

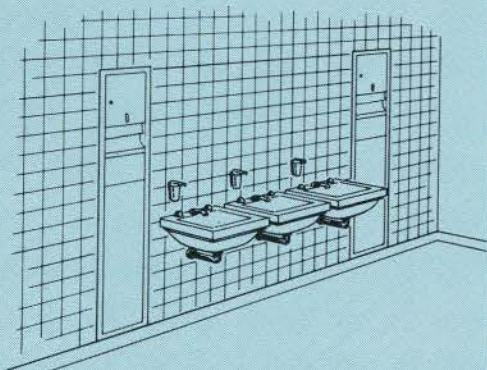


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Institute News

THREE COMPETITIONS

1. Housing Design Council

The Canadian Housing Design Council is offering awards in two separate competitions. One for detached single family houses, the other for all forms of multiple housing. Judging will be in two stages: on a regional basis and by the Awards jury. Enquiries to: The Canadian Housing Design Council, Ottawa, Ont. Closing date: Sept. 12, 1964.

2. Conservatoire du Québec

A one stage competition for the design of the "Conservatoire du Québec" in Quebec City has been announced by the Government of Quebec. The building is to commemorate the Centenary of Confederation. The Conservatoire will comprise a 1500 seat opera house; a 400 seat theatre auditorium; and a school of music. Total cost will be \$5 million including, fees. The competition has been approved by the RAIC and is restricted to Canadian citizens residing in Canada who are members of the RAIC. André Blouin, architect and town planner is the professional adviser and chairman of the jury. The jury consists of Paul Rudolph, FAIA, School of Art and Architecture, Yale University; Jacques Poliéri, director (Scénographe), Paris; James A. Murray (F), Toronto; Guy Frégault, deputy minister of cultural affairs, province of Quebec; Edouard Fiset (A) chief architect for EXPO '67; Henry Bernard, Grand Prix de Rome, Paris. Registration closes July 15, 1964.

3. CLA House for Expo '67

A national competition in 1965 for the design of a house is to be sponsored by the Canadian Lumbermen's Association. The RAIC has approved the competition which has a first prize of \$10,000, a second prize of \$5,000, a third prize of \$2,500, 20 Honorable Mentions of \$500 each and four special prizes of \$1,000 each for the best use of Eastern softwoods; the best use of Eastern hardwoods; best submission by a student of architecture; best new use of any wood product. Samuel A. Gitterman, architect and town planner, of Ottawa, is professional advisor and chairman of the jury. The winning design will be built on a plot of ground at the site of the 1967 World Fair in Montreal. The board of assessors for the competition will be

Edouard Fiset (A), chief architect EXPO 67, Montreal; Professor André Blouin, Ecole d'Architecture de Montréal, vice-president of the PQAA; Paul Rudolph, School of Art and Architecture, Yale University; Mrs. A. F. Plumtree, president, Consumers Association of Canada; S. D. C. Chutter, general manager, Canadian Construction Association; David E. Crinion, chief architect and planner, CMHC; and E. R. Alexander, president, National House Builders Association.

RCAA EXHIBITION

The 85th Annual Exhibition of the Royal Canadian Academy of Arts will be held at the Montreal Museum of Fine Art this November. The Academy cordially invites all architects practicing in Canada to participate by submitting photographs of one or two buildings executed subsequent to 1960, and not previously shown in an Academy exhibition. Full instructions regarding submissions may be obtained from the office of the secretary—63 Warland Avenue, Toronto 6, not later than July 15. The jury will consist of Ray Affleck, Dr. Eric Arthur and Gordon S. Adamson. John C. Parkin will act as an alternative juror in case one of the others cannot be present. The architectural section of the last exhibition was a credit to the profession and is presently on tour under the auspices of the National Gallery of Canada. The Academy hopes for even greater response from the architects for the 85th exhibition.

Harold Beament, RCA President

TRAVELLING SCHOLARSHIPS

Six winners have been announced for the travelling scholarships offered annually by CMHC. Successful candidates for these awards, made available to students planning to enter their final year in architectural studies, are: Catherine M. Macdonald, University of Toronto; Brian E. Woods, University of Manitoba; Raymond Levesque, Ecole d'Architecture de Québec; Pierre Teasdale, McGill University; Anthony Cook, Nova Scotia Technical College; Rainer J. Fassler, University of British Columbia. Fraser Watts of the School of Architecture, University of Toronto, has been selected as tour leader.

CAA SECRETARY APPOINTED

T. C. Colchester has been appointed secretary of the newly formed Com-

monwealth Association of Architects and took up his duties on June 1. Mr. Colchester served for many years in the Colonial Service. As Commissioner for Local Government and Housing in Kenya and Northern Rhodesia from 1945 to 1952 and as Permanent Secretary to the Ministry of Works in Kenya from 1956 to 1961 he work closely with architects, engineers and planners. He retired from the Colonial Service in 1961. All correspondence concerning the Association should be addressed to: T. C. Colchester Esq., CMG, Secretary, Commonwealth Association of Architects, 66 Portland Place, London W1.

FREDERICK PALMER PRIZE

The Frederick Palmer prize of the Institution of Civil Engineers has been awarded to Robert F. Legget, director of the Division of Building Research of the NRC for a paper which he presented to the Institution on "The Failure of a Prestressed Concrete Pipeline at Regina". Mr. Legget is an Honorary Fellow of the RAIC.

NOUVELLE ASSOCIATION

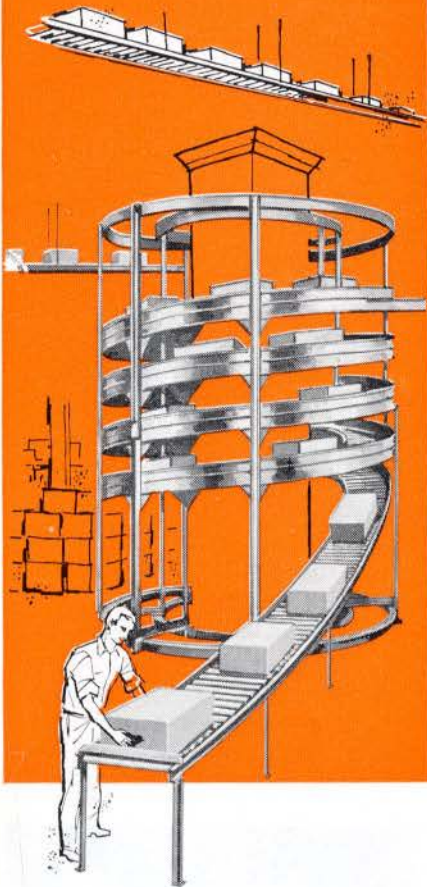
Les architectes Jean Gareau, Jean-Louis Lalonde et Joseph Pauer annoncent leur association. Ils seront heureux de recevoir toute correspondance d'affaire à l'adresse de: Gareau, Lalonde et Pauer, 1625 ouest, rue Sherbrooke, Montréal 25.



REYNOLDS AWARD

The 1964 eighth annual R. S. Reynolds Memorial Award has been given to Skidmore, Owings and Merrill for the design of the U.S. Air Force Academy Chapel, Colorado Springs. Partner in charge and designer was Walter A. Netsch, Jr., AIA, of the firm's Chicago office. Largest in architecture, the award annually brings \$25,000 and an original sculpture to the winner. It is conferred for distinguished achievement in architecture with significant use of aluminum.

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CCURR GRANTS

The Canadian Council on Urban and Regional Research has made a grant of \$12,000 to Murray V. Jones and the Metropolitan Planning Board for a study of the problems of public-private co-operation in reaching the stated objectives of urban renewal.

Grants totalling \$69,030 have also been made to six individuals and firms. The assisted work will be conducted by Profs William Benallick and Donald Clairmont of Halifax, Richard Du Wors of Saskatoon, Walter Hardwick of Vancouver, Harold Kaplan of Toronto, Harold Spence-Sales of Montreal, and by Damas and Smith Limited of Toronto.

Profs Benallick and Clairmont of St. Mary's University are to receive \$8,670 for a study of community life in some 20 centres in Halifax County.

Dr. Du Wors, head of the department of Sociology, University of Saskatchewan, is granted \$7,300 to pursue his studies of the individuality of urban communities.

Dr. Hardwick, assistant professor of geography at the U of BC, is to receive \$12,165 to discover why certain economic activities have left the core areas of cities while others remain.

Dr. Kaplan of the political science department, York University, Toronto, has been granted up to \$27,495 to continue his study of the forces that influence planning policies and decisions in large Canadian cities.

Mr. Spence-Sales, professor in planning at McGill University is awarded \$6,000 to study the public value of landscaped areas around downtown buildings.

Damas and Smith Limited, a Toronto consulting firm is to receive \$7,400 for research on mode and route choices in urban travel.

PETER DOBUSH AGAIN HEADS CCURR

The Canadian Council on Urban and Regional Research announces election of fourteen Canadians to membership for the term 1964-67, and election of a new board of directors and committees for the year 1964-65. Peter Dobush (F), Montreal, is again chairman of the Council and Eric Beecroft of the Ottawa office of the Canadian Federation of Mayors and Municipalities is vice-chairman. Other directors are Dean Napoléon LeBlanc of Laval University; Jean-Marie Martin of the Quebec Ministry of Education; Humphrey Carver of Central Mortgage and Housing Corporation; Gavin Henderson of the Conservation

Council of Ontario and Professor James Milner of the University of Toronto. Newly elected to the Council are Hans Blumenfeld of Toronto; Professor Kenneth Buckley of the University of Saskatchewan; Gerald Sutton Brown, Vancouver; Howard Coxon, Toronto; Charles Langlois, Sherbrooke; Professor Albert Rose, Toronto; Jean Morin, Montreal; Miss Norma Nelson, Halifax; John S. B. Pemberton, and Claude Ryan, Montréal; and Professor William Summers, St. John's, Nfld. W. Harold Clark, Toronto, was re-elected; as were Mayor C. N. Kushner of West Kildonan and Guy Henson of Dalhousie University.

CRUISE SEMINAR

Due to lack of support the cruise seminar scheduled for Wednesday Sept. 9 aboard the S.S. Norgoma has been cancelled.

PRACTICE NOTES

Bregman and Hamann, architects, of Toronto announce the appointment of Serge Zerafa, MRAIC, ARIBA as an associate of the firm.

Waisman Ross & Associates and Blankstein Coop Gillmor & Hanna have announced their amalgamation. They will be known as Waisman Ross Blankstein Coop Gillmor Hanna Associates, architects, engineers, planners and will have their offices at 10 Donald Street, North, Winnipeg 1.

Hartley and Barnes of Kelowna BC announce that Uldis Arajs B. Arch. (UBC, 57) has joined the firm, the name of which will now be Hartley Barnes and Arajs, at 1710 Ellis St Kelowna, 762-3545.

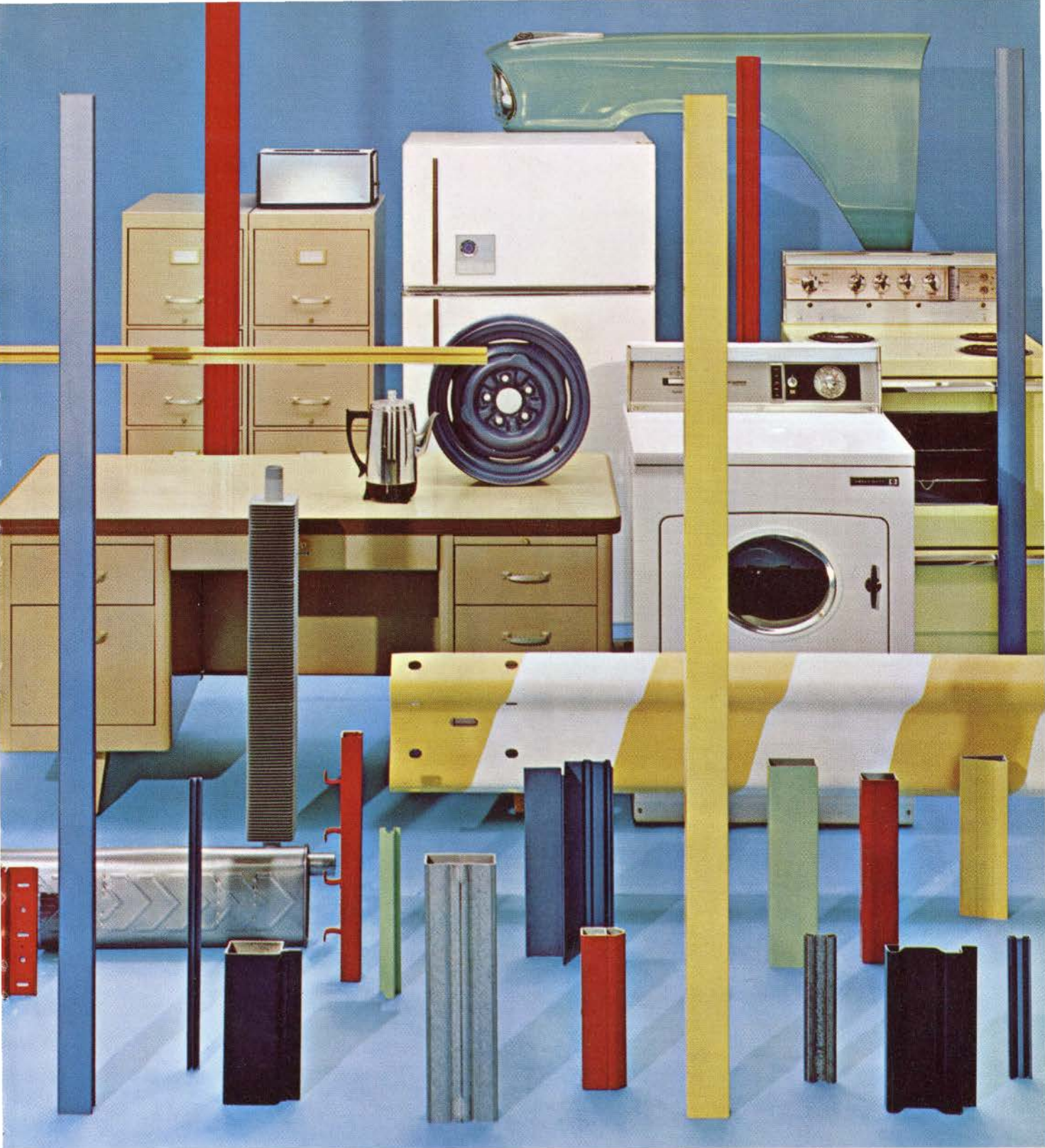
DESIGN COURSE

A course on Swedish design and architecture will be held in Stockholm August 17 to 19. Course will be in English and restricted to 25 participants. Total cost \$254.

POSITIONS VACANT

Ashworth Robbie Vaughan & Williams/Schoeler & Barkham/ Z.M. Stankiewicz, architects and planners, require architects with two to five years experience. Must be good designers. Project: Canadian Government Pavilion, Expo '67, Montreal. Offices: Ottawa. Salary: by arrangement. Call collect 613/233-2855.

(continued on page 96)



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An Appreciation

by Eric R. Arthur (F)

Stewart Bates, MA (Glasgow), LL.D., FRAIC (Hon.), President of Central Mortgage and Housing Corporation, died suddenly on May 24. He was 57. Following a distinguished career as an economist and university professor in the United Kingdom and Canada he entered the public service, and in 1947 was appointed Deputy Minister of Fisheries. He left this position in 1954 to become President of CMHC. In this capacity his contributions to the advancement of architecture, housing and planning were recognized by the RAIC by the conferring of an Honorary Fellowship in 1961.

In the death of Stewart Bates, Canada has lost a very great public servant, and the profession of architecture one of its most distinguished Fellows. It must be the ambition of every good citizen to leave a mark on the country of his birth or adoption, to leave it, even in a small way, better than he found it. How fully did Stewart Bates achieve such a goal. His friends and admirers were many, but, to them, must be added the anonymous hundreds who did not even know his name, yet who today enjoy a standard of family environment that he, in no little measure, inspired through the Corporation over which he presided. A milestone in his development and, in ours as a profession, was his sponsorship of the "Royal Architectural Institute of Canada Committee of Enquiry into the Design of the Residential Environment", a title of extraordinary fatuity that must have caused him to wince every time he saw it in print. He had no patience with the bombastic in people or in language.

Stewart's friends will remember his rapier like wit, that was never meant to hurt, and his warm heartedness. Indeed, his quite un-Scottish, but, obviously genuine, show of affection at times will always remain a memory with me as it must with others. But that will pass as those who enjoyed his friendship themselves pass on. What will remain will be the achievements of the Corporation, but, also, his writing, the evidence of his humanity and his wide reading in English and in Plato and Aristotle. History pro-

vides many examples like Stewart Bates where a love of words and a mystery in their use had their origin in a Scottish home and God fearing Presbyterian parents. He was born at Greenock on the Clyde, and, being fully aware of my pride in Highland grandparents, he more than once took the keenest pleasure in expatiating on the achievements of those men of genius who came from the Lowlands of Scotland. It seemed that no great works of man either in art, science or literature came out of the Highlands. In these discussions, I always felt at a loss because Stewart had all the advantage of a beautiful speaking voice, an authentic accent and a degree from Glasgow University — first class honors in economics and philosophy. These base charges against the intellectual capacities of my forbears in the Highlands brought forth all his gifts of eloquence, and greatly entertained his listeners.

Even if his affections were limited to the Lowlands, he was a loyal Scot who, at the same time, revelled in the opportunities of the new world. In a speech before the Royal Architectural Institute of Canada in his fiftieth year, he said "The thought of the past half century breeds in me a sort of perpetual benediction. Given a choice of birth — the time, the place, the nationality — I can think of none better than that in which I am reposed — except, perhaps, to be born in Canada, where to be young is very Heaven."

He had other loves besides the countries of his birth and adoption. He loved music, and was himself a not inconsiderable performer on the piano, but the sea appears in many of his speeches. His feelings for the men who "go down to the sea in ships" was deep, and must have long antedated his appointment as Deputy Minister of Fisheries. For many years after his transfer to CMHC, the Fisheries folk kept in touch with him. Indeed, for the RAIC assembly in Vancouver, he had just returned from a survey on the BC coast, and, with Ian MacLennan, we sat up late at night hearing of his friends on board and of a gigantic halibut weighing 250 pounds. Internationally, his reputation for conservation in the world's supply of fish persisted long after his retirement from Fisheries. When the Russians launched their first atomic fishing vessel, he was the only Canadian guest on board.

His thoughts can never have been far from the sea. "The tree withers before it falls, so do kingdoms of the earth and of

the mind (so do houses and city precincts — to mention the mundane). It is easy to forget that it is not the lofty sail but the unseen wind that drives the ship. As in the southern latitudes, whose mountainous seas range round the world, having no land to break them, so new ideas and ways have accelerated themselves in this country, sweeping before them older standards, criteria, principles, canons. Since 1914 war has never stopped. Over vast ranges of the earth, and its peoples, we have seen laid a wide and melancholy waste of putrid marshes. The naked shingles of the world have been revealed to us more than to any of our forefathers. But, more significant to us, are the changes wrought in the kingdom of the mind — in the world of ideas, ideas in science, art, religion — all in flux. We are now prostrate before the Vatican of Science . . . All of this has replaced the time when man's presence on the earth gave it dignity amid the Heavenly Hosts; when Hamlet could say — "What a piece of work is a man! How noble in reason, how infinite in faculty!" Of course, he was mad!"

A few years ago, I invited a distinguished American architect to a meeting of the RAIC when Stewart Bates spoke. My friend was completely captivated by the speaker and asked me "Is it possible that you have other senior civil servants with such obvious familiarity with philosophy and world history?" Stewart Bates' address had touched on the philosophic concept of space-time. "Your whole study of design is aimed at enclosing space, aesthetically and economically . . . Space and time change conceptually, and the man who did it — who said he was never at home in the world — died quietly in Princeton a few years ago. Anyway, the Heavens, that used to reveal the glory of God, now show only the curvature of space".

A fascinating speech of his was given in 1955, a year after his appointment. He had been preparing himself for the job by looking at books — at housing schemes. "How pale some of these book drawings appear beside the passions and intrigues, the hatreds and the ambitions, the glitter, the pageantry and poverty of the vast city. The books seem to avoid some of this; indeed, they seem to prefer the lukewarm emotions. The model cities have a preference for the decencies — perhaps even a preference for the tepid" — a challenge to the courageous young architect that had to be said many times, before it was accepted.

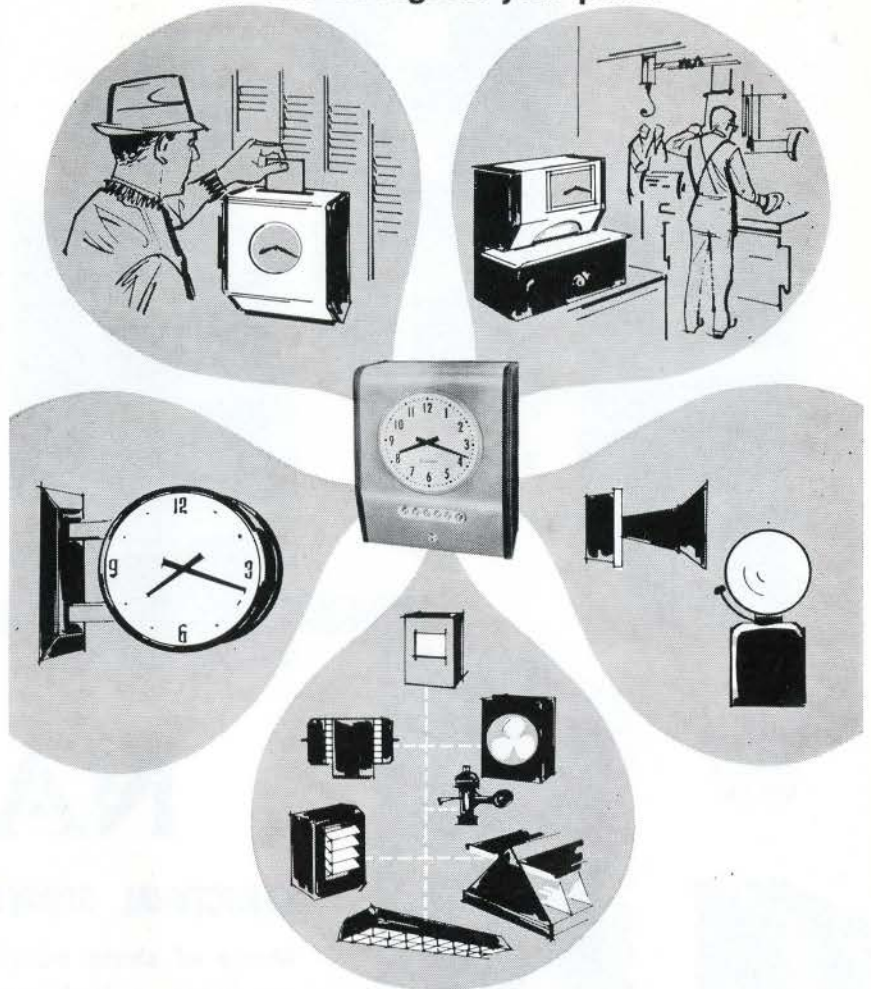
It is a great honor to be asked to write an appreciation of this unusual and lovable person. One's faith in democratic government is confirmed when one thinks of so eminent a humanist being placed in charge of a government corporation whose previous achievements had been largely in the making of plans for dreary houses on equally dreary subdivisions.

The change was to be enormous and will affect the lives of Canadians for generations to come. A new voice was to be heard in the land, a voice that spoke for the "plain man and his family" of "dignity and opportunity—a place that can satisfy most of the workings of the human heart", and of the "civic scene" where there would be "quiet shallows for human retreat". "The city is never at rest. Like the sea, it is untamed, moody and capricious. Like the sea, the city can lay a spell on you. It has its sheltered lagoons and quiet havens. It is in eternal flux, filled with ceaseless hostilities and ill-made compromises.

Within it, the lovely has no priority over the vile—nor wisdom much advantage over folly. The most compelling feature of all this complex is that it lives. The city is a heritage which no generation has a right to exploit. It has to be restored, re-created, re-fashioned for present and future enjoyment . . . The last and greatest insult one can offer the human race is to regard it as a herd of cattle to be driven to your selected pasture."

In writing this appreciation of Stewart Bates, I have avoided the statistical, his many degrees and honors (though I cannot omit his appointment as chairman of the new United Nations Committee on Housing, Building and Planning, 1963, or his skill as a young man in track and field.) Rather, I have let him speak to us himself in addresses given over a decade. Some day, I hope, these addresses will find a place in a book which his old friends and many others would cherish. He accomplished much in so short a time, but there is enough evidence for us to appreciate his influence on the Corporation and on the reconstruction areas of many Canadian cities where slums have given place to havens of decent living. If I were to venture an epitaph for this great man, I would offer one jealously guarded by architects for over two hundred and fifty years, for it marks the resting place of one who also served his generation with honor and distinction — "*Si monumentum requiris, Circumspice*". If you would seek his monument, look around you.

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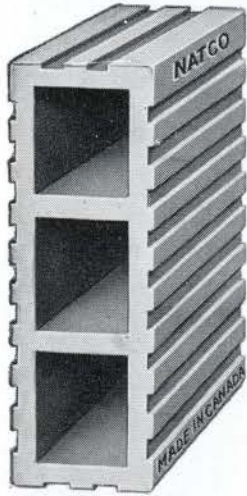
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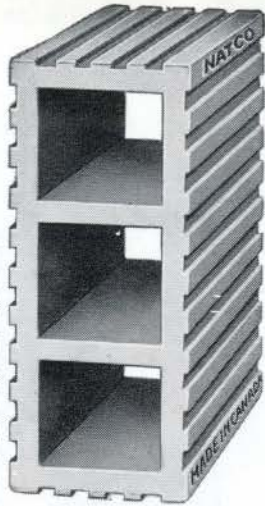
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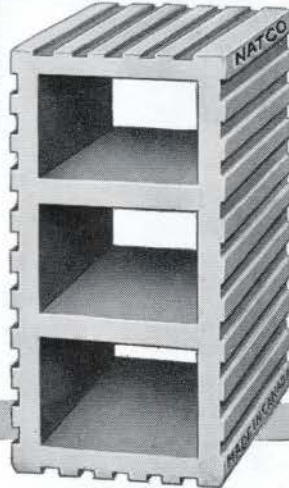
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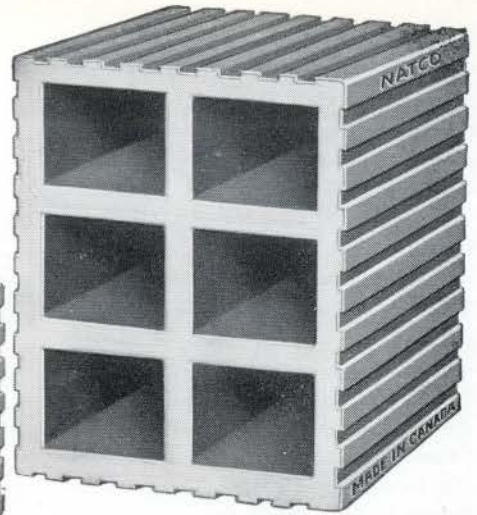
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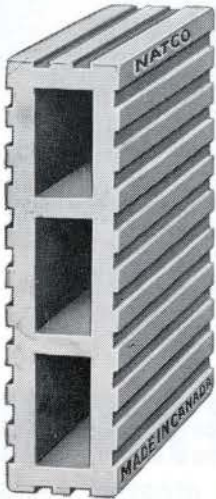
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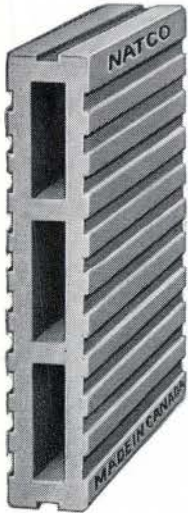
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Made of shale burnt to maturity, which produces a lightweight, unshrinkable and fire proof building unit.

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

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

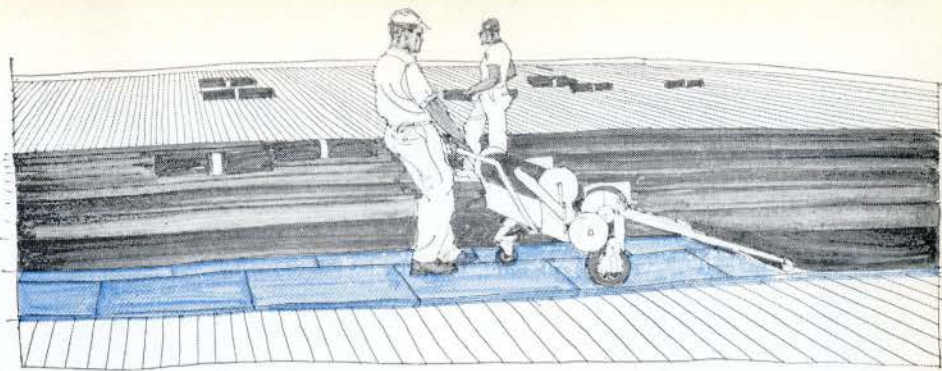
NATCO
CLAY PRODUCTS LIMITED
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THE COMPLETE LINE
OF STRUCTURAL TILE

closed cell construction, is water-resistant and does not need vapour barriers. Since it is unaffected by water or water vapour, Roofmate FR maintains a permanently low "K" factor leading to lifetime insulating effectiveness. Furthermore, because it stays permanently dry, it eliminates a major cause of roof-blistering and subsequent roof leaks.

This new insulation board is designed especially for installation under built-up roofs in conjunction with the Coated Base Sheet System. Compared to most other insulation materials, Roofmate FR has extremely high impact resistance and compressive strength, and because of its high density skin there is less danger of ripping the surface. In addition, Roofmate FR is a flame retardant material.

The Coated Base Sheet System

In the final analysis, it is the complete compatibility of Roofmate FR with the Coated Base Sheet System which produces the permanence and superiority in the finished roof. They complement each other so



Coated base sheet produced on the job from saturated roofing felt.

perfectly that the finished roof has literally no weakness. Yet the cost factor is competitive with present pricing structures.

The secret to this lower cost factor lies in the reduction in costs brought about by the use of the Coated Base Sheet System, which employs conventional roofing materials and know-how, takes less time and labour to complete . . . and eliminates the need for a vapour barrier!

The only change from normal roofing techniques that need be made is in the sequence of operation. The first layer of felt in a 4-ply built-up roof is replaced with a coated base sheet. This is followed by 3 plies of #15 felt. These are applied with hot asphalt in the conventional manner, finished as usual with gravel embedded in a flood coat of hot asphalt. This means that the first layer of asphalt is installed as an integral part of the first felt with consequent savings in cost, time, and labour . . . while the finished roof has been improved in performance and durability.

Interesting Technical Data

The following interesting technical data on Roofmate FR, support these contentions.

- Because of its closed cell construction, Roofmate FR maintains a permanently low K factor of 0.23 (BTU/hr.-sq. ft.-°F)
- The excellent impact resistance is evidenced by the density of 2.5 lbs./cu. ft. average.
- A compressive strength of 30.0 psi. at 5% deflection.
- Water resistance properties show capillarity at zero, and

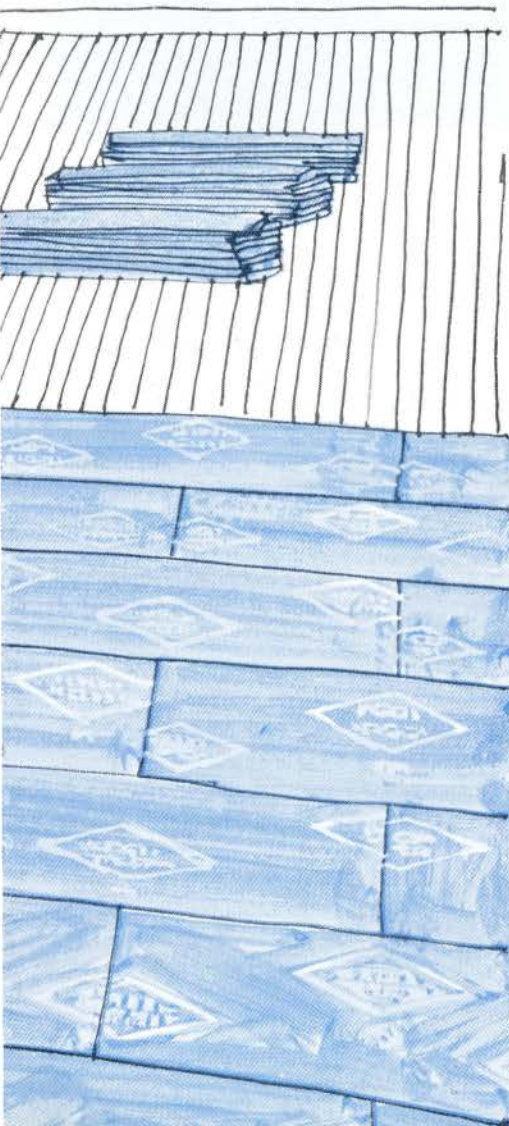
water vapour transmission (perms) at less than 1.0. • Roofmate FR can be bonded directly to *any* conventional poured concrete, pre-cast panel, poured gypsum, wood or metal decks. • Product is conveniently taped in bundles of approximately 100 board feet, weighing approximately 25 lbs. • The "C", "R", and "U" values of Roofmate FR are superior to those of conventional insulation. • Roofmate FR is made in Canada from Canadian raw materials.

Overall Advantages and Summary

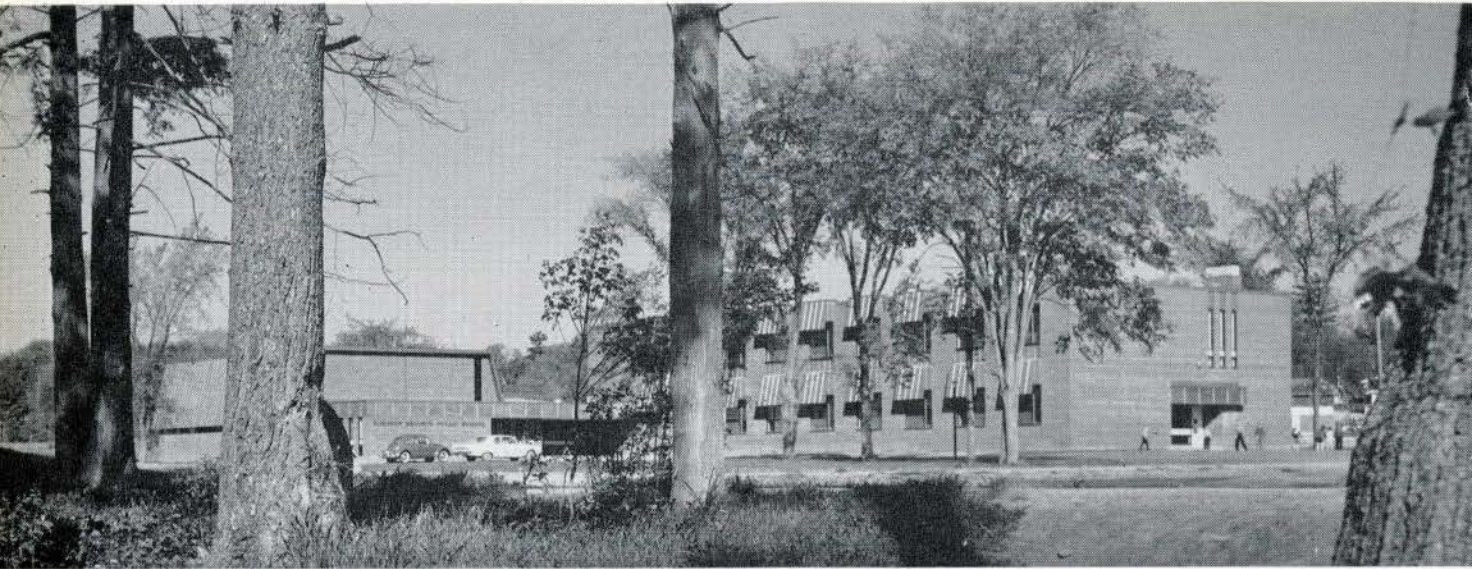
There are a great many other advantages to using Roofmate FR insulation which should at least be mentioned at this time. It is easy to handle and cut, goes down quickly and effortlessly, and its smooth clean surface develops a high tensile bond strength with the coated base sheet. It lowers roof dead loads, and needs no costly tools to install. Because it has no edible value, and stays dry permanently, fungus cannot grow and rot cannot occur. Roofmate cuts down-time on the site, since it comes packaged only by glass-reinforced tapes which virtually eliminate unpacking and clean-up time.

There is a great deal more evidence available to you in the form of brochures, engineering and technical data, and illustrated installation instructions, which are worthy of your consideration. Just contact the Dow office nearest you. Dow Chemical of Canada, Limited, in Vancouver, Calgary, Winnipeg, Sarnia, Toronto, Montreal, Saint John.

*Registered Trademark



Felt being mopped over factory-coated base sheet. Hot asphalt does not contact Roofmate FR.



Features

EDMISON HEIGHTS PUBLIC SCHOOL, PETERBOROUGH, ONT.

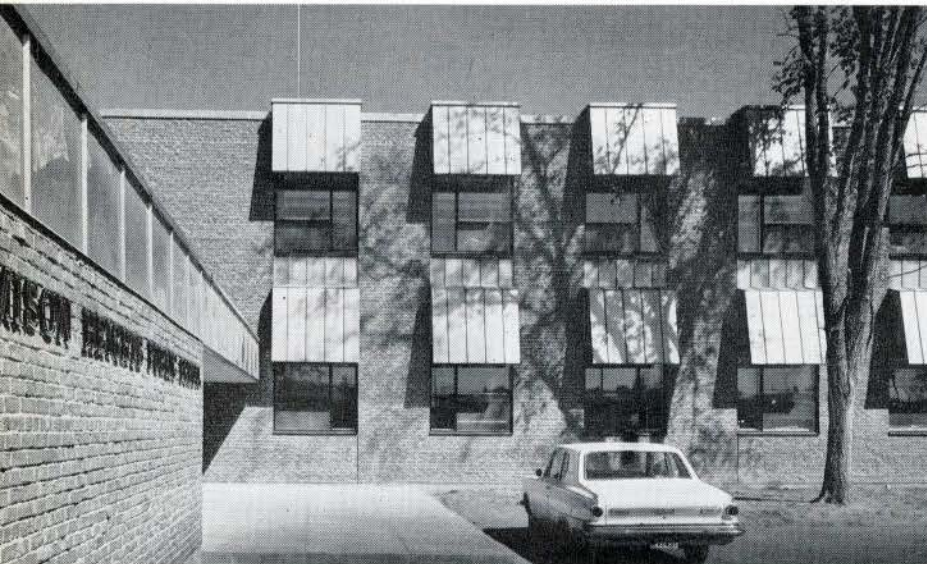
School boards are slow to accept advances in teaching techniques and until they do the architect is left to design another 'little red school house'. After the many visual errors that 'modern' architects have imposed upon the landscape it is being realized that the earlier times at least had a sense of proportion.

The architects here have achieved a sense of dignity and created a pleasant atmosphere where children can 'learn, play and grow'. As well they have paid attention to a few practical considerations, one being a minimum window area with effective sun control. There is almost no external maintenance and the materials used, brick and copper, provide a warmth and friendliness well suited to the function. (cost per sq. ft. \$13.30)

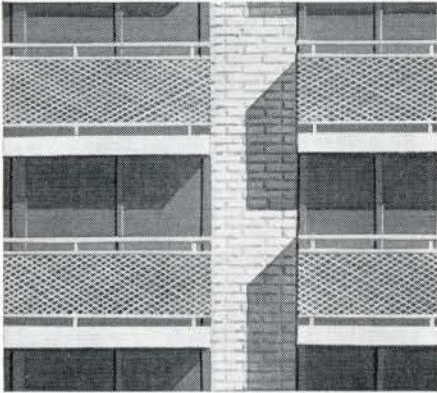
ARCHITECTS/CRAIG, ZEIDLER AND STRONG



Photos/Roy

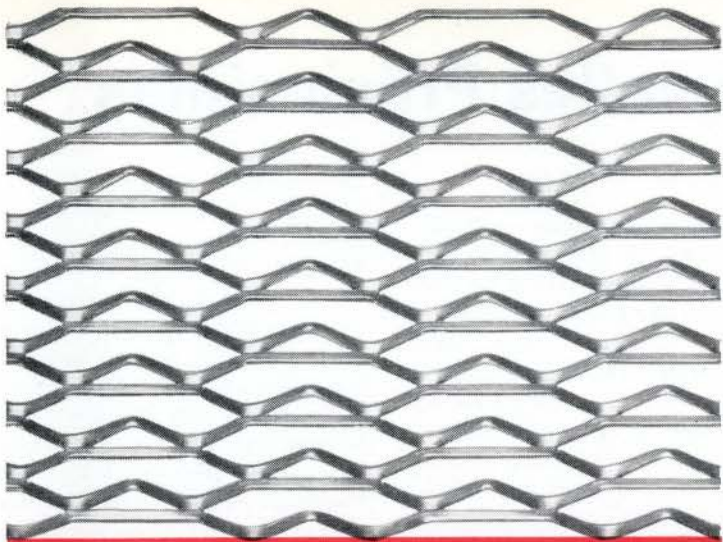


Balcony safety barriers
and modesty screening

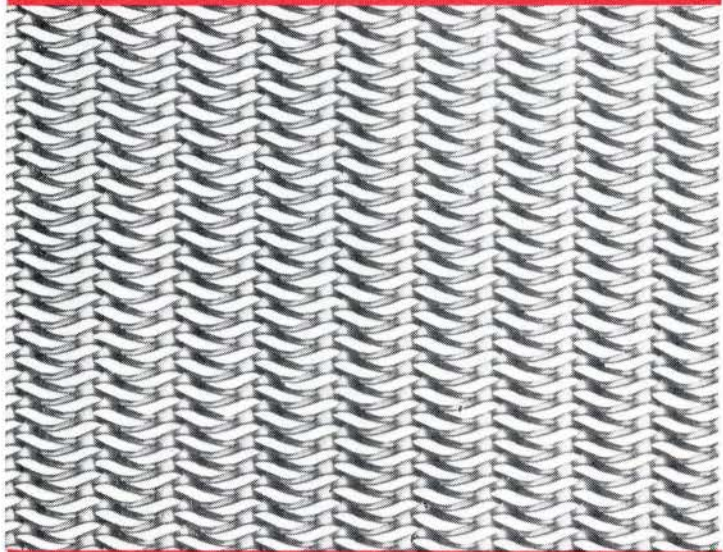


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Nouvelles Provinciales

PARUTION D'UNE PARTIE

The Committee of Inquiry on Architectural Training in Montreal and Quebec Schools of Architecture has been established by the Quebec Government under whose jurisdiction those schools are. The report, the conclusions and recommendations of which have already been published, deals with actual professional practice, architectural training in North America and with matters pertaining to architectural schools not affiliated with Universities. The Committee recommends that the two schools be maintained and integrated with Montreal and Laval Universities as autonomous faculties. The curriculum will be in two parts: a common two-year introductory course and a three-year specialised course leading to a bachelor degree in either architecture (both schools), town planning (Montreal) or environmental planning (Quebec). The proposed curricula include post-graduate study. A provisional committee has been established to carry out the recommendations of the report, which has been approved by the Government.

J.G.

Le Comité d'étude sur l'enseignement dans les écoles d'architecture de Montréal et de Québec a été créé par le Gouvernement du Québec.

Son enquête et son rapport dont seules les conclusions et les recommandations avaient été publiées à la mi-mai ont portés sur les écoles d'architecture relevant du Ministère de la Jeunesse, depuis Ministère de l'Éducation.

C'est à cause des délais d'impression que seules ces parties, d'ailleurs les plus importantes, ont été adressées au Lieutenant-Gouverneur en conseil le 31 mars dernier. Elles ont été approuvées depuis dans leur ensemble.

Devant l'ampleur des réformes que le rapport suggère, on peut se demander légitimement si elles pourront être complétées en moins de trois années académiques.

Le rapport intégral dégagera trois têtes de chapitre sur la notion contemporaine d'architecte et le rôle de la profession d'architecte, sur la formation de l'architecte dans les divers types d'écoles d'architecture en Amérique du Nord et enfin sur la question des écoles relevant du Gouvernement de Québec.

Les conclusions portent d'abord sur le nombre d'école d'architecture au Québec, compte tenu de l'existence de l'école de l'Université McGill, sur les effectifs optimums d'une école d'architecture, le statut des écoles, leurs structures administratives et leur budget. L'enseignement y fait suite, depuis les normes d'administration, la structure des cours, le corps enseignant l'équipement des institutions et la cléricature jusqu'au rôle de l'assistance professionnelle. Les recommandations touchent ces mêmes sujets.

LES DEUX ECOLES

"L'une des principales questions que le ministre de la Jeunesse avait soumises à l'attention du Comité portait sur le nombre des écoles d'architecture que la Province devait maintenir," note-t-on au début du rapport.

"Il paraissait logique de conserver celle de Montréal pour de multiples raisons: Montréal est le centre démographique et la plus vaste agglomération urbaine de la province; c'est là que se fait une grande partie de la construction industrielle, commerciale, institutionnelle et domiciliaire. En outre il s'y prépare et s'y exécute constamment des projets de démolition, de reconstruction, de rénovation et de réaménagement. C'est aussi le foyer le plus vivant de toute l'activité artistique de la province. C'est encore un milieu très cosmopolite où l'apport des cultures et des civilisations étrangères est très considérable. D'ailleurs l'architecture s'y est enseignée sans interruption depuis 1907."

"Par contre, de continuer les enquêtes, si nous ne pensons qu'à Montréal comme site de l'école d'architecture, nous contribuons à intensifier la concentration déjà exagérée d'activités importantes dans un seul milieu qui devient de plus en plus international. Au reste, la ville de Québec est plus près du milieu provincial et conserve plus intact son héritage historique et culturel. C'est certainement Québec qui, par suite de sa situation géographique, doit normalement se préoccuper du développement actuel et futur des vastes territoires de l'est de la province. L'École de Québec, même si elle a connu une existence assez précaire, semble plus consciente que celle de Montréal de la contribution qu'elle apporte à la vie culturelle et artistique de son milieu."

L'enquête a révélé "les nombreux avantages à ce que les Ecoles d'architecture de Montréal et de Québec continuent toutes les deux d'exister quitte à ce qu'elles soient transformées de façon à mieux répondre aux exigences d'une conception renouvelée de l'enseignement de l'architecture."

"Le premier motif de l'existence de deux écoles de langue française devant se fonder principalement sur les besoins du Canada français en architectes," note le rapport.

Certains de ces besoins relèvent de constatations de fait sur la pratique de l'architecture. Il existe une pénurie d'architectes. Des quelque trente membres admis chaque année dans l'Association des Architectes, la moitié était formée au Québec et à peine le quart à l'École de Montréal. Les divers secteurs de la construction, d'ailleurs en expansion, échappent en bonne partie (80%) aux architectes. Tel secteur nouveau, la rénovation urbaine, manque d'architectes. Les administrations publiques comme les particuliers que l'aisance favorise ont un besoin croissant d'architectes. Enfin les constructeurs auraient observé que les plans et devis que leur remettent les architectes seraient loin d'être complets; cette observation s'ajoute à l'impression d'une absence générale de qualité de l'architecture du Québec que le Comité d'étude formule et commente en expliquant que les architectes, trop peu nombreux pour se soucier de la concurrence, manquent d'application.

D'autres besoins touchent l'enseignement: le peu d'intérêt montré par les jeunes architectes à l'égard des études supérieures et de la recherche, la nécessité d'orienter les étudiants vers les enseignements connexes à l'architecture, la difficulté que les écoles éprouvent à recruter les professeurs de qualité dont elles ont besoin, le manque de disposition des écoles pour faire face à la pression démographique qui doublera les effectifs d'ici cinq ans, l'absence d'influence des écoles d'architecture relevant de l'Etat sur les francophones d'outre-frontière et des pays en voie de développement.

Tous ces facteurs militeraient en faveur de deux écoles. Le Comité d'étude évoque d'ailleurs l'augmentation rapide du nombre d'ingénieurs québécois au cours de la dernière décennie et l'explique entre autres par la présence de plusieurs écoles de génie au Québec.

Et de continuer le rapport, "un autre

argument en faveur de deux écoles s'appuie sur la différenciation et la spécialisation de l'enseignement. Le programme d'études que propose le Comité pourrait difficilement s'appliquer dans une seule des deux écoles actuelles. En effet le cours d'architecte en bâtiments se donnerait à Québec et à Montréal. Ce cours devrait être parallèle d'année en année dans chacune des deux écoles. A coté de cette formation traditionnelle, chacune des deux écoles aurait sa spécialité propre, selon les caractéristiques du milieu où elle existe et selon les moyens particuliers dont elle dispose. L'École de Montréal formerait des architectes qui pourraient se spécialiser en urbanisme, puisque l'Université de Montréal possède déjà un Institut d'urbanisme. L'École de Québec formerait également des architectes en bâtiments mais elle permettrait à ses élèves de se spécialiser en architecture aménagiste; il existe déjà à Québec des enseignements d'appoint.

Il y aurait entre les deux écoles non seulement échange d'étudiants mais aussi échange de professeurs, promesse de saine émulation dans un état dont on a souvent regretté le monolithisme intellectuel.

Ces moyens de spécialisation permettraient d'aborder des champs de recherche où peu de nos architectes se sont aventurés."

Il s'agit alors pour compléter cette justification de deux écoles que de démontrer que les effectifs de l'école idéale se rapprochent de ceux que dénombreront les écoles de Québec et de Montréal d'ici quelques années si elles répondent aux besoins du Canada français.

Cetter démonstration postule que le cours de composition architecturale demeure le fondement de l'enseignement de toute école d'architecture et que la forme que prend cet enseignement ne varie guère: "plus, il se rapproche du colloque, plus il semble profitable" remarque-t-on.

Le rapport définit ensuite le travail d'atelier non sans une flatteuse allusion à l'étincelle de génie qui peut guider le processus de composition architecturale. La justification de la composition d'un atelier idéal — trois professeurs, 36 élèves — n'est pas sans charme pour qui connaît un tant soit peu la faune de nos écoles. Si l'autorité d'un seul professeur serait coercitive, les opinions de deux sèmeraient la confusion alors que les

décisions d'un troisième rétabliraient l'équilibre en donnant raison à la majorité.

Les cinq classes de trente-six élèves totalisent cent quatre-vingts étudiants, nombre voisin de la moyenne des écoles canadiennes.

L'INTEGRATION DES ECOLES D'ARCHITECTURE AUX UNIVERSITES

De l'avis de l'ensemble des personnes consultées, les avantages d'un rapprochement des écoles seraient à la fois d'ordre administratif et d'ordre pédagogique. Aux directeurs déléguant au comité des études et au conseil de l'université seraient épargnées les carences et les lenteurs du fonctionariat. Les moyens d'assurer la qualité des programmes d'étude, le choix et le traitement des professeurs, la justice des normes d'admission, l'équipement et les services des universités, leurs bibliothèques et leurs laboratoires, les programmes de conférences, les écoles et les facultés dont le corps professoral serait disponible pour certaines parties du cours, le climat

(continued on page 25)



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(continued from page 23)

favorable à la poursuite de la recherche, l'émulation créatrice, la diversité du milieu stimulant à la fois professeurs et élèves, tous ces arguments en faveur de l'intégration ont été portés à la connaissance du comité d'étude.

Des divers statuts possibles, seule l'intégration à titre de faculté est examinée à fond. A ce titre, il serait décevant qu'elle soit à rejeter. De l'hypothèse d'une corporation autonome, à l'instar de l'École polytechnique, pessimistes ou défaitistes, les enquêteurs notent: "pour des raisons évidentes d'attribution de pouvoirs, de jeu d'influences, d'exercice d'autorité, il a paru au Comité que cette formule était difficile d'application. Ce qui au fond n'infirme pas la validité du principe de l'autre option. A partir d'une définition d'une école que relèverait habituellement d'une faculté qui, à son tour, repondrait au conseil ou à la direction universitaire par l'entremise de son doyen, le comité d'étude prenant justement parti pour un statut qui garantisse l'autonomie prone celui de faculté. Et de conclure le rapport: "dans ces circonstances, nos écoles d'architecture devraient être intégrées immédiatement à nos universités

Laval et de Montréal à titre de facultés autonomes et elles devraient s'installer le plus tôt possible sur nos campus universitaires." Dans ce cas, les structures administratives des nouvelles facultés sont prévues par les règlements et les statuts des universités Laval et de Montréal.

L'ENSEIGNEMENT

Le rapport fait d'abord état de la préparation des candidats et constate qu'il n'y a plus de raison de refuser les élèves du secteur secondaire public, quitte à imposer prudemment une année préparatoire. Notant ensuite "qu'il n'existe jusqu'à présent aucune épreuve permettant de mesurer avec un certain degré d'exactitude les qualités d'esprit, de sensibilité et d'imagination qui distinguent un architecte des autres hommes de profession", le comité d'étude recommande l'abolition des examens d'admission pour les titulaires d'un baccalauréat. Ces candidats seraient admis en première, le cours comprendrait deux cycles, outre l'année préparatoire destinée à étudier les dons scientifiques et les aptitudes créatrices des candidats.

Le premier cycle comprendrait les études de base communes d'une durée de deux

ans; le second cycle comprendrait les cours de spécialisation d'une durée de trois ans en architecture et en architecture aménagiste et de deux ans en urbanisme. Dans chacune des options, une année supplémentaire conduirait à une maîtrise. Tout élève d'une des trois sections qui, en cours d'étude, accorderait une année à l'une des autres options, pourrait présenter un projet de diplôme conduisant à un double baccalauréat.

Il est regrettable que, pour ne pas surcharger le texte des conclusions et des recommandations du rapport, on ait laissé le programme d'étude en appendice. L'examen "soigné de l'annuaire de nombreuses écoles, tant au Canada qu'à l'étranger" a sans doute permis de dégager et de composer pour les seules écoles françaises d'Amérique un programme reflétant ce florilège d'écoles anglo-saxonnes. Cependant les termes brefs dans lesquels ce programme est annoncé ne laissent pas de suggérer une unité d'intention nouvelle susceptible de commender une étude attentive.

D'abord le déroulement continu d'une matière sans morcellement, ensuite la

(continued on page 28)



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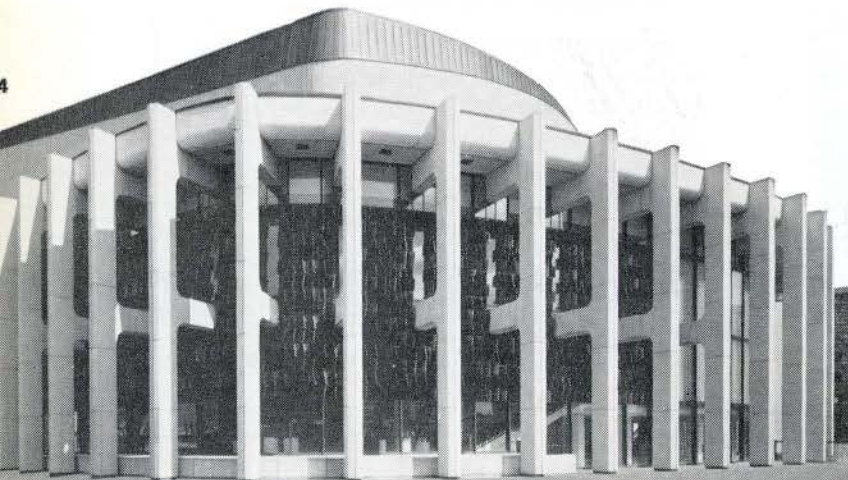


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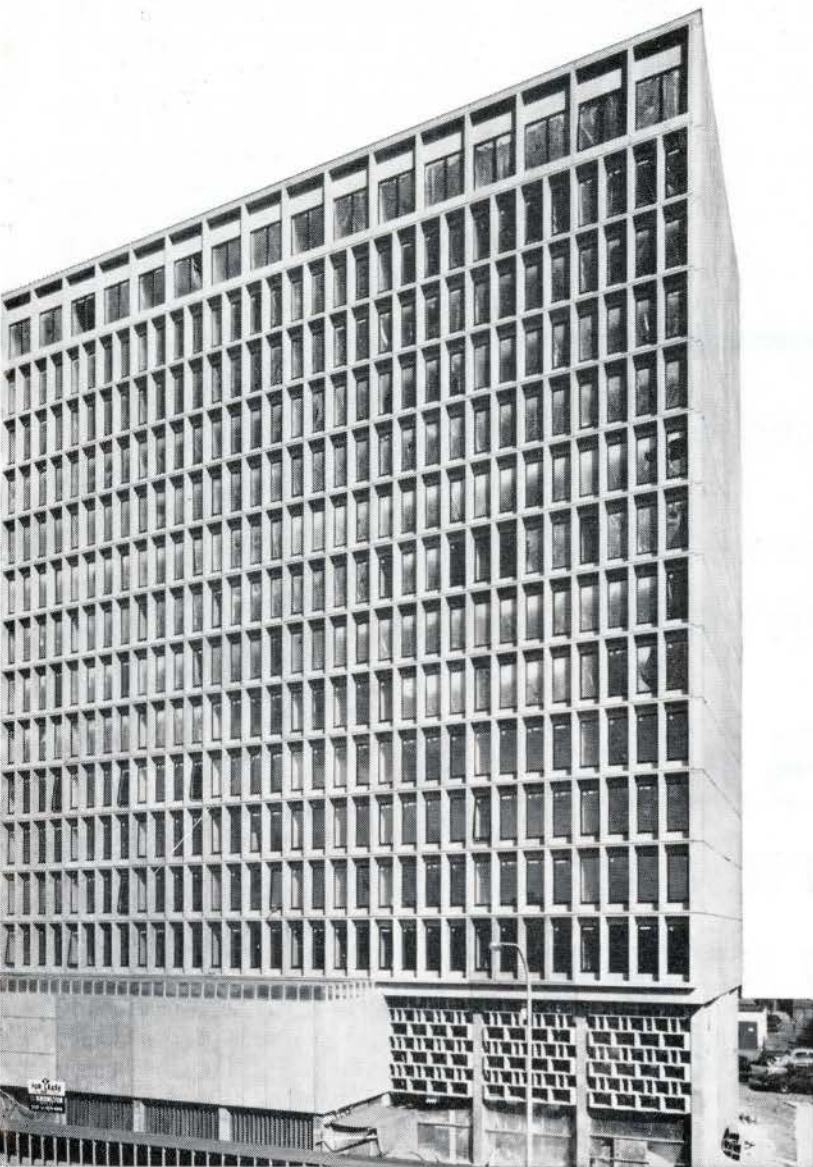
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6. Manitoba Telephone System Building. Architects & Engineers: Smith, Carter, Searle, Associates, Architect of the Manitoba Telephone Co.: R. Brian Ross. General Contractor: Pearson Construction Co. Ltd. Precast concrete panels supplied by: Supercrete Limited.
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(continued from page 25)

vision globale de chacune des cinq sections—composition architecturale, structure, équipement mécanique, histoire des arts, sciences sociales et administration. Chaque section fait l'objet d'un cours d'introduction complet avant, la spécialisation des matières. Tout éducateur reconnaîtra la difficulté de mettre un tel programme en pratique. Aussi ne sera-t-il pas surpris de lire plus loin: "La réalisation courageuse et soutenue de ce programme dépend en grande partie de la

qualité des professeurs choisis." Soumis à ce programme précis, le corps enseignant ne semble pourtant appelé qu'à un rôle d'exécutant. La vaste culture que laisse supposer la continuité dans l'enseignement des matières, la vision globale de la corrélation de tous les éléments du programme et l'acceptation tranquille d'un rôle d'exécutant peuvent paraître plus difficile à concilier que d'autres aspects sur lesquels le Comité d'étude s'est penché.

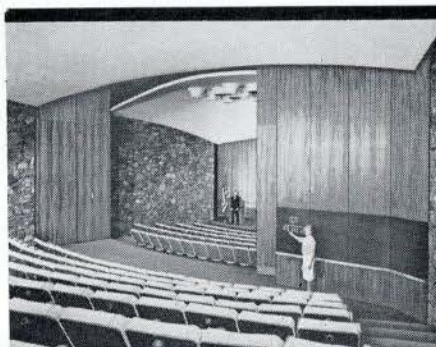
L'importance d'une bibliothèque con-

stamment mise à jour, les possibilités d'éveil que présentent les critiques visiteurs sont ensuite évoquées. Diverses observations touchent les architectes; elles portent sur les stages des étudiants dans les agences—ces stages devraient leur être adaptés, sur la cléricature qui devrait être portée à trois ans pour les titulaires d'un baccalauréat et demeurer à deux ans pour les titulaires d'une maîtrise, sur les méthodes d'examen pour l'admission des candidates à la pratique de l'architecture. Le Comité d'étude estime que "l'Association des Architectes devrait remettre cette question à l'étude et s'assurer que cet examen réponde à la fin pour laquelle il a été créé et qu'il soit juste pour tous les candidats d'où qu'ils viennent".

Le rapport se termine avec la description d'un milieu physique qui correspond davantage aux exigences de la formation des architectes.

Des recommandations formulées par le Comité d'étude se dégagent plusieurs points qui touchent l'Association des architectes et l'influence qu'elle-même et ses membres peuvent exercer auprès des écoles d'architecture. Il serait intéressant d'y revenir en faisant état des réactions du Comité d'admission et bourses de l'Association qui se sera réuni le 28 mai. La veille aura eu lieu à Québec la première réunion du Comité provisoire créé à l'instigation du Comité d'étude avec mandat de 1) donner suite aux recommandations au Comité d'étude qui auront été accepté par le Gouvernement; 2) s'assurer du transfert aux universités conformément à la décision du Gouvernement des sommes prévues au budget du Ministère de la Jeunesse pour l'année 1964-65 en faveur des Ecoles d'architecture; 3) voir à ce que les élèves actuels ne souffrent aucun préjudice par suite du changement recommandé; 4) examiner les candidatures pour les postes de directeurs et de professeurs et transmettre les recommandations aux Universités.

Ce dernier comité est formé de M. Jean-Marie Martin, directeur de l'enseignement supérieur au Ministère de l'éducation, représentant le Gouvernement, de M. Léopold Lamontagne, doyen de la Faculté des lettres de l'université Laval et de M. Lucien Piché, vice-recteur de l'Université de Montréal, représentant leur université, de M. Jean-Paul Carlhian, représentant le Comité d'étude et de M. Gilles Marchand, président de l'AAPQ, représentant le corps professionnel.



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Style Leader 125 — Se prête partout où l'élégance est un facteur important et la résistance une nécessité. L'illustration représente une installation en Noir Permanodic No 29.



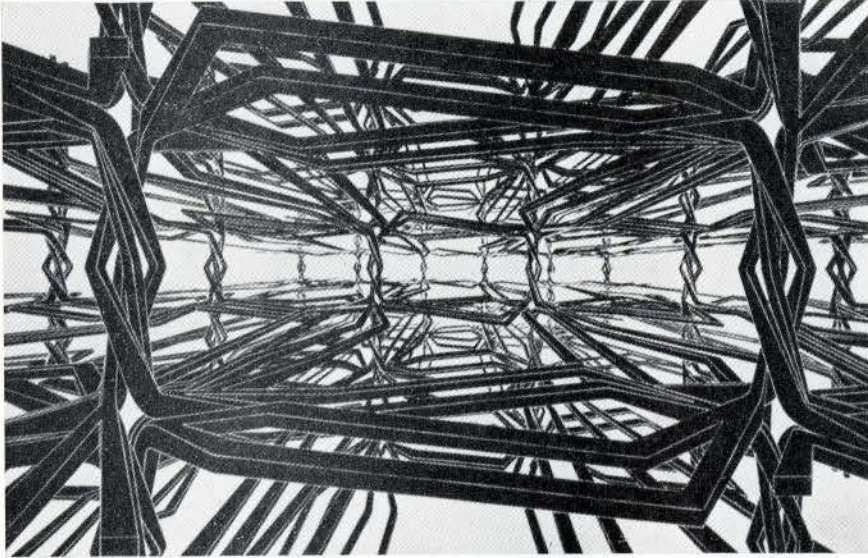
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Book Reviews



Konrad Wachsmann Structural study, 1954-55, from *The Architecture of Fantasy*.

THE ARCHITECTURE OF FANTASY by Ulrich Conrads and Hans G. Sperlich. 188 pages. Burns & MacEachern Ltd., Toronto, 1962. \$19.50.

In setting forth my evaluation of this book "The Architecture of Fantasy", I wondered what it was that readers of book reviews looked for in such writings. This, of course, assumes a fact not in evidence that there are people who read book reviews. Nevertheless, if we grant that there are such readers, what would they appreciate most in a review. The more one ponders this question, the more one is led to the conclusion that an opinion concerning "a distinctive Canadian flag" would be more readily forthcoming and would perhaps, be equally unimportant.

And so I am led by my own rationalization to the belief that in reviewing "The Architecture of Fantasy" I should please myself what I write. Which I shall proceed to do.

"The Architecture of Fantasy" as its fly-leaf reads—"in one volume is a selection of the unusual and the visionary in twentieth-century architecture—imagery out of which architectural fantasy is spun" and certainly the book fulfills this purpose. It is divided into four sections. The first attempts to set forth the categories and classifications of the fantasies presented. Since fantasies have about them an elusive and dream-like quality, it is not too clear what all these categories are. However, several classes of fantasy are discussed and upon the

framework of these criteria, the illustrations of section two are hung.

These illustrations for the most part are excellent both photographically and in the context in which they are used. There are a number of sketches and drawings interspersed with the photographs since the architecture of fantasy described consists of both imaginative schemes for real projects and projected schemes for imaginary ones, or—to state it another way, some of the fantasies were built and some were not.

Section three consists of what is termed "Documents"; the writings of architects chiefly living in Germany in the first part of the century. The authors, especially the translators and writers of the expanded American edition, Catherine and George R. Collins, have done a very fine job of presenting whole passages rather than excerpts. Many of the writers represented have certainly not been widely read previously even, I would suspect, in their native Germany. Such people as Paul Scheerbart, Adolf Behne, and, though we had heard the name perhaps, we had not read much of Bruno Taut.

Section four is the Notes on the Texts and Illustrations and rather than merely giving footnote references, we find in this section profuse explanatory passages amplifying the other three sections almost to the point of gross overstatement of the case. By the time I had struggled with the first three sections I was very selective with my reading of the notes which is not necessarily a bad thing.

The book is an interesting study of a

fascinating subject. Technically it leaves little to be desired; well bound, attractively set out as far as arrangement of type faces, illustrations, references, notes and so forth.

It has however, some minor deficiencies. The division into four sections is not a very imaginative one, especially when one considers the whole subject of fantasy. This is also highlighted by the use of a different paper stock for sections 3 and 4 than for the remainder of the book. Also in spite of the wide range of categories given for the discussion of fantasies in architecture, and the fact that the authors did not restrict their material to projects that had been built, it still seems to be only a very brief glimpse of a fascinating subject.

One wonders about many other buildings and projects that one feels belong in a book like this. But this only points up what is really so obvious in any discussion of "fantasy" (which is almost synonymous with "fancy"); that we are dealing with a very personal, a very subjective thing. It is the ultimate in individual expression and as the authors state, it is the architecture of what has been vaguely termed "expressionism" that is being explored in this volume. Nevertheless this is a fine book and will, I know, give much pleasure and enlightenment to those interested in an area of architecture that is frequently neglected but is, by its very nature, most imaginative and most inspiring.

Ronald Whiteley

Ronald Whiteley is a professor at the School of Architecture, University of Toronto.

NEW BOOKS

Images of American Living by Alan Cowans, 1964. 488 pages. McClelland & Stewart Ltd., \$20.

Earthquakes in Canada/Effect on Buildings by Robert E. David, Reg. Eng. Canadian Institute of Steel Construction, 1964.

American Architecture and Other Writings by Montgomery Shugler, 1964. Harvard University Press. \$2.95.

God's Own Junkyard by Peter Blake, 1964. 144 pages. Holt, Reinhart & Winston of Canada, \$5.20.

The Historians and the City of Handlin & Burchard, 1963. 299 pages. MIT, Harvard. \$8.25.

Thermal Design of Buildings by Tyler Stewart Rogers, 1964. Wiley & Sons, NY. 196 pages. \$10.

Letters

ARCHITECTURAL STANDARDS
Editor RAIC *Journal*

At the panel discussions you so kindly arrange where architects and manufacturers can meet on a common ground, there is considerable discussion on the desirability of "Standards" and the use of these standards in specifications.

One area where we see a genuine need for standards is in that of "Sound Tests". Manufacturers from across the line are advertising decibel ratings which we believe are unattainable in Canada. Yet Canadian architects, recognizing the standing of these companies, readily accept these ratings which must be arrived at on different standards to those set up by Dr T. D. Northwood, Division of Building Research, National Research Council, Ottawa.

Dr Northwood, I understand, is recognized on this continent by the experts in this field as an expert in Sound Transmission. The *Journal* published one of his papers in March this year. Dr Northwood believes that the recently developed

"Sound Transmission Class" which appears in the revised standard ASTM E90-61T is superior to the system using the average sound transmission losses measured on nine frequencies. The STC tests emphasize the mid-frequency range of sound which is characteristic of speech and typical sounds. In using this rating a partition would be described as having a Sound Transmission Class of, for example, 40 instead of an average decibel rating based on 9 frequencies.

This system is well described in the National Research Council's Building Digest No. CBD 51 entitled "Sound Insulation in Office Buildings" by Dr Northwood. Another paper (Research Paper 160) published by the Division of Building Research, National Research Council, by Dr Northwood, is of considerable interest on the subject. Copies of these publications are available from the Publications Section of the Division of Building Research.

As mentioned to you in one of our discussions, it may well be that Canadian architects are being led "down the garden path" through accepting across-the-line tests in comparison with National

Research Council tests. Therefore, we are of the strong conviction that the National Research Council should be the *only* recognized authority for Standards on sound tests. This is the only way in which Canadian manufacturers can be placed on an equality basis with United States manufacturers. This is the only way in which architects can be assured that they are getting what they require in relation to sound.

Is there anything further that we can do to put this proposal to the Institute's Committee on Standards? May we suggest some member of the Committee discuss the matter personally with Dr Northwood.

John Russell, Advertising Manager,
Westeel Products, Toronto.

A GOOD MASTER PLAN

Reprinted from the Calgary North Hill News, May 14.

Sir:

I am not an architect but I happened to read an article in *The Journal of the Royal Architectural Institute of Canada* concerning Calgary. It was written by

(continued on page 94)

don't bury waterproofing costs!

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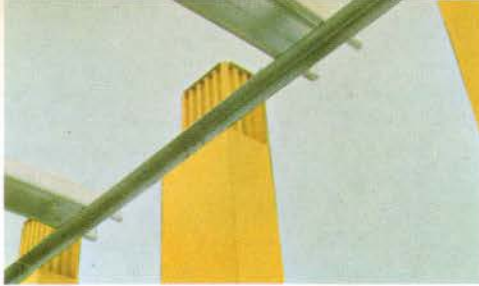
The effectiveness of your waterproofing is therefore far less reliant upon manual labour.

Furthermore, PM costs less than **technically comparable** hand-labour installations — 14¢ to 20¢ per square foot for PM installed as compared to up to 40¢ per square foot the other way. Also, we know you may be quoted a waterproofing (?) job for around 10¢ a square foot. Only your client will know if this is adequate. If it is not, he may be faced with half-a-century of damp walls and peeling paint. We have the facts and figures to prove our cost analysis and we invite your enquiries.

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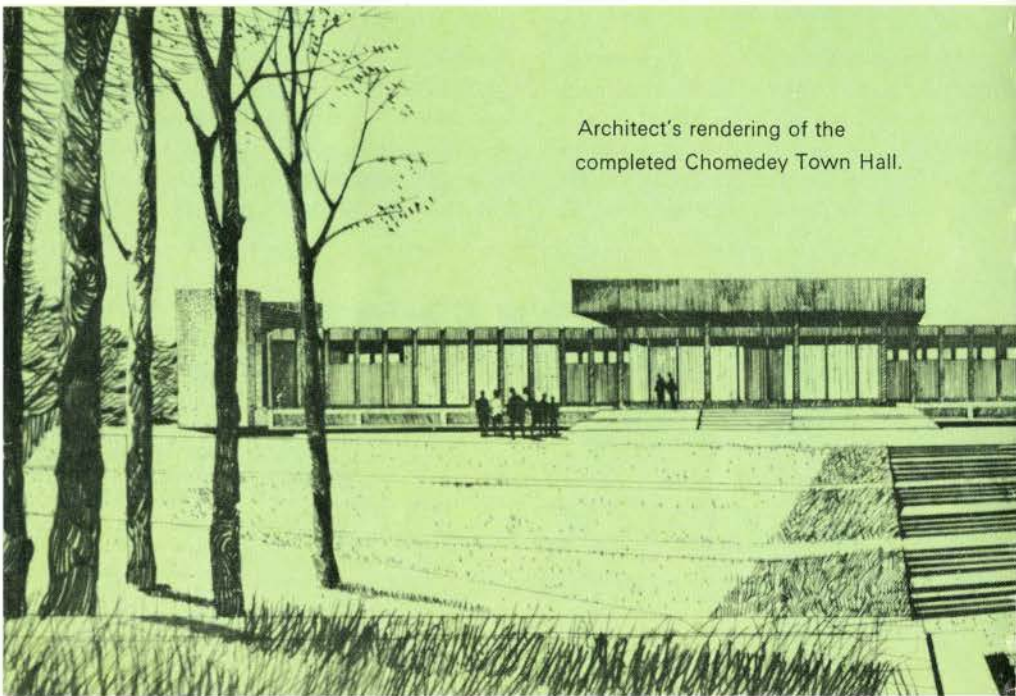
(Above) Each pair of columns with transverse members enclose a window frame.



(Above) Each column consists of a core of corrugated sheet steel, with inner and outer steel skins.



(Above) Handling of the panels was fast and easy, in any weather.



Architect's rendering of the completed Chomedey Town Hall.

(Left) Columns are set upright and bolted to the foundations.

(Below) Pre-formed sheet steel roof deck adds to the speed and economy of erection.



(Below) The "sculptured" effect in steel, supersedes the "flat faced" look.

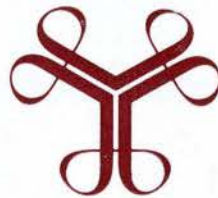


The last decade has seen a definite break with the convention that large-scale shopping facilities — particularly department stores — can only be found down-town. Comprehensive shopping plazas are being built in the suburban areas of most Canadian cities providing all the amenities of their down-town counterpart with the added facility of almost unlimited free parking. The Journal asked Michael Hugo-Brunt, architect and town planner to prepare a study of shopping centre design. The recently completed Yorkdale Shopping Centre is examined, with contributions by Howard Lesser, planning consultant and Allison Hymas, interior designer.

Mr. Hugo-Brunt of the Division of Town and Regional Planning, School of Architecture, University of Toronto is chairman, Central Ontario Chapter, TPIC. Scarborough College, of which he was a member of the design team, will appear in the July Journal.

Miss Hymas received her bachelor of interior design degree from the University of Manitoba in 1954. She is with the firm of Webb, Zerafa and Menkes, architects, and was responsible for such recent projects as the Waterloo Trust Building in Kitchener and the Telegram Building in Toronto.

Yorkdale Shopping Centre



Toronto

owners/Trizec Corporation Ltd

developers/Webb & Knapp (Canada) Limited

design and structural engineering/John Graham Consultants Ltd

electrical and mechanical engineering/Ellard-Willson Associates Ltd

market analyses/Larry Smith & Co

traffic engineering/Barton-Aschman Associates Inc

site engineering/Marshall Macklin Monaghan Ltd

landscaping/J. Austin Floyd, with design and development by E. K. Johnson

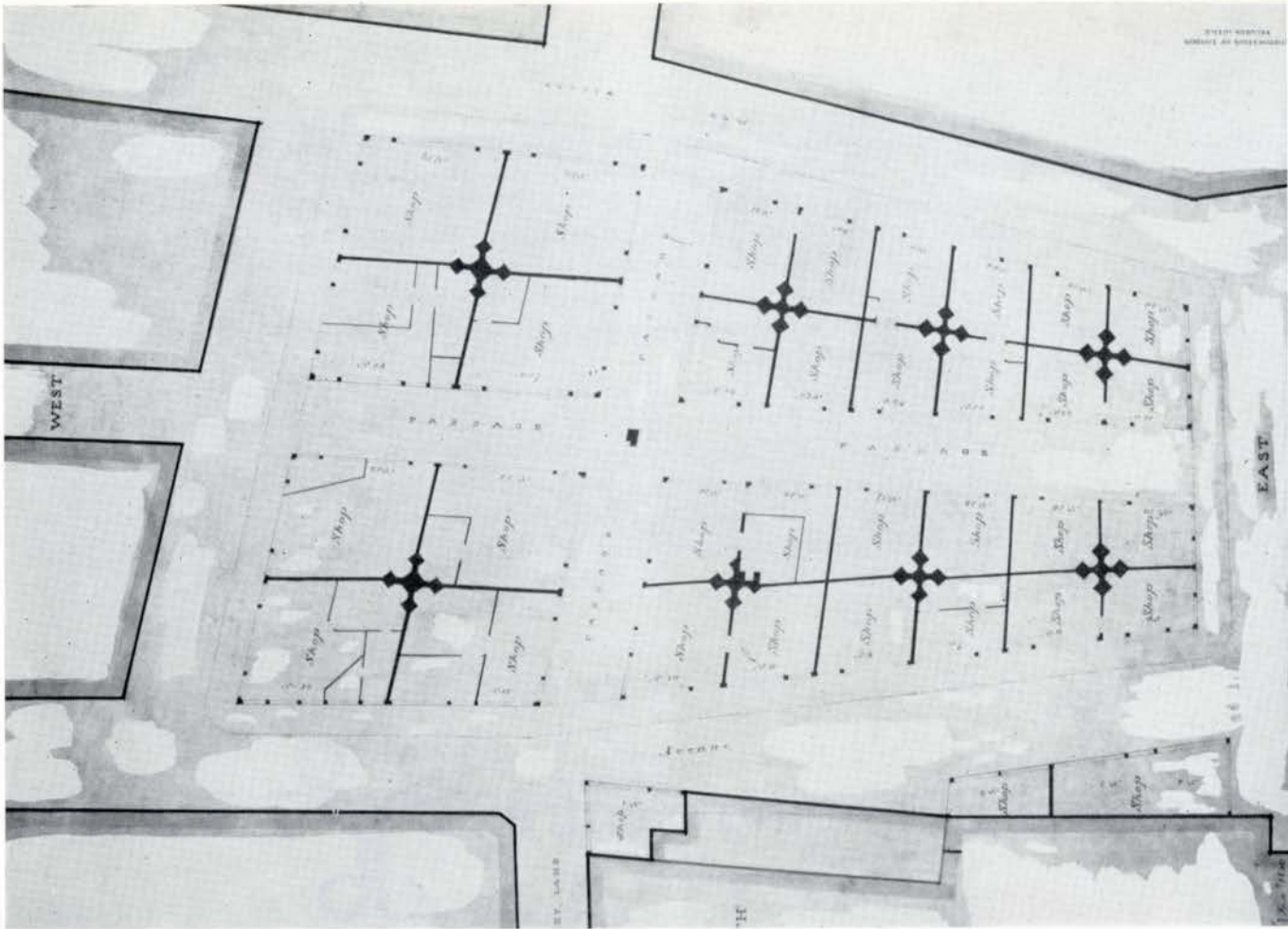
contractor/Taylor Woodrow (Canada) Ltd

Simpson's

architectural, structural, mechanical and electrical/John B. Parkin Associates

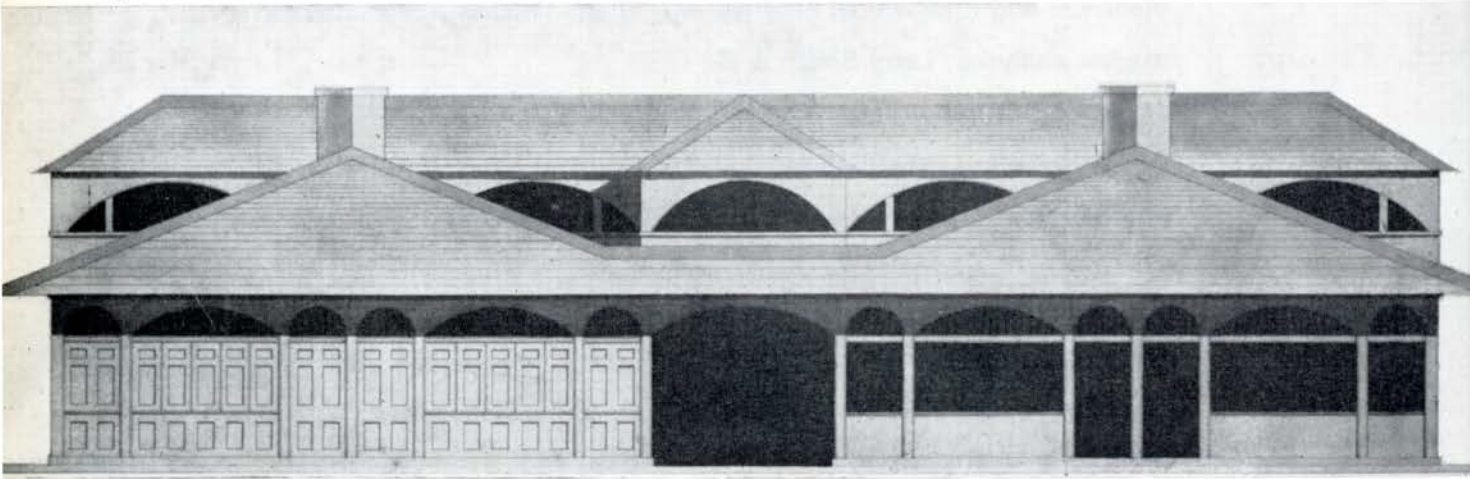
consultants and interior designers/Victor Gruen Associates

contractor/E.G.M.Cape & Company (1956) Ltd



1

2



Shopping is characteristic of city living, so much so that from classical times it has been inherent to the effective functioning of Western society. The Greeks and Romans had open-fronted shops aligning major streets whose craft activities and simple advertisements lured customers inside. The earliest shopping centres were, however, stoas, which survived as late as the 8th century in Byzantium. The open oriental market and the covered passage-way between stores tempted the customer with a comprehensive display of all merchandise.

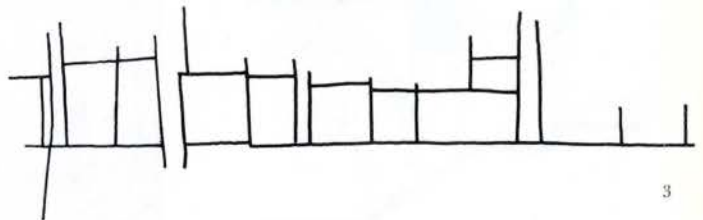
The market also survived the monopoly of the mediaeval guild, but the open-fronted shop once again became the primary outlet for manufactured and assembled goods. The status and wealth of the European proprietor was expressed by the beauty of his building, while his speciality was advertised by the hanging sign. The inn evolved as the ancestor of the restaurant, and the warehouse became a centre for wholesale commerce. The introduction of accountancy and bookkeeping in Venice and the Low Countries between the 16th and 18th centuries was accompanied by the specialized construction of commercial and company buildings. Nevertheless, commerce remained domestic in scale so that residences and shops were indistinguishable save for glass display windows overlooking the street.

The 19th century witnessed the intensive development of town centres, the lineal shopping street and the corner shop in residential areas. Expansion was associated with a shortage of space, greater commercial specialization, as well as the separation of the wholesale and retail functions. A greater variety of goods resulted from the development of the clipper ships and their successors, the steam packets, and stimulated new shops which occasionally were six stories high. Frame buildings in the form of shopping blocks succeeded them.

The railway, the street-car, and the automobile encouraged commerce to move into residential areas. The shopping plaza is a phenomenon which occurred after World War II. It was a response to space shortage, high land cost, suburban living and the extensive use of the car. Municipalities, seeking additional assessments, have encouraged their development and have waived restrictions as an incentive. Shopping centres were investigated as early as 1942, although the first Toronto example, Sunnybrook, did not appear until 1951. Others soon followed.

Yorkdale Shopping Centre a Study

by Michael Hugo-Brunt

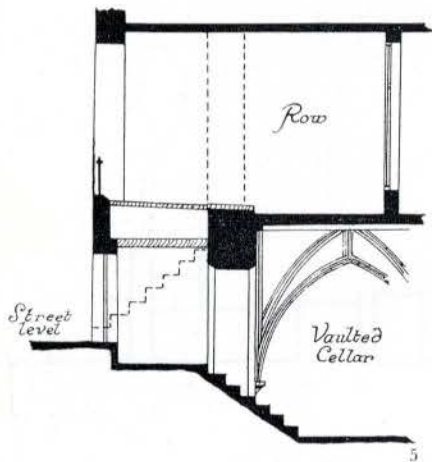


1,2 Honey Lane Market, 1787. Architect/George Dance the Younger. This market was developed by the City of London and leased out to individual merchants on annual or 61 year leases. The plan was made by the city surveyor. Buildings were of timber to reduce costs—no ornamentation—two stalls created clerestory lighting—wagons parked on periphery or market—primarily pedestrian.

3 Verulamium (St. Albans). Typical Roman shopping streets. This type of development was found throughout Britain. These streets were excavated in 1957-58 on the south median frontage of Watling street. There were three periods of commercial structures. The wooden shops uncovered date from circa A.D. 155-160. These general usage shops had a nine foot colonnade along the open frontage.



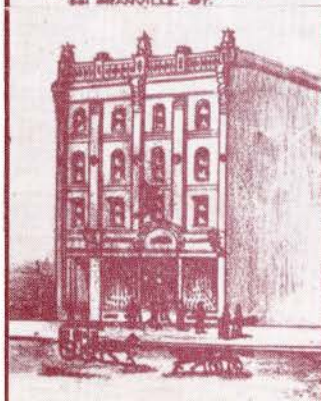
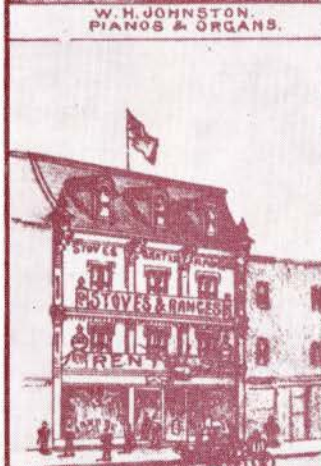
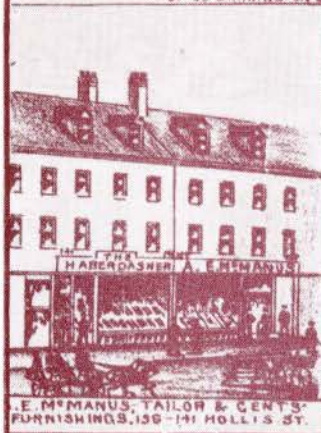
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5

4, 5 *The Rows, Chester.* A two tiered shopping core forming the commercial centre of the town. The existing shops combine a form commenced in the 13th Century which underwent extensive renovation in the 17th-18th centuries. The Rows removed pedestrians to a higher level off an intensively used street and provided protection in winter. The section indicates the upper colonnade and the lower tiers of shops in relations to the street level.

6 *Halifax, 1860-1880.* Typical examples of specialized covered structures in Halifax toward the end of the 19th Century. Solid load-bearing brick work. Traces of stylistic medieval but adapted Georgian plan form — shop windows appear — parapet walls and mansard roofs — purely commercial in use — no residential and faced pedestrian street.



7 *Sunnybrook Plaza, 1951.* First example of a shopping plaza in Toronto. Since this photo was taken Eglinton widened at the intersection cutting away $\frac{1}{3}$ of the parking lot. Photo/Panda.

8,9 *Polo Park, Winnipeg, 1959.* First major sub-centre in Winnipeg. The mall is eventually to be roofed over (part of this has been completed as illustrated in sketch, top foreground). Photos/Kalen Architects & Engineers/Green Blankstein Russell Associates.

10 *Cumbernauld.* A major centre with roads and car parks below the pedestrian decks. The upper floors are laid out in squares and promenades, some covered and enclosed, others open, to fulfill a variety of shopping needs. Decks are linked by stairs and ramps for ease of communication throughout the complex.

11 *Yorkdale shopping centre from the north showing the community beyond and the parking facilities around.* Photo/Martin.

THE SHOPPING PLAZA

Today all businesses undertake market research, using statistical sciences, computers and other contemporary planning techniques. Their specialists analyse those who use shopping centres as customers, merchants or personnel, and plan for private, service, and public transportation and their segregation. The indolent character of the public is titillated by a continual panorama, and functions are carefully analysed to eliminate interference. Blatant advertisements, encouraging refrigerator and dry storage techniques, incite the weekly shopping expedition *en famille*. Banks and professional offices are introduced to encourage such patronization and an intimate social atmosphere is deliberately created by the various specialists to enhance shopping enjoyment.

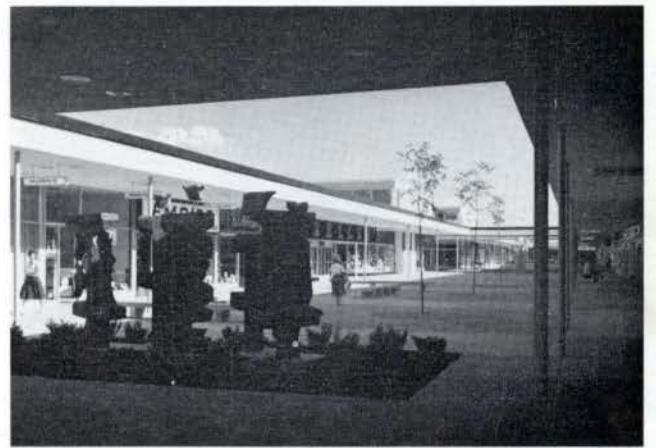
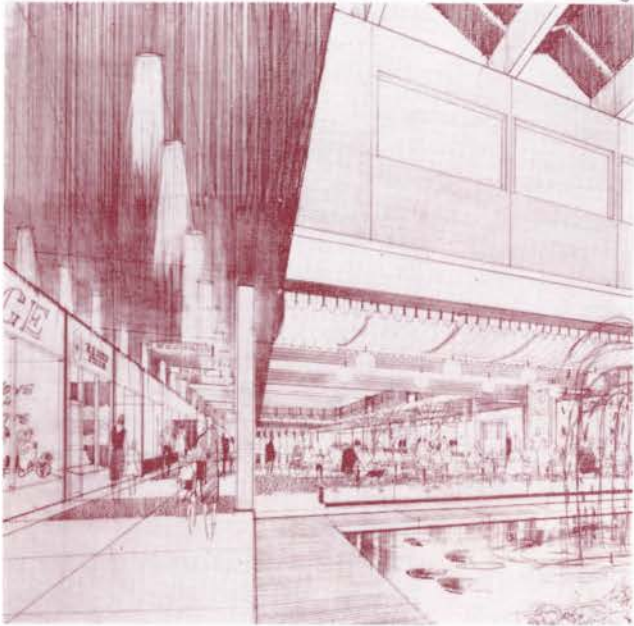
Behavioural studies ease circulation, both horizontal and vertical, so that piazzas, elevators, escalators and climate control are typical. Artificial lighting, ventilation, textures, colors and tones enhance function. Everything is done to stimulate sales and reduce first costs, overhead and maintenance.

Plazas can be classified as controlled or uncontrolled. Yorkdale is an example of the former, in which a developer has selected the tenants, decided the extent of the competition and determined upon the nature of its promotion. As a sub-centre it is larger than the usual regional centre and attracts business from the central area.

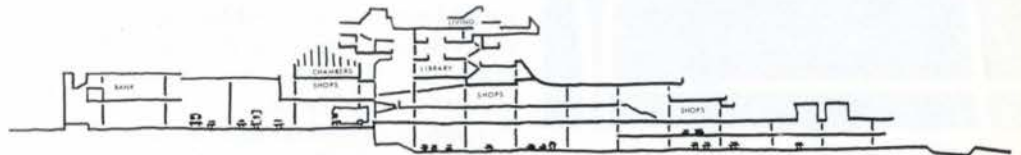


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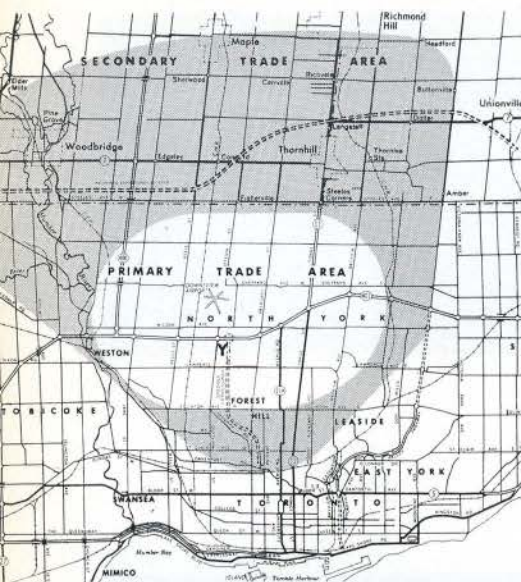
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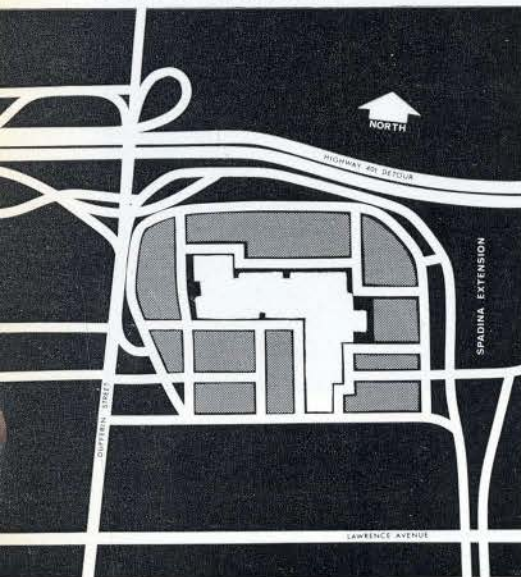
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11





TRADE ZONE PLAN



SITE PLAN

THE MONOTONY OF THE PRESENT CENTRES

Despite advances, many centres are monotonous. This may be deliberately done in an attempt to lower operating costs and induce the customer inside. Developers invariably choose land to eliminate changes in grade. Barren tracts of parking, associated with unimaginative landscaping, accentuate a sense of isolation. Landscaping is pinned to its essentials and may not distract the customer. The standardized store facade imprints a deliberate mental image, *e.g.*, the supermarket. Advertising, often vulgar, is the prerogative of free enterprise.

Designer's efforts also are nullified by a lack of three dimensional control as well as by-laws designed to permit minimum standards. Nor do architects usually have design control inside stores because many business firms use their own specialists for this purpose. Materials are standardized for economy and landscaping is reduced — deflowered — to the requirements of impulse buying. Developers primarily are concerned with financial returns, not with aesthetics. Most centres are characterized, therefore, by conservatism, an unwillingness to experiment, poor design and monotony.

THE DEVELOPER'S OBJECTIVES

As competition is fierce and profits small, maintenance costs are reduced to a minimum. Cheap land being essential, peripheral location is preferred but the final choice is also related to densities and future growth. Sites are normally acquired years before use.

As construction costs are high, developers usually combine and may provide only a small proportion of the required capital, the remainder being obtained from other sources. The participating firms prefer a monopoly, although competition appears to encourage the turnover, *e.g.*, supermarket locations in Toronto. Rents are based upon anticipated profits; small stores, therefore, pay a proportionately higher percentage of their income. Human weakness is exploited to encourage impulse buying (some wives won't let their husbands loose alone in a supermarket) and determine circulation plans. Although most centres offer a wide range of products, choice is limited to only 35% to 45% of those available on the market and those the usual brand names. Nevertheless, storage facilities, occupying 30% to 50% of the total floor area, are required in each shop to meet volume requirements. Fittings are also designed to

provide maximum storage and lowest maintenance. The materials used are subdued and do not compete with display. Pilfering is controlled through supervised exits and entrances, by a lineal arrangement of fittings as well as the provision of mirrors and now, closed circuit television.

GENERAL BACKGROUND OF YORKDALE

In 1953 the T. Eaton Company commissioned Larry Smith and Company to do a marketing study. This resulted in the purchase of a 99-acre site in 1955. In 1958 the Simpson Company became associated with the project. By 1957 zoning negotiations being completed, architectural, traffic, and other studies were undertaken. In 1960 Webb and Knapp purchased the site and commenced operations. They later formed the Trizec Corporation, who now operate it.

During the site preparation, over 5,000,000 cubic yards of earth were removed. Yorkdale encloses 1,277,041 sq ft, of which Eaton's has 366,000 sq ft and Simpson's 285,000 sq ft. In 1962 the Dominion Stores supermarket, a "bazaar" area and the dual auditorium theatre were incorporated in the complex.

PHYSICAL PLANNING

The developers negotiated zoning modifications with the authorities, having chosen the site after an extensive market analysis, which indicated a potential market of 796,000 customers from a primary and secondary trade area. By 1966, it was estimated that local expenditure might well be over \$50,000,000.

The site adjoins Highway 401 and the Spadina Expressway, under construction, on the east. Dufferin Street defines the western boundary. The 6,500 parking spaces have vehicular access from all directions. The heaviest flows come east from 401 via the Dufferin clover leaf, so that the present traffic concentrations are in the south-west parking area. 401 traffic from the west enters the northern parking area. Recently there has been a degree of confusion resulting in the south-western car park being filled to capacity so that the rear has been the primary entrance, while the west, north, and eastern parking lots are less intensively used. This situation will rectify itself, however, after the Spadina Expressway and other highway improvements are completed in about two years.

MERCHANDISING PLANNING

The Yorkdale Merchants' Association describe their purpose as advancing "the

common, civic and commercial interests of the tenants of Yorkdale; to integrate the shopping centre as a part of the community in which it is situated, and to encourage and promote the good will of the residents in such community and of all levels of government having authority within it, and to develop the shopping centre as a focal point of cultural and economic activities."

The centre was conceived, therefore, as self-sufficient, with stores, restaurants, theatres, offices and service areas which could serve up-town Metropolitan Toronto. Thus, selected merchants would constitute a retail force able to meet any competition and still make reasonable profits. This was not easy, as only 85% of the space was leased on opening day.

LANDSCAPING THE SITE

The parking area is landscaped but no matter how carefully this is done, its extent (which is approximately four times that of the centre itself) will retain a monotonous character. It is planted with 250 maple, linden, chinese elm, white birch and crab apple trees between 15 and 20 feet high which define the sidewalks and the central dividers.

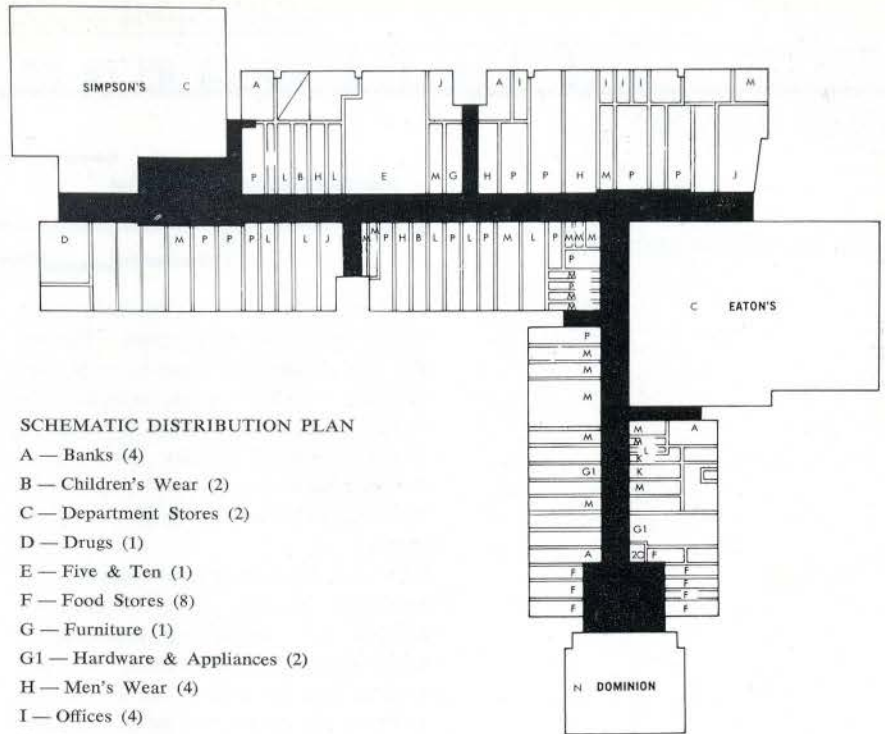
250 conifers are planted as barriers to the highways on the eastern and western periphery. Foliage and flowering trees will grow between, punctuated by 40 foot trees. The northern elevation will be unscreened, an unfortunate decision as it does distract high speed traffic. This, no doubt, is justified for advertising purposes.

THE PLAN

Yorkdale depends upon pedestrian malls for climate control and covered circulation throughout the year. In addition to the three important stores, there are 90 small shops, a dual auditorium theatre, a bazaar and professional offices. The primary mall, with entrances at each end, runs from east to west. There are also four subsidiary entrances in the north and south. The east-west mall has 26 shops on the south, 22 shops and professional offices on the north frontage. The north-south mall has 21 stores on the west and 10 stores on the east.

The enclosed L-shaped malls total 1,600 ft in length and include the Simpson's store on the west, the Eaton's store on the east and the Dominion supermarket on the south.

The junction between the two malls, which might have been the significant

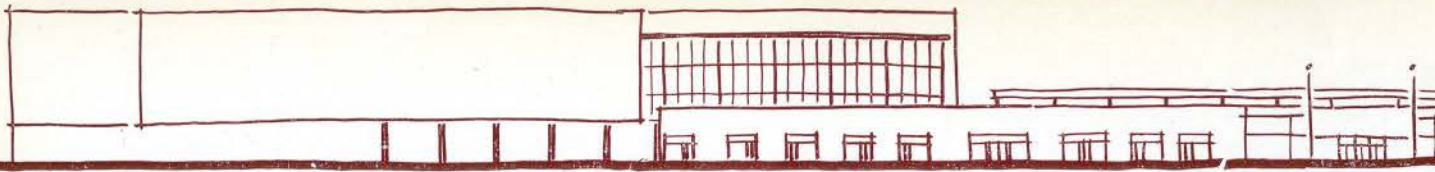


SCHMATIC DISTRIBUTION PLAN

- A — Banks (4)
- B — Children's Wear (2)
- C — Department Stores (2)
- D — Drugs (1)
- E — Five & Ten (1)
- F — Food Stores (8)
- G — Furniture (1)
- G1 — Hardware & Appliances (2)
- H — Men's Wear (4)
- I — Offices (4)
- J — Restaurants (3)
- K — Service Shops (2)
- L — Shoe Shops (8)
- M — Specialty Shops (21)
- N — Supermarket (1)
- O — Theatres (2)
- P — Women's Wear (15)

12 The primary (east-west) mall. Photo / Martin





NORTH ELEVATION



NORTH/SOUTH SECTION

13 *Burlington Arcade, London.*

14 *Simpson's court. Second floor restaurant and winding staircase in back-ground.*

15 *Eaton's court with elevated dining facilities.*

16 *Bazaar at Dominion supermarket and food centre.*

Photos / Martin (except 13)

focal point, is, save for a fountain and a mural, passively demarcated. Perhaps this was deliberately done to emphasize Eaton's. In effect, it has relegated the store to the poorest of all locations in terms of internal identity. The area of the northern shops could have been reduced to increase the significance of the space.

The most frequently used entrance, the southerly, because of its convenience, adjoins the dominating supermarket, which draws car owners from the southwestern parking areas. Small numbers enter by the centre entrances, adjoining Eaton's. The pedestrian is never conscious of entering at a centre from the variously dispersed entrances because there is no focal point. Undoubtedly, the failure to determine a main entrance, through massing or a distinctive pattern of entrances, is a primary weakness.

The malls do encourage shopping throughout the year and are a highly effective means of separating pedestrian and vehicular traffic. Their height, in relation to their length, has destroyed any chance of a satisfactory relationship and results in a monotony which is not relieved by an effective visual termination. They are too low. The present bazaar is a nebulous termination; as is the fountain court on the west. The central seats, benches and internal landscaping screen the vistas by breaking up the space. The shop frontages vary extensively and their elevational diversity reflects a lack of discipline or control. As they were designed by different specialists, there is no unity in the diversity.

Three major spaces provide the shopper with relaxation and meeting areas. The Simpson's court, paved in a pale grey terrazzo-marble, is 160 feet long and 100 feet wide. The 40 foot high ceiling is a symphony of 110 stalactite vaults, each terminated with an illuminated pendant. It is extremely dramatic, perhaps too much so for serenity. The store has 200 feet of sliding glass entrance doors off the mall. A multiple jet fountain, illuminated by underwater lighting, includes a decorative bridge for fashion displays.

There is an aesthetic uneasiness however, which can perhaps be attributed to a loss of scale between the space, the mall and the spectator.

A series of unhappy palm and bamboo trees in oval concrete containers, as well as solid benches and flower boxes, adjoin the fountain court. These fail to complement the architecture. A balcony restaurant incorporating a spiral staircase and a "Folly" within the court provide vertical stress and an element of "fun".

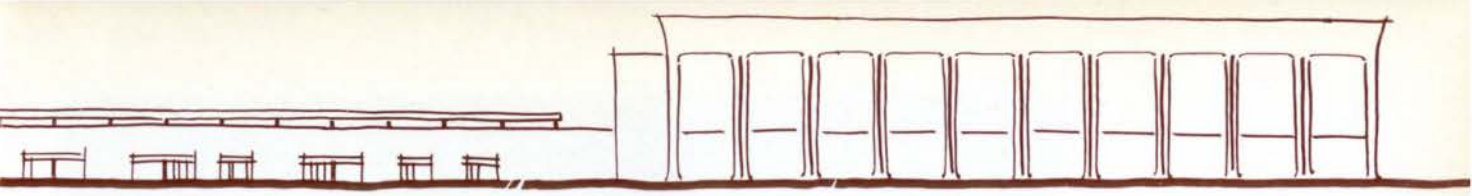
The conjunction of both malls at Eaton's is seen to advantage when standing in the east-west mall near the junction, looking south-east. The mushroom structures are strong expressions but as seen from eye level their effect is lost to some extent. They are most effective from the interior approach from Eaton's main floor. A great opportunity for expressing the major focus point of the centre was missed.

The bazaar space adjoining the supermarket is the best of three spaces as the user has no trouble in finding his direction. It has activity and liveliness due to its simple and logical treatment as a termination point. At the present time it is somewhat barren of facilities.

Beneath the mall, service vehicles enter an underground truck tunnel which affords access to all stores and releases customer parking space at grade. All stores have truck docks in operation. The Simpson's loading bays adjoin the budget floor, coffee shop and stock rooms. The tunnel continues to Eaton's and other stores in the same manner. The supermarket has an underground conveyor belt which transfers a customer's order to a parcel pick-up station adjoining the south-west car park. This includes 300 feet of parcel storage and can handle 150 cars an hour. This is an excellent solution to the service requirements and cannot be too highly commended.

THE ELEVATIONS

The north elevation, adjoining Highway 401 is commanded on the west by the rectangular Simpson's block. This covers 19 acres and has pre-cast rib floors. The



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white facade is of quartz faced pre-cast concrete in ten bays. There are 83 porcelain-enamel steel panels aligning a colonnade decorated by local artists. The firm has described these as "whimsey" because they may be reversed seasonally "to provide just the right amount of color for the occasion". As each panel weighs 160 pounds and swings on steel ball-bearings, the eulogy appears extravagant. Mary Waterworth describes this as dramatic in concept. "The use of varying colors tends to create a feeling of sophisticated casualness—ideal for suburban shopping". This appreciation was, no doubt, inspired by market research and may be aesthetically suspect. The publicity release confirms the apparent ingenuity of the panels when it enquires "What do they mean? We asked the architect—he didn't know. Do you?" As customers may gaze upon and appreciate the panels while walking in the colonnade, it would seem they have two purposes, distant scale and detail scale. The building is extremely strong in mass, with twin columns framing slim grey windows. As there is a chamfered parapet starting from the wall plane; and, as each bay is topped by a glass void above a strong vertically articulated panel, which defines the colonnade, it is obvious that the elevation was conceived primarily to attract passers-by on 401; the distant view, and the panels reinforce the focus and do it well.

On attaining an intimate visual scale, the spectator could find Simpson's overpowering because it is relieved only by the store sign and the entrance canopies. The panels focus his attention to detail and induce him to penetrate into the colonnade.

The adjoining mall stretches eastwards to the cruciform-shaped Eaton's building. It is flanked by shops and offices having a lower ceiling to permit clerestorey lighting. As Eaton's and Simpson's contrast unhappily with each other in the northern elevation, the lack of articulation in the intervening shops render it dissonant. The shop fronts are orange brick, inset with rectangular display windows. Brick frames of the same material enclose the panels but are not apparent from a distance. An east entrance, a central entrance, an intermediate western entrance and a central chimney are link elements in the north elevation. Eaton's has an unusual exterior in off-white brick with a three dimensional pattern adding a strong vertical accent. This is offset by plain masses to the south and east. There

are subsidiary entrances with parking on the north and south. The store has its primary entrance in the south facade and it orientates itself to the eastern car park. Once the Spadina Expressway is fully operational this entrance will probably come into its own. At the moment it draws fewer customers in this location although those that do come penetrate through the store to the mall. In perspective, Eaton's is seen to its best advantage from the east. Unfortunately, the store incorporates an interpenetrating block in its north-western corner. This provides top lighting but is an unhappy element and it detracts from the mass of the unit.

The west, south and east elevations of the centre lack unity. All are redeemed, to some extent, by the location and expression of the three large stores which do give contrast to the masses and afford logic to the mall shop links between them. The elevations are less effective in perspective. An impression is created of a variety of architectural elements threaded haphazardly upon a pedestrian bead-string.

THE CONCLUSION

Yorkdale is probably more significant as a commercial achievement than a great work of architecture or of planning. Nevertheless, it is a new and more logical solution in metropolitan shopping. It caters to the car shopper, provides him with adequate parking and affords him the shelter and comfort of a climatically controlled environment. The entrepreneur has provided the customer with substantially more than the minimum facilities. The developers have functioned as patrons of the arts and evolved a variety of environmental experience for the user, both in the public and merchandising spaces.

Yorkdale's failures are poor elevations, an unfortunate but characteristic individualism between the various elements and a loss of scale in the enormous car parks. These also occur in the internal malls which are rather long for comfortable shopping circulation. The proximity of the complex to Highway 401 and the Spadina Expressway is sound in terms of traffic and future residential developments. Yorkdale is an experimental shopping sub-centre which will, undoubtedly, become a prototype for developments in the future. With an example like this greater architectural control might be expected both internally and externally.

17 Simpson's and north elevation perspective from 401 Highway.

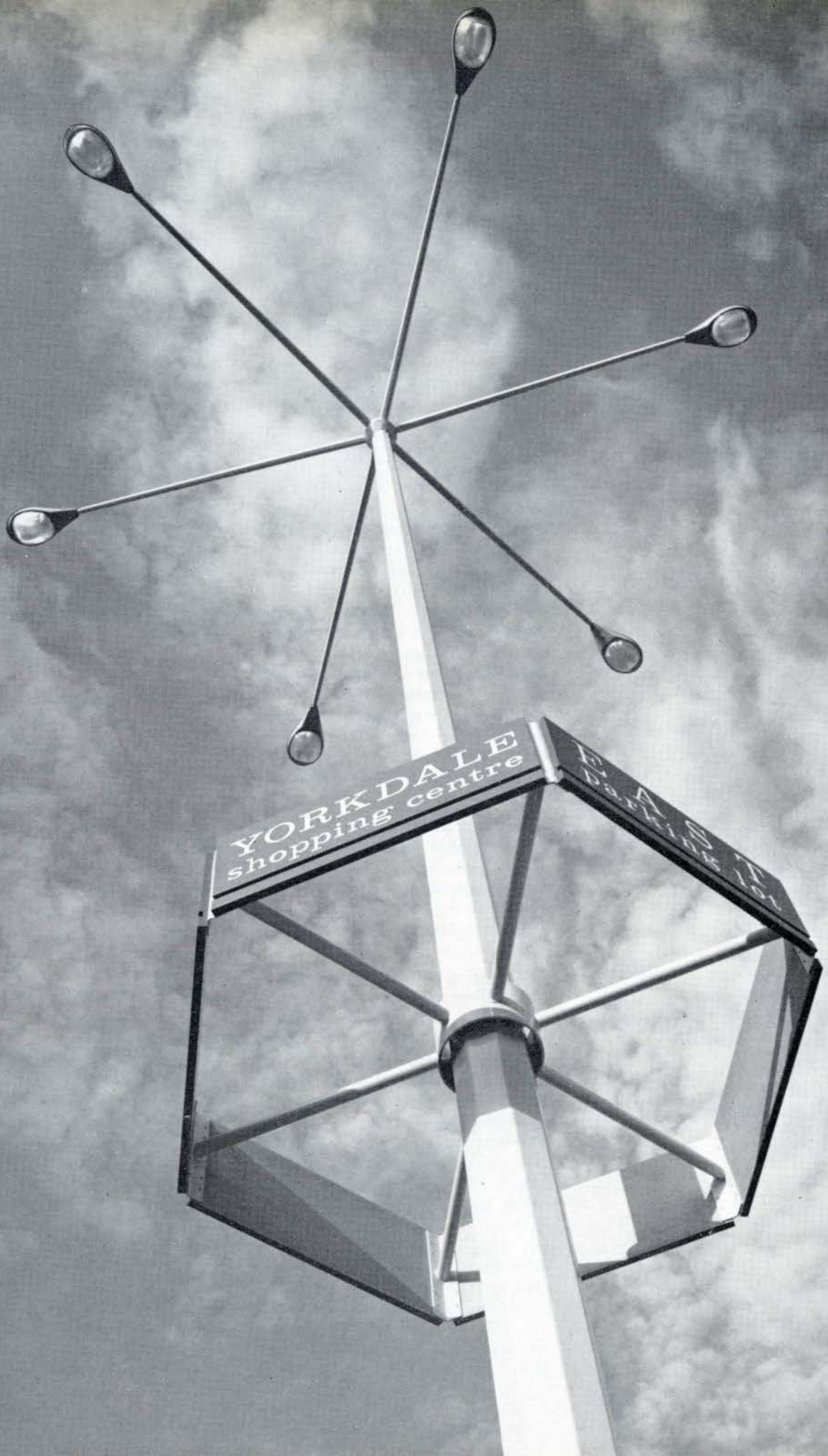
18 West elevation of Yorkdale complex.

19 Eaton's east elevation from lower parking level.

Photos / Martin

20 (page 48) Lamp standard and parking lot identification.

Photo / Jowett



the Role of the Planning and Development Consultant

by Howard Lesser

A development such as the Yorkdale Shopping Centre requires a careful blending of numerous ingredients — market research, site and access planning, architecture, leasing, merchandising and management. Each of the foregoing are of themselves areas of specialization. In the absence of intervening checks and balances, each would understandably attempt to become the dominant point of departure in the taking of concept decisions. A development consultant could thus be described as an individual who, has survived a series of such decisions on previous projects, and through the experience thereby gained, can assist in relating these significant aspects in perspective, one to the other.

Yorkdale is perhaps a unique case, since the ground rules set out in advance clarified the consultant's role considerably. The presence of both the T. Eaton Company and the Robert Simpson Company, after a thorough researching by their respective organizations of the trade area, was itself an unusual precedent. In most instances, the development consultant is involved in evaluating prospective sites and site potential prior to attracting the major tenants. This study may be completed in conjunction with professional researchers retained to assemble specific market data on population, socio-economic characteristics, existing and proposed competition and traffic patterns.

In Yorkdale, the early considerations involved determining the extent of trade area (based on a two department store tenancy), analysing the unsatisfied retail potential and determining the amount of retail dollars available to the site after assigning allowances for the sales potential of the senior department store tenants and for area competition.

Eaton's and Simpson's have shown sound business judgement in their joint participation at Yorkdale. This decision points up the inevitable trend towards "bigness"

to offset increased competition, especially in regard to sales presentation, advertising and promotional buying power, control of operating and selling expenses, the avoidance of duplication. Another factor was the emergence of family shopping, a significant departure from the traditional buying pattern. The opportunity to establish controlled competition in part of the suburban market was highly attractive.

Upon arriving at the non-departmental store retail potential, by category of merchandise, it is necessary to determine the amount of selling area and back-up storage space required to capture the maximum sales. The knowledge of sales capability per square foot for the various categories is utilized to avoid the production of excessive space and improper store dimensions. The number of shop units by category required to make up this total area is an important consideration. Certain sociological and economic characteristics of the marketing zone must be taken into account. For instance, better-income residents of the area must be offered higher-grade merchandise and more personal service. Middle-income and lower-income shoppers require largely the same categories of goods, but different price ranges. The market surveys on population, age and income distribution assist considerably in determining the emphasis and depth by category of the final merchandising plan.

The planning of balanced competition is not based on the number of stores in the project but on the space allocation and price level in each category. This type of presentation encourages the completion of more shopping errands per trip. Prior to getting at the rent schedule, the consultant will assist in devising the merchandising layout, once the merchandising needs have been settled. The grouping of store units within the plan is another important factor in the success of a regional centre, with emphasis upon comparison shopping, category linkage,

shopping patterns and the relationship between traffic generating tenants and non-generating tenants. Proper application of planning techniques can avoid being left with spaces that are last but not leased.

The determination of rents is, contrary to popular tenant opinion, one of the last items to be settled. Were rental levels to be settled upon at Stage One, there would be little need for or application of the various steps outlined above. If the development team has honestly (and accurately) taken the necessary procedural course, the successful implementation of a rent roll is largely assured.

The sales potential by area and category and the sales performance of prospective tenants in other locations is essential information. It enables the consultant to advise the developer on what tenants to seek, or accept, their performance elsewhere, and their likely performance in the project. By relating a firm's record to the sales potential at hand it is possible to set rents which the tenants consider tolerable.

One is frequently asked whether the rentals at a project aren't "quite high" and whether competition in a given category isn't "quite excessive". These questions generally answer themselves by an examination of the quality of tenancy. We are long past the stage (if one ever existed) where astute merchants took locations for the pleasure of being represented. Were the rentals and competitive factors respectively high and excessive, no project would obtain extensive commitments from quality firms. The test of rent levels and competition is to be found in the success of the occupants, not in the realm of conjecture. The availability of major tenants as a prior leasing inducement does not convince other prospective lessees that the rentals being asked are justified — it merely simplifies "selling" the site validity.

In conjunction with establishing rental levels, the consultant will assist in deciding upon the extent of the landowner's work to be performed in construction. The developer will then be able to decide whether the project can be brought in at a price consistent with the rent projections and the amount which may be allocated to special features and amenities.

Another service of the development consultant will be his role in preparing the lease form. Here again is an area where prior operating experience plus constant

research can result in considerable dollar savings to the developer over the years. The consultant must be up-to-date on such diverse items as taxes, insurance, maintenance costs, merchants associations, operating problems and financing requirements.

An experienced consultant can be of substantial assistance throughout the leasing programme. Using Yorkdale as an example, the leasing department interviewed and settled the financial arrangements with prospective tenants and the consultant conducted lease negotiations with the tenants counsel. This two-stage approach reduces the amount of "trading" in the course of completing lease documents.

The foregoing discussion dwells only upon the consultant's role in the planning and development of regional shopping centres. His function is equal in scope but different in substance when related to a major office building complex, apartment building and hotels. As in other fields of endeavour, the professional development consultant is initiating and employing techniques tailored to his function. Although often specializing in one particular type of project, he is continuously studying other aspects of the market in order to be of use to clients with varied requirements.

The development business of today is considerably more complex than during the immediate post-war period, when demand for all types of accommodation virtually guaranteed success to enterprising persons and firms. The margin of permissible error has been drastically reduced by increased public awareness and by the number of well-planned and poorly-planned projects completed to date within our metropolitan areas. It is the consultant's responsibility (although a non-exclusive one) to assist in the transition of the development field from a "seat-of-the-pants" business to an orderly, exciting profession.

Mr. Lesser, President of Howard A. Lesser & Co. Limited, Toronto, is a planning and development consultant to developers, corporations and retail organizations. A partial list of the projects and clients with whom he has been associated includes Yorkdale Shopping Centre and Place Ville Marie (Webb & Knapp (Canada) Limited); Polo Park Centre and Parkway Plaza (Camp Investments Limited); Don Mills Shopping Centre extension (Don Mills Developments Limited) and Thorncliffe Market Place (Canada-Wide Properties Ltd.). He is the author of a booklet "Signposts for Tomorrow: Evolution in Retailing" (copies are available from him at 2439 Bayview Ave., Willowdale, Ont. on request).



21

Yorkdale's interiors/comments

by Allison Hymas

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When one has added up the many factors involved in a project such as Yorkdale it is difficult to assess one of those factors, design, as either good or bad. The factor of commerce is its chief reason for being and no doubt the centre will be successful from that standpoint. The design critic must bear in mind that this is essentially real estate and not architecture; that return on the financial investment is the aim of the developers and not a concern for the creation of well ordered buildings in which buying and selling take place.

However one cannot help but wish that design control had been used as a positive measure toward the merging of successful merchandizing and orderly visual impact. Yorkdale appears to be a collection of many small shopowners who have only their close proximity in common. They have few common design features, which, outlined sensibly, could have resulted in a more unified impression. This lack of common architectural features is prominent in the wide stretching malls which form a link between Eaton's and Simpson's. The use of a myriad of type faces in signs and the very individual treatment of the facades themselves are the most obvious departures from control. Fascia heights and materials bear little relation to each other with the result that each is fighting for attention. Ironically the more subtle the facade the more effective it is.

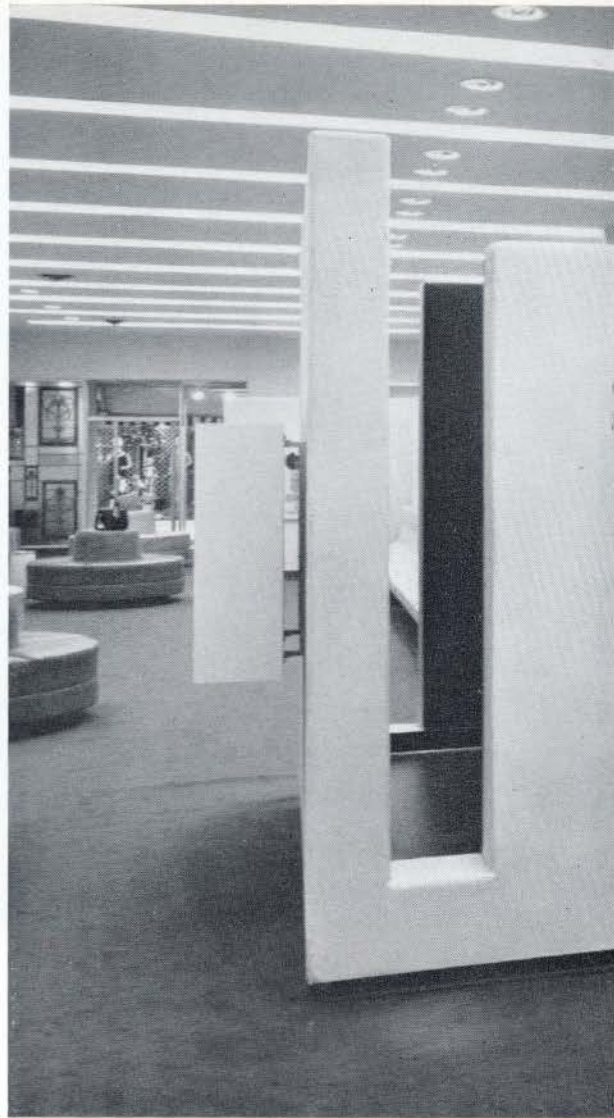
This total approach may be contrasted vividly with that established in the underground shopping mall at Place Ville Marie in Montreal. The owner provided a well ordered series of rentable spaces where the architectural features are controlled. Identification signs, doors, facades, show windows carry through with a clarity of design concept. Certainly the imposed sense of order is more pleasing than the laissez faire attitude at Yorkdale. Conversely however it has not resulted in boredom or lack of excitement. Shop owners were free to use their own recognizable logos and this feature plus their individual display make them forceful in attracting the attention of the shopper. The overall impression would seem to have a more lasting architectural value than that created at Yorkdale where a thatched roof feigns neighbour lines to a Florentine arcade.

21 *Shopping Mall, Yorkdale. Photo / Martin*

22 *Shopping Mall, Place Ville Marie. Photo / Arnott Rogers Batten Ltd*



23



24

COLLYER SHOES (23, 24)

The dark entrance and the 'formed' ceiling acts as a foil to the bright, high space of the main store area. The casual old timbers in this space are well lighted but the plastic cases projecting from them are foreign to the established character.

The low adobe-like walls separate the store stock and the manager's office from the customer's space. This, along with the direction of the lighting fixtures enhances the internal volume.

Commercial Planners / Frank Sherwood Associates

LAURA SECORD (25)

The plastic shell and brightly colored murals provide relief for the anticipated crowded corner position. The freshness, however, is lost in the fixtures and cluttered displays of the shop.

Industrial Designers / Stewart Morrison Roberts Ltd

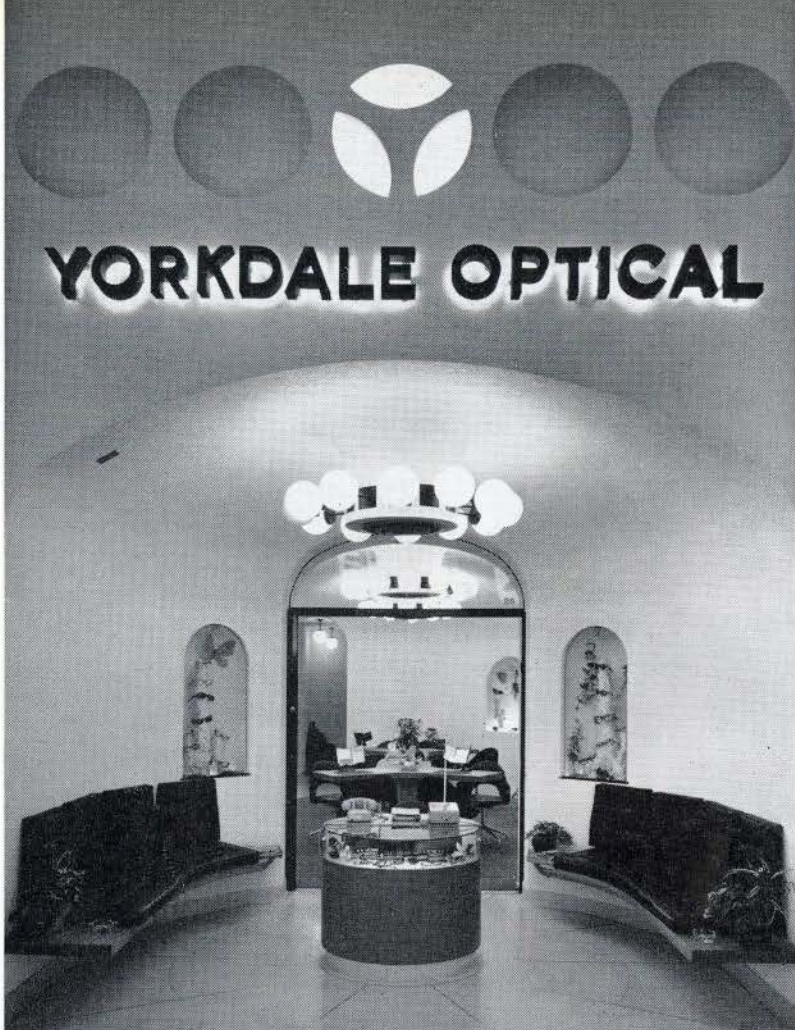
Photos / Jowett



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YORKDALE THEATRE (26, Page 53)

The restricted entrance (not shown) encourages the flow of traffic into the lobby at the lower level. The position of the ticket desk to the side of main entrance has proven to be cumbersome in serving a double line of customers for the two separate theatres. A central position (in the traditional manner of the movie houses) permitting two definite lines to form may have been more efficient.

The low key color scheme of the lobby, predominantly deep red, is subtle and rich. Mirrors, adjacent to the escalator and over the refreshment bar awnings relate this area to the rest of the lobby.

Architects / Bregman & Hamann

YORKDALE OPTICAL (27)

Ceilings are gently vaulted, doors and showcase niches are arched and the furniture has a free flowing line. The Yorkdale logo has been redesigned for a circular niche on the facade. The display in the arched niches are not convincing and detract from the clarity of the planning.

Architect / Irving Grossman

JANKOK (28)

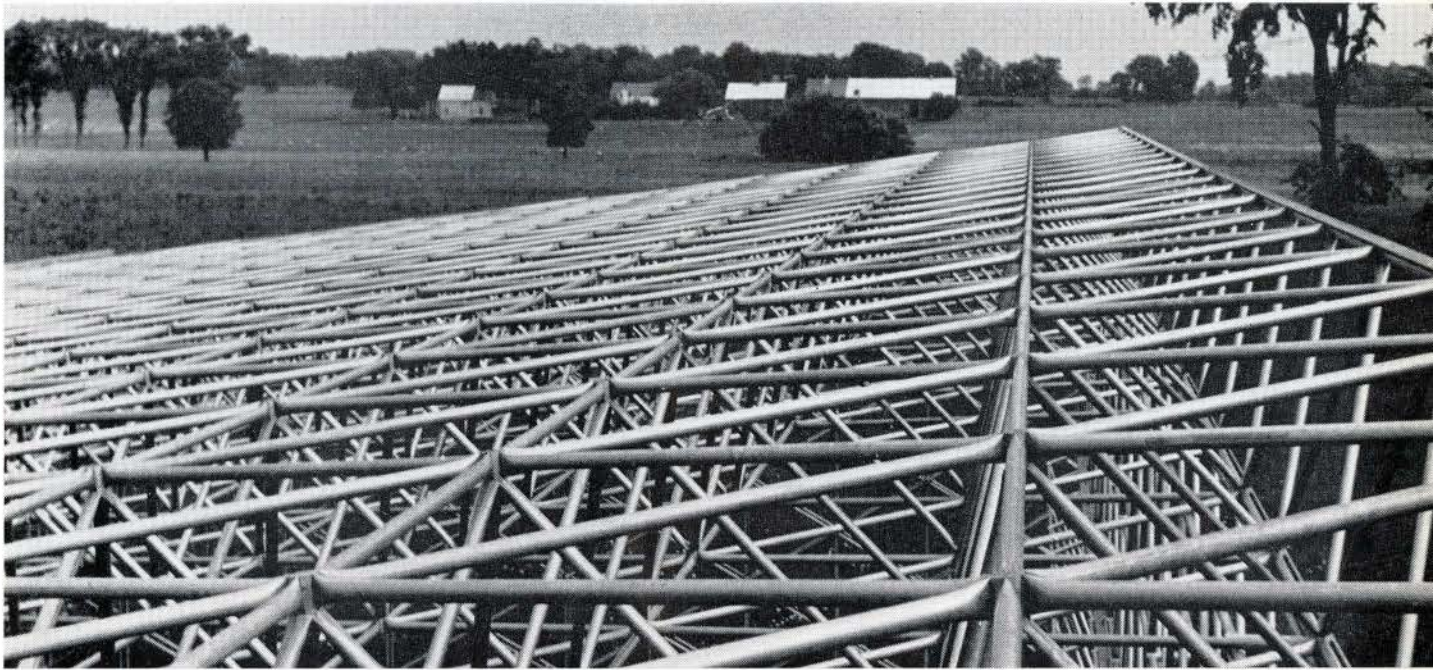
Merchandise has been displayed well and becomes a part of the store. Bright skeins of wool placed in a neat series of pigeon holes create a dancing geometric pattern on the wall and with their reflections are seen from the street in both directions. A fascia of felt circles blanket the remaining opaque facade.

Designers / The Winston Group

Photos / Jowett



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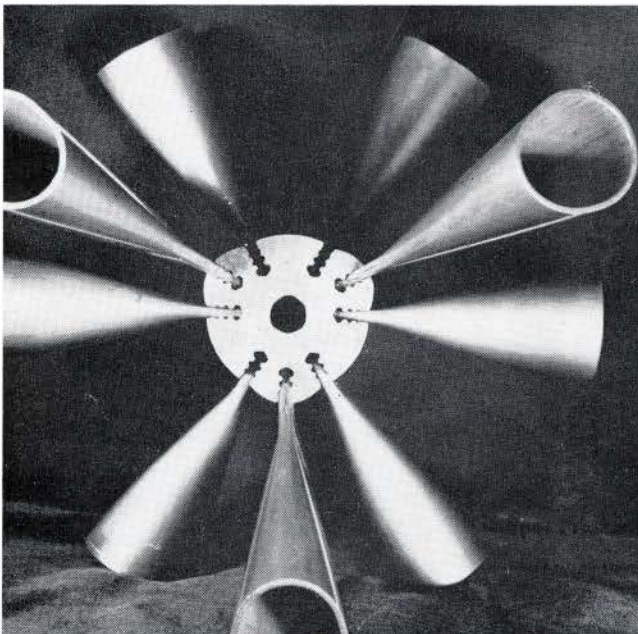


Three-way space frame, Ottawa (Triodetic structures)

Space Frames

by D. T. Wright

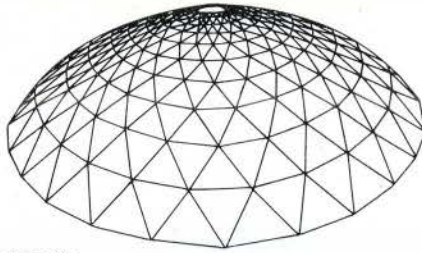
Triodetic joint (Canada)



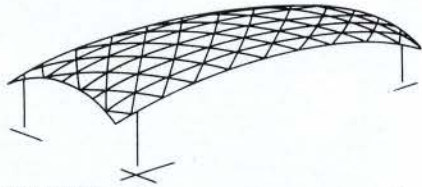
Without being too conscious of it we have been witnessing and participating in a veritable reformation in structural forms and concepts. While the full impact of the advances made possible by the developments of the past decade or so may take some time to be realized and exploited, it seems fair to suggest that they are no less significant than the developments in the mid- and late-nineteenth century of "modern" structural materials and formal structural analysis and design.

Newly developed understandings of structural behaviour give far greater authority in the use of our common structural materials, and technical advances have led to better or even new materials, radically improved structural connections (so important), and construction practices. Significant as are these advances, both professionals and public alike are more readily impressed by new structural *forms* — with one aspect of which this article is concerned.

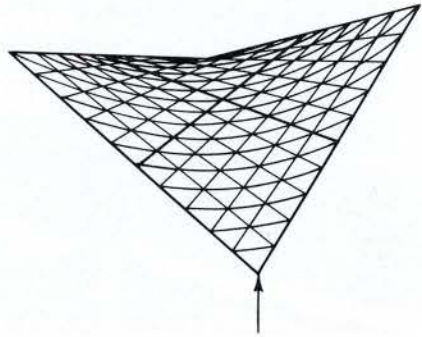
It doesn't require much thought to see that in a three-dimensional world all structure and all building is three-dimensional. With some imprecision however, we usually reserve the appellation "three-dimensional structure" to cases that are con-



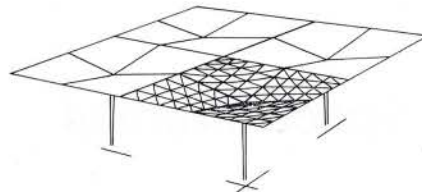
DOME



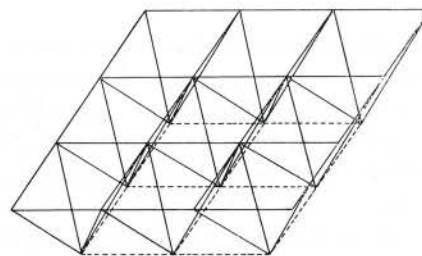
TOROID



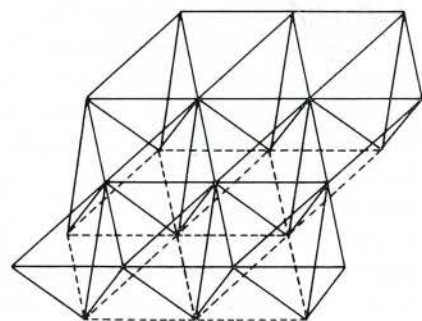
HYPAR



UMBRELLA (MULTIPLE HYPAR)



TWO-WAY



THREE-WAY

spicuously so — and in which we readily distinguish two main classes: surface structures (shells, folded plates, etc.), and framed structures (the “true” space frames, composed of linear, usually prismatic, elements with or without rigid joints), and a mixed class where surface and linear elements are combined.

Before going on to consider more closely some of these “true” space frames, it is worth noting that the frameworks of buildings in which sets of orthogonal planes in three principal directions divide space into rectilinear parallelepipeds are no less “space frames”. Of course in the design and analysis of such frameworks we regularly examine and proportion, independently, the different plane frames involved. For gravity loadings this is fair enough; it takes extraordinarily stiff flexural or torsional coupling to induce parallel plane frames to share vertical loads delivered in the plane of one of them. But for wind and earthquake loads (and we shouldn’t forget that 5 of Canada’s largest cities lie in regions of highest earthquake intensity) it is the exceptional building that is so regular and symmetrical that three-dimensional action needn’t be considered. A major part of the damage to buildings subjected to earthquakes is clearly due to torsion and asymmetrically arranged stiffnesses (intended or not). Coupling of frames to resist wind is no less important. Yet attention to questions of torsional moments in design of conventional building skeletons is a rarity in Canada.

Turning away from the simple orthogonal plane frame system, casual inspection of examples of space frames would seem to suggest an almost endless variety of types and forms. While variety is indeed a characteristic of space frames, some fairly simple general classifications are possible, such as “single layer” or “double layer”, then as flat or curved in overall form.

The single layer system is different from the usual plane frame (in a truss or building skeleton), not only in often having members intersecting at other than right angles, but more importantly in being expected to carry loads with components normal to the plane, as well as in the plane. The flat single layer system is usually called a “grillage”, and it is readily evident that it must have rigid joints, and that its members act primarily in flexure. While grillages are most often used to support floors they are being used increasingly for supporting wind loads in building faces. They are more efficient than simple beam and girder systems, and are attractive in many applications because of their remarkable ability to support large local load concentrations without distress.

When the single layer grid is given a curvature in one direction it assumes a barrel shape and can serve as an arch (not then really a space frame) or as a cylindrical shell. With a double curvature, domes, hypars and all the other shapes made familiar by concrete shell construction may be realized. (Of course, while the flat and singly curved forms can be achieved with all members and joints identical, the warping of the doubly curved surfaces prevents this and member lengths and are usually called “reticulated shells”, and they are amazingly efficient and economic, and need very little falsework for

erection. While yet little exploited, the single layer reticulated shell is almost certainly the most efficient and economic roof structure available for spans from 40 to 50 ft up to perhaps 200 ft. Like the concrete shell, the framed shell operates primarily as a membrane (and hence does not essentially need rigid joints), but for resistance both to local loads and buckling moment-resisting joints become essential.

The cable structure which functions as a tension membrane, deriving its stiffness from its curvature(s) and prestressing, may be thought of as a special kind of single layer space frame — in which only tensile loads are admissible. The implicit nature of a structural “frame” is of course that axial loads of either sign are admissible, usually along with flexure, and occasionally torsion.

The double layer space frame has been used and thought of primarily as a flat plate-like structure, when it may behave as a grillage or as a slab, but of course it can also be built in singly or doubly-curved form as a shell. The usual arrangement of the double layer space frame deck provides such stiffness, even as a pin-jointed system, that members are subjected primarily to axial loading with very little bending, just as in a plane truss. A subtle, though structurally important difference exists between space frame decks that function like grillages, and space frame decks that function like plates or slabs. The former are readily identifiable by noting that planes normal to the deck that contain the members in the top face also contain the members in the bottom face and the inner or “web” members. Whether there are two or more directions of such vertical planes, the result is no more than a grillage of plane trusses — and must be analysed and designed as such. The slab-like space frame, by virtue of the arrangement of its members, and even where pin-jointed, can resist torsion or twisting moments through axial member loadings alone, and is, accordingly, stiffer than the grillage-type space frame. The slab-like space frame is also more challenging to design, since it has rather too many joints and indeterminacies to analyse formally as a three-dimensional truss (as is done for three-dimensional framing in aircraft design and simple towers) and doesn't behave in quite the same way as a simple slab since it has significant shear deformations which are not found in the solid slab or plate. Notwithstanding these difficulties, a number of different methods of analysis have been developed and used with evident success.

When the double layer system is used for a shell, it will also act primarily as a membrane, with primary loadings being axial forces and shears in the shell “surface”. But the double layer framed shell is of course very much stiffer than either the single layer shell, or even a concrete shell, and so affords much greater resistance to concentrated loads, and with increased buckling strength opens the prospects of truly remarkable spans — perhaps up to 1200 or 1500 ft. (although it must be asserted that Buckminster Fuller's proposed one- or two-mile diameter dome over New York City is *not* practicable because of the prospect of bucking — unless it be made airtight and supported by air pressure!)

Given all these interesting and structurally efficient space

frame structures, it is a little surprising that they have not been used more widely. General inertia (world's fairs apart) is undoubtedly significant — especially, it must be acknowledged, on the part of the structural engineers who have become a little too accustomed to the conveniences of plane frames! Certainly most of the advocacy (not always too realistic, unfortunately) of space frames has been with the architects. Beyond such matters, there have also been some practical problems. As already noted, some of the most exciting flights of fancy by Fuller and Wachsmann are, in plain terms, structurally impossible! And many of the space frames that have been built clearly suffer from poor designs (usually too much material, and occasionally too little!) and inefficient or uneconomic connections. From an understanding of some of these problems, it may be possible objectively to consider the prospects for the space frame.

In a perceptive commentary, Curt Siegel has suggested that, ideally, space frame construction should offer: 1) ready variability in the lengths of individual members, 2) ready variability in the strength (sections) of individual members, 3) universal joints able to accept necessary numbers of members (up to a dozen, perhaps) at any required angles without introducing bending or impairing axial strengths, 4) methods for conveniently determining member lengths (in shells, where lengths vary slightly from region to region), and 5) reliable structural analysis and design. With all these conditions met, Siegel suggests that we would be “much closer to the ideal of organic structure”.

The first three of Siegel's points all really turn on the connection, which is the key both to structural performance and efficiency, as well as to overall economy. Some of the connections that have been used in space frames are so fussy or inefficient as to be well-nigh incredible. More recently, however, some efficient welded connection methods have been developed (utilizing special connectors, or automatic cutting machines for the necessary end profiles), and in Canada there has been developed a simple and efficient mechanical joint suitable for steel or aluminum members (welding aluminum structural alloys causes annealing and reduces strengths by up to 50%) called the Triodetic system. Prof. Z. S. Makowski, a ranking “expert” on space frames, in a paper before the “Symposium on Aluminum in Structural Engineering” held recently in London by the Institution of Structural Engineers, has termed the Triodetic joint, “versatile, superior, . . . , a real breakthrough”.

While presenting some important difficulties the problems noted by Siegel of determining member lengths and angles, are susceptible to fairly straightforward treatment, and can even be computerized for repetitive detailing of such common shapes, say, as domes and hypars. The problem of structural design and analysis, is, in general, rather more challenging. Some aspects of this question have already been touched upon, and it may be seen that while many cases are readily treated, some others are undoubtedly difficult if not even impossible by formal methods. (It must be remembered and acknowledged that many concrete shells can't be analysed rigorously either — but are still built!) The analyses in use or proposed are of two kinds, treating the space frame either as a finite system of

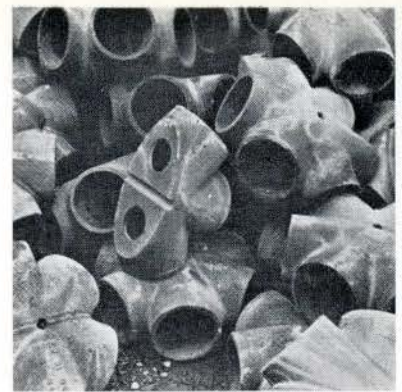
discrete elements (just as in conventional truss or frame analysis), or replacing it by an equivalent analogous continua, for which some powerful rigorous and approximate methods are available. While the former is attractive in its formalism, and indeed advocated by several authorities, it must be noted that it presents some staggering challenges. Whereas a plane frame with even 200 joints (each with 3 unknowns—2 displacements and a rotation) is already uncommon, space frames with 400 to 4000 joints (each with 6 unknowns in a general solution, 3 displacements and 3 rotations) are not uncommon. The analogous continua looks all the more attractive in this perspective, and seems to be becoming increasingly popular.

In conclusion, then, we have open to us for immediate use a variety of interesting, efficient and economic three-dimensional space frame forms, for which we can now find effective joints, and for which structural designs can evidently be managed with as much reliability as in more conventional structures. Given the prevailing conditions of material and labour costs in Canada and the United States, it is probably fair to predict that the space frame shell may eclipse the concrete shell here, and finally make possible that common use of shell forms that distinguishes the architecture of some other countries. And both flat and curved space structures will certainly come to be very strong rivals of more conventional structural media, for roofs and floors for clear spans over about 40 ft.

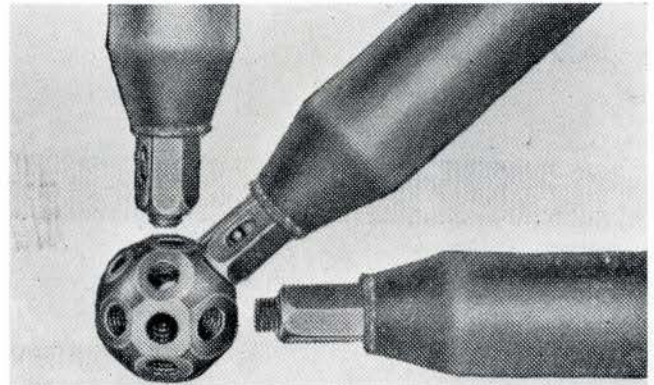
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- 3 Z. S. Makowski, "Aluminium Space Structures", Proc. 1963 Symposium on Aluminium in Structural Engineering, Inst. of Structural Engrs., London (1964).

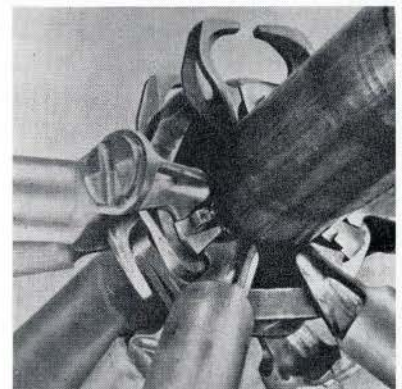
C. D. Wright is Dean of Engineering at the University of Waterloo and professor of Civil Engineering.



5DC joints (France)



Above: Mero joint (Germany)



Joint by Conrad Wachsmann (USA)



Barrel vault, Paris. (5 Du Chateau)



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As a result, the malls at Yorkdale give shoppers a feeling of being outdoors. Children, quick to note such things, are calling Yorkdale "the outside inside shopping center."

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National Research Council

a review of the Canadian Building Digest

Information from research is useful only if it reaches and is read by those who should be concerned. In an attempt to provide an information service for architects, builders, and others interested in building, the Division of Building Research, NRC, in 1960 began publishing a monthly series "Canadian Building Digests." These are, as their name implies, short statements usually under 3000 words concerning building performance and building problems and are prepared in such a way that they can be read quickly and easily understood.

From the beginning of the series, a copy of a Digest has been bound into each monthly issue of the Journal of the Royal Architectural Institute of Canada. Those engaged in construction have received copies through the assistance of the Canadian Construction Association and Central Mortgage and Housing Corporation.

Digests are written by members of the Division and cover a wide range of topics, as is shown by the accompanying list. Each in the first instance was designed to be informative and useful and each deals with a particular topic. Many subjects, however, cannot be dealt with adequately in a single Digest and, as the series has developed, succeeding Digests have been prepared to present other aspects of the same subject, each building on preceding issues. As an example, the recent building science seminar made use of 17 Digests, each one of which contributed to the broad subject of exterior wall design. The Digests have proved to be the Division's most successful means of reaching, through the printed word, those concerned with building. When the series was started, 14,000 copies of each Digest were sufficient to handle the required monthly distribution. Today, 25,000 copies are printed and frequently certain Digests have to be reprinted to satisfy the demand for copies. The total number distributed in 1963 was over 320,000. As over half this number was distributed as a result of requests from individuals and

groups it is fairly evident that this series forms an important link between building research and the practice of building.

Digests are issued free of charge; back issues are available on request. Over half of the series has now been translated into French and this work is progressing as quickly as possible. Binders for both English and French Digests are available for those wishing to keep copies together as a set. The cost of a binder is \$2.00; orders should be sent to the Division.

The Division always tries to ensure that its publications are made available to those who would be interested. Anyone wishing to be put on the mailing list to receive a copy of each Digest as it is issued or to request copies of back issues can do so by writing to the Publications Section, Division of Building Research, National Research Council, Ottawa 2, Canada.

- 1* Humidity in Canadian Buildings
by *N. B. Hutcheon.*
- 2* Efflorescence
by *T. Ritchie.*
- 3* Soil and Buildings
by *R. F. Legget.*
- 4* Condensation on Inside Window Surfaces
by *A. G. Wilson.*
- 5* Condensation between Panes of Double Windows
by *A. G. Wilson.*
- 6* Rain Penetration of Walls of Unit Masonry
by *T. Ritchie.*
- 7* Winter Construction
by *C. R. Crocker.*
- 8* Modular Coordination
by *S. R. Kent.*
- 9* Vapour Barriers in Home Construction
by *G. O. Handegord.*
- 10* Noise Transmission in Buildings
by *T. D. Northwood.*
- 11* Fire and the Design of Buildings
by *J. H. McGuire.*
- 12* House Foundations
by *C. B. Crawford.*
- 13* House Basements
by *C. R. Crocker.*
- 14* Weather and Building
by *D. W. Boyd.*
- 15* Concrete
by *N. B. Hutcheon.*
- 16* Thermal Insulation in Dwellings
by *W. H. Ball.*
- 17* Daylight Design
by *Murdoch Galbreath.*
- 18* Strength of Small Roofs
by *W. R. Schriever and H. J. Thorburn.*
- 19* Caulking Compounds
by *E. V. Gibbons.*
- 20* Corrosion in Buildings
by *P. J. Sereda.*
- 21* Cavity Walls
by *T. Ritchie.*
- 22* Concrete Floor Finishes
by *H. B. Dickens.*
- 23* Air Leakage in Buildings
by *A. G. Wilson.*
- 24* Built-up Roofing
by *M. C. Baker.*
- 25* Window Air Leakage
by *J. R. Sasaki and A. G. Wilson.*
- 26* Ground Freezing and Frost Heaving
by *E. Penner.*

- 27 Sources of Information on Building
by *Eileen R. Carson.*
 - 28 Wind on Buildings
by *W. A. Dalgliesh and D. W. Boyd.*
 - 29 Engineering Site Investigations
by *C. B. Crawford.*
 - 30 Water and Building Materials
by *J. K. Catta.*
 - 31 Fire in Buildings
by *G. W. Shorter.*
 - 32 Safety from Fires and Explosions in Hospital Operating Rooms
by *P. J. Sereda.*
 - 33 Fire and the Compartmentation of Buildings
by *J. H. McGuire.*
 - 34 Wind Pressures on Buildings
by *W. A. Dalgliesh and W. R. Schriever.*
 - 35 Control of Condensation in Curling Rinks
by *G. O. Handegord and C. R. Crocker.*
 - 36 Temperature Gradients through Building Envelopes
by *J. K. Latta and G. K. Garden.*
 - 37 Snow Loads on Roofs
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 - 38 Bituminous Materials
by *P. M. Jones.*
 - 39 Solar Heat Gain through Glass Walls
by *D. G. Stephenson.*
 - 40 Rain Penetration and its Control
by *G. K. Garden.*
 - 41 Sound and People
by *T. D. Northwood.*
 - 42 Humidified Buildings
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 - 43 Soil Testing
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by *K. R. Solvason and A. G. Wilson.*
 - 47 Extreme Temperatures at the Outer Surfaces of Buildings
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 - 49 New Roofing Systems
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 - 50 Principles Applied to an Insulated Masonry Wall
by *T. D. Northwood.*
 - 52 Heat Transfer at Building Surfaces
by *D. G. Stephenson.*
- * Disponibles en français.

Building Science Seminar

The Division of Building Research, NRC, initiated still another means of disseminating information on building with its first building science seminar held in Ottawa on 12-14 February. More than 200 persons, about half of them architects, provided an attentive and enthusiastic audience for two full days during which DBR staff members discussed the problems, principles, and practice of exterior wall design. The third day was devoted to more general discussions about building research, and to a tour of the DBR laboratories.

The selection of this subject for the first seminar was prompted by the growing

number of cases of serious problems with exterior walls brought to the attention of DBR. There is every reason to believe that these are widespread and currently on the increase. The dynamic situation in wall design encouraged by new materials, methods and components has led to many departures from old established practices. This in itself could be expected to produce some new problems, or to aggravate some old ones, but additional factors are also being introduced. One of these is the increased height of many buildings, and the other, which is most significant, is the trend to humidification of many buildings in cold weather.

Most buildings are far from air-tight. The air inside a building is warmer and less dense than that outside in winter and tends to leak outward through the upper parts and to be replaced by cold air leaking inwards at lower levels. This occurs in almost all heated buildings, but, so long as the warm air is dry (due to the low winter humidities normally maintained), no particular difficulties are encountered. As winter indoor humidities are increased, however, condensation occurs on cool interior surfaces of windows and walls, water vapour diffuses outward through walls and may be condensed within them. But even more serious, the air leaking outwards carries increased quantities of water vapour which will condense on any cold surfaces it encounters within the wall as it makes its way to the outside. Signs of distress due to excessive water from these causes, and probably also from rain penetration, can be seen on the exterior wall of a humidified building shown in figure 1. On the humidified building shown in figure 2 the stucco over tile has become wet due to condensation within the wall resulting from lack of control of air and vapour flow. Greatly accelerated degradation of this wall can be expected. An even more dramatic example is shown by figure 3, and its wall section detail, figure 4. In this case outward air leakage from a humidified building has deposited water in substantial quantities in the masonry, and particularly in the parapet, resulting in severe displacement and failure in the masonry after only one winter through subsequent freezing of the water. The destructive action of freezing of water deposited in mortar is further demonstrated by figure 5 which shows failure of 4 in. granite slabs by the growth of ice in bedding mortar into which water was fed by capillarity from a badly drained terrace.

These and other serious problems arising in various forms of construction result from the lack of coordination in design to deal adequately with the control of heat, water vapour, air, and rain. Many of the pertinent topics have been dealt with individually in Canadian Building Digests which have been issued monthly by the Division since 1960. Seventeen of these, together with supplementary notes, formed the basis for the seminar on the design of exterior walls. The principles involved were discussed, and their implications in design pointed out. The afternoon of the second day was devoted to a discussion and analysis of a number of case histories and, following this, the application of the principles to one common type of wall was elaborated. It was shown that the various technical requirements of exterior walls are most readily met by the use of a structurally adequate inner wythe, or panel, insulation located on the outside of this and covering all principal framing members, and protected on the outside by cladding designed as an "open rain screen." The response to the seminar, as indicated by the registration, interest and questions of those attending and by the many favourable comments subsequently received, has demonstrated the value of this form of communication to supplement the

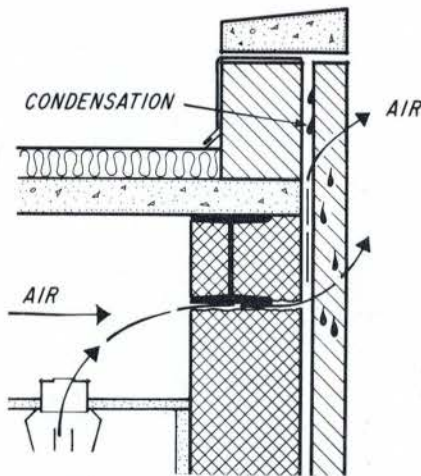


FIGURE 4

digests and other publications. DBR is already making plans to repeat the exterior wall seminar in Ottawa and in a western city, probably in November. A new seminar planned for February 1965 will be on the subject of windows, which require many of the same considerations as exterior walls, and are involved in some of the same problems of condensation, air leakage and rain penetration.

N. B. Hutcheon

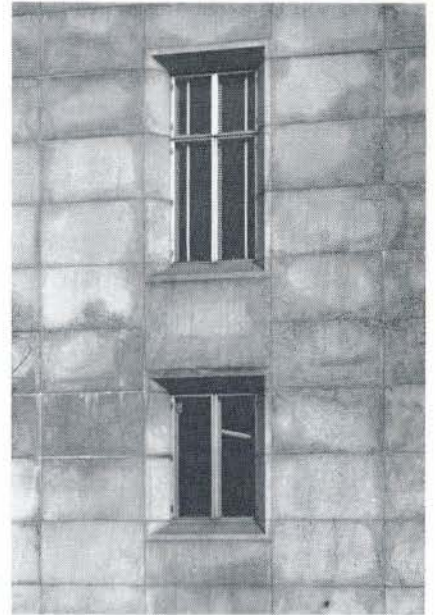


FIGURE 1

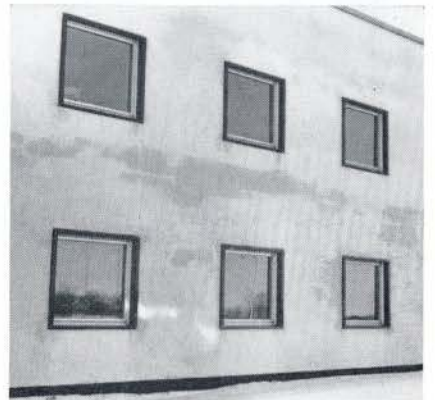


FIGURE 2

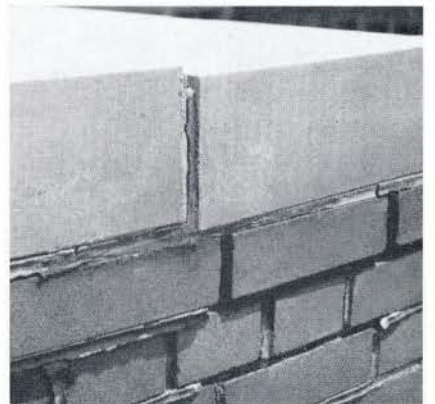


FIGURE 3

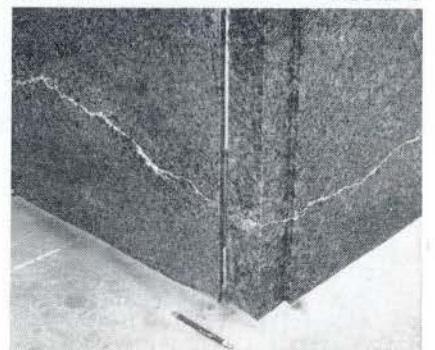


FIGURE 5

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Technical Column

Edited by Douglas H. Lee

Asphalt Paving

by Norman W. McLeod

This is the first of a three-part article by Norman W. McLeod, BSc, MSc, ScD. Doctor McLeod is asphalt consultant with Imperial Oil Limited.

More than ninety per cent of the current paved mileage of roads and streets in North America are surfaced with asphalt. Asphalt pavements are carrying vehicle loadings that range from light passenger cars to aircraft weighing several hundred thousand pounds, and traffic volumes ranging from less than one hundred vehicles per day to more than one hundred thousand. In addition, there is a wide choice of asphalt pavements available on the basis of cost, which can range from a few cents to several dollars per square yard, depending upon vehicle loads and traffic volumes to be carried. Consequently, an economical asphalt pavement can be selected for every combination of traffic volume, and wheel loading anticipated.

It has been requested that this article be restricted to asphalt pavements for driveways, shopping plazas, parking areas, playgrounds, etc. This limits the range of wheel loads to those of highway vehicles, and the effective traffic volumes to a relatively low value.

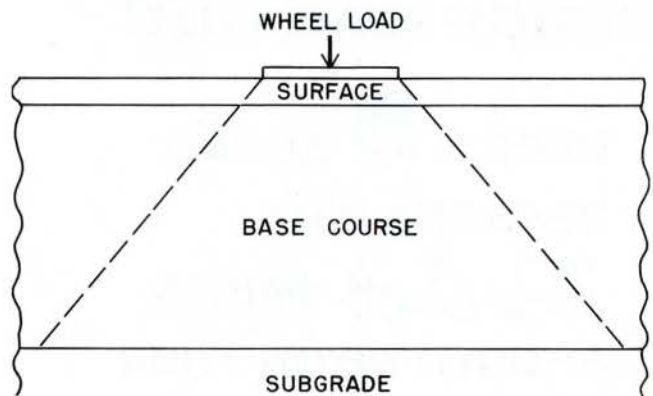


FIGURE 1

Figure 1 illustrates a typical cross-section of an asphalt pavement structure. The subgrade consists of the natural soil that either exists on the right-of-way, or is brought in from nearby borrow pits or other sources. Since very few natural soils have sufficient bearing capacity to support the wheel loads to be carried, a base course must be placed over the subgrade. It is a major function of the base course to distribute the wheel load over a wide enough area of the subgrade that the subgrade will not be overloaded at any point. The base course is often designed and constructed as two separate layers, in which case the lower layer is called the sub-base. For the conventional design employed in the past, the sub-base has been usually constructed with sandy gravel, while the base course has consisted of highly stable crushed gravel or crushed stone. Recently however, asphalt paving mixtures are being substituted frequently for both the sub-base and base course layers. This is often more economical, because a smaller thickness of asphalt paving mixture can provide the same load carrying capacity as a much greater thickness of conventional granular sub-base and base course.

The asphalt pavement provides a smooth-riding surface, protects the foundation from traffic and weather, and contributes substantially to the load carrying capacity of the overall pavement structure.

(continued on page 68)

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In North America, it is customary to refer to all material above the subgrade as "asphalt pavement structure", or as "flexible pavement". These terms will be used synonymously in this article. In a conventional asphalt pavement structure containing granular sub-base and base course, the asphalt surfacing normally consists of an asphalt base course and an asphalt surface, and is referred to as the "asphalt pavement". When an asphalt paving mixture is substituted for a granular base course, or for a granular base and sub-base, only an asphalt wearing course is required. The subgrade, sub-base, and base course taken together, make up the "foundation" for the asphalt pavement.

To obtain satisfactory service performance from asphalt pavements, three basic factors must be considered:

1. Design and preparation of the foundation for the asphalt surface.
2. Basic principles of design for asphalt paving mixtures.
3. Good asphalt pavement construction practice.

Most of the subject matter of this paper will be presented under these headings:

DESIGN AND PREPARATION OF THE FOUNDATION

No asphalt pavement can provide satisfactory performance unless it has been placed on an adequate foundation. Therefore, it cannot be too strongly emphasized that the foundation, consisting of the sub-grade, sub-base, and base course, must be designed and constructed with care.

Buildings, bridges, and similar structures can be designed on a rational basis because the strength in psi of the materials to be used is known, and the stress and strain developed at any point in the loaded structure can be calculated. On the other hand, the design of asphalt pavement structures for strength is still entirely empirical, because reliable methods for measuring the strengths of soils, aggregates, and pavement materials, and for determining the distribution of stress through them are not yet available. While theoretical soil mechanics teaches that when a given intensity of load is applied at the surface of a semi-infinite, elastic, isotropic, continuum, the pressure in psi decreases quite rapidly with depth below the loaded area, for example, from 100 psi on a uniformly loaded circular area of radius "r" at the surface, to 50 psi at a depth of 1.3r on the vertical axis of the loaded area, and to 20 psi at a depth of 2.5r, this information provides only a rough guide for current flexible pavement design, because the soil, base, and pavement materials do not behave in accordance with the theoretical assumptions. Furthermore, the subgrade, base course, and asphalt pavement constitute a layered system rather than an isotropic semi-infinite continuum. Nevertheless, as indicated by theoretical soil mechanics, experience acquired over many years has shown that for most economical flexible pavement design, layers of material of increasingly greater strength should be provided from the bottom to the top of the structure. In addition, the strength of the material in each layer must be at

(continued on page 72)

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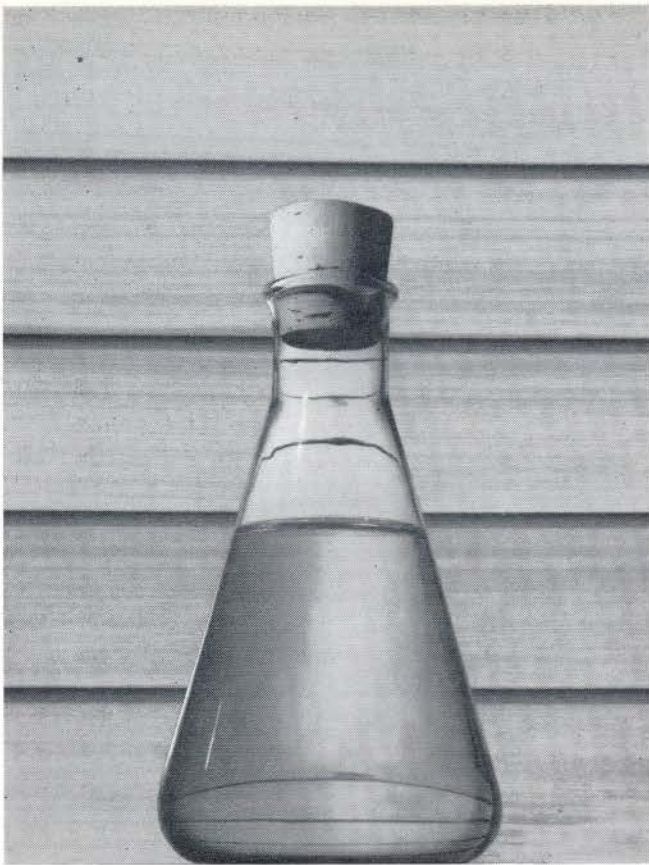


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least equal to the intensity of pressure transmitted to it, if failure of the overall pavement structure is to be avoided. It has been demonstrated that the asphalt pavement itself is subject to fatigue failure. Each time a wheel of a vehicle moves over any given point on a pavement, the pavement is depressed at that point, but rebounds to approximately its original level when the wheel has passed, if the pavement structure has sufficient strength. For high traffic volumes, the amplitude of this vertical movement must be much smaller than for low traffic volumes, if pavement cracking and failure is to be avoided. Consequently, to maintain this amplitude of movement within acceptable limits of only a very few hundredths of an inch, the overall pavement structure must have adequate strength.

The first operations required toward achieving a foundation of adequate strength, concern the grading, drainage, and compaction of the subgrade, and the elimination of acute frost action.

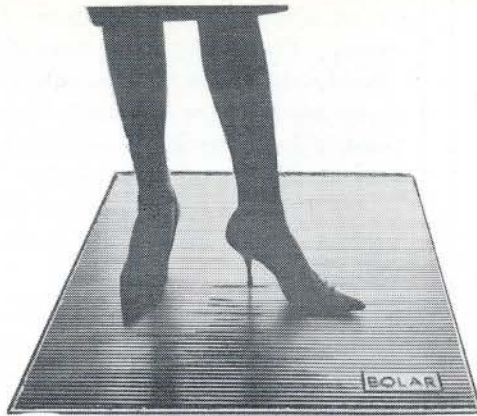
Acute frost action that results in frost heaves and frost boils is due very largely to pockets of silt or fine sand, or to layers of these materials, that are intersected during the grading operation. Where these occur, the soil in the top one to two feet (depending on the severity of the frost action) of the subgrade in cuts, should be lifted, thoroughly mixed to obtain a soil of uniform texture, and recompact in six inch layers. For fill sections the soil taken from cuts or borrow pits should be thoroughly mixed, and placed and compacted in layers of not more than eight inches loose depth. Pneumatic-tire rollers are the preferred compaction equipment. Cohesive soils (clays and loams) should be compacted to a minimum of 95 per cent of standard AASHO density (AASHO Designation T99). Non-cohesive sandy and gravelly soils should be compacted to a minimum of 100 per cent of standard AASHO density.

When the construction site is located on an area that has been gradually filled in over a long period of time, borings should be made to establish the nature of the subgrade soil. Any unstable material found, such as tree stumps, logs, and pockets of soft saturated soil, should be removed before the embankment soil is placed. The information provided by borings can also be used to ensure that the top four to six feet of the existing material are well compacted, and thereby avoid excessive uneven settlement later after the area has been paved.

The above cut, fill, and grading operations should be conducted to provide a finished subgrade that has been thoroughly compacted and shaped to the required profile and cross-section. Any soft areas that still remain should be excavated and replaced with acceptable soil that has been thoroughly compacted into place. The finished surface of the subgrade should be smooth, firm, and unyielding, and should conform to the specified grades within a tolerance of $\pm \frac{1}{2}$ inch.

The need for adequate drainage cannot be overstressed. Positive drainage must be provided to remove surface water, and any sub-surface water that may enter the pavement structure. To ensure fast run-off, the surface of the pavement should have a slope of about one per cent either to the outer perimeter of the paved area, or to shallow gutters crossing the paved area,

(continued on page 76)



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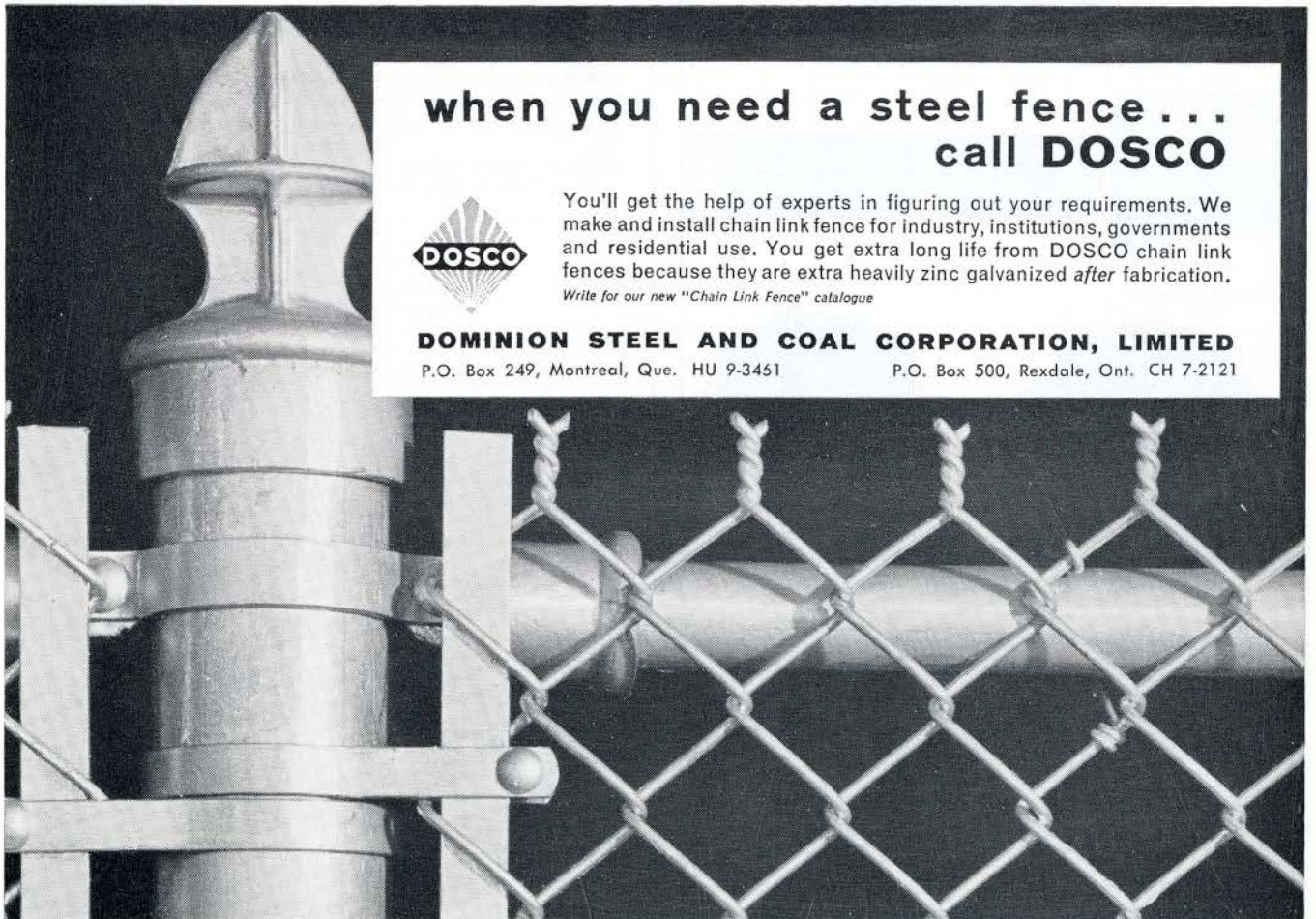
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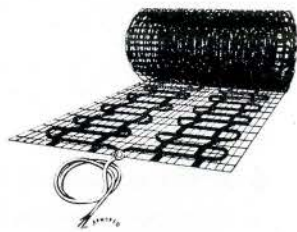
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P.O. Box 249, Montreal, Que. HU 9-3451 P.O. Box 500, Rexdale, Ont. CH 7-2121

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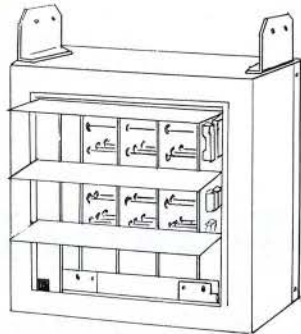
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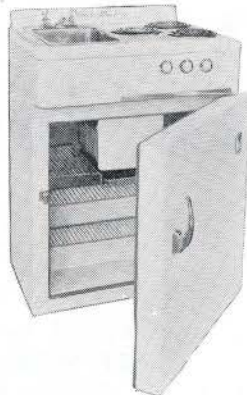
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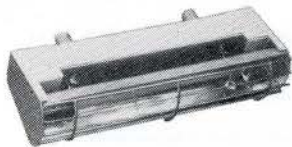
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Unit heater



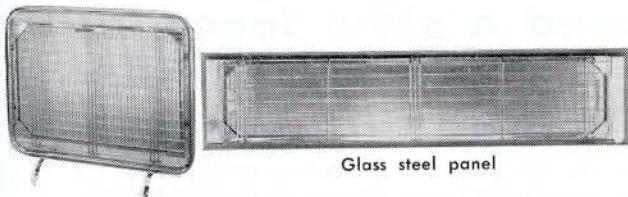
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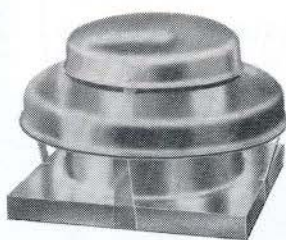


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or to suitably located catch-basins leading to underground drains. The contour of the finished pavement at all points should prevent water from standing on the surface, and surface water should not be permitted to seep back under the outer edges of the pavement. Sub-surface drains should be installed only in locations where sub-surface water may accumulate within the pavement structure, or where it is necessary to intercept water that would tend to make its way into the pavement structure.

Table 1 lists The Asphalt Institute's recommendations for the thicknesses of the sub-base, base course, and asphalt pavement layers that should be placed in succession over the prepared subgrade, for driveways, shopping plazas, and parking areas for essentially passenger car traffic. Table 2 provides information for similar paved areas subjected to heavy truck traffic. Table 3 presents like data for asphalt paved playgrounds, tennis courts, etc.

TABLE 1 THICKNESSES OF PAVEMENT LAYERS¹ FOR PARKING AREAS AND DRIVEWAYS FOR PASSENGER CARS

Type of Subgrade	Asphalt Concrete Surface Course	Base Course		Subbase ³ Course (Sandy Gravel)	Insulation ³ Course
		Asphalt Concrete	Crushed ² Aggregate		
Gravelly or sandy soils, well drained	2" to 3"	1½" to 2"	3" to 4"	none	none
Average clay loam soils	2" to 3"	1½" to 2"	3" to 4"	0 to 3"	1½" to 2"
Soft clay soils, plastic when wet	2" to 3"	2" to 2½"	4" to 5"	4" to 5"	1½" to 2"

1 Thicknesses of surface, base, and subbase depend upon intensity of use and severity of climatic conditions.

2 Well graded crushed stone or equivalent compacted to high density.

3 One inch of asphalt concrete may be substituted for each 3 inches of sandy gravel and the insulation course eliminated.

TABLE 2 THICKNESSES OF PAVEMENT LAYERS¹ FOR PARKING AREAS AND DRIVEWAYS FOR HEAVY TRUCKS

Type of Subgrade	Asphalt Concrete Surface Course	Base Course		Subbase ³ Course (Sandy Gravel)	Insulation ³ Course
		Asphalt Concrete	Crushed ² Aggregate		
Gravelly or sandy soils, well drained	3" min.	2" to 2½"	4" to 5"	none	none
Average clay loam soils	3" min.	2" to 2½"	4" to 5"	3" to 4"	1½" to 2"
Soft clay soils, plastic when wet	3" min.	2½" to 3"	5" to 6"	6" to 8"	2" to 2½"

TABLE 3 THICKNESSES OF PAVEMENT LAYERS FOR PLAYGROUNDS

Type of Subgrade	Asphalt Concrete Surface Course	Base Course		Insulation Course
		Asphalt Concrete	Crushed Aggregate	
Gravelly or sandy soils, well drained	1½" to 2"	1½"	3"	0
Average clay loam soils	1½" to 2"	2"	4"	1½" to 2"
Soft clay soils, plastic when wet	1½" to 2"	2½"	5"	1½" to 2"

(concluded on page 78)

FRANKI FACTS



CLIENT:
Atlas Steels Limited
LOCATION:
Tracy, Quebec
TYPE OF STRUCTURE:
Steel Mill
CONSULTING ENGINEERS:
Surveyer, Nenniger & Chênevert,
Montreal
SOILS CONSULTANTS:
Racey, MacCallum & Associates
Ltd., Montreal
Teratech Limitée, Montreal
GENERAL CONTRACTORS:
Pigott Construction Company
Limited, Montreal
NUMBER OF FRANKI UNITS:
1410 Caisson-Piles
UNIT WORKING LOAD:
75 to 100 tons in compression
16.5 tons in tension

VERSATILITY OF FRANKI CAISSONS SATISFY NINE DIFFERENT FOUNDATION DESIGNS

Problem

The site for the new steel mill, built by Atlas Steels Limited, was typical of the Sorel area. It consisted of sandy material to 70-foot depth, overlying plastic clay, with rock down at 275 feet.

Heavy load concentrations were to be anticipated. A technical and economic study by the Consulting Engineers indicated the use of piles. The end-bearing pedestal type pile, as built by Franki, seemed the best selection, as it develops a greater capacity at a higher elevation, thereby reducing the stresses on the underlying clay. Franki Caisson-Piles had also been used successfully on nearby projects.

An additional problem on this site was created by the presence of a 3-foot layer of clay at 10-foot depth, over part of the area, and a second one of 4-feet about 30 feet deep, over the whole area.

Solution

Even though the Franki Caisson-Piles would have developed their bearing capacity at 20-foot depth, the presence of these clay layers might have caused long term settlement.

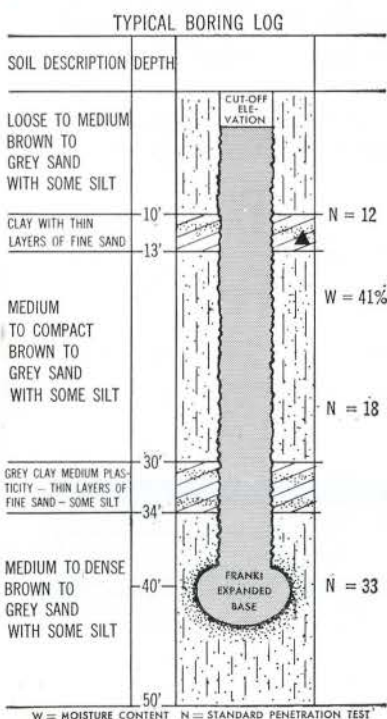
To overcome the special conditions and also to suit the great variations in loads (including uplift forces of 16.5 tons) the Consultants designed nine different types of Caisson-Piles. All were of the Franki type but differed from one another in diameter, in depth, in type of shaft or in reinforcing.

A total of 1410 Caisson-Piles were driven on the site by Franki Canada Limited.

This project has demonstrated the versatility of the Franki type Caisson-Pile, which can be designed to fit the most difficult and variable site conditions.

Franki's controlled installation procedure achieved uniform bearing throughout all the buildings comprising this steel mill.

We are proud to state that our work was performed on or ahead of schedule, to the entire satisfaction of the client.



FRANKI

CANADA LIMITED

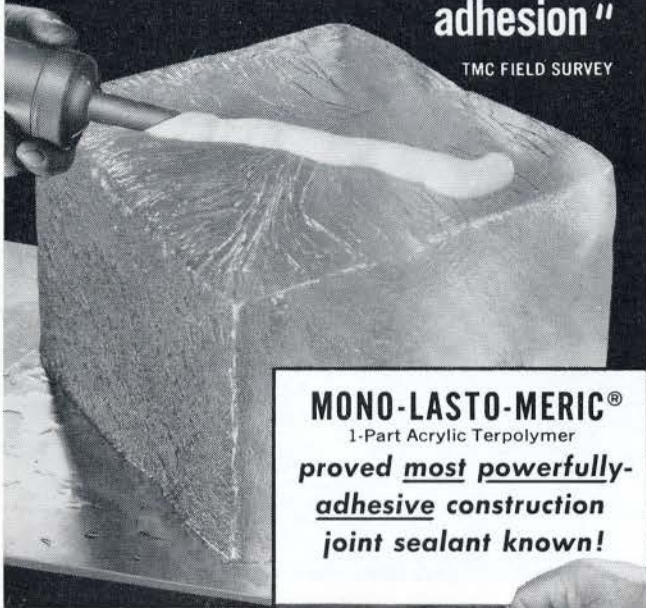
Head Office: 187 GRAHAM BLVD., MONTREAL 16, P. Q.
QUEBEC OTTAWA TORONTO EDMONTON VANCOUVER

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

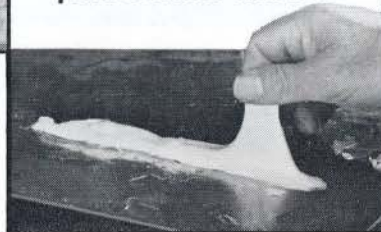


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When a gravel sub-base is to be applied over a subgrade composed of clay or clay loam soil, an insulation course consisting of from 1½ to 2½ inches of sand or stone screenings should first be applied directly on the subgrade. This prevents the subgrade soil from penetrating into the granular sub-base with resulting loss of strength. However, if an asphalt paving mixture is substituted for the granular sub-base, an insulation course is not needed.

When a granular sub-base is employed, it may consist of a sandy gravel all passing a 2-inch square opening. For a granular base course, a well graded crushed stone, crushed gravel or crushed slag, all passing a ¾-inch square opening, should be specified. The specifications of the local provincial department of highways or city engineer's department for granular sub-base and granular base course will usually be satisfactory. Granular base and sub-base materials should be spread in layers of three to four inches, and should be compacted by rolling to a minimum of 100 per cent of modified AASHTO density (AASHTO Designation T180).

The surface of the granular base course should be shaped by blading and rolling to the specified cross-section and profile. When testing with a 10-foot straight edge, the finished surface of the base should not vary in profile or cross-section by more than 1/8 inch.

The surface of the granular base should be primed with from 0.2 to 0.5 gallon per square yard of asphalt primer (Special Primer or MCO). Within these limits, the precise quantity of primer to be applied will depend on the porosity of the surface of the base course, but should be the maximum amount that will be completely absorbed within 24 hours.

If small areas of unabsorbed primer remain on the surface after 24 hours, they should be blotted with clean fine sand. Any excess fine sand should be swept from the surface before the pavement is laid.

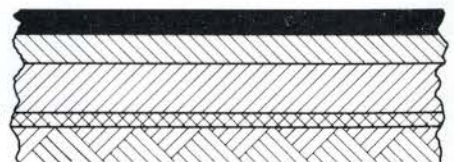
Tables 1, 2 and 3 indicate that hot-mix asphalt concrete can be substituted for granular base and sub-base. In these cases, the substitution of hot-mix asphalt concrete can be made on the basis of one inch of asphalt concrete for each three inches of sandy gravel sub-base, and one inch of asphalt concrete for each two inches of crushed stone base. It must be emphasized however, that the *only* asphalt paving mixture to which these substitution ratios can be applied is well designed, hot-mix asphalt concrete.

On many projects, it will be more convenient to eliminate granular base, or granular base and sub-base, and to employ hot-mix asphalt concrete for the entire asphalt pavement structure.

A typical cross-section for asphalt paved driveways, parking areas, playgrounds, etc., is illustrated by Figure 2.

FIGURE 2

SURFACE 2-3"
BASE 1½-6"
SUBBASE 0-8"
INSULATION 0-2½"
SUBGRADE



Industry

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(Circle reply card item 3)

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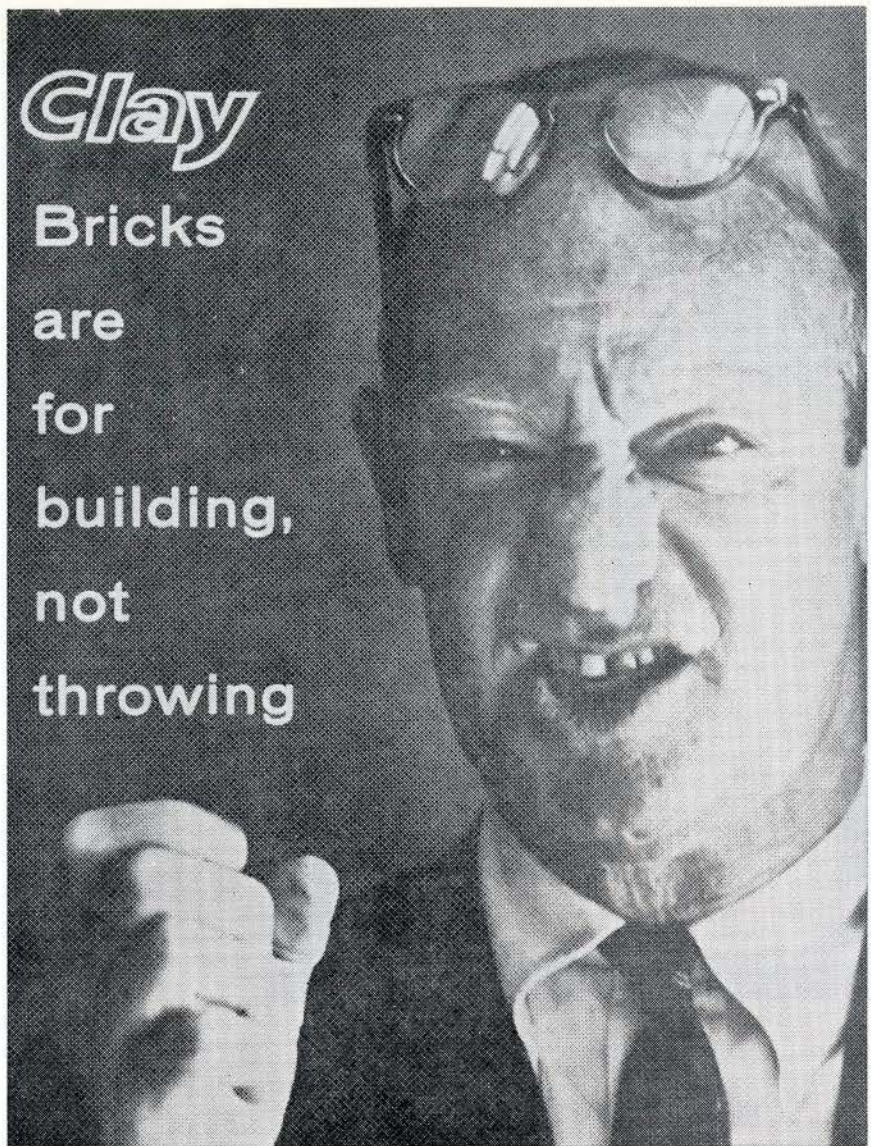
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(continued on page 92)



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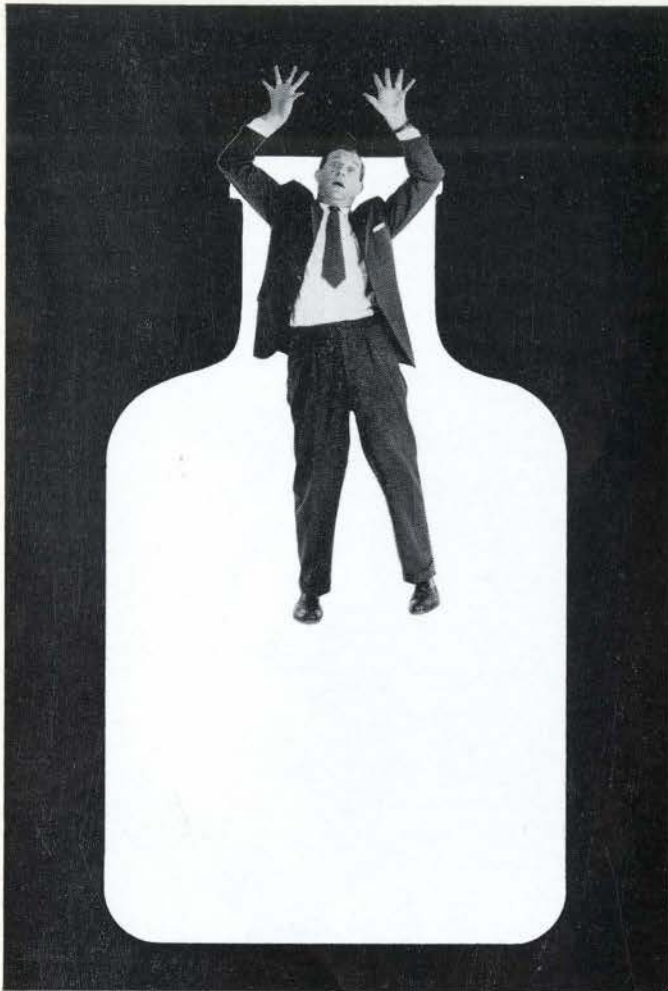
Finally, if you are an architect you will know all this from past performance of genuine burned clay brick. May we send you a copy of a recent study! showing comparative total costs of other materials and clay brick.

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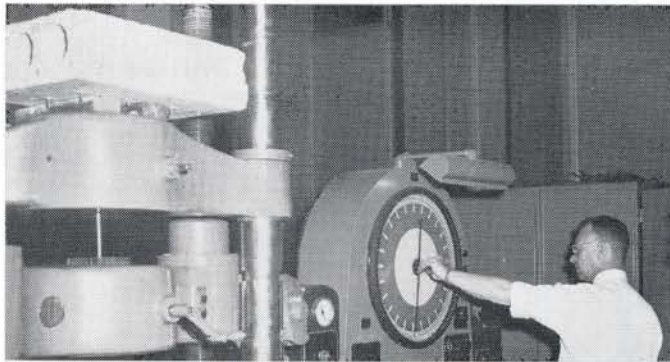
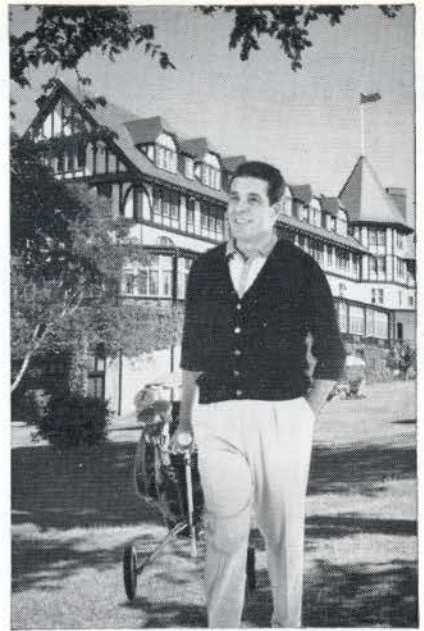
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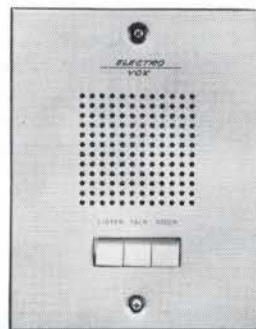
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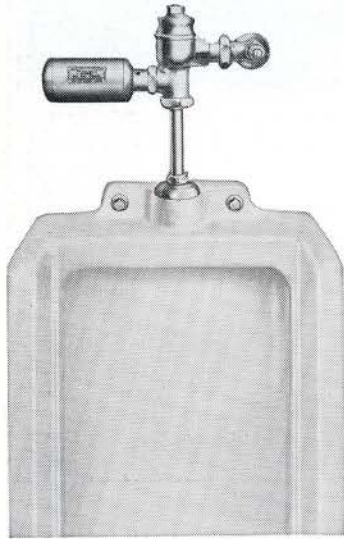
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(continued from page 85)

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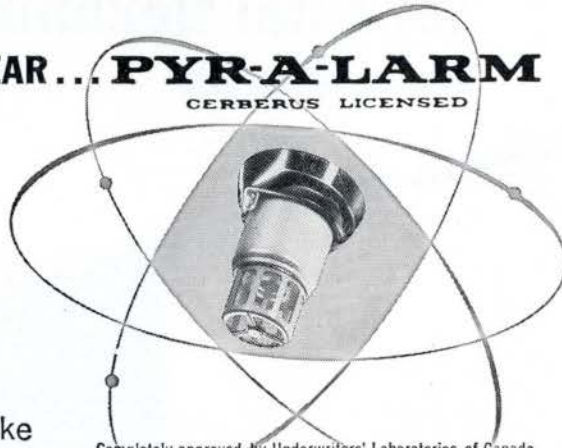
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(continued from page 33)

Dr. Styliaras, a professor at Manitoba's University. Evidently he is a respected member of his profession and has lectured at Weimar, Yale and Columbia. He discussed Calgary and the CPR development proposal.

It was refreshing to read the viewpoint of a disinterested scholar. Here everyone seems to take such a personal attitude. One citizen is concerned because he hates the CPR, another because of his increased tax cost, another is disappointed the Robin Hood Mill isn't being removed, others are worried about raising the bridges and their cost, others are only concerned with possible jobs for a few months or increased prices for their own property.

This man brought you down to earth. His concern was only for the city as a whole and the lives of the people who will live in that city.

He says in effect (like that great city planner Thomas Mawson 50 years ago): Exploit the Bow river in downtown development. The city centre is a triangle with the river along two sides and the apex at St. Patrick's Island.

Styliaras states Calgary is an overdeveloped sprawling residential area and an underdeveloped central core. He feels the core is the "essence of any city" and our city's core is "a sharply defined triangle delimited on two sides east and west by the pleasant Bow River, its clear fast running waters and on the long (south) side by the present CPR tracks". An included air photograph of downtown Calgary makes this crystal clear at a glance.

He feels we have "treated the triangle portion of the Bow River bank with exploitation rather than vision" and states that we are all aware that the south River bank is an "unsightly area awaiting as it were for a chance to be put to better use."

He is opposed to moving the tracks along the river and says "In an era such as ours that makes so many demands on our incredibly tortured cities by congestion, pollution, noise, disorder and ugliness it is important that no freight lines be allowed to run through or close to central parts of the city. As he points out they really are neither necessary nor can they properly serve industry. Presently the CPR agreement provides for through passenger trains on the river and freight with some office and store space on old right of way. He thought the correct pro-

cedure is to remove the freights from the centre and keep the passenger lines on the CPR present right of way on 9th Avenue. He suggests the city then use part of the old right of way and occupy land that is now partially a traffic road-block, for a south throughway running across Calgary parallel to the tracks, close to downtown and yet allowing for turnoffs east and west. At present the CPR agreement with its provision for elevated bridges over the railway as well as the river are cutting off traffic north. We could afford wider bridges instead of higher ones with this plan and underpasses under the passenger lines.

This would leave our river to be developed with apartments, hotels, clubs, buildings, restaurants and small shops. It could be firmly linked into the present section by devoting some of the north-south streets to pedestrian use only. As he points out it could be a pleasant and beautiful walk of 15 minutes from 9th Avenue where the busy area now begins to the river bank area.

This gives us a beautiful core, free of railroads and cross city traffic incorporating the natural and cheap external beauty of the river. It destroys none of our present development and involves very few actual major alterations. Of course to put Dr. Styliaras' plan in force means two things: defeat of the present agreement allowing two sets of railway lines in our central core and insisting that city council obtain a proper master plan for development in downtown Calgary which includes and benefits the CPR, but, which still links our downtown area into a whole not squeezes it between two sets of railway tracks. He says "Calgary may never be a city of millions but with its beautiful river and clear air could become a centre of prominence". If only it could be done!

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