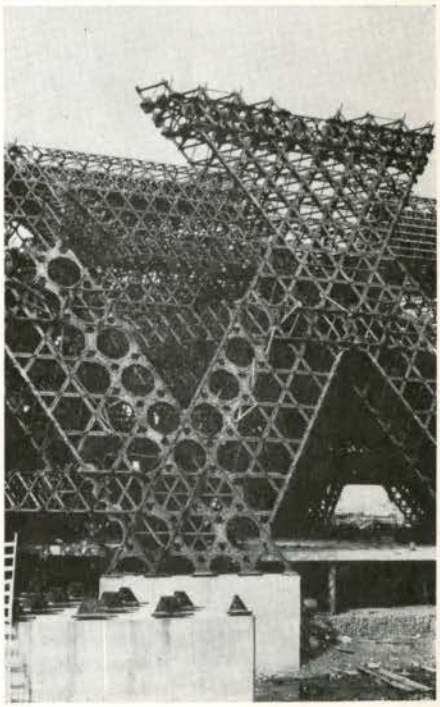

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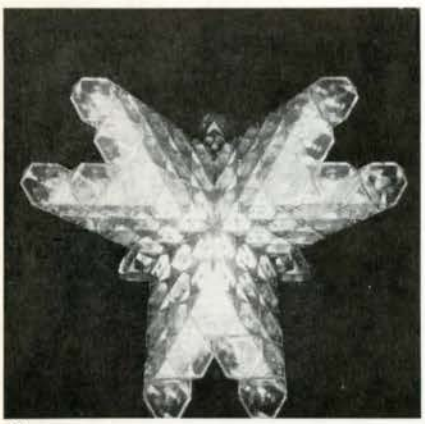
12 Model of Man the Producer structure at intersection of walls above concrete piers or higher in the building, assembled from plastic truncated tetrahedrons
Maquette de la structure du pavillon de l'Homme à l'Oeuvre à l'intersection des murs au-dessus des piliers en béton ou plus haut dans le bâtiment faite d'un assemblage de tétraèdres tronqués en plastique

13 Horizontal section of three-dimensional module of Man the Producer pavilion 14 cells high – basis for system of forming volumes
Coupe horizontale sur un module à trois dimensions du pavillon de l'Homme à l'Oeuvre de 14 cellules en hauteur – la base du système de la formation de volumes

14 Wall arrangement defining the building modules of Man the Producer pavilion complex. Volumes were carved out of the three-dimensional system of intersecting walls
Disposition des murs indiquant les modules de bâtiment dans le complexe du pavillon de l'Homme à l'Oeuvre. Les volumes ont été taillés dans le système à trois dimensions des murs qui s'entrecroisent



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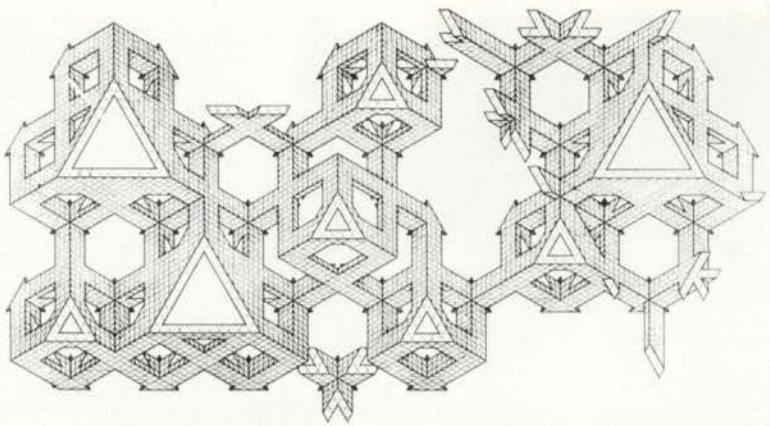

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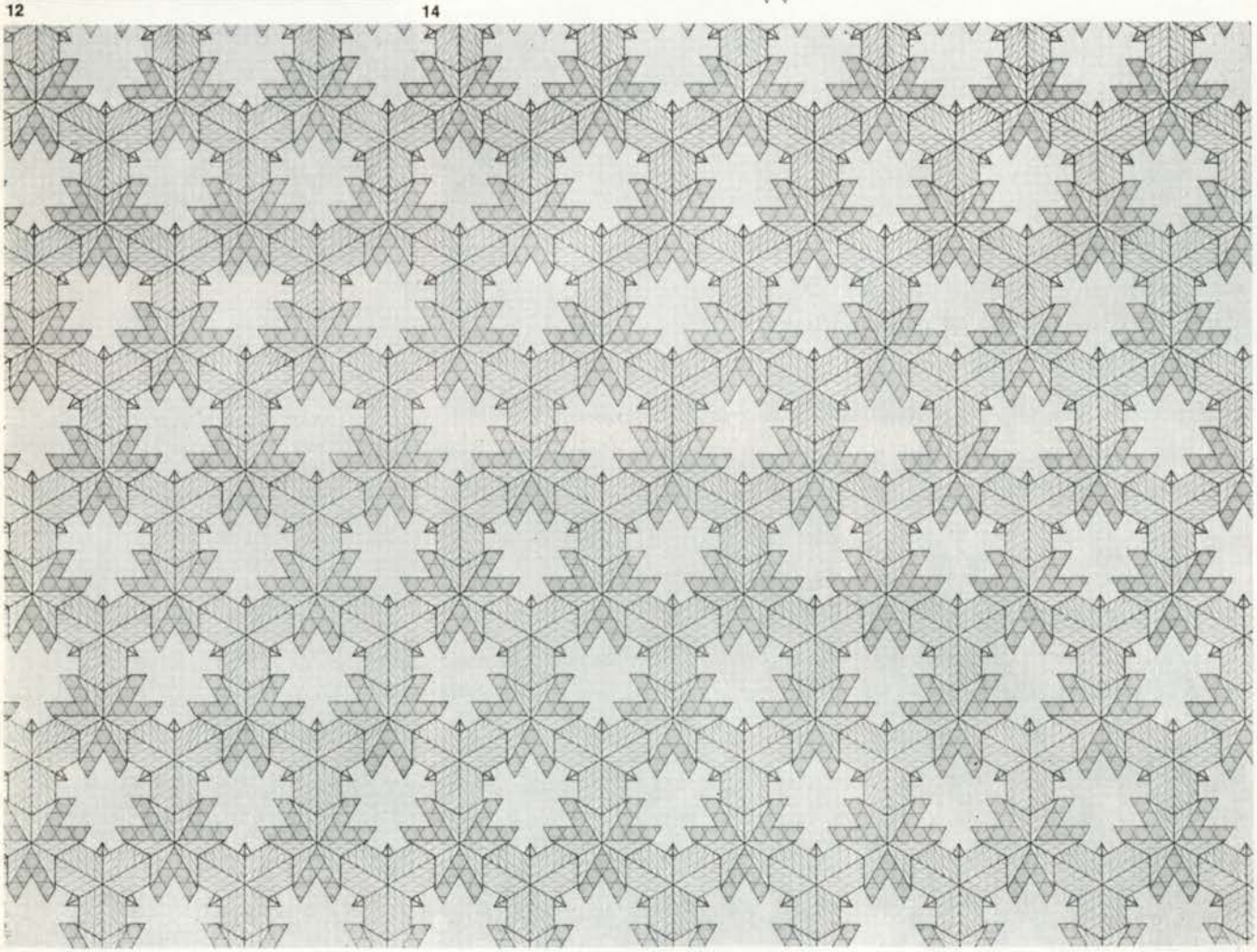

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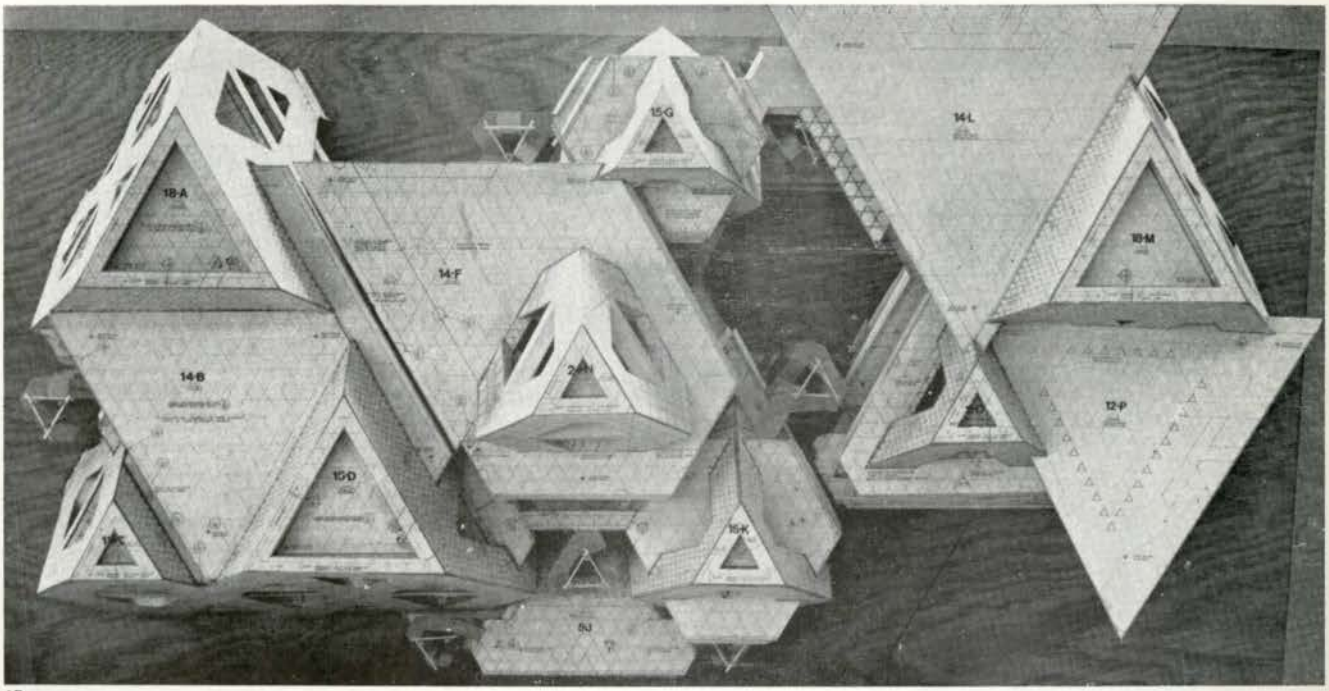
15 Model of Man the Producer pavilion built from working drawings after construction was started to check location of cladding. Similar model was first built by general contractor for better understanding of the building
Maquette du pavillon de l'Homme à l'Oeuvre construite en utilisant les plans d'exécution après le commencement du montage afin de vérifier l'emplacement du parement. Une maquette semblable avait été construite d'abord par l'entrepreneur général afin de mieux comprendre le bâtiment



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these features were recognized by the architects and subsequently rediscovered by the fabricators, but it was too late to incorporate them. Adoption of this system throughout would be structurally most unnecessary, complicate erection, and greatly increase costs. However, use of this system for all wall to wall and wall to floor intersections and the wall and floor edges, with elimination of all structurally unessential components elsewhere, such as extra diagonals, nodes or parts of them, would have resulted in a truly unique building system, and would have eliminated many of the encountered fabrication problems.

Architecture as a System

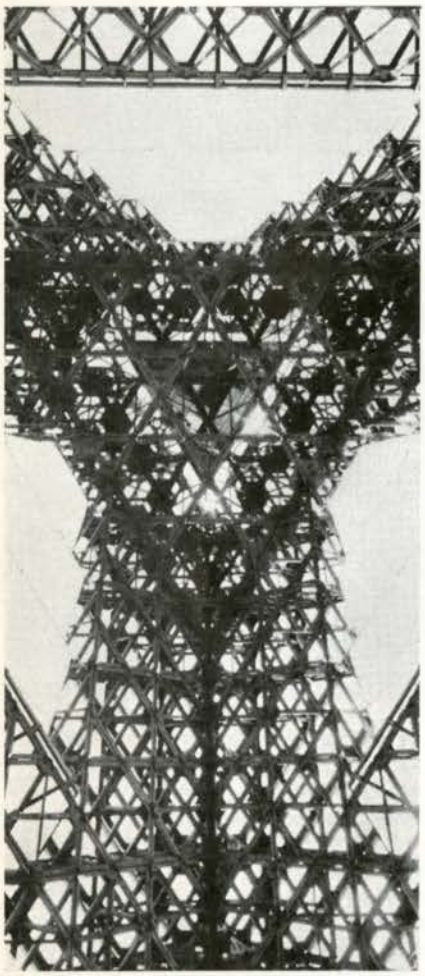
The almost total lack of information on the exhibit content, even the number of sub-theme exhibits within a pavilion, and other building requirements, necessitated, in view of the rigid building schedule, an immediate search for a larger discipline or a system for forming volumes. This space enclosure system should permit easy assembly of volumes of various size for arranging the building's functions into a cohesive whole. Furthermore, it should allow for continual revisions in design drawings and study models. To achieve the highly integrated character of the exhibits and the spaces as outlined in the program, re-evaluation of the total pavilion massing was anticipated at each major adjustment in exhibit content. Half a year of simultanous development of theme pavilions and exhibits kept the arrangement of building volumes in Man the Producer pavilion flexible. In fact, budget cuts, elimination of sub-theme exhibits and changes in exhibit content required several total redesigns after the building form was fixed. As predicted by the program, the final requirements in some areas were not known until after construction was well under way.

In studying the system of forming volumes from the truncated tetrahedron geometrical unit, the natural tendency to form larger tetrahedrons or truncated tetrahedrons, as noted before, of any size in one cell increments, suggested the use of structural walls for a larger size grid. This grid forms the same pattern as the three-dimensional structural module *(figs. 12 & 13)*. A larger discipline for orderly nesting of volumes was thus achieved. Spanning capacity of the space truss system, exhibit requirements and site limitations determined the location of walls nine cells on center, which allowed for combination of these volumes to form larger spaces. The walls are not solid planes but three cell bands joined at one end to form a 60 degree angle in plan. This provides for openings in the walls and eliminates structure where it is not absolutely essential. The total Man the Producer pavilion complex is based on the concept of subtraction of walls to form volumes of various sizes within the discipline of tetrahedron and truncated tetrahedron geometry of intersecting walls *(figs. 14 & 15)*. Floor and roof planes penetrate this wall configuration.

The structural geometry and the building system posed many problems in visualizing, studying and presenting the pavilions. Paper cells and numerous cardboard models were used in search of a vocabulary of a system. A plastic truncated tetrahedron was manufactured at a scale of ¼″=1′0″ *(fig. 12)*. Each cell was made of two pieces of injection-molded acrylic plastic, fitted with male

16 Reflected ceiling plan of the highest space volume enclosing the main "interchange" area of Man the Producer pavilion. Acrylic cladding covers the exterior of steel structure and canvas panels shed rain in openings between the sloping wall structure
Plan miroité du plafond du volume d'espace le plus haut renfermant le secteur "d'échange" du pavillon de l'Homme à l'Oeuvre. Un parement d'acrylique enveloppe l'extérieur de la structure en acier, et, des panneaux en toile rejettent la pluie des ouvertures entre les pentes de la structure des murs

17 Site below Man the Producer pavilion and entrance from east of canals
Le site sous le pavillon de l'Homme à l'Oeuvre et l'entrée du côté est du canal



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and female snaps and cemented together. The plastic cells of the building geometry were extremely helpful in refining the system of forming spaces, in studying complicated areas, and assisted in drawing the plans. One complete end of Man the Producer pavilion was built, and the sequence and interrelationship of the spaces were studied.

The chosen building system was not free from structural and planning difficulties. The complex configuration of building volumes in Man the Producer pavilion resulted in structural complications. Structurally the volumes required symmetrical wall arrangement, but this in turn imposed architectural restrictions. The three-cell wall band has eight compression members or columns which are the chords of trusses *(figs. 11 & 16)*. These trusses extend to triangular piers on grade. Site activities below the pavilion (canal, service road, pedestrian passages, plazas) as well as the need to form larger volumes suggested elimination of five triangular piers. Consequently, some of the three-cell wall bands do not extend directly to the piers but are supported by the other walls. The sloping walls produced horizontal forces in the floor and roof structures of appreciable magnitude, which had to be resolved. The interlocking forms required a careful juxtaposition of tetrahedron and truncated tetrahedron volumes and introduction of one cell wide construction joints to produce as nearly balanced forces for the pavilion as possible.

Man the Producer theme pavilion is a conscientious attempt to conceive architecture as a system for forming spaces. Thus form of the pavilion is the resultant of a selected discipline and not a preconceived objective. Multiplication of form according to geometric laws was the basis for establishing order in what could have become an amorphous growth impossible to control. An adaptable building system is a fascinating design tool, but limitations imposed by the larger discipline of tetrahedral volumes proved to be a blessing by exercising some restraint on the numerous changes in exhibit content.

The extremely complex relationship between the owner, architects, consultants and the many industrial design offices who designed the different sub-theme exhibits and their consultants was hardly contributive to excellence in the final building complex. Perhaps the most monumental task was the coordination of exhibit accommodation. Few of the design groups sensed the potential of the building system, exploited the exhibit spaces and recognized the structural and geometrical discipline. Hierarchy of space in relation to building function could not be maintained, and the difference between exhibit, circulation and service spaces expressed. An acceptable relationship (to exhibit designers) of the sub-theme exhibits to the circulation scheme finalized the pavilion form without permitting design development of some of the other building functions. The need for further study of the pavilion as a whole was not recognized and permitted by the awkward organizational structure. This is not an inherent fault of the building system as such; the unfortunate pressures would have affected any building form. Without a system, chaos would have prevailed.

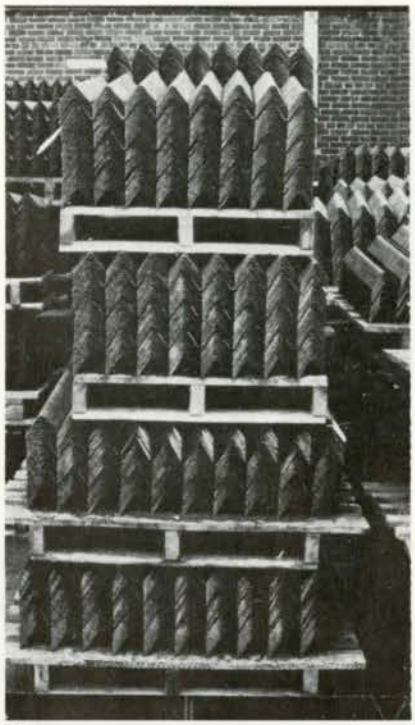
With structure as the basis of architectural expression, and the system of forming spaces affecting almost every building component, excessive demands were put on the architectural team in the short time allotted for working drawing production. The drawings, in themselves a subject for an interesting study, had to be adapted to suit the building and the method of scheduling. Elevations of all wall planes were drawn perpendicular to the sloping walls. The production of work required the re-education of the drafting staff. Construction of the pavilions was altogether possible due to a method of scheduling design work in order of priority in construction or lead time in fabrication. Escalators and structural steel, for example, were released before the architectural, mechanical and electrical drawings were issued for bids and the general contractors selected. Most of the design development continued simultaneously with construction, whereas cladding, stair structures and other work was released to the contractor during construction.

It was not possible to resolve all the architectural aspects of these temporary buildings to satisfy the demands of industrialized architecture and still fulfil the exhibit

18 Fabricated chord and web members stacked on pallets at the fabricator's shipping yard
Pièces usinées des éléments structuraux empilées sur des plateaux de chargement dans la cour d'expédition du fabricant

19 Field assembly shop showing two sub-assemblies and chordal planes built up from standard and maximum size nodes
Atelier d'assemblage sur chantier indiquant deux sous-assemblages et des plans d'éléments structuraux construits de noeuds standards et de noeuds de grandeur maximum

20 Delivery of a sub-assembly
Livraison d'un sous-assemblage



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requirements. Cement fibre board over floor structure provided formwork for 3" concrete slab and an acoustical absorptive surface. Concrete slab is anchored to structure at nodes only to prevent bending in chords. Cladding in Man the Producer pavilion is always, as a rule, on the upper surface of the sloping wall with one side of the structure exposed, and on the exterior it consists of stained plywood shingles over a cement fibre board sub-surface. Particularly interesting solutions developed for the stair structures, the building railings and the fenestration panels for the large wall openings – all an outgrowth of the structural and architectural system *(fig. 1)*.

With the exception of lighting, the mechanical and electrical services do not constitute a system related to the architectural volumes, but a careful integration within the space structure. This in itself was a formidable task, as all the piping had to conform to the truncated tetrahedron geometry.

Man the Explorer theme pavilion on Ile Ste-Helene is not based on the concept of architectural space as a system *(fig. 5)*. Some of the exhibit requirements were known earlier and the site conditions did not require a close interdependence of spaces. Three main forms with a central pedestrian plaza determined the general layout of the pavilion complex.

Man the Producer theme pavilion is raised above the ground to allow for an integrated exhibit complex without the interference of site activities *(fig. 17)*. The three closely interrelated scientific sub-theme exhibits could be viewed in sequence or individually from a central "interchange" area about 40 feet in the air. The main approach to the pavilion is from below with an intermediate arrival deck connecting the transit system station, the two sides of a canal and the interchange area.

Fabrication and Erection of Structure

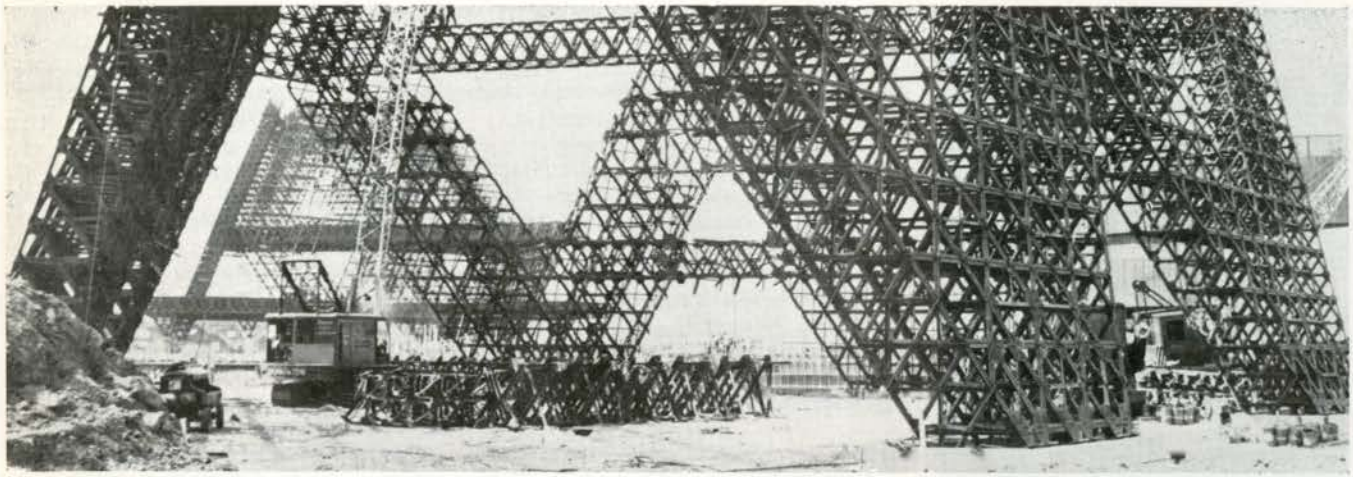
The procedure of delivery of small members to the site, assembly into larger sections at a field assembly shop, and lifting these sub-assemblies into place was followed by the structural steel contractor. The concept of an industrialized production did not materialize due to thousands of different members resulting from variations in member thickness, bolt holes and cell geometry. The architectural team was confronted with a conflicting approach towards engineering and production of the components which was alien to the nature of the structure. Fabricator's difficulties can be traced to attempts to economize in the use of material by varying the thickness of node gusset plates and thus departing from identical geometry of all tetrahedron and truncated tetrahedron units. The monumental fabrication problems delayed the erection of the structure and consequently all other building trades.

In view of the variation in member types, the mass production approach adopted for fabrication of the 860,000 linear members was hardly effective *(fig. 18)*. A heavy press, operated by two people, in three operations sheared a 6" wide flat, punched the required number of holes, and bent to 70 or 110 degree angles the chord or web members. Production averaged 120 members per hour, and 4 to 6 hours were required for retooling and adjusting the press for a different member. All nodes were hand-welded in a jig from three sheared gusset plates. Fabricator's work schedule did not capitalize on the potential for mass production. Even with completed structural drawings of both pavilions and exact number and type of members known, fabrication was carried out in piecemeal fashion with time lost in constant retooling of presses before fabrication of one type of member was completed. Such lack of organization was characteristic of all phases of fabrication.

Members were shipped to a field assembly shop below a mass transit station on Ile Ste-Helene. The procedure for assembling a sub-assembly consisted of building up of X-frame components, assembly of two chordal planes from these components and rotation of the chordal planes into a 70 degre position for insertion of web members *(fig. 19)*. More than 2,000 sub-assemblies were needed for the two pavilions, each one and a half cells wide and up to 6 cells long. The rate of production of the sub-assemblies with two assembly jigs was one per hour. Assembled sections were moved to erection crews or to a storage area *(fig. 20)*.

21 Erection of Man the Explorer theme pavillon
Montage du pavillon thématique l'Homme Interroge l'univers

22 Pyramids formed by intersection of walls of Man the Producer theme pavilion were assembled on site from maximum size components. These pyramids were never deliberately designed but resulted from erection sequence
Des pyramides formées par l'intersection des murs du pavillon thématique l'Homme à l'Oeuvre ont été assemblées sur chantier à partir des éléments constitutifs des plus grandes dimensions. Ces pyramides n'ont jamais été dessinées délibérement mais elles ont été le résultat d'une séquence de montage.



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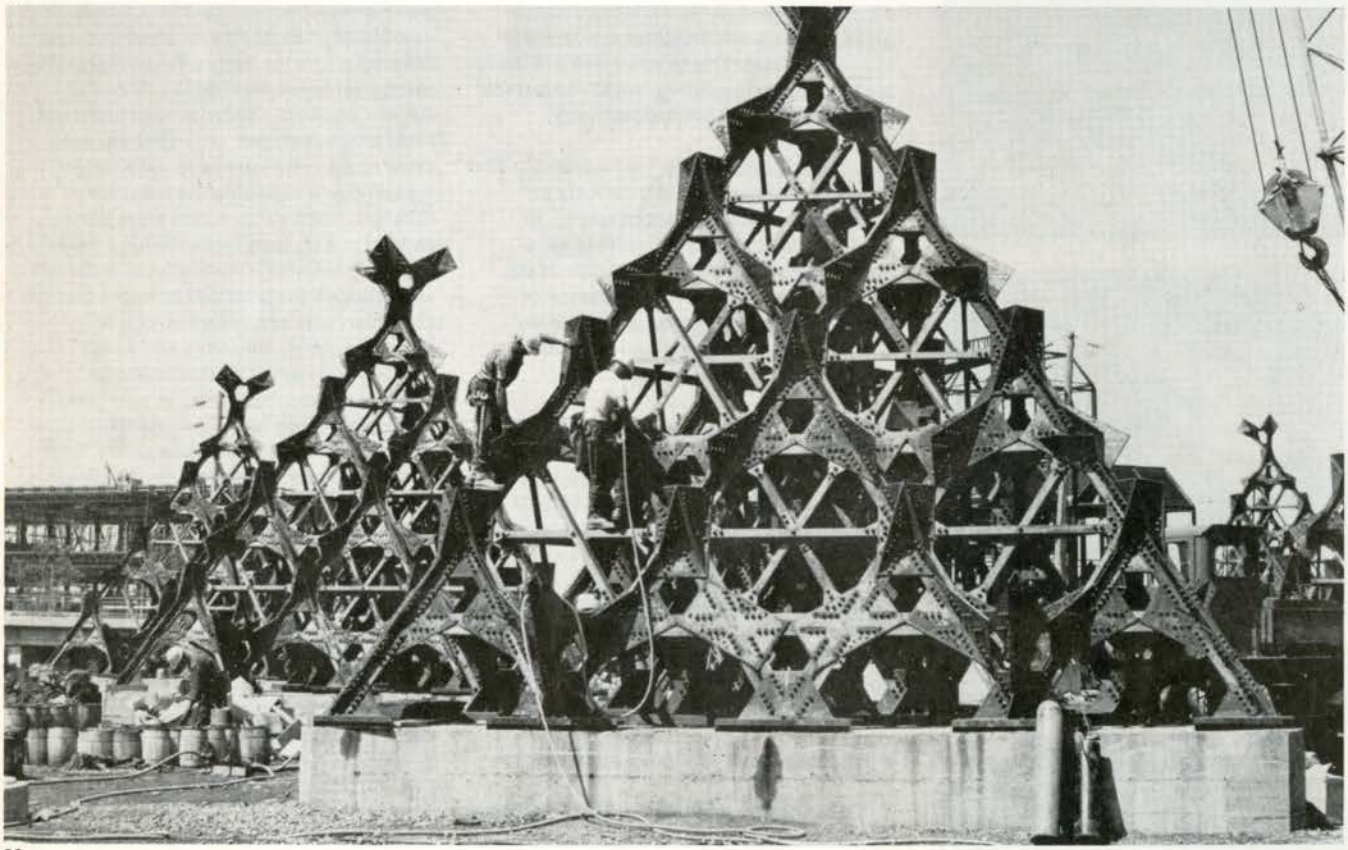

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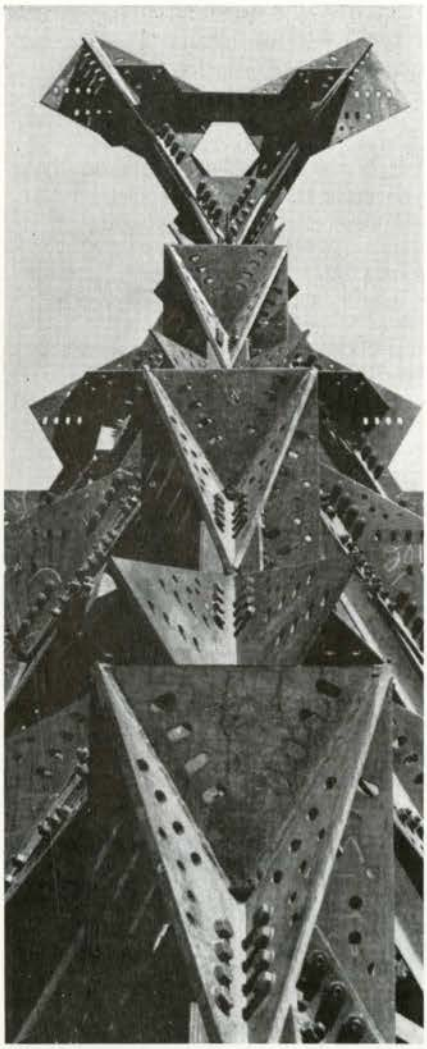
23 Detail view of a pyramid
Vue du détail d'une pyramide



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Erection of the structure was carried out without bracing and scaffolding *(figs. 11 & 21)*. Foundation design permitted erection of unbraced sloping walls up to nine cells high. Floor and roof assemblies spanning between walls were erected next. A 3'3" gap between sub-assemblies was filled in and bolted in place to facilitate erection, and this accounts for the chaotic appearance during construction.

Understanding and control of the process of fabrication is of paramount importance to the architect, as the effects of fabrication can be seen in the two pavilions. The structure for the first two forms of Man the Explorer pavilion *(figs. 5 & 21)* was fabricated to original requirements, with greater variation in member sizes and without fabricator's understanding of the more demanding geometric characteristics of Man the Producer pavilion. Although generally the stresses in members are also not as great due to fewer floors, the structure appears much lighter than in Man the Producer pavilion. The slow pace of fabrication required extensive, and possibly excessive, standardization, much in the spirit of the architect's original concept, however, without their control, resulting in unforeseen structural details and appearance. The owner dismissed fabricator's requirement to submit shop drawings. Pyramids formed by intersection of walls on the piers, and higher in the structure, were assembled from maximum size components only *(figs. 12, 22 & 23)*. Nodes and additional face plates are so large that chord members are hardly required, and the resulting structure approaches some of the very early studies. Likewise, maximum size nodes were used for all wall to floor intersections and standard nodes for all wall and floor edges requiring field cutting. In some extreme cases huge gusset plates with as many as 42 pre-punched holes are used in places requiring only 4 bolts. All this late standardization drastically affected the development of architectural details and created conditions which could be solved only in the field – a demanding and uneconomical method.

Conclusion

In retrospect, despite the numerous shortcomings in detailing and producing a fully industrialized structure, the pavilions did explore a new space truss structure system and a system of forming spaces compatible with the geometric discipline. It is important to note that an infinite number of space structures are suitable for creating architectural systems. The architect in working with space structures must demonstrate thorough insight into the laws of geometry. This responsibility cannot be delegated to the engineer or fabricator, who are not equipped to recognize these intrinsic characteristics. It requires a particular kind of personality and ability to be able to visualize, independent of professional training, geometric order, combinations and implicit limitations. Architectural training in this respect leaves much to be desired. Any disregard for the laws of geometry will eventually result in conflicting situations and special conditions. Partial understanding of these laws and attempts to ignore some of them was also the source of most difficulties in realizing these structures.

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Project Architect: Thomas E. Blood
Project Manager: Ian Elliott
Job Captain Man the Explorer: William Hughes
Job Captain Man the Producer: Guntis Plésums
Structural Engineers
Eskenazi & Baracs, de Stein & Associates
Mechanical and Electrical Engineers
Cote, Leclair, Langlois, Boisvert & Associates
Special Consultants
Space Frames: Jeffrey Lindsay
Lighting: Wm. M. C. Lam
Acoustics: Bolt, Beranek and Newman, Inc.
Circulation: Ben Schlanger
Fabricator
Dominion Bridge Company Limited
General Contractor Man the Explorer
Perini Quebec Inc.
General Contractor Man the Producer
Desourdy Construction Limitée

Alpine '68

Gardiner Thornton Davidson Garrett Masson & Associates, Architects & Planners

In November 1966 we published a ski village at Whistler Mountain, B.C. by Davidson & Davidson Architects. Now that a second similar village is underway we asked Ian Davidson for a brief explanation of how his experience with the first affected Alpine '68. His comments follow.

Early in 1966 we were approached by a developer who proposed to build a condominium ski village near the base terminal of the new gondola which had just been constructed at Whistler Mountain. We were asked to visit the area and choose a site, several of which were available. The area is serviced by a highway and the PGE railway from Vancouver, both of which divide the Cheakamus Valley.

The site chosen was one of two rocky tree-covered hills which were between the highway and a small lake which, by its very nature, provided protection and a suitable setting for the development. The rest of the Whistler area that was available was either cleared or flat land. There was no overall planning control whatsoever. Although the chosen site had many construction problems – access, etc. – we felt it was justified by the beauty and protection that it provided.

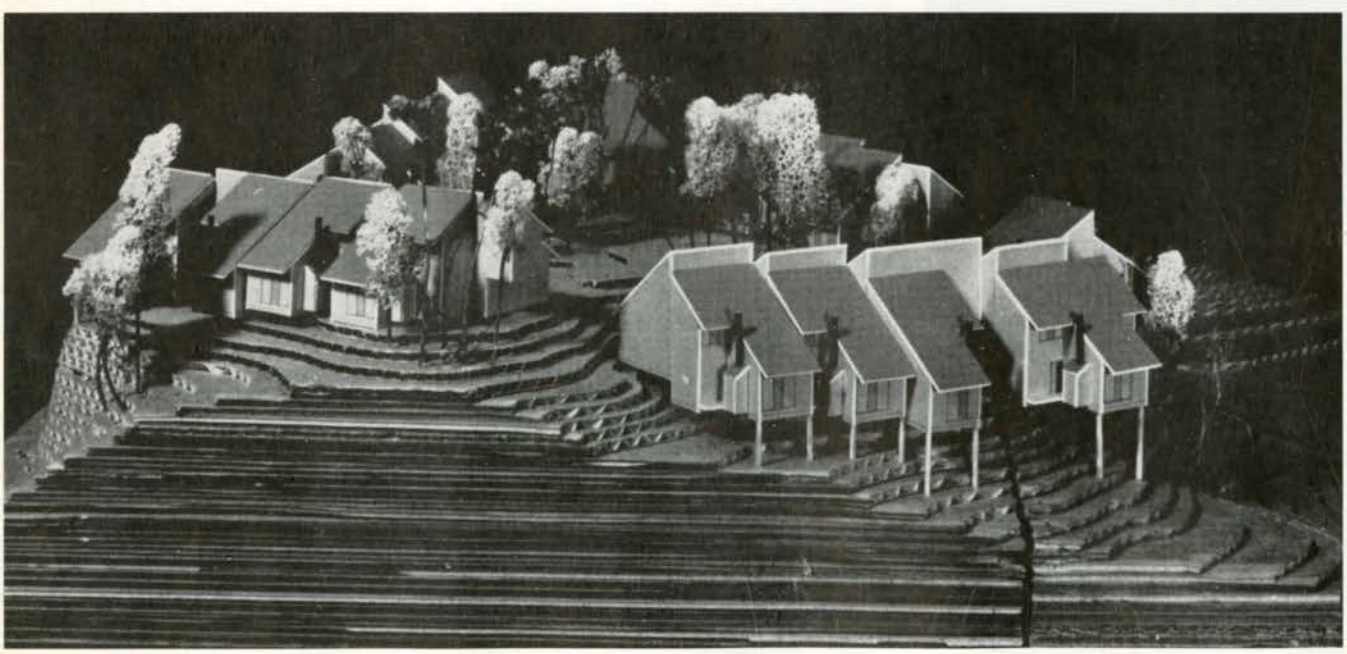
At the outset it seemed natural to ring the hill and form a village and common with a cul-de-sac service road connecting the common and parking facilities which are at the base of the hill next to the highway. In the beginning there was opposition to this concept by the developer because of service costs. He favored a single linear building straddling the site. However, once he was aware that very little of the site could be left intact and after we had built a model showing what great possibilities the village and common arrangement provided, it was agreed to proceed with this concept. Working drawings were prepared and the condominium was built in the summers of 1966 and 1967. All the units are privately-owned and the village employs a manager. (See *Architecture Canada, November 1966)*

Early this year a second group approached us to develop the next hill north with a similar, but smaller, village. A lot had been learned about skiers' requirements from the first village which was desirable to be incorporated into the new village. The result is a greater selection of plan types, with different building arrangement and modelling, but keeping the basic ring plan with its central communal open space.

Alpine Village I had only one basic floor plan of 580 sq. ft. The units were placed side by side, back to back and they had only one possible variation to the single unit which was to buy two units and open them one to each other. This was done in four of the 52 units in Alpine Village I. This, however, is in most cases too large for most skiing families' requirements. Therefore, in the second village we have developed two basic floor plans of 600 sq. ft. and 850 sq. ft. The latter has the option of a larger kitchen which brings its area to 900 sq. ft. This final choice appears to be the optimum area most skiing families require. 14 of these units are now under construction – 6 small, 2 large and the remaining 6 with the kitchen extension. The total village will have 36 units which will be finished this coming summer.

Many technological improvements were incorporated, mainly in roof design, location of fireplaces, placement of balconies, etc. All water and sewage systems are above ground and the heating is electric. These systems are very vulnerable to extreme cold and to power failure. However, owing to the great cost of underground services in rock, these methods are the only ones feasible so far.

Ian J. Davidson



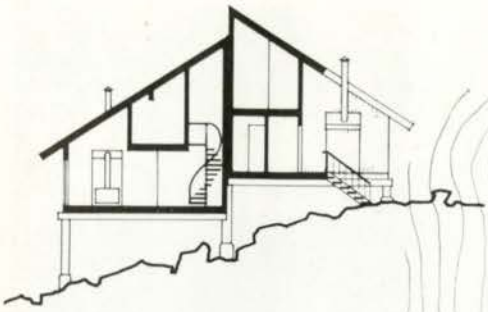
1 Section
Coupe

2 Elevation
Façade

3 Upper Floor Plan
Plan de l'étage supérieur

4 Lower Floor Plan
Plan du rez-de chaussée

5 Site Plan
Plan de situation



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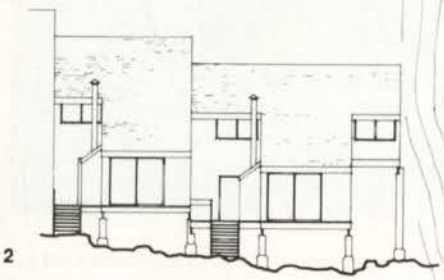

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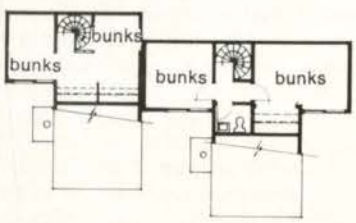

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Unit A Unit B

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Deutschland Diary

Seven Canadian Architects Visit Germany

by William A. Strong

The Federal Republic of West Germany periodically invites various organizations and groups to partake of a Study Tour of their country annually. Such an invitation was extended to the RAIC and in working cooperation with the RAIC President and a representative of the German Government, names of Canadian architects across the country were submitted to Bonn, who then made a final selection. The tour lasted from the 21st of October to the 16th of November, 1968, and the seven architects participating were, Gordon R. Arnott, (F), Regina, Howard L. Bouey, (F), Edmonton, Jean-Louis Lalonde, Montreal, James A. Langford, (F), Ottawa, William G. Leithead, (F), Vancouver, James E. Searle, (F), Winnipeg, William A. Strong, Toronto. Also invited but unable to attend were, Derek Buck, (F), Toronto, Guy Desbarats, (F), Montreal, Norman H. McMurrich, (F), Toronto and John C. Parkin, (F), Toronto.

1 Cologne, group with interpreter at Town Hall excavations: Left to right are James E. Searle, the interpreter, William G. Leithead, Jean-Louis Lalonde, Howard Bouey, James A. Langford, William A. Strong and Gordon Arnott. Cologne, le groupe avec un guide-interprète aux fouilles de l'Hôtel de Ville

Bonn, Dusseldorf, Hannover, Munich and Berlin–these were the principle cities visited by a group of seven Canadian architects, representing the RAIC across Canada. The purpose – to provide each individual with an opportunity to study areas of his own particular field of interest, also, to gain an insight into cultural, economic and social conditions in Germany. During our briefing session in Bonn we were advised that each land area that we visited would be responsible for their own respective program. We were to meet architects and city planners and we would be shown new construction for universities, theatres, concert halls, churches, hospitals, housing projects, satellite cities and historical buildings. Also included were invitations to operas, ballet and concerts as well as visits to museums and art institutes.

I think the program was purposely kept broad to illustrate that a country's architecture draws from its cultural, sociological and geographic background. Great regional architectural contrasts existed between the North and South. Northern Germany, after the war, became an expanding industrial and commercial area. Town planners were in a position to establish new principles in virtually destroyed cities such as Dusseldorf and Hannover, or plan anew with satellite cities like Wolfsberg. The rebuilding problem was just as great in Bavaria to the south where gay and gracious baroque architecture abounded, however, the tendency was to restore the traditional architecture to its original form.

German Sense of Discipline Prevailed

The German sense of discipline and order was the one fundamental characteristic that prevailed both in the North and the South. Prefabricated building components and the systems approach to building was very much in evidence, I did not always admire the results, because in many instances the system overpowered everything including the architecture.

During our first two weeks in Bonn, Dusseldorf and Hannover formal briefing sessions and reports on town-planning, housing, school buildings and city-planning became so extensive as to cut down our time in the field, this was passed on to our gracious architect friends of the BDA, the counterpart of our RAIC and subsequently corrected. Interchange of information then began to take place more at the end of such a trip by a question and answer period. Bonn is in the difficult position of being the seat of The Federal Republic of West Germany on a temporary basis. This of course had detrimental effects on long range planning. From Bonn we were in driving range of Bad Godesberg and Cologne. We toured various construction sites, buildings, and settlements in Bad Godesberg. However, most impressive was the attention given to landscaping and the incorporation of sculpture in and around the buildings. The sculpture is extremely sensitive and of the highest quality. I was amazed to see it standing in crates before uncompleted buildings. Funds are obviously made available for all types of building projects for sculpture allocation. The competition system seemed to prevail for the development of designs for all categories of buildings. I can understand why this process was looked upon unfavourably by the architects inasmuch as the first prize winner of the competition was not necessarily awarded the commission. Also the project management approach, which I thought prevailed in German construction, is supposed to be diminishing with a reversion to the conventional tender method.

Cologne Architecture Most Significant

Our trip to Cologne permitted us to view the excavations of the early town under the town hall. The Cologne cathedral was magnificent and was the prelude to a score of churches and cathedrals both contemporary and traditional that we were to see on our

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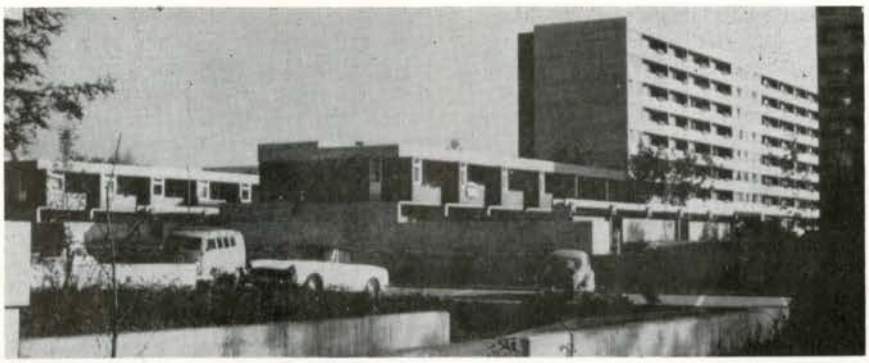
2 Dusseldorf, Hochdahl and Garath, new housing developments
Dusseldorf, Hochdahl et Garath, nouveaux groupes d'habitation

3 Bochum University, view of classroom blocks and lecture theatre
L'Université de Bochum, vue des bâtiments de salles de classes et du théâtre de conférence

4 Star shaped terminal pod under construction at Cologne-Bonn Airport
Etoile terminale à l'aérogare de Cologne-Bonn en cours de construction

5 Bensberg Town Hall, old and new, architect G. Bohm
L'ancien et le nouvel Hôtel de Ville de Bensbourg, architecte G. Bohm

6 Hannover, A. Jacobsen's Foyer Galeriegebaude in the Harrenhausen Gardens
Hanovre, Le Foyer Galeriegebaude de A. Jacobsen dans les Jardins de Harrenhausen



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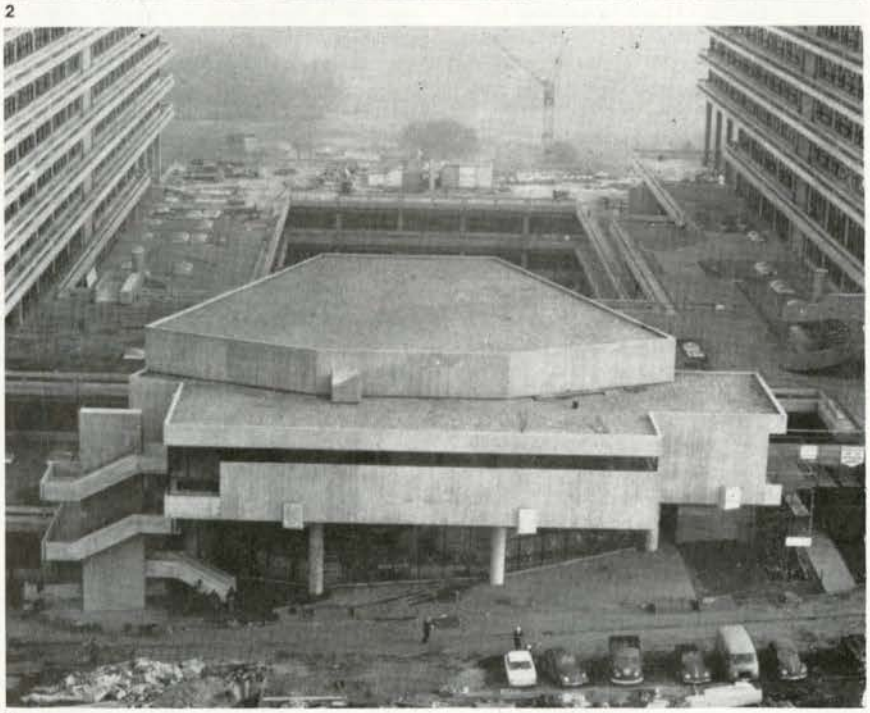

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tour. I felt this area of architecture to be most significant – possibly because of the immense amount of construction the Germans were faced with, systems building predominated and the less stereotyped church architecture afforded a welcome relief.

The gardens of the Hofgarten, the magnificent Thyssen House office building, and the Rhine River which flows down the centre of the Königsallee – the main street of Dusseldorf, provide a beautiful setting for a bustling industrious city. This city was 40% to 85% destroyed at the end of the last war and a tremendous effort was necessary in rebuilding, and reconstruction of road, subway and transportation systems.

We visited three of these areas where new planning was evident, Hochdahl, Garath and Monheim. The new Garath residential section has 8,000 dwellings included in the master plan, is located in the south east of the city, and is nearly finished. Explanations of the building program for a new passenger terminal at Dusseldorf airport impressed greatly, the terminal has exploded from a passenger capacity of 300,000 to 2½ million passengers today with expansion potential to a total of 9½ million passengers. This along with the Cologne/Bonn Airport gave us a good look into the future at the problems and solutions in providing for conventional aircraft and the jumbo jets.

Bochum University serving the Ruhr area was an exercise in instant university that could not help but impress by its magnitude. The institutions and the organization of the entire university will be concentrated on one site physically connected with each other. The building frame is on a module of approximately 23' x 23', all disciplines existing within the same module. A site plant is organized for the production of precast concrete sections that span between the structural steel frame. This construction was commenced at the beginning of 1964 and is still under way. The stereotyped exterior building facades were relieved by the lecture theatres and inter-connecting buildings.

Cologne/Bonn Airport Outstanding

The Cologne/Bonn airport presentation outlined how plans for a staged growth could take place. This should be one of the outstanding airports in the world when it is completed. Pre-fabricated concrete building components were utilized on this non-rectilinear building plan and the poured in place concrete had to be some of the finest that we were to see on our entire trip. A hilight of our tour was the view of the construction site by air and on to Cologne cathedral and back. One of the most exciting buildings that I witnessed was the town hall in Bensberg. The building occupies a prominent position on a hill in the central portion of the town. The plan configuration is sympathetic to the hill and street pattern. It replaces a portion of the original town hall and serves as a counter point to the existing town hall of the 10th Century which will subsequently be replaced by the future expansion of the new building. Buildings of this nature are few and far between and will become classics of the 20th Century in the same way that the cathedral at Altenberg was an outstanding example of the 13th Century. This we visited late during the day – a beautiful proportioned Gothic cathedral built by the Cistercian Monks. Hannover – impressive was the planning history of Hannover which was supplemented by models illustrating the growth pattern of the city. Incredible when you consider that this city was virtually 100% destroyed by World War 2. The resulting tragedy permitted city planners another opportunity to cope with town planning problems of the 20th Century. Historical buildings were never intended to be viewed from the contemporary vehicles of today and consequently some of our best exposures to new and old architecture was by virtue of walking tours. The Altes Rathaus (old city hall) and the restored Gothic Marktchirche present a traditional island amongst the modern functional buildings of the surrounding streets. The soft pink brick work of the area is beautiful and no better example could be found than in Marktkirche.

Significant was our trip to Wolfsberg, a new town of 100,000 persons approximately five miles from the Iron Curtain. I consider this trip important not only because of the planning and buildings that we saw but also because it signified the industry and growth pattern of the North Rhine, Westphalean area. The only historical element here was the Wolfsberg castle which dates back to the 14th Century. One of the largest Volkswagen plants in Germany is centred in Wolfsberg and forms the labor base for this enterprising young town. Careful town planning permits adequate expansion space in both residential and commercial areas. The school complex is organized to permit education from the elementary grades to the end of secondary school levels. Pedestrian access across the major highway is provided by bridges which support commercial space on each side of a pedestrian mall – shopkeepers are charged rent to pay for the cost of construction of the bridges by the municipal government. Housing appeared interesting but not particularly stimulating. Apartment block projects were stepped back on successive floors to provide terraces to the apartment dwellers. In the midst of all this one has to recognize the implications of the North America economy – the Volkswagen plant produced one of every three cars for North American consumption.

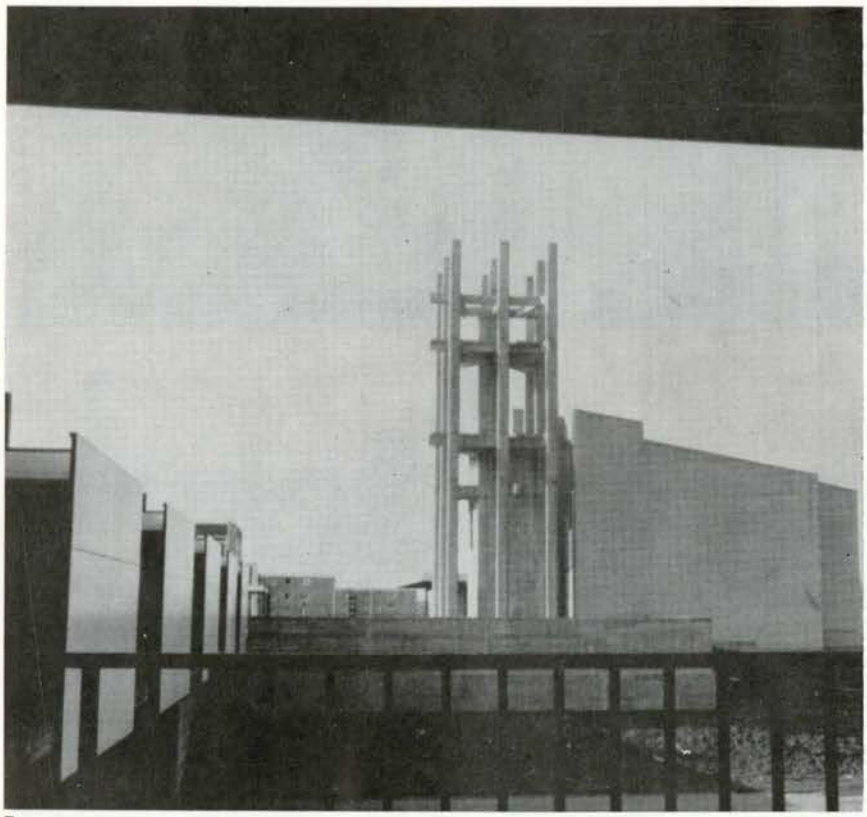
Our trip to Edemissen convinced me that school architecture and academic planning has not achieved the levels of our own Canadian system. I subsequently established in Berlin, through the Central Planning Offices for schools for West Germany, that open-teaching concepts were in process of development, although it was not evident in any buildings that we visited. Bilateral lighting seemed a requirement in all schools that we visited and under no circumstances were internal classrooms accepted, the emphasis being on plenty of fresh air and natural light. At Edemissen plans were all single-loaded corridor systems developed after the Vienese architect Schuster. The complex that we saw permitted a continuing form of education from the lowest grade level up to university entrance.

The town of Hamlin of Pied Piper fame demonstrated some interesting aspects of town planning. All the principal streets were to be retained as pedestrian streets with the significant buildings restored as necessary. Inner court-yard areas would be gutted depending on the building's condition to provide for parking areas, future municipal buildings, shopping centres etc. A sensible approach that will recognize the fine historical aspects of the town and permit the contemporary buildings to fulfill modern functions.

7 Wolfsberg, A. Aalto's church and combined shopping center, bridge across Kennedy-Allee
Wolfsbourg, l'église d'Aalto et le centre d'achats intégré avec le pont sur la Kennedy-Allée

8 Munich, nurses residence under developer system serving 2,500 bed hospital (under construction)
Munich, résidence des infirmières pour un hôpital de 2500 lits (en cours de construction sous l'égide d'une société d'exploitation)

9 Regensburg, detail of entrance to cathedral
Regensbourg, détail de l'entrée de la cathédrale



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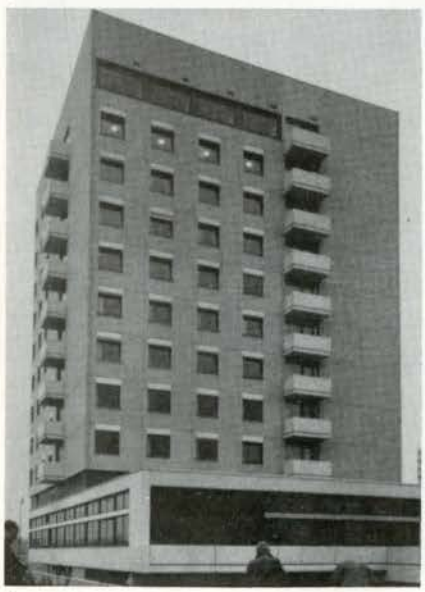

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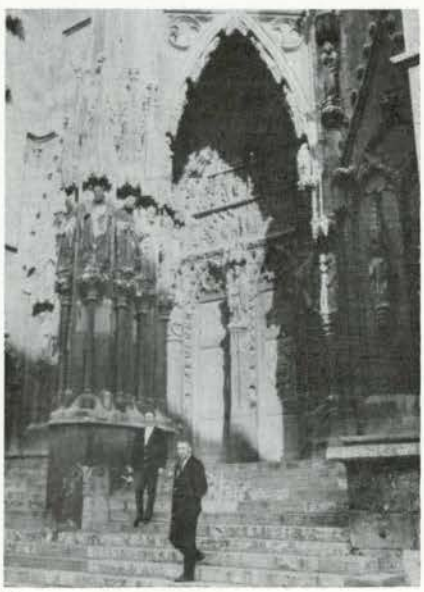

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Munich – Exciting

Munich – everything that has been said of this exciting city is true and more. Our prelude was our trip from Hannover to Munich via the Trans-European Express. This permitted us to travel the length of Germany and truly appreciate the great beauty of the countryside and the architectural transition from North to South. A one day side trip to Regensburg provided a memorable event for some of us. We walked for several hours around this treasure chest of architectural history. The city was originally a fortified Roman town and one of the oldest in Germany. It is built abutting the Danube river.

We visited the building site for the 1972 Olympics and it would appear that this will help solve some of the pressing problems of the planning of Munich – mainly congested roads and inadequate and insufficient housing. Low density zoning and restrictions as to building heights have been enacted in deference to existing buildings, once more reflecting the addage that "Munich will always be Munich" absorbing others into its own culture. This was reinforced with our pleasant tour round the town to watch the Glockenspiel at Marien Platz and subsequently beer and weiswurst sausage in the Rathskeller with the town council amidst a warm and friendly atmosphere. Further evidence of the lack of expansion space was in the Technical University where a moderate amount of expansion was taking place here but the major university had been removed to Garching, the location of the atomic reactor plant. No particular architectural message is presented in the trip to the Benedictine Monastery at Ettal, the village of Oberammergau, the Royal Castle – Linderhof and Wieskirche at Steingaden with the exception that this is a trip that should not be missed to gain further insight into the character of the Bavarian people. The large hospital that we visited in Munich was approximately 2,500 beds, perhaps too large because its extensive period of time in planning tended to render it obsolete before it was finished. Contemporary architecture in this city was not in great evidence, however, magnificent art galleries, theatres and museums provided a happy alternative.

10 Berlin, East Berlin apartments along one of main streets
Berlin, appartements sur une des rues principales de Berlin Est

11 Berlin, view of Kaiser Wilhelm Church on Kurfuerstendamm and Europa Center
Berlin, vue de l'église Kaiser Wilhelm sur Kurfuerstendamm et Europa Center

12 Berlin, National Gallery at Tiergarten by Mies Van der Rohe
Berlin, Galerie National à Tiergarten, de Mies Van der Rohe

Berlin to me was a city of great uncertainty, political unrest and contradiction, heightened by gloomy weather and a tour of the Berlin wall. I was particularly conscious of the existence of war damage in some areas and immature landscaping. Town planning of underground and overhead subways, road systems, services etc. became continually thwarted by the uncooperative East German Government rendering a very difficult situation for West Berlin planners. The cultural centre of the national gallery, Philharmonie, library and other connected buildings were located next to the Berlin wall presumably to present a booming economy to those of the Eastern sector. The nerve centre of Berlin and the pulse seemed to centre on the bustling Kurfuerstendamm and the Kaiser Willhelm church and the Europa centre, a modern shopping centre and office building complex. The church combined the original Willhelm church tower ruin in conjunction with the new buildings which sparkle like jewels from any vantage point in the city.

The IBM Building and "flame" sculpture on the Ernst-Reuter-Platz impressed. Finally a rushed tour of Berlin on a cold day. The Philharmonie was as disappointing from without as the National Gallery was exciting and the interior proved to be a delightful surprise – a theatre with excellent acoustics for large groups and yet always leaving you with the feeling of close contact with the musical source and your neighbour. Another church – Maria Regina Martyrum (dedicated to Martyrs of the last war) impressed in its simplicity of concept, elegance of detailing and material selection, and excellence of the courtyard sculpture.

I could go on and on about the highlights of this RAIC sponsored tour and there were certainly hundreds of them. Final impressions must be summed up as – we have equally fine single buildings in Canada, but not an equivalent heritage. Without diminishing the achievements of re-building post-war Germany, renewed towns had some historical anchor, this creates harmony between old and new which we do not have in this country. Unfortunately more important than systems building is 500 years of culture.

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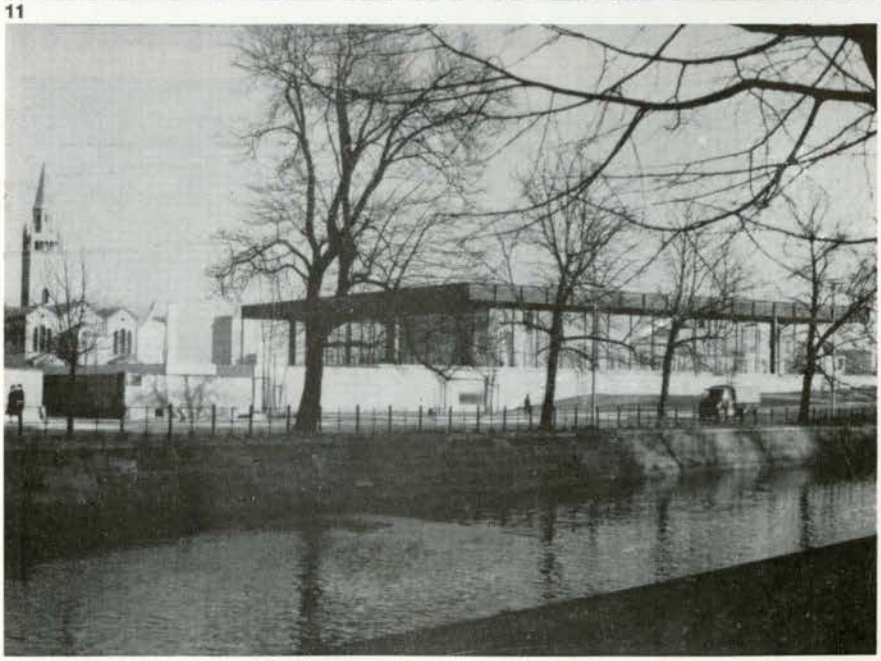

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Are New Techniques and Pooled Resources the Concern of All?

C. F. T. Rounthwaite, FRAIC

The need for a pooling of resources by architects to take advantage of new techniques, to remove some of the drudgery of architecture, and to make architectural practice more rewarding in both a personal and a financial sense is discussed by C. F. T. Rounthwaite who is a partner in the in the firm of Marani, Rounthwaite and Dick. Mr Rounthwaite is also president of Margroup Computers Limited, a firm which has developed many of the techniques described in this article.

If architecture is purely a business, the return on investment is measurable in dollars on a carefully prepared balance sheet. A bald, economic statement can be appreciated by non-professionals and related to their scale of values. If architecture is an art, success or failure cannot be so easily assessed. It is one thing to be a "legal" architect, which means in the eyes of the general public you are entitled to call yourself by that name. It is another thing to be an "architect's architect", which means that in the eyes of the profession you have achieved a reputation, a more elusive hallmark. It is hard to value the quality of professional service in dollars and cents. Only to a degree can the by-products of first rate professional achievement ever be reflected on a balance sheet. These two widely separated methods of evaluating satisfactory performance raise doubts and dissatisfaction in the minds of thinking practitioners to a point where one is often surprised to learn of deep misgivings among architects who supposedly have every reason to be content with their personal achievements. Obviously something is wrong and some sort of remedy must be found. Are we able to pinpoint some of the factors which contribute to our present dilemma?

Freedom From All-Consuming Repetitive Tasks

For a start, we must ask whether any particular species of architect is entitled to wear the robe of the high priest of the profession? Is the profession embodied in the image of the design, the research, the academic or the management oriented architect? Does society expect and need all these different skills and abilities? Does the profession generally agree that all skills are reasonable ingredients to be expected in the mix of comprehensive performance? The basic problem seems to lie in developing ways and means to let those who are trained to provide these services have more time and freedom to exercise their best ability, and so free themselves as far as possible from the all-consuming, repetitive soul destroying tasks which we, and society, have built into present day practice. Can we find ways to release the architect to do more self-satisfying work, and at the same time, supplement his range of capabilities by methods which will reduce the present "transmission" loss?

We acknowledge that all these questions have been discussed by various individuals and firms, and many of the contributing problems have been identified. In most offices we can agree that the largest amount of time and money is spent on the production of contract documents. These are not an end in themselves, but merely a means to an end. They only describe to the contractor the dimensions, nature and scope of the work.

Working Drawings, Specifications

A careful analysis of any complete set of working drawings reveals there is little originality in their contents beyond the site plan, floor plans, elevations and the related positioning of components. In hundreds of offices all across Canada, draftsmen by the thousands are daily drawing over and over again, roof flashings, hollow metal door frames, tile walls, vertical expansion joints in concrete and masonry, wall hung toilet sections, the junctions of plaster walls with terrazzo bases, etc. Specification writers write and rewrite sixteen or more divisions of repetitive descriptions as to how formwork will be constructed and how a metal pan ceiling will be suspended or paint shall be applied to interior woodwork. Hours are lost thumbing through manufacturers' catalogues (which one hopes are current, but suspects otherwise), to find suitable intake grilles of a price and appearance suitable for a current situation. As no fast effective information service is yet available, hours are wasted. In all this busy bustle, the clock ticks off the dollars as the comedy is enacted from St Johns to Victoria. So much for the interior economy and efficiency of the architect's drawing office, but from the client's point of view, every hour spent in preparing to start construction means an increase in the costs due to the annual escalation of construction prices.

Ashley and Crippen

C. F. T. Rounthwaite

While the picture of the working drawing office is sufficiently startling and frustrating, the preceding and succeeding activities which bracket the production of the contract documents are also a worthy subject for evaluation. Hours are spent checking shop drawings. This relaxing procedure endeavours to discover whether a contractor or his supplier might be able to pass a simple arithmetic examination, or whether a window meets specification standards. Worse still, it involves the responsibility of assessing packaged mechanical units with all the implications relating to their design capacity, quality of bearings, grease cups and vibration characteristics, which can have all sorts of professional implications.

Through this period, decisions relating to the quality of items which are "similar and equal to" those specified are made. Here the very wording of the architect's own carefully drawn specifications returns to haunt him and he must spend more time weighing comparisons visited upon his office by the custom of the industry.

Before production drafting starts, a period known as "design" has been experienced.

Generally, this is a phase with an attached monetary value of roughly twenty percent of the overall fee. Probably the origin of this first financial marker was set in order that the architect could receive something on account so he might meet his expenses. It has absolutely no related position to what really happens, nor is the design "cut off point" as the start of producing drafting or even supervision realistic or desirable in terms of the quality of the commission.

A Forest Inside Professional Practice

We are now in the midst of the forest which has grown inside our professional practice, making it all the harder to distinguish between the fundamentals of satisfaction from a job well done, and the auditor's balance sheet. The most amazing thing about the situation is that while these nuisances are common to the whole profession, we prefer to work out our solutions alone!

If we could change our habits, much of the problem as stated above can be dismissed. Consider what practice would be like if we tackled the difficulties together and availed ourselves of methods and techniques now available to every office in the country! As mentioned before, to provide a quality service, it is necessary to have access to not only some but all of the skills and abilities of the highest related level of competence. While it may have been possible two hundred years ago to say after ten years of study you knew all the technology that could be learned, it is not so today.

Pooling of Techniques – a Fundamental

The pooling of technical resources is one of the first fundamentals. Decades past, as medical science began to advance at a rapid rate, doctors realized that the time required to produce a first rate surgeon precluded him from being a top expert in say, pathology. They were also sufficiently astute to refrain from foisting the less desirable results of the general practitioner attempting to perform a complicated surgical operation upon the general public, even though he was presumed to be competent by legislation.

By the same token, the architect must have access to the special skills of others in both his own profession and other disciplines. A national inventory of the names and locations of such services could be readily established by the RAIC. The well experienced architect in the smaller practice could gain self satisfaction and stature by being available for such consulting work. The larger practices would undoubtedly be very happy to share the services of personnel they would like to be able to afford but whom they could not keep fully occupied.

The general result should lead to a higher regard for the profession in the eyes of the public and a better spirit of mutual respect within its ranks. So much for the public image side of our problem!

Interior Economy

Let us return to seek an answer for the state of the interior economy of practice and for solutions which will enable the practitioner to find a greater degree of self satisfaction in his work and more time to perform in a professional role. Developments now in use in Canada and the United States can be of assistance, *ie* the foremost American, and some Canadian firms, have been producing sophisticated techniques for pre-design programming. These are intended to assist the architect to assess more quickly and accurately the essentials of any design problem and make logical deductions. Particular stress is laid upon the fact that no pencil to paper design can start before a compatible balance has been reached between the main *Objective,* the *Time* available and the *Budget* restrictions. If one or more of these three is in imbalance you are not ready to proceed toward a graphic design solution.

Computer programs have been written and used which provide answers analyzed to hundreds of probabilities for complicated space relationships. These can be applied to the relationship of major departments in buildings, or to single floor layouts. The fact that the personnel who understand and can program such studies are costly and must be continuously employed along with the need for very expensive hardware, makes it mandatory that this sort of service should be like a hydro or telephone utility to which many subscribe and share the cost on the basis of their rate of usage.

Coupled with such must go other time saving assists in the fields of architectural project cost control, pre-tender critical path programming and scheduling, post tender programming, assistance in urban design, engineering, elevator design and a host of others too numerous to mention. Properly used, and intelligently appreciated, these back-up services can reduce the guesswork and drudgery in many areas of practice. Semi-automated procedures for mechanical estimating have been successfully tried and will soon be followed by programs for architectural and structural quantity estimates and analysis. The relief that reliable estimates will produce within the architectural office cannot be underrated.

Machines exist which can automatically scan and take off quantities but these are economically beyond the range of even the largest firms. Collectively owned by the profession and the construction industry, they would save everyone time, money and concern.

Research on Wastage of Time and Expense

Several years of research and valiant efforts on the part of some firms who tried to stop the wastage of time and expense related to specification writing and production drafting, have brought to light the following facts:

(i) At least two Canadian organizations have produced a creditable sixteen division master performance specification with provision for sub-master inserts for hospital, commercial, school, university work, etc. Nevertheless, these costly undertakings will only be beneficial if they are accepted by the whole profession and the construction and supply industry on a *National* basis. The indexing systems, the performance standards and the interpretations must be recognized from coast to coast, and be related to manufacturer's literature. All must be accepted at the professional, municipal, provincial and federal levels. Obviously this is not possible on an isolated, unilateral office basis.

The specification "writer" with green eye shade and writer's cramp is no longer the answer. The production of the specification should be automatic but the *Input* must be the result of design appreciation and material research. Such research should not be the product of hundreds of offices from coast to coast, but entrusted to a centrally controlled and sponsored centre which has the confidence of all authorities having jurisdiction.

(ii) The indexing and cataloguing of performance proven details should be undertaken on a national basis. Some details will have universal application, others will have regional usefulness. All must be assessed for aesthetic qualities, practicability and economic comparisons. If all offices pooled these details in the calendar year of 1969, the overall collective gain would be astonishing. The Scandinavian architect can open his detail file and find forty pages of flashing details showing examples and then decide upon one of 160 choices, each known to the trades. If he cannot find one which satisfies, he can then produce one of his own, which in turn, can be inserted in the master file. Consider the effect upon Canadian practice if each office had access to a national detail library and could select a performance proven standard which had a related performance specification clause and an up to date regional unit cost!

(iii) Drafting indexing, formats and system of modules must be standardized. As mentioned before, only a small portion of a set of working drawings is unique, all the rest is redrawn time after time. We must acknowledge that pure original design can never be reduced to automation but on the other hand, the drafting of working drawings, like specification writing, is one operation which logically can be converted into an assembly

line process. In Norway, automatic machines carrying inkpens draw the working drawings for ships and detail irregular sections which are beyond the competence of the normal human being. Another such machine drafts buildings in the United States from a punched card process. It is essential for us to adopt a module for detail and working drawing sheet sizes, hopefully related to the international microfilm unit sheet of approximately 8½ x 11 inches. It is also necessary for us to code drawings with standard reference systems and numerals so that suppliers can readily identify whether the index refers to a hollow metal item or carpentry.

A universal format would enable all concerned to learn where to look in a set of working drawings for certain information. How simple it would be to agree that exterior materials would be noted on the elevations and interior materials on the finish schedule, and so stop the everlasting repetition on plans, sections and details.

When a successful, non-repetitive format is produced and accepted and universally used, not only will mistakes be avoided but production time will be reduced by up to sixty percent. This gives time to devote to the real job of co-ordinating.

To a degree the electrical consultant and the industry have achieved, through well understood symbols, a means of graphically indicating procedures, components and functioning of the electrical installation. Most architects continue to produce working drawings in the same way which was necessary before artisans were generally expected to be able to read!

So out of touch has the whole working drawing ritual become that recent research with the help of construction specialists has shown that we spend time and money drawing things which we *think* contractors should see, but actually do not need! Still worse, we neglect to produce the information they require! At the same time, we manage to overdraw, underdraw and even draw out of the construction sequence! A more convincing case for a pooled co-ordinating effort between the profession and the industry cannot be made!

(iv) More general use must be made of the present results of building research. The National Research Council has produced valuable information relating to rain screen wall design, ice action, roofing design, windows, thermal action and many other pertinent factors. The time has come when we should stop specifying the XYZ window by name and only refer to a performance reference which would set the standards for the frame material, color, glass, thickness, quality, fixing, caulking and price. Anyone in the window business should be able to furnish the complete assembly providing they were an approved fabricator.

As in the case of the Canadian Welding Bureau, greater emphasis should be placed on a self-policing policy established and maintained by the individual branches of the industry itself. Such products should be clearly identified, *ie* as "performance proven" under certain service conditions.

(v) A common vocabulary for the purposes of clear understanding is essential. If we asked ten architects to write a definition for "net to gross" chances are we would get half a dozen variations, yet each would swear he understood the question. In a bilingual country correct understanding is of paramount importance. Still no federal academic or professional glossary of building terms has appeared in one hundred years.

This article commenced comparing architecture to a business and an art. An attempt has been made to identify the traditional, economic extravagances which tend to crush out the pleasure and the time to be creative. Can we come to some general policy which will support the philosophy of finding ways to permit more personal involvement in the big things that matter? Can we find relief from the staggering administrative load and transmission loss which diverts to the business balance sheet too much attention from practicing a profession as we once imagined it?

I believe the answer is in the affirmative but can only be possible when we pool our respective know-how, share the cost of repetitive work, reach agreement on techniques and standards and let as many of the new machines do as much of the drudgery as possible. We must have access as subscribers, or partial owners, along with others such as the construction and manufacturing industries to a highly organized, independent, technical resources centre, capable of providing general and specific research. Information retrieval with the shared use of time saving equipment, reliable material evaluation and cost information programming techniques and consulting references for special problems should be added. While this will be expensive it would be cheap in terms of the millions we independently spend trying to do all of this on an individual basis.

More Time for the Art of Architecture

The whole possibility can be simply stated in terms of more time for the art of architecture with less on the busyness of business, with the reasonable hope that the by-product balance sheet is compatible with the self-satisfaction of a higher quality of performance. □

Library Review

National Research Council Publications: Smoke Problems in High Rise Buildings
Technical Paper, No. 288, 6pp., October, 1968, 10 cents.
Reprint from ASHRAE Journal examines hazard of smoke from fires in multi-storey buildings and stresses implications in design of air handling systems.

A Survey of Exit Facilities in High Office Buildings
Building Research note No. 64, 9pp., October, 1968.
Study of exit stairs in 10 office buildings of seven storeys or more in height giving times for evacuation in practice drills.

A Method of Water-Leakage Testing of Windows in North America
Research Paper No. 336, 4pp., October, 1968, 10 cents.
Proposes a standard method for rain leakage tests for windows using a static air-pressure difference to simulate wind driven rain.

Structural Sandwich Components in Building:
Technical Paper No. 267, 58pp., July, 1968, 75 cents.
Summary of history, engineering design, materials and properties and detailed description of core materials.

Moisture Content & Freeze-Thaw Cycles of Masonry Materials
Research Paper No. 370, 13pp., September, 1968, 25 cents, Reprint from Journal of Materials
Results of tests carried out over a two year period on masonry materials exposed to the weather indicates that more realistic conditions should be used in laboratory freeze-thaw testing.

Events

A course in computer graphics for designers is being offered June 9-20 by the University of Michigan. No previous experience with computers is expected. Fee $450. Information from Engineering Summer Conferences, Chrysler Centre, The University of Michigan, Ann Arbor, Michigan, 48105.

A five day symposium on Winter Construction is to be held in February 1970 in Edmonton under the joint auspices of RILEM (Réunion Internationale des Laboratoires d'Essais et de Recherches sur les Matériaux et les Constructions) and CIB (Conseil International du Bâtiment pour la Recherche l'Etude et la Documentation).

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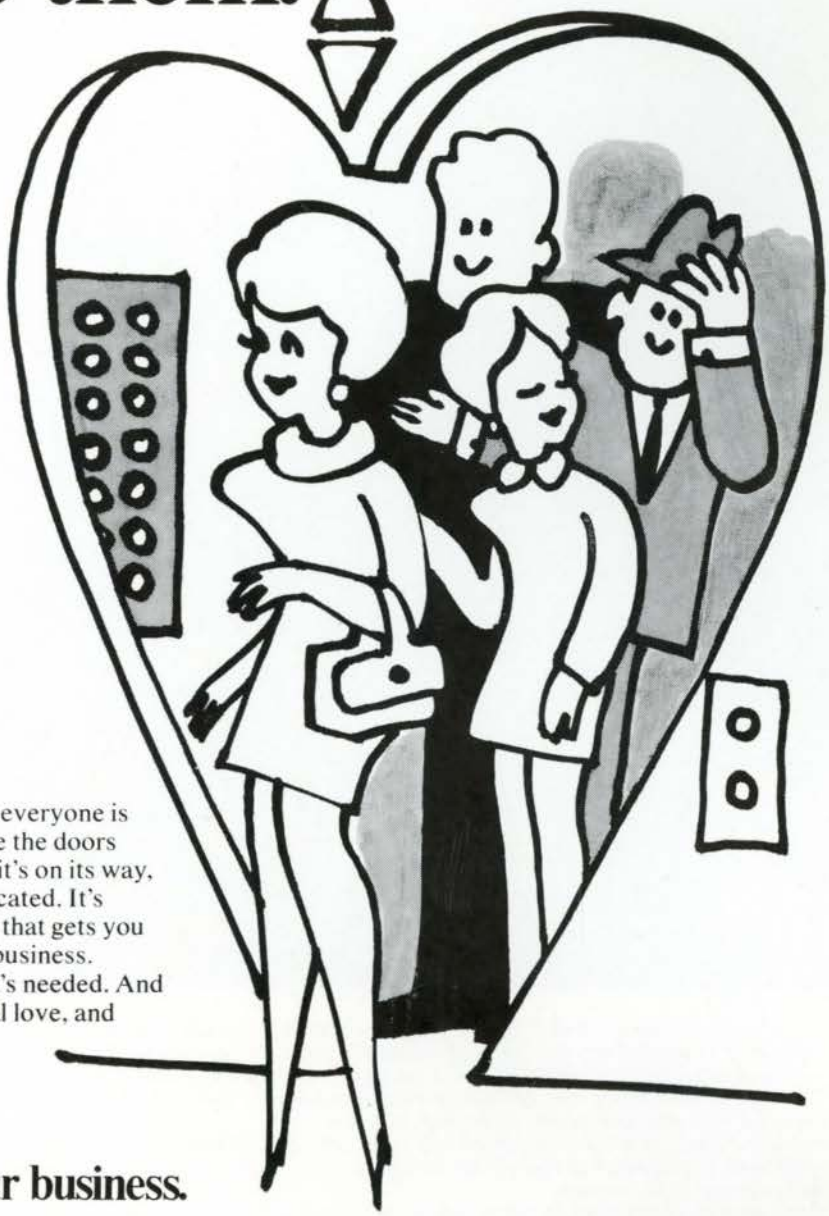

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7

University of Toronto Department of Architecture

The Schools Section in this issue has been prepared by students at the Department of Architecture at the University of Toronto. They give their views of the important factors of any architectural activity – the initial statement of the problem and the method of approach to its solution.

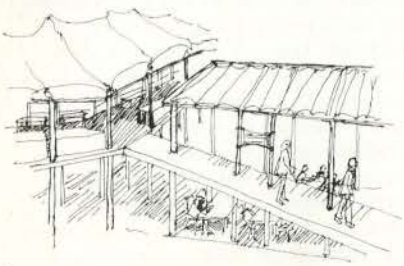
What is at stake today is the rejection of the notion of architecture as a finished product. We start from a common ground of associations and experience, but there is a point beyond which it becomes futile to try to anticipate in detail the infinite variety of accommodations which are required. To make it possible for people to make themselves at home in our buildings we have to enter into a partnership with them, we have to produce an architecture which invites interpretation and response. The problem is then to define what we provide – the support – according to the kind of commitment people will bring to a given situation.

Year One

When I put a thought into words, or even think a thought in "word patterns", I destroy something and give something. The thought comes from something that was not at that point an idea: it was the matter from which ideas were fished up. I destroy the infinite quality of the "idea matter" by limiting it to words, but I give myself consciousness of something of which I was unconscious, something amorphous, unplumbed. By using words, I give others opportunities.

My task is to create places for people.

I must provide "listeners", so that *whoever's* "idea matter" is translated into words, the listeners understand and appreciate these words, even though they do not know what they are going to hear. I can also provide active listeners who say things that encourage more words to surface from everyone's "idea matter". Further, I can plant biased listeners who can attempt to solicit specific words. The difference between these – accommodation, stimulation, and suggestion – is not subtle: creating a balance is.



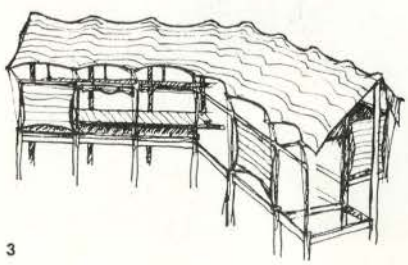
1

Perhaps "suggestion" needs amplification. I do not mean fascism. I mean the kind of unconscious – non-planned and non-preached – influence that a person with self-knowledge exercises involuntarily on people who are ready to receive.

2

In my study of Japanese houses I learned of a doorway into a tea-house 3'-6" high, that forced people to stoop on entering. In my design for a Summer Place for Fourteen Year-olds I put the tubular steel supports for the kitchen area through the ramp running from the sleeping quarters. These two things had no conscious connection – I thought of it as I wrote this. Perhaps someone will linger round one as they descend to talk to the cooks, perhaps a "found" towel will be wrapped around one, to be claimed by the owner. **(1)**

I have provided a "listener", and thought only of some of the words. The fact that the decision was a "brainwave" as well as a rational one, may mean that more can be heard than the words *I* imagine. **(2)**
The man with a board on his knees has made his own lunch table. Obviously I don't say, "abandon table construction tomorrow" – men like making-do. But awarenesses like these must be allowed to seep in – and emerge later when, with all the rational decisions made, a little more is needed.

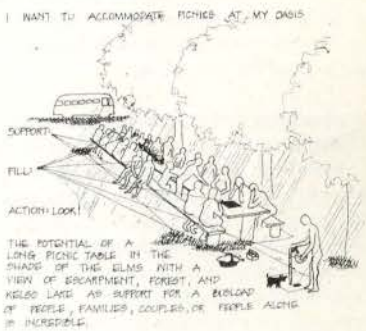


3

If I have to use canvas for a roof, an awareness of sailing boats, hammocks, canvas bags or even tents cannot consciously influence my design, because the function in each case has determined a specific use. But somehow the in-feed of information may emerge, when I begin to answer the basic needs, in a satisfactory solution. **(3)**

Year Two

Assuming that built form is manifest human behavior, the notion "an architecture for people" contains a number of essential ingredients:
– The opportunity for participation on the part of any potential user confronted with built form. Implicit in this sense of participation is the element of choice. One may choose to be either a participant or non-participant.



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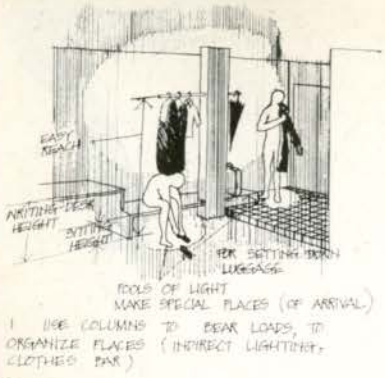
– Built form must be interpretable, and as such carry meaning for the user, be it that the interpretability is evocative immediately, or with time – as people bring to the architectural act their own artifacts, changing its "use". In other words, our architecture must be comprehensible before choice can be established. This built-in comprehensibility however, must not be forfeited by simple-minded or selfish decisions.
The subtle placement of a long table **(4)** for example, is an easily comprehended element which is able to elicit a wide range of responses.
– A corollary to this is that our architecture



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must be inclusive rather than exclusive. An "architecture for people" cannot impose one set of social values at the expense of another, nor can it be the blatant imposition of an architectural esthetic. This type of imposition can occur at many levels: urban 'renewal' schemes at the expense of vibrant community life . . . picture postcard sculpture rather than city centre . . . Miesian "clarity" for the sake of facade esthetics.

– Built stuff must be sympathetic to human needs. We must create things at the right stride and the right reach for men. **(5)**

Lying behind all these ingredients is the fact that it is what we as people, of various backgrounds, likes, dislikes, hopes, fears, bring to any place must be accommodated in our architecture. Although conceivably a purely democratic architecture – in the sense of a place to satisfy all – is impossible, it is the responsibility of the architect to extend himself beyond the confines of client demands to try and provide the opportunity for all men to feel at home in our built environment, and to extend the invitation for them to participate in it.

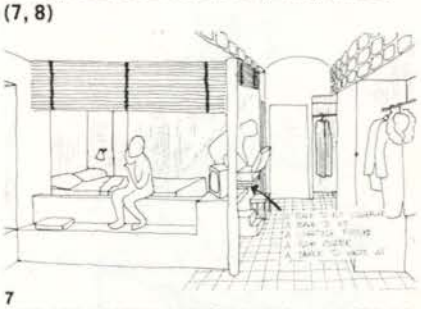
In the work of the second year we have been interested in providing accommodation for travellers, for people on journey from one place to another – an oasis.

Being conscious of the elements enumerated above, in the scheme illustrated (in fig. **12**) I have tried to translate into built form a number of elements which I consider essential to the quality of an oasis: – Zones of activity related to the needs of the users, which are entities in themselves and yet not restricted to specified users. There has therefore to be a common element linking them all – an interior street. This is the element that separates and joins the zones of activity. – Complimental qualities: places where there is action and at the same time places where there is quiet . . . to be with kids or away from them . . . to be together or to be alone.
– Degrees of penetration, from public to more private, from highway turbulence to overnight tranquility: factors which are conducive to the movement both of cars and people – The critical factor of time: since people would tend to use the oasis for only short or negligible amounts of time, the choices offered have to be obvious and readily identifiable. – An economy of means.

In the design of the individual unit I attempted as much as possible to "personalize" the room by taking advantage of the little that people would bring with them – cars, luggage, hats, coats, etc. I brought the car, which could be thought of as "the other suitcase", as close as possible to the unit and by leaving it slightly below grade, was able to remove it as an obstacle to the view. **(6)**

6

The luggage itself got a special place in the room – close to the bed and to cupboard space. The table on which it rests is at the right height on the one side for writing a letter, and on the other the right height for sitting. It also serves as a lighting fixture. **(7, 8)**



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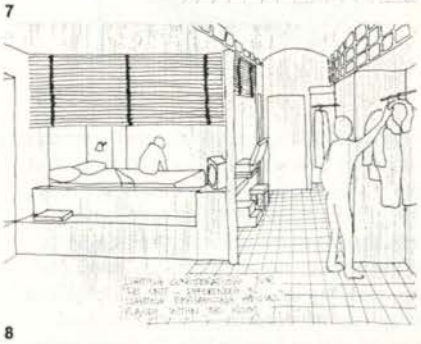
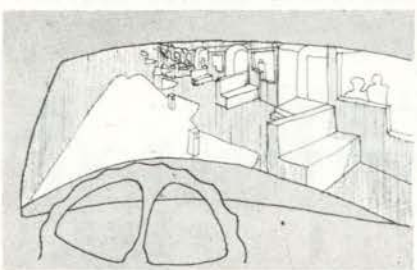


8

Elements in the room which the user can operate, allow him the opportunity to make the unit more his own. Changes in level, types of lighting, and objects such as blinds around the bed, allow him to vary the room to meet his needs.

Outside, **(9)** poles at the road perform a number of functions with an economy of means: lights showing the way, markers identifying places to park, and lamps to illuminate the trunk of a car.



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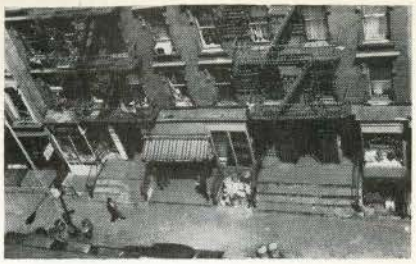
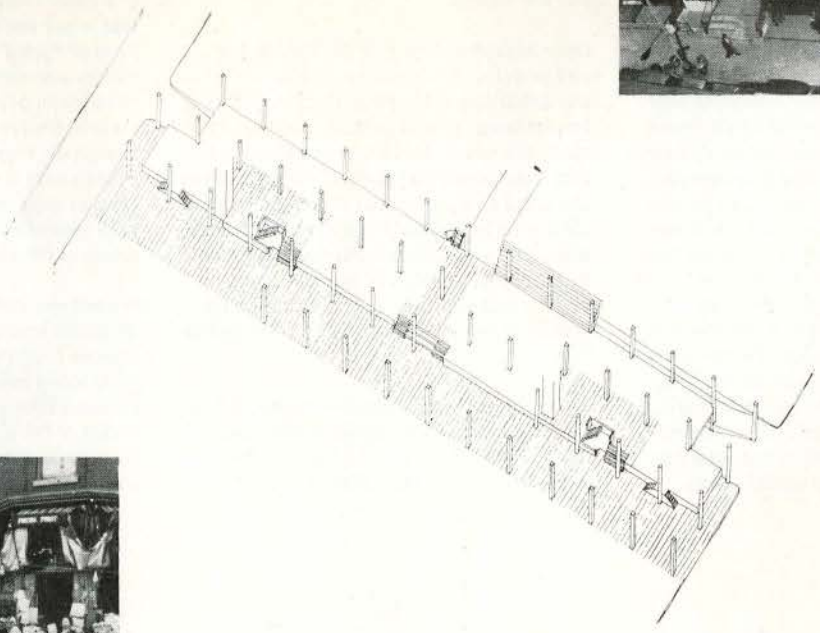
Year Four

This is a project for an educational facility built over the publicly owned subway. It has to do with providing facilities for higher education in such a way that they become an effective extension of the public domain – responsive to the people in a given area of the city and available to them as a resource.

The first problem is to convey this potential through the location of the building. It is made as an extension of the public street, giving the alternative of a partially sheltered way through. One of the oldest forms of understandable support, the public street implies spontaneity, room for small, diverse, initiatives, responsiveness, entertainment, and communication. Most important, there is an underlying assumption of everyone's absolute right to be there which is clarified by a universally understood fill: telephones, mailboxes, newspaper stands, kiosks, etc. In this scheme the street has an edge we can sit on. Vehicles can share a street with people on foot. Here, a row of columns offers protection at critical moments. Changes in level make protected platforms with special vantage points.
When we come to situations where people need physical equipment to accommodate an activity, the articulation of the support must give clear indications of organization. We have to find that delicate line between not doing enough to make the usefulness of a building apparent and doing so much as to severely limit interpretation. Columns, bay sizes, lighting, access, and surfaces all have the potential to provoke subtle responses. An auditorium in this scheme consists of: 1. a set of steps the right height for sitting, 2. the provision for adding bleachers which expand their use, and 3. the possibility for immediate adaptation when a given group of people organizes equipment, platforms, benches, and lighting to suit its purpose.
The ends of the building are made with their own entrances so that they can be occupied autonomously by a restaurant, a shop, a secretarial school, a social club etc., or work as a part of the larger whole. Courtyards made by the building on one side of the street can be extended by response of the other side. Every change in parts produces a new whole. The process is endless. Each bit of fill becomes in turn a support for additional fill and action.
Over time the building can amplify the existing patterns, – stores may begin to open their back doors to capitalize on the people passing through and make short cuts which offer choices. The richness occurs when, on the way somewhere, we can satisfy our curiosity about what is going on without looking foolish. This may precipitate a more serious involvement in something we knew nothing about. If we can then participate easily in the shaping of our physical surroundings we can make the place "ours". This is the kind of involvement which can make a building, and in this instance ultimately the educational process, fundamentally responsive to the interests and aspirations of the users.





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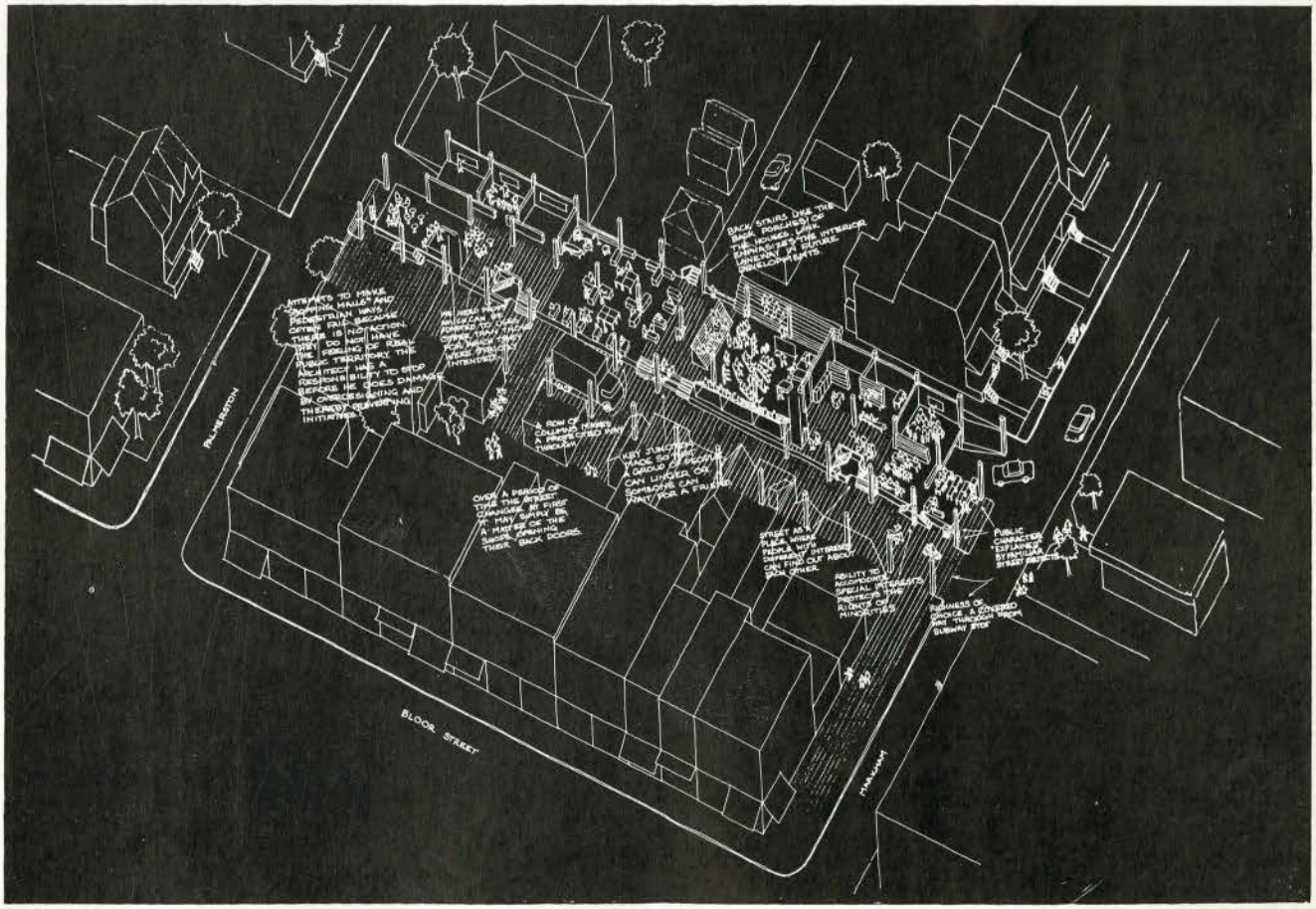

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Year Five

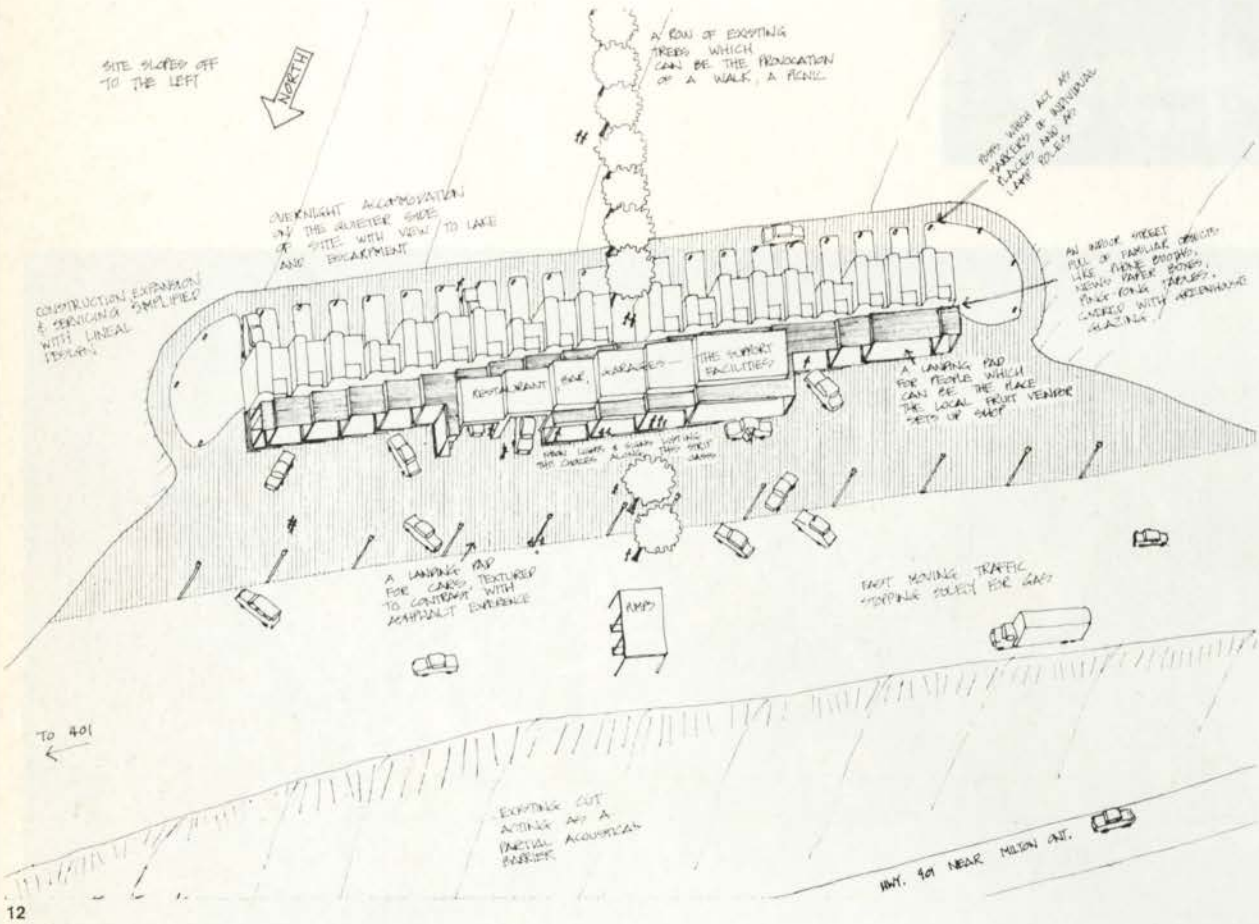
If we state that our primary responsibility is for the accommodation and further development of man's ways of life, it then seems imperative that as problem-solvers we understand the limitations of our influence.

The task of large-scale expansion or rejuvenation of an existing organism, like the city, demands that the designer recognize and understand the "supports" which acknowledge the complexity of contemporary human events. A tree, a bench, and a newspaper stand are "supports" engendering certain activities at a micro-scale; similarly, transportation, recreation, communication, education, economic, political and other institutions are "supports" at the city scale. Society is made up of these institutions as forms of human activity within which exist rival conceptions, with their own traditions, of the right way for an activity to be carried on. It is within such forms of activity, and in the context of such conflicts between opposing conceptions, that social values, ideas of what is good, arise. Only by understanding these existing forces can a designer hope to give definition to those that hold meaning for the future. If only the utilitarian and consumer concerns are pursued, then the human events and activities of the city will be lost.

Upon studying a specific problem in the city, physical or otherwise, or a specific site exhibiting some potential, the designer becomes aware that to study one part, is to study the whole. No longer can the architect enact a role as principal problemsolver since the complexities of urban structuring dictate an inter-disciplinary approach. However, if an architect assumes an expertise in the conscious design of space for human activity and behavior, his contribution becomes as potent as that of any other institution.

We are aware of the disastrous effects the large-scale renewal approach often has on our cities. This raises an issue too often neglected by the inter-disciplinary team; that is, the people resident in an area are the only "experts" in terms of what they have and what they need. Investigations made by sociologists and economists usually uncover values and traditions which are a meagre reflection of the true social fabric of a community. We must emphasize again that in our society there are many conceptions of "good" which overlap, interact and modify each other. Shouldn't an important criterion in our thinking be that different ways of life are valuable in themselves, even though we may not actively engage in them ourselves? How can we possibly justify a team of experts passing judgment on an area owned and supported by a different group of people?

We believe that an individual or team of individuals involved in urban growth and change must act more in a consulting capacity to the people most affected by the physical change. In this way alone the elements of the physical environment which have the greatest effect on the lives of the users can be retained, expanded or created.



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Contributors are: Barry Stone, 1st Year; Joost Bakker and Bruce Kuwabara, 2nd Year; Ken Greenberg and Jack Dougan, 4th Year and Norman Hotson, 5th Year, Student Editor.

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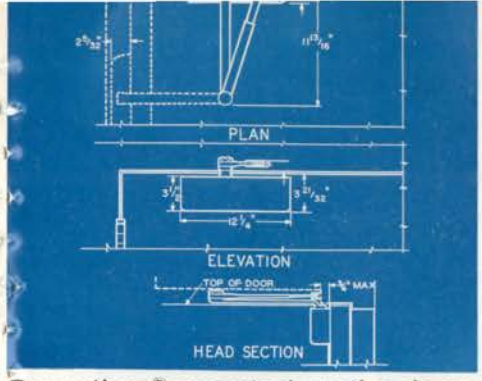

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Zion Heights Junior High School, Architect: James A. Murray, FRAIC

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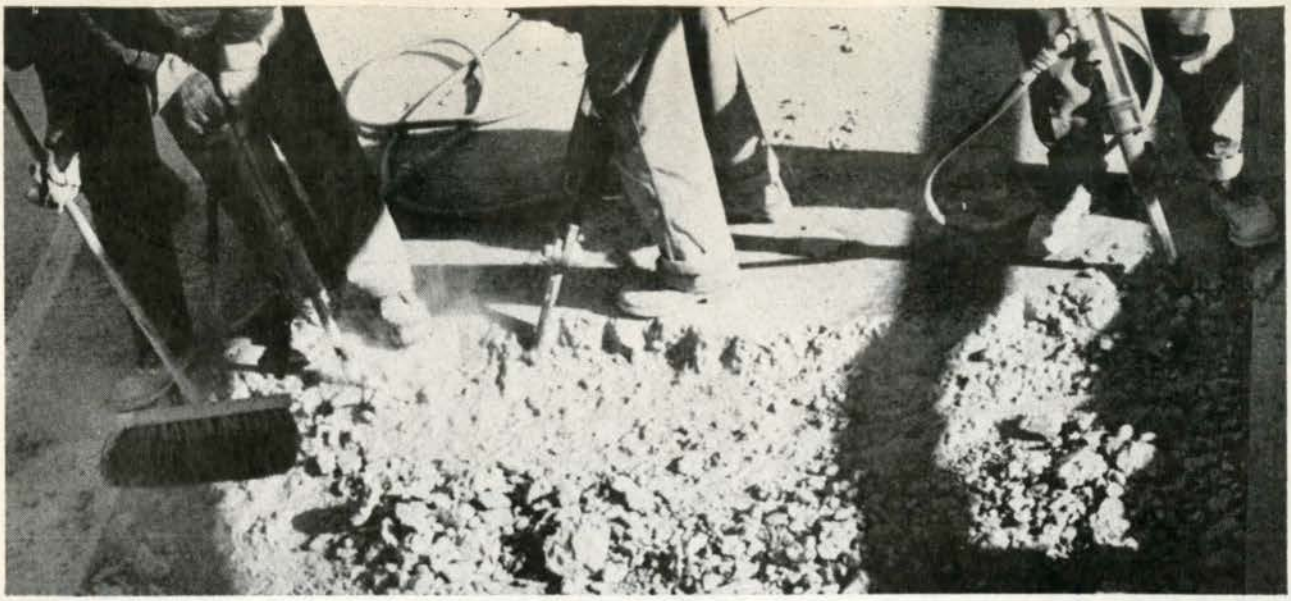

It can cost $5.00 per sq. ft. to correct a floor failure.

MASTERPLATE prevents it for 25¢.

When the top ¼" wears out, the entire investment in a concrete floor is lost. But that's not all.

A rough, disintegrating floor is a safety hazard. It creates contaminating dust. It can cause damage to equipment and production goods moved over it. It *will* cause production interference while the floor is being replaced.

So it *pays* to protect the surface of a concrete floor against disintegration. It also pays to be *sure* of the quality of protection you choose and use.

The more than one billion square feet of MASTERPLATE *iron-armoured floors that have been installed prove it produces industry's most wear-resistant, non-dusting floors.*

SOME PERTINENT FACTS ABOUT OUR PRODUCT—MASTERPLATE iron-armours concrete with a ductile, impact-resistant surface. 28-day strength is over 12,000 p.s.i. Abrasion resistance is 4 to 8 times greater than the concrete or topping beneath it. Installed cost is only 20c to 25c per sq. ft. more than plain concrete.

A SIGNIFICANT FACT ABOUT OUR SERVICE—When requested, a Master Builders field man will be on the job, during early stages, to explain application procedures under job conditions.

A REASSURING FACT ABOUT US—North America's leading manufacturer of products for improving concrete floors stands behind the performance capability of MASTERPLATE.

So whether it's a new building, an addition or a resurfacing job, the best way to protect your investment in the floor is with a spec that states "MASTERPLATE" . . . *and stays* "MASTERPLATE". There is no equal to MASTERPLATE!

Like to know more? Write for our catalogue or consult a Master Builders field man. General offices and factory: Toronto 15, Ontario. Branches: Vancouver, Calgary, Edmonton, Saskatoon, Winnipeg, London, Ottawa, Montreal and Moncton.

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MC-6802-M

9

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.

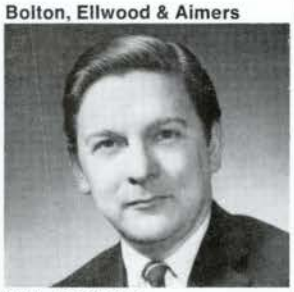
Registrations

Ontario Association of Architects January 17th, 1969: Leonard W. Dickson, B.Arch; R. Allan Graham, B.Arch; Richard A. Lieblich, Dipl.Arch; and Christopher R. Wright, Dip.Arch.

Restored to membership: Garth W. Miller, B.Arch.

Ontario Association of Architects, February 11, 1969: David R. Evans; Roland R. Deimel, B.Arch; Frank J. Kirst, B.Arch; and Cameron C. Ridsdale, B.Arch.

Bolton, Ellwood & Aimers



A. M. Henderson

Bolton, Ellwood & Aimers, Architects, of Montreal and Ottawa, are pleased to announce that Mr A. M. Henderson, Dip.Arch., MRAIC, ARIBA, has become a partner in the firm. Mr Henderson, who came to Canada from Scotland in 1953 after service in the Royal Air Force, has had extensive architectural experience in Edmonton, Halifax and Ottawa. He joined the Central Mortgage & Housing Corporation staff in 1956 and served as Atlantic Regional Architect in Halifax, and later as Senior Architect in Ottawa. He joined the firm of Bolton, Ellwood & Aimers as Chief Designer in 1965.

Nova Scotia Association of Architects January, 1969: Dr. Peter N. Manning, Rosa Bishop and James G. Sykes.

Alberta Association of Architects, February, 1969: Guy C. C. Maron and A. G. W. Roberts, Edmonton; Paul Tarjan and A. W. Fullerton, Calgary.

Practice Notes

John W. Keith-King and James C. Barnum have begun practice at 1008 Homer St., suite 301A, Vancouver, B.C., telephone 688-9231. The new firm name is Keith-King & Barnum, Architects.

The telephone number of Govan, Kaminker, Langley, Keenleyside, Melick, Devonshire, Wilson, Architects, 10 Price St., Toronto 5, has been changed from 924-7781 to 920-1620, area 416.

Harvey Cowan, MRAIC, has commenced practice at 101A Admiral Road, Toronto 5, Ontario, telephone 923-6498.

Alan D. Soutar and Royce S. B. Condie have formed a partnership as of February 1st, 1969, in Terrace, British Columbia, under the name of Soutar Condie Associates Architecture Planning, 4648 Lakelse, telephone 635-7191.

Specification Writer Wanted

Gordon R. Arnott & Associates, Architects, Engineers, Planning Consultants, have an immediate opening in their Regina office for a Specification Writer. This position is a permanent one and will entail responsibility for preparation of architectural specifications utilizing computerized program, as well as quality control of working drawings and some administration of construction contracts. Qualifications shall include experience in preparation of specifications and working drawings and familiarity with techniques of contract administration. Salary commensurate with qualifications, and benefits include group pension and insurance plans. Apply to 2222 Albert St., Regina, Sask., Telephone 523-4608.

Positions Wanted

Third year student at Bristol University studying for RIBA Intermediate standard in June seeks position with Canadian architect for one year commencing July or August. Reply David W. Ridel, 2 Saville Pl., Bristol, B58 4EJ England.

Student at Oxford School of Architecture who will have completed three years at the school seeks position with architectural firm in Canada for 12 months. Reply A. M. McNeally, 29, Littleworth Caravan Park, Wheatley, Oxford, Eng.

Architect, MRAIC, Alberta, 5 years practical experience, desires all-round position in Ottawa. Small or medium-sized office preferred. Reply Box 159, Architecture Canada.

23-year old graduate of National College of Arts, Lahore, two years of professional experience in concept design, working drawings and site supervision, seeks position as draftsman anywhere in Canada. Reply R. Khan c/o Karim Bukhari, YMCA, 511 Pellisier St. (Room 314) Windsor, Ontario.

B. Arch. from Indian Institute of Technology, Kharagpur, considering immigration, seeks employment in advance. Six months' practical training in New Delhi, taught architecture six months, presently senior technical assistant Architecture Department. Reply Sarat Ch. Bhatia, 2/5, Bachelors' Flat, Indian Institute of Technology, Kharagpur (W. Bengal) India.

Near qualified 27 year old R.I.B.A., English man married, seeks employment. Two years School of Architecture, ten years experience in architects offices. Variety of contacts with full responsibility up to $150.000, last three years as senior assistant in $9,000,000 project. Contact C. T. Breakspeare, 9 The Hedges, Rushden, Northants. NNIO 9DJ, England.

Qualified architect, Government Diploma in Architecture (Equivalent to Intermediate RIBA), Associate Member of Indian Institute of Architects, ten years experience on various projects – residential, commercial, industrial, seeks position in architectural firm in Toronto. Write J. J. Kapadia, P.O. Box 1026, Lusaka, Zambia.

Canadian Architect, 32 years old, 11 years of comprehensive experience including five years of private practice in the province of Quebec, seeks new position with association possibilities anywhere in Canada. Full details upon request. Box 158, Architecture Canada.

Third-year diploma student at Oxford School of Architecture studying for Intermediate RIBA examinations in May seeks position Sept/69 to July/70 in Toronto. Reply Derek Neale, 39 Manor Lane, Halesowen, Worcestershire, Eng.

Architect's Inspector, 53, seeks appointment, 12 years Canadian site experience with all trades, primarily institutional. Reply W. J. Trusler, 49 Spruce St., Aurora, Ont. or 727-9233 evenings.

Architectural Assistant, 25 years, six years office experience including timber framed housing, passed intermediate RIBA 1968, seeks employment Canada from June 1969. Reply C. J. Masters, 15 Blair Ave., Esher, Surrey, England.

Scottish architect with firm which emphasizes high standard of design seeks exchange of employment and residence with Canadian architect of similar qualifications. RIBA Associate. Year to 18 months commencing October. Reply to Gordon J. Lust, 20, Buckstone Bank, Edinburgh 10.

English man, aged 23, seeks employment as an architectural assistant. Qualified as a professional Associate of the Royal Institute of Chartered Surveyors in 1968; worked 6½ years in firm of Building Surveyors preparing drawings and specifications for new buildings and extensions, surveys, levelling, etc. Area unimportant, interesting and challenging position essential. Reply R. P. Vivian, c/o 1056 Lynbrook Road, Oakville, Ontario.

Draftsman, project architect, housing project inspector, estimator and fire protection inspector, B.S. Architecture in 1961, seeks position as draftsman anywhere in Canada. Reply Manuel Ruuz y Padua, 1224 Espana Blvd., Sampaloc, Manila, Philippines.

Second-year architecture student at McGill seeks full or part summer employment in architect's office in any capacity, any province. Reply to Elizabeth Langley, 555 Sherbrooke St. W., Montreal or (after April) 30 Gwendolen Cres., Willowdale, Ont., Phone 221-8498.

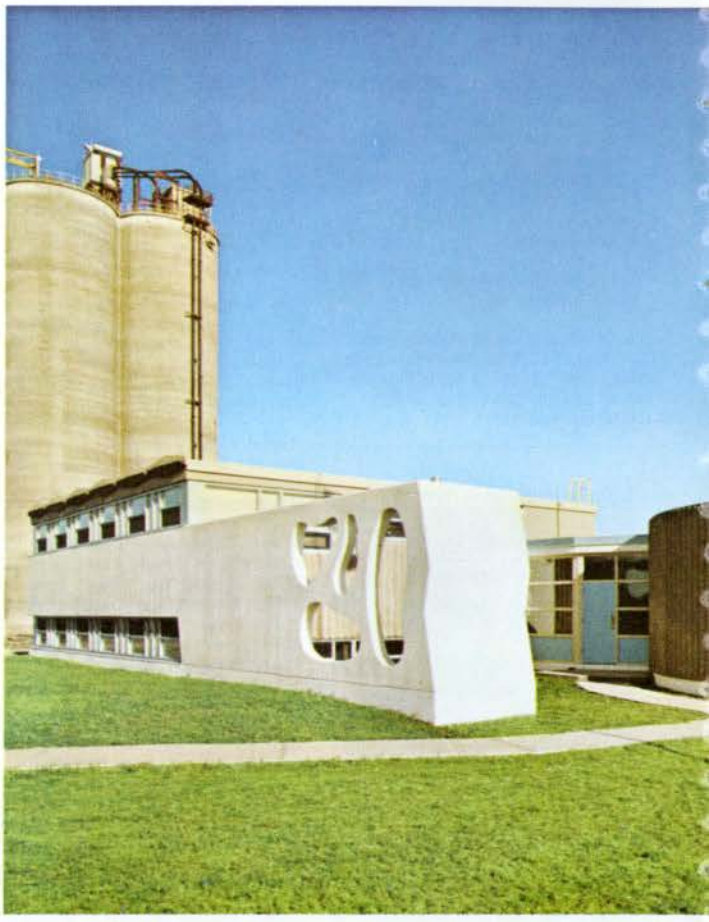
Graduate Architect, Technical University of Istanbul, seeks work as draftsman with Canadian firm. Bilingual, member of TMMOB, 3 years experience. Reply to Tuncmen Ilkin, 1009 St-Hubert St., number 9, Montreal.

Artistic mural at Bishop Grandin Academic & Vocational High School, Calgary.

2 Another decorative mural at Bishop Grandin High School, Calgary.

3 Precast concrete pedestrian bridge at University of Saskatchewan.

4 St. Basil's Ukrainian Catholic Church, Edmonton.



5 Decorative concrete wall at Canada Cement plant near Saskatoon.

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ARCHITECTURAL AND DECORATIVE APPLICATIONS OF CONCRETE

Your architectural ideas can be easily transformed into decorative concrete features in a variety of shapes, colours and patterns. Concrete curtain walls, exposed aggregate surfaces, murals and sophisticated landscaping provide freedom of expression to architects and lend distinction to modern buildings. While fulfilling their practical function and imparting a feeling of stability, concrete walls can also be designed to reflect the commercial, religious, educational and housing nature of the buildings they form. Artistic motifs for concrete murals usually mirror the character of the buildings they adorn. The effective use of concrete in landscaping permanently enhances the surroundings of public and commercial properties. For further information, free technical assistance and literature, contact any Canada Cement office.

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7 Pitney-Bowes Building, Ottawa, Ont.

8 Centennial Cultural Centre, Dorval, Que.

9 Pathology Institute Building, Halifax, N.S.

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& Interior mural hand sculptured by: R. Oldrich of Oldrich
2. Design Ltd.
Genl. Contr.: Oland Construction Co. Ltd.
Precast and prestressed concrete members: Con-Force Products Ltd.
Ready-mixed concrete: Gallelli Construction Materials Ltd.

3. Archt.: John Holliday-Scott
Cons. Struct. Engrs.: Douglas, Pearson, Fossey & Partnership
Genl. Contr.: Poole Construction Ltd.
Precast concrete members: Con-Force Products Ltd.
Ready-mixed concrete: Stodola Concrete (Sask) Ltd.

4. Archt.: Eugene Olekshy
Cons. Struct. Engrs.: Duthie Newby & Associates Ltd.
Genl. Contr.: Christensen & MacDonald Construction Ltd.
Precast and prestressed concrete members: Con-Force Products Ltd.

5. Archts : Marvin & Vanstone
Cons. Struct. Engrs.: Underwood, McLellan & Associates Ltd.
Genl. Contr.: Graham Construction
Precast concrete members: Con-Force Products Ltd.
Ready-mixed concrete: Stodola Concrete (Sask) Ltd. and Redi-Mix Concrete Ltd.

6. Archts.: Georges Lagacé & Roland Massicotte
Cons. Struct. Engr.: Réjean Pelletier
Genl. Contr.: Pelletier et Martin
Supplier of concrete: Construction St-Patrice Ltée

7. Archts.: Murray & Murray and L. Rebanks
Cons. Struct. Engrs.: Robert Halsall & Assoc. Ltd.
Genl. Contr.: Aselford-Martin Ltd.
Precast concrete panels: Durie Mosaic & Marble Ltd.
Ready-mixed concrete: Francon Limited

8. Archts.: Oberman & Paskulin
Cons. Struct. Engrs.: Sachs & MacKean
Genl. Contr.: Chant Co. Ltd.
Precast concrete panels: Creaghan & Archibald Ltd.

9. Archts.: Leslie R. Fairn & Associates
Cons. Struct. Engrs.: D. B. Dorey Engineering Ltd.
Genl. Contr.: McDonald Construction Co. Ltd.
Precast concrete panels: Nova Stone Ltd.
Ready-mixed concrete: Whebby's Concrete Mix Ltd.

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Index to Advertisers




This advertisement is published as living proof that the Metalsmiths' 6043 chair is the 2nd known* chair with sex appeal.

Notice how the girl reacts with evident disdain to the fellow on the ordinary chair.

The chair, of course, must be a contributing factor, for unfortunately, it does not have soft cushions, buttoned and tufted in traditional leather fashion.

Now look below at the same guy and girl but this time with our sexy 6043 chair.





You can tell, even in the little contact prints, that she is more vibrant and interested. It is either the interesting design of the chair itself or the steel frame which is (1) formed, (2) welded, (3) polished, (4) ground, (5) repolished, (6) copper-plated, (7) polished again, (8) nickle-plated, (9) polished some more, (10) then chrome-plated. Even a diamond engagement ring doesn't get that much polishing, and, unlike the aforementioned ring, we have **never** had one returned for any reason.

You can see from the last picture that it's the same man and the same girl. Only the chair is different. We can therefore deduce that the chair (being the variable) has sex appeal. Thank you for reading this scientific report.

Place your order now for several 6043 chairs in either cloth, vinyl or leather.

**The name of the 1st known chair with sex appeal will be sent to you on request.*

Metalsmiths

110 LAIRD DRIVE, TORONTO

Sales Representation by Leif Jacobsen Ltd., 130 Yorkland Blvd., Willowdale

Which of these quality-engineered products can solve a troublesome problem for you?

Sealant Adheres To Concrete, Mortar.

Dow Corning® 780 building sealant is totally acid-free. Hence, this silicone rubber sealant will neither corrode calcite-based substrates during cure, nor support chemical reactions that impair adhesion.

Dow Corning 780 building sealant is the most durable of all *flexible* construction sealants for joints subject to expansion and contraction of commonly used building materials.

Request "Dow Corning 780 building sealant".

Avoid Soiling, Discoloration

by specifying a brick that is factory treated with Silaneal® water repellent. *Silaneal water repellent keeps bricks clean* Applied by the brick manufacturer, it protects the natural beauty of brick in storage, in transit, at the job site and in the wall.

The protection it affords is essential—especially on porous, light colored brick. The long-lasting protection also shields brick walls against infiltration by moisture and water, prevents unsightly efflorescence and helps keep walls dry

Request "Silaneal Water Repellent".

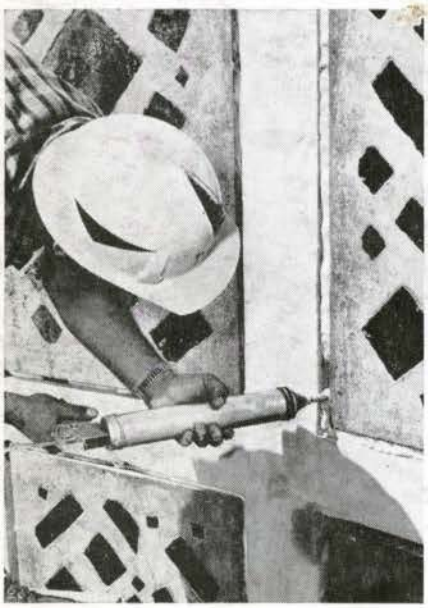
Keep Water Out

of masonry walls by having your waterproofing contractor apply above-grade Silicone Masonry Water Repellent made with Dow Corning silicones. A single application forms a water barrier up to 3/16 inch in depth, prevents damaging freeze-thaw cycling, staining and discoloration by smoke, soot, dust, dirt or splashes.

The invisible, in-depth protection lasts 5 to 10 years.

Effective on precast and poured concrete, concrete block, brick, mortar, sandstone, stucco, terrazzo, and other porous masonry.

Request "Silicone Masonry Water Repellent".



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