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## EDITORIAL

THE STUDENTS IN THE SCHOOLS OF ARCHITECTURE in Canada seem, suddenly, to have become aware of the architecture of the United States. They, and their predecessors, have long been familiar with buildings, through the technical magazines, from the Temple of the Scottish Rite in Washington to the new Lever House in New York. The modern concern is not so much with the design as such, but with the three dimensional building, its materials, its furnishings and the emotional appeal which it arouses. Anyone who has seen St. Peter's, Rome, by photograph and, later, stood in amazement before the church itself, will realize how important, from an educational point of view, is the visual, actual experience. What is true of St. Peter's is no less true of the United Nations in New York, or a house by Frank Lloyd Wright.

As a result of student expeditions, we now have, in Canada, a collection of coloured photographs of buildings from Boston to Chicago that could hardly be more complete in the libraries of the United States. In those schools that are discarding their old black and white slides in favour of colour, the influx of the new slides is as much a problem as it is an asset. Architects and students are bringing back photographs of European buildings, both ancient and modern, and five hundred from one individual is not an uncommon bag.

The average architect, in a strange town, is usually a shy person who takes his photographs surreptitiously, but students en masse have no shame and an insatiable curiosity. Toronto, so far, has an unblemished record of behaviour, and it could hardly be otherwise when one recalls the hospitality of architects like Alden B. Dow, and of the owners of Frank Lloyd Wright houses. It was an interesting discovery that these same owners have a pride in the smallest of these houses not surpassed by the Duke of Marlborough in Blenheim. Blenheim Palace is now a business, but the showing of modern American houses to thirty students, armed to the teeth with cameras and light meters, can spring only from a genuine love for the building.

It is, probably, platitudinous to say that in no field of architecture is the printed page a substitute for actual building, but, in the field of housing the argument is incontestable. Plans, elevations and photographs are of little importance compared with a visit to one tenant's apartment, or a view of children at play. We have just seen housing in Harlem, and we shall long remember a tenant's apartment. With appropriate captions, it could well be illustrated in any magazine dealing with homes and furnishing. The walls were white and furniture was modern and inexpensive. Clichés like driftwood over the chesterfield seemed less incongruous than they would in the living rooms of the well to do. It was hard to remember, as one went from room to room, that the occupant, only a year ago, was a tenant in a loathesome slum.

Even more remarkable to the Canadian was the accommodation for children whose mothers were at work. In one room, in the early afternoon, fifty or more negro children were asleep on spotlessly white sheets, while, in another, children were singing behind tables gaily set for their halloween party. The same pride in the house that we saw in the Frank Lloyd Wright owners, was evident, in a different way, in this low rent housing. There was the obvious pride of tenants and children, and a different pride in those who conceived and managed the estate. Their's was a pride in achievement, and in the happiness that they were giving to thousands of poor citizens. We have yet to see housing on any scale in Canada, and we hope, when that time comes, that we shall show the same hospitality to a group of American visitors. Our hosts had nothing to learn from us, but the welcoming committee consisted of an architect, a member of the board, three social workers, the manager and the building superintendent. How long it will last we do not know, but among all the sights of New York, the Lever building and a negro apartment seem, at the moment, the most indelible impressions.

## The Role of Architecture

Cecil S. Burgess

ARCHITECTURE IN THE SENSE OF SERVICEABLE BUILDING is the most omnipresent of all the arts. It has the longest and most continuous history. It is ever present with us. We cannot escape from it. It is important that we should understand clearly upon what foundations our art is built, and what is its social role. Architecture is both a profession and an art. These two diverse elements are inseparable in it.

It is well to consider, from time to time, the general state of architecture, and to ask ourselves how we stand, whither we are going, and why. In doing so, we shall find that whilst apparently rapid changes are taking place in the features of our buildings, there are also slower and more important changes coming over our judgments regarding these more superficial appearances. We, naturally, endeavour to keep up to date with the most recent materials and methods of construction in order to make our buildings more efficient and to have them dressed according to the latest fashion. This keeps us on our toes and brings custom to our doors. We are happy in the enthusiasm which this activity engenders. A lot of work is going on and it is being done with high technical efficiency. Much sound thought is being employed upon it, and we are inclined to think that at no time in the world's history has so much intelligence and experience been applied in architecture. Our profession is progressive and goes on from strength to strength so rapidly that, on looking back even a few years, we smile at the incompetence, not only of an entirely past generation, but even of our own efforts of a few years ago. Surely, we are apt to think, we have reached a higher level of intelligence than those who were satisfied with such inefficient arrangements, and we proceed with relish to demolish their works. More careful thought about that past work may cool our enthusiasm somewhat, but, like a cold bath, may be good for the health. Will our successors in like manner jeer at our efforts? The bright and active souls of all past times had exactly similar exalted opinions of themselves as we have, and just the same scorn of their benighted predecessors. Do not let us imagine that we alone shall escape the condemnation of those who shall follow us. That is as sure as fate.

The lesson that we should draw from this is not one of discouragement, but that we belong to a great company of those who, each in his generation, played a good part in its service; for each generation has left some work of noble note of service to us and to humanity. Times change and we are changed in them. What is the nature of these changes and what has caused them? Some examples will suggest the answer.

In the 16th century, an Italian, Vincenzio Scamozzi, an enthusiastic follower of Andrea Palladio, published a book to which he gave the title "The Idea of the Universal Architecture." He seriously believed that he was expounding the final prescription for the production of beautiful architecture. A French writer about the middle of the 18th century says of the current architecture of Paris that it has "a fine general effect, proportionate to our needs, fulfilling all rules of taste and all the exigencies of life, giving form, in a word, to French architecture, that is to say, modern architecture, skilfully evolved from ancient architecture." English architects of the same period had no less conviction of the excellence of their own work; it was the final crown of architecture. This Palladian architecture had style and was responsible for many buildings of great beauty. Previously, what we call the Gothic style had been general in Europe. The Palladians refer to it as the "barbarous" manner of our ancestors. Yet in that barbarous style there had been built hundreds of the grandest cathedrals, thousands of the loveliest churches upon earth and, if we include its latest phase, the Tudor, many a residence of delightful charm still extant and still charming. Why was it barbarous? The medieval builders went into a great building project in the spirit of young adventurers. They were prepared to invent scores of expedients to make this thing stand firm. Nothing would daunt them. The problems that they faced with the means at their disposal cannot be faced by modern engineers. The complexity of the vaulting system of a medieval cathedral, with the uncertainty of the contingents, cannot be solved by any simple system of graphs or calculations. By empirical methods, the medieval builders tackled the problem and won the fight. Who, today, would build up of small stones a rose-window forty feet in diameter and filled with delicate pattern of stone tracery? That risky sort of thing isn't done. But it was tremendous fun to do it. It was done in a spirit of youthful adventure. That is why it was "barbarous." Europe had grown up now and that sort of thing had lost its appeal. The Palladians were full grown thinking men. They wanted reason and beauty and calculated procedure. They could learn that procedure from books and at leisure. Times had changed. Good manners and culture were more prized than redundant energy.

Today, energy and enterprise have staged a revival. New methods of construction, new materials are being sought for and found, and we hail them with enthusiasm. Are we reverting to the barbarous spirit of our ancestors? Have we retained our respect for the fine ideals of good manners, dignity and refinement of our civilized Palladian ancestors? Do we have their scorn of vulgarity? We have not. On the other hand, we may perhaps claim that, in spite of our world wars and bitter antagonisms, we are replacing these more superficial qualities with a more genuine recognition of the brotherhood of man, which is the only true criterion of progress and civilization, and this will inevitably make its mark in our architecture of the future.

In turn, there was a revolt from Palladian architecture. It was felt that they had not said the final word about architecture. It was a type of work introduced by intellectuals for intellectuals, having their ideas carried out by workers who might, or might not, sympathize with its ideals, but who did not share in its creation nor influence it in its various applications. The revolt against this was well expressed by William Morris's claim that art should be produced "by the people, for the people, a joy to the maker and the user," a saying that applied well to medieval art, and is not without appeal to us.

It is interesting to consider carefully this contrast between a period of energetic enterprise and one of calm reflection in which the higher values of life come into prominence in men's mind. In the one case, the chief pleasure and satisfaction is found in the outlet of energy, in the other, in the judgment of the work produced. In the one, the satisfaction arises from the display and evidence of human endeavour towards practical ends, from what is "expressed" of human aims and consequently of the character of the workers; in the other, the value of the work is tested by its appeal to the sense of sight. We call that a work of art which gives satisfaction in either of these two ways. We distinguish between its "expression" of character and its "beauty" of form; but in all work of high value these two elements are inherent and inseparable. In the works of man, the satisfaction of the sense of sight has a notable function quite different from the satisfaction we get from the expression of character. It imposes upon us demands of its own. This function is like that of our conscience in its judgment upon our conduct. Our conduct may be energetic and successful in its practical aims, but these must pass the final test of conscience. In a similar way, all our ideas have to pass the final test of reason. So the eye demands final satisfaction; its function is that of a judge, and it is the final judge of "beauty." All the other aims that enter into a work express our character and this "expression" is what gives us the most stirring delight. It is the joy of living.

Beauty in art has thus a place distinct from all other satisfactions. There is that in our nature that can never be satisfied without it. Our eye is the only judge of it. The Palladians had caught a vision, derived from the resurgence of long lost ideas, of a way of building deliberately to satisfy this sense of beauty. The great medieval enthusiasm for overcoming the challenges of construction did not appeal as of supreme importance to the minds of these adult and calmly thinking men. They realized that there was still a human interest that placed a crown upon all other human appetites and that could be consciously embodied in their buildings. Further, they realized that the pursuit of this aim exercised a refining and cultivating power over their own minds and characters. If, looking over the historic field of architecture, we distinguish these elements, on the one hand the desire for "beauty" and on the other hand, all those other aims and appetites that find satisfaction in creative work and which we summarize as "expression," it will be seen that the degree of emphasis and appreciation for one or the other at different times and in different social circumstances has determined the types of architecture. The Greek temple is the product of minds and eyes investigating the quality of beauty with intense interest and in full self-consciousness. These buildings express the character of their builders in their exhibition of careful forethought, and of delight in delicate and accurate workmanship applied in handling masses of material. All this, however, is kept subordinate to the satisfaction of the eye, that is to say, to the creation of beauty. In the medieval building, display of constructive power and the craftsman's skill are the chief objectives, yet the innate sense of beauty has demanded a share because that is a permanent and essential requirement of human nature.

The expressive element in art arises from the emotions and stirs the emotions. We derive from it knowledge of human nature and sympathy with all nature and this is a source of happiness. The element of beauty in art does nothing of this sort. In the beauty of a building or other work of art, no extraneous emotion is involved either in creating or appreciating it. It simply supplies the eye with what the eye craves for and which the eye in its turn passes on to the mind and spirit. Expression is the servant of our desires. Beauty is the teacher of our minds. From it we acquire finer ideas, better manners, higher values of life.

From living amongst good buildings we feel better, more self-respecting, more like good human beings living amongst other human beings, all with duties and responsibilities to one another and good feelings towards one another. They are examples that we have to live up to. We can readily understand how, in the Middle Ages, in every city or village, the citizens or villagers felt better when they had at last got a fine cathedral or a good little stone church erected in their midst. Now they were somebody of real consequence; not simply because they could go to church services regularly, but also because they now had something amongst them that they could respect and should try to live up to. Londoners have preserved this feeling about their St. Paul's Cathedral. Other buildings may express more of human emotions and aims. Visitors may, or may not, admire it. Critics may say what they like about it. The Londoner cares little about what they say, he judges them and not the building by their opinions; for in his innermost consciousness he knows that that building has a continuous and powerful influence over him, guarding his self-respect and making him a better citizen of no mean city. It may be suggested that this arises from purely religious association; but the irreligious feel just the same about it. The feeling is due to the fact that the building itself embodies so much of the universal laws of beauty to which human nature is attuned. Being a harmonious creation it stands as an example for harmonious life. The citizen is called upon to live up to it.

Westminster Abbey commands respect of a different sort. Its great beauty is incidental. Primarily, it expresses forcibly the courage and enthusiasms that brought it into being, the efforts of thought and power expended in its structure, the skill and ingenuity of the many craftsmen that laboured upon it. It is a record of all these and also of much of the rough island's story which has passed in and around it. All these arouse lively emotions, but only in a secondary measure does the building instil lessons of good manners and refinement of life. The Palladian mind even thought it barbarous.

In view of the above examples, let us go further back in history to see how the principles of "expression" and of "beauty" were treated in the buildings of the ancient Greeks. That mutable and semi-nomadic people kept spreading settlements around the sea coasts. Not one of these colonies was happy or felt itself settled at all until it had built a good solid temple in its midst. This they did in order that they might thereby draw to themselves the attention and special favour of some one of the superhuman family. These Greek gods were delightful creatures, each one very admirable and loveable on account of his or her qualities or defects; they were all in one way or another fine specimens of humanity. This religion was a common tie for this scattered race. Greek knew his fellow Greek wherever he met him by his shared enthusiasm for these charming Olympic gods, and by his delight in the temples dedicated to these gods. These temples commanded more respect and reverence than the gods themselves. They were designed to set models of beauty before the eyes of the citizens. One is tempted to call them abstract architecture, so severely did they subordinate all expression of the current life of the people around them who were a busy, excitable roving lot "for ever roaming with a hungry heart"—eager to see and to know new things. There was no novelty about the form of the temple, the type of which remained fixed for centuries. The thought of their designers was fixed upon creating one great harmony of part to part and upon everything, modulation of form, however subtle, that could satisfy the most exacting eyes that ever took delight in beauty. From the stories of their gods they learned the joy of life. From the beauty of their temples they learned how to live, for to them what was beautiful was good. This they really worshipped — it was their conscience — it kept them sane and made them noble.

It is frequently said amongst lay-men and occasionally by architects, who ought to know better, that, at the renaissance, architects "went ancient" and copied ancient Roman buildings. This is baseless nonsense. Such buildings as St. Peters, Rome, The Invalides, Paris, St. Paul's, London, the Italian, French and English palaces, the manor houses of England of that period, have not the shadow of a counterpart in ancient architecture. What really happened at that time was that architects and others "went modern" as completely as they are doing today. It is true that the beauty of classical orders fascinated men's eyes. But these were actually used as a "new" way of decoration. New functional forms of buildings and new building techniques were introduced in accord with new social demands. The same sort of thing is taking place today with the addition that many new and serviceable materials are being put at the disposal of architects. Our whole social conditions are undergoing great changes and demand this revolution so that our architecture may be the "expression" of our society. It is also necessary to embody in our work that other element of art, "beauty", without which our eyes shall be starved of their necessary nourishment.

*This is the first of a short series of articles which Professor Burgess has agreed to write for the Journal.* *Editor*

# The Manufacturers Life Insurance Company Building

R. Schofield Morris

In 1925, the Manufacturers Life moved into its new building on Bloor Street. The building was placed in an area which at the time was very remote from the business and commercial section of the city. It was a bold move and one which has paid off handsomely. The 1925 building was placed in an open field in an area of four-and-a-half acres on the southern edge of one of Toronto's very lovely wooded ravines. Although it was then in a residential area, Bloor Street was an important thoroughfare. The building was placed well back from the street and the property was surrounded by a fine wrought iron fence with stone posts. In front and to the sides of the building a broad level lawn was started. A small section of grass from the edge of a creek in Scarborough Township was lifted and planted in a new garden. From this small beginning, there now has grown a lawn of "Scarborough Bent", almost half an acre in area, for which the Company is justly famous and which must be one of the finest of its kind in existence.

In 1925, when the building was first opened, there were two hundred and fifty Company employees, and, in 1948, this number had increased to six hundred – and this, in spite of great savings in personnel, brought about by the use of various kinds of mechanical business machines. At that time, 1948, the building was naturally very crowded and one floor of the garage had been taken over for files. The company had overflowed into four adjacent buildings. The need for space was urgent.

The task of the architects was to add some 200,000 square feet of floor area to the 58,000 then existing. The old building was designed by Sproat and Rolph of Toronto. It was basically well conceived, simple in plan and had clear spans in the wings of some 45 feet. The service core was in the centre of the building opposite the front entrance and the shape of the plan was a very shallow U. It had been expected that additions would be made by extending the prongs of the U towards the north.

Together with the addition of a large area of thoroughly up-to-date working space, the program included modernizing the old building and making it as much like the new as possible. This meant completely new mechanical equipment and the provision of full air-conditioning.

The contract for the new building was let in June, 1950. Construction was complicated almost immediately by the outbreak of the Korean war which led to shortages of material, rumours of shortages and out-and-out restrictions.

The old building was, of course, fully occupied during the construction period. In fact, between the time of beginning sketches and occupancy of the new building, the staff had increased by more than 15%. As soon as the basement could be made habitable, the filing department which had occupied one floor of the garage was moved into the new building, the space it had occupied being needed for vital parts of the mechanical installation. As soon as each floor of the new building was finished it was occupied, releasing a corresponding amount of space in the old. The whole building new and old was completely taken over during the early summer of 1953 – almost exactly five years after the beginning of preliminary sketches.

Much of the work of the typical insurance company head office staff is done in groups working together upon what amounts to almost a production line arrangement, each member of the team or group having a particular function to perform. Departments grow, some of them then consisting of many groups, and as each group may occupy six or seven hundred square feet of floor space, large unobstructed areas become very desirable in order to take care of units of this size. Fairly steady, but quite rapid, expansion has become normal to insurance companies on this continent and particularly in Canada. In terms of floor space, this expansion must obviously be provided for in a horizontal direction if departments are not to be split. As growth continues, large departments encroach upon smaller less rapidly growing ones which are then moved to another floor. Changing economic conditions often cause some departments to shrink as others grow. Mechanical business machines on account of their weight, the noise which they make, and the heat which they generate, are usually concentrated in one large area. All these considerations usually result in the need for unobstructed depths of about fifty feet (this being about the limit of economical span), and lengths which are limited only by the area of the lot and the allowable maximum in horizontal travel. In larger buildings, these considerations sometimes lead to a depth from outside walls of about 100 feet with a row of columns down the middle. In other cases, the answer is in wrapping 50 foot space around a service core or to a combination of both, plus some short span space for small departments requiring outside light and consisting of a comparatively large number of small rooms. Manufacturers Life became essentially a centre core plan.

Having decided that such space is the most efficient and economical for the work to be done in it, it becomes obvious that essentially the same working conditions must be provided at a desk which may be fifty feet from the nearest window as is experienced at one which is close to an outside wall. It is also desirable for obvious reasons of economy to place desks close to exterior walls and windows and without the occupant feeling chilly in cold weather. The answer is, in the first instance, of course, first-class air-conditioning and artificial lighting, and in the second, insulated walls and windows. If these conditions are provided, competition for locations close to windows does, in fact, almost disappear. It might be argued that under these circumstances windows might be eliminated altogether if fire regulations permitted. However, in spite of the apparent experience of one company occupying a large and new building where venetian blinds are permanently lowered and the slats turned so that it is impossible to see through them, we still like to be able to get a glimpse, even though a relatively distant one, of the outside – of sunshine or rain, of an adjoining building or of distant greenery.

Employee welfare is important to insurance companies. Apart from the general and obvious interest of life companies in raising the general health of the people and in setting an example in providing healthful surroundings for large numbers of office workers, requirements for new staff are inevitably constant in such large companies. Much of the work can be and is done by young girls who do not need much previous training. While in these days young women often continue with their jobs after marriage, the turnover is largest in this group of office workers. The need for attracting large numbers of the right sort of employee is a paramount and continuing consideration. Convenience in transportation is important in this respect, and so also are good luncheons at moderate prices, good rest rooms and some opportunity for recreation and of meeting other members of the staff on a social or recreational basis. Company groups, societies and clubs are often formed by the employees, and the Company sometimes provides moderate facilities for the special use of these groups.

It is the practice of most companies, if possible, to gather their employees together from time to time for lectures or instruction. For this purpose, auditoriums are provided which also function as games rooms and sometimes for dances and theatrical productions or concerts. In the largest companies it becomes obviously impossible to provide an auditorium which is large enough to accommodate the staff at one time, and very often the auditorium is omitted altogether, as was the case with Manufacturers Life, inter-communicating lounges being used for this purpose.

The problem of expansion is always important in this type of building. The original structure had been planned with the idea that the ultimate building would be a fully developed U. It was soon found as the plan developed that an extension carrying out this plan would not provide nearly enough space and a modified T shape plan was adopted.

The mechanical facilities for the entire building were placed in the new addition. These included the necessary duct work, elevators, lavatories, fire escape stairs, vertical correspondence conveyor, and all other such facilities. This allowed the existing facilities in the old building to remain untouched until after the staff was moved into the new.

The addition was carried to a height of eleven stories, being five stories above the old building. As an addition of this size and kind was not and could not have been anticipated in 1925, a major job of underpinning the north wall of the old building became necessary. This is described in some detail in Mr Carruther's article following. There is ample space for still further expansion towards the north.

No attempt was made by the architects to follow the design of the old building. We were content that the new part should be in general harmony with the old and that the same stone should be used. It was necessary, in order to provide a satisfactory surface for partitioning, that the interior wall line should be straight and without breaks. This meant that the exterior walls are comparatively thick. This was allowed to show on the exterior of the building as relatively deep reveals to the windows which, incidentally, provide some shade against the diagonal or slanting rays of the sun. The stone is selected Indiana limestone with a rubbed finish. The new building, of necessity, dominates the old without competing with it.

Tying in with the old building, the need for long spans and erection speed dictated the use of structural steel. Windbracing requirements ruled out pre-cast or metal floor systems, resulting in the adoption of standard reinforced concrete floors with the usual under-floor ducts at five foot centres. Approval was secured for the use of Zonolite plaster fireproofing for all steel beams, thousands of pounds of unnecessary weight thereby being eliminated. Floor heights in the old building were fortunately found to be sufficient for the great complexity of structural and mechanical installations required in a modern building. Mr Carruther's article deals with the structure in detail.

The character of the space required has been described above, where the requirements of the program were outlined. Working spaces are wide, open and well lighted. Colours of floors, ceilings, furniture have been correlated to produce harmony of colour and light reflection in order to cut down visual fatigue caused by brightness contrast. A heating and cooling system which is fully described in Mr Wigg's and Mr Leopold's articles was adopted after being found to be economical in this particular application. The system resulted in the moving of much less air than would normally be required where the temperature of the air is solely dependent upon the air supply. Translucent curtains were used to eliminate direct sunlight. These provisions have resulted in remarkably uniform conditions throughout the entire floor. This result is achieved, also, by the use of temperature controls which anticipate needs and which are actuated by outside conditions. Changes are thereby taken care of before overheating or overcooling takes place. The whole building is, of course, zoned so that hot sun beating on one side of the building accompanied by cold wind blowing on the other side does not result in unbalanced conditions in the interior. (One side of the building may be heated while the other is cooled.) The interior zone of each floor, that is to say the area which is more than twenty-five feet from the exterior walls, is controlled independently and here, while the building is occupied, year-around cooling is necessary. This condition is due to the heat generated by the lighting fixtures and by the occupants themselves, all heat loss or gain being taken care of by the exterior zone. Air is cleaned and washed and either humidified or dehumidified according to need.

It is a requirement of a building such as Manufacturers Life, that desks may be placed in any location upon a working floor with the assurance of standard working conditions as described above. It is also necessary that the desk should be supplied with telephone, inter-communication and power for the operation of light business machines without wiring being carried across the floor. This latter condition is fulfilled by a three compartment under-floor duct system described elsewhere. It is also necessary that partitions, waist height, seven feet or reaching to the ceiling, may be erected or removed in the least possible time and with the least possible disturbance to the staff. This is accomplished by the use of a standard 9′ 4″ ceiling for all working areas, by ceilings and walls without breaks of any kind and by moveable partitions.

Tile flooring in one foot squares – rubber in the case of Manufacturers Life – is used in order that if electrical connections are abandoned the flooring may be made good by the replacement of tiles. The floor may also be repaired in this way if it is damaged by reason of temporary partitions resting upon it for any length of time.

By careful attention to layout of lighting fixtures, a minimum adjustment is necessary by reason of partition changes, and this adjustment is easily accomplished by the removal of sections of the metal pan ceiling and by the space provided above it for making the necessary connections. By these means, maximum flexibility is achieved which is one of the most important requirements of the program. Temperature, light and air vary very little with the time of day or the month or even between summer and winter or with position on the floor. These are the methods used to satisfy the requirements mentioned earlier in this article.

Light is provided by troffers containing two four foot or six foot long fluorescent tubes. These troffers are flush with the ceiling. In large areas, and wherever there is a uniform arrangement of desks placed at right angles to the line of sight, the fixtures are without lenses or shielding of any kind, other than that provided by the body of the fixture itself. The lighting tubes are not directly visible when viewed at a normal angle. The absence of shielding results in a considerable increase in lighting efficiency and a worthwhile saving in maintenance.

Recesses are provided in the permanent walls of the central core which are used in accordance with the need either for coat racks or for files. There are no central locker rooms for office employees.

In order, as mentioned above, to be able to place desks close to exterior walls, regardless of weather, without any danger of chill, it was decided that the walls should be thoroughly insulated and that the windows should be double glazed. It was also decided that in order to take full advantage of double glazing and to be able to maintain relatively high humidities in cold weather, there should be no metal contact in frame or sash between outside and inside air. An economical solution was found in the use of two independent box section aluminum casement windows. These windows are fitted with standard hardware and may be opened without a special tool. It was made deliberately inconvenient to do so, however, except by the window cleaning staff.

Even when the building again becomes crowded, and before a further addition is completed, it is expected that reasonable working conditions will still be experienced.

A full system of communication by signal or voice is provided by a public address system, concealed above the ceiling and consisting of more than twenty stations on each floor. This system may also be used for regular musical programs and may be hooked up to outside broadcasting.

A very complete medical suite has been provided. This is primarily for looking after the health of the staff. A doctor and two registered nurses are in attendance. "They are primarily concerned with prevention of illness by education and regular check-ups. They are also equipped to administer to the minor ailment or to render first-aid should it be needed at any time. The most up-to-date clinical supplies are provided for this purpose. Here also is a laboratory where urine analysis tests are made for insurance applicants."

Manufacturers Life has agents in twenty-two foreign countries. Many hundreds of pounds of mail and supplies enter and leave the building every day. For the handling of this traffic a basement receiving room has been provided. This is reached by a ramp leading to a trucking area at basement level with an outside loading dock. Here, incoming supplies are received and checked in a room provided for that purpose. This space is in direct communication with the mailing room and with the store rooms and the addressograph department. The building maintenance rooms are also nearby and the freight elevator opens into this area. This elevator is available for moving freight to any floor and is so designed and placed that it can be thrown into service, if desirable, to take care of peak passenger loads on lower floors.

Mail is distributed and collected at approximately half-hour intervals on each floor. Documentary inter-communication and distribution between departments is taken care of by the same means. Requests for files are received in the filing room over a telautograph system and are despatched to their destination by means of the vertical conveyor provided for that purpose. This conveyor is also used for the collection and distribution of outside mail. The conveyor runs continuously and is operated on the endless chain principle, picking up and discharging standard size correspondence boxes at their designated destinations. A spiral ramp at the bottom of the conveyor in the mailing room provides storage space for an accumulation of out-going mail waiting to be attended to.

There are four passenger elevators with a speed of 600 feet per minute and a capacity of 3500 pounds. They are fully automatic with the latest timing and scheduling apparatus. Since this equipment was specified, advances have been made in operatorless control, and these elevators may be equipped in the future in this way without difficulty, if thought to be desirable.

The employees' lounge is on the north side of the ground floor of the building. It opens on to a terrace with a view over the garden beyond, with fine elm trees in the foreground and the foliage of the far bank of the ravine in the distance.

The kitchen is situated on the third floor and is served by the freight elevator from the receiving room in the first basement. All equipment is stainless steel. The walls are glazed structural tile and spaces are left for additional equipment when needed. The cafeteria is on the floor below. An island servery immediately below the kitchen is reached by two dumb waiters. Two complete counter lines are provided, one for each half of the cafeteria, which is decorated in coral, green and two shades of light brown. An attempt is made to avoid an institutional character and to produce surroundings which provide for maximum relaxation and enjoyment. Natural finish wood chairs are upholstered with green leatherette. Table tops are formica. Patterned curtains are provided and wallpaper is used in sections. The decorations and furnishings of the cafeteria and lounge were under the direction of Miss June Demerling, interior decorator on the architects' staff. Those of the private offices, ante room, board room, etc., were the responsibility of Mr Guy Mitchell of the Robert Simpson Company Limited, working under the general direction of the architects.

To the right is a room divided from the main lounge by a folding door. This room is for active games, ping-pong being particularly popular. A similar room on the left which is used for cards is divided in the same way from the lounge. These three spaces may be thrown into one and the large area thus produced is then used as an auditorium or meeting room. Adjoining the lounge is a library. This is used as a technical reference centre, to provide text books for those who are studying for examinations and as a circulating library for all members of the staff. It contains 3,500 volumes.

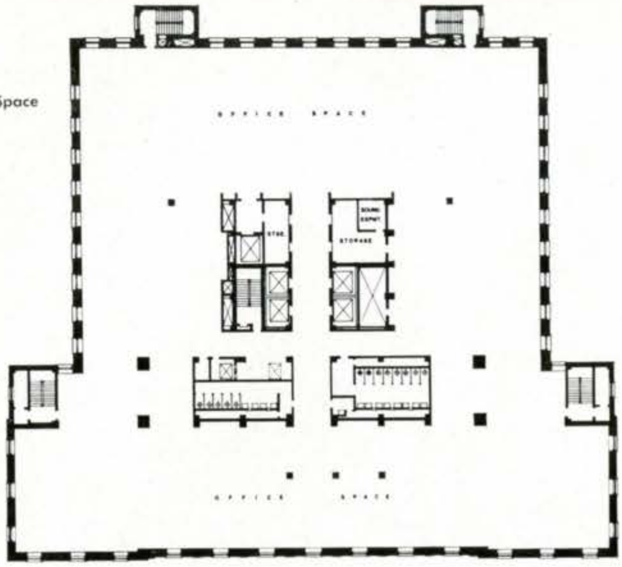
Walls of all lavatories from floor to ceiling are tiled in colour. The floors are ceramic tile in a basket weave pattern. Partitions are black structural glass and are hung from the ceiling. For ease of cleaning, all plumbing fixtures are wall hung and the floor is completely free of any obstruction.

A recess in the entrance lobby contains the War Memorial. Above the list of staff members who lost their lives in two world wars is a low relief of St George and the Dragon, carved in portland stone by Miss Jacobine Jones.

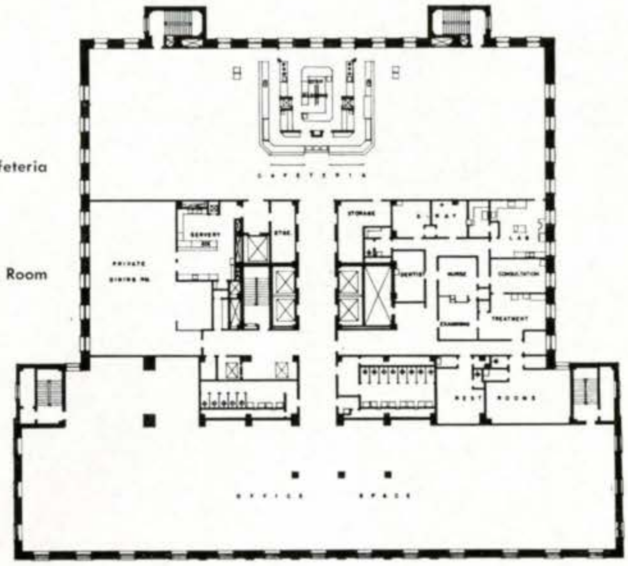
Special lighting fixtures were designed by the architects and executed by the Holden Company. Project managers for the architects were Messrs W. K. Aykroyd and J. Wilson, and the General Contractors were the Anglin-Norcross (Ontario) Limited. The clerk of works was Mr Russell McLelland.

The architects had the benefit of exhaustive work of the Companies' Housing Research Section in defining requirements in planning and in acting as a liaison with the owners.

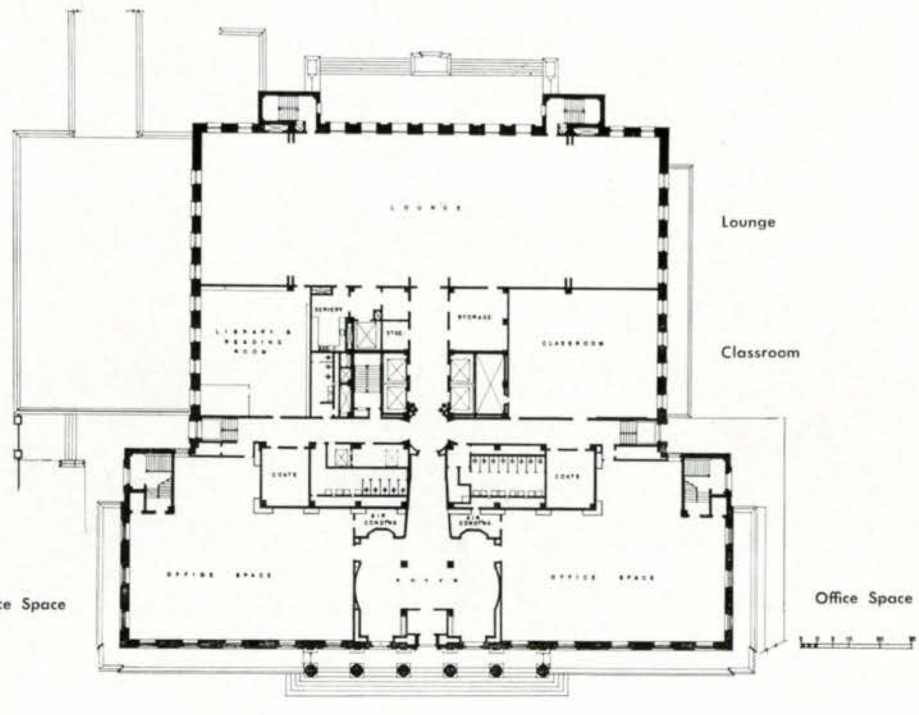
The Company was founded in 1887 with Sir John A. Macdonald as its first president. During the past five years alone its assets have increased by 25%. To take care of such future expansion, extra space has been provided within the present building. All of the eighth and ninth floors and parts of the third and fourth are rented on five and ten year leases. This will provide ample room for growth as space is required, and, sometime in the future, if we do not become almost completely mechanized, another addition may be built.




*Fourth floor*




*Second floor*




*First floor*

**Marani & Morris, Architects**

*Wallace, Carruthers & Associates Ltd., Structural Engineers*
*Wiggs, Walford, Frost & Lindsay, Electrical and Mechanical Engineers*
*Charles S. Leopold, Consulting Engineer for Air Conditioning*
*Anglin-Norcross (Ontario) Limited, General Contractors*

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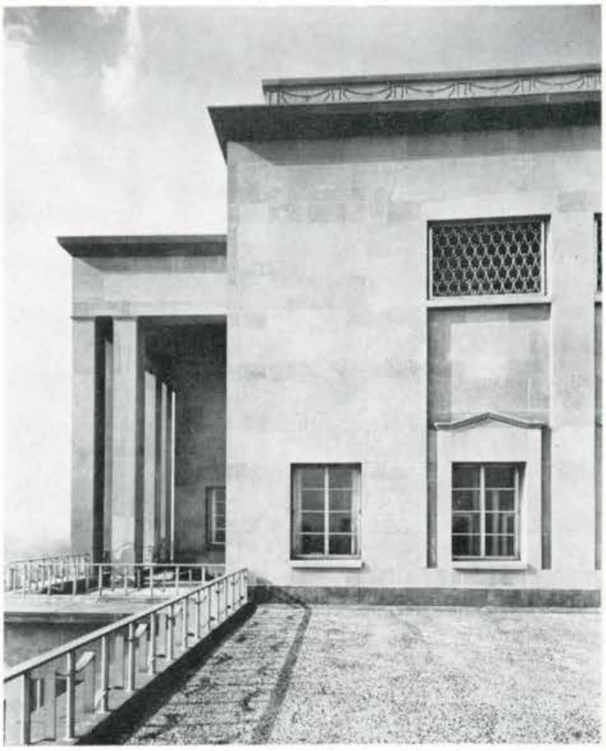
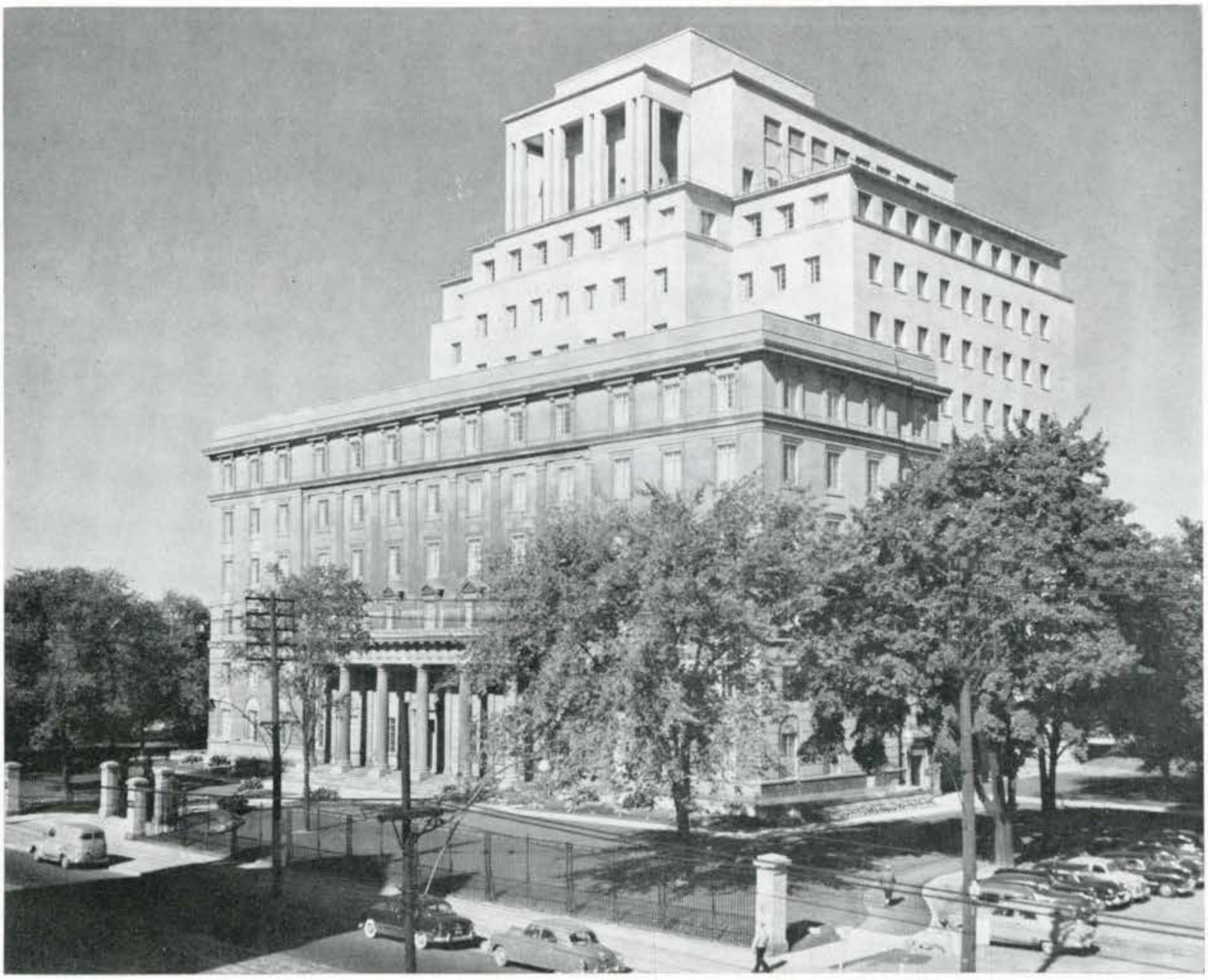


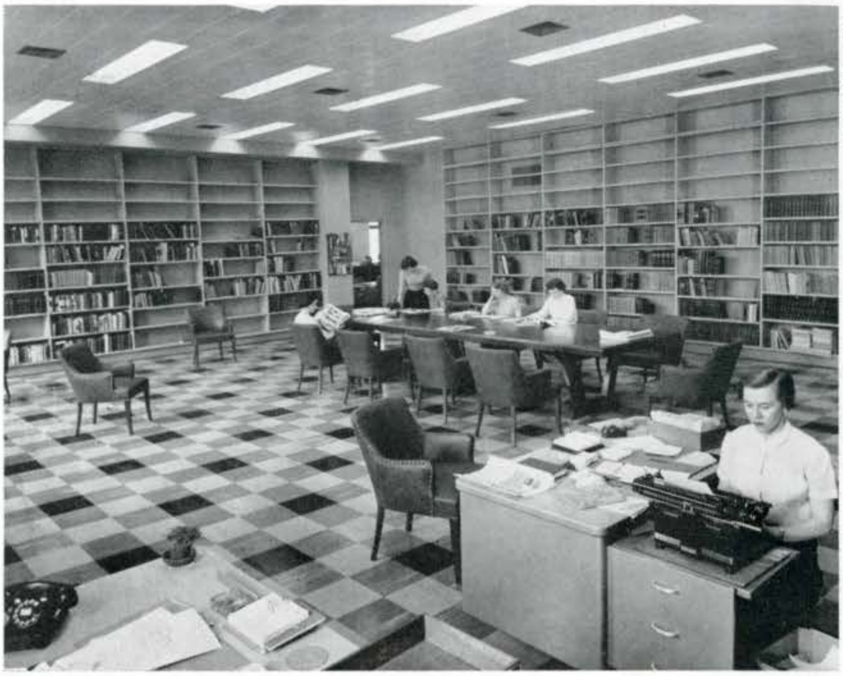
*Detail at eleventh floor*

*The weathered building in the foreground is the original head office by Sproat and Rolph*



*View from south east*

Library and reading room



GILBERT A. MILNE

WARNER BROS.

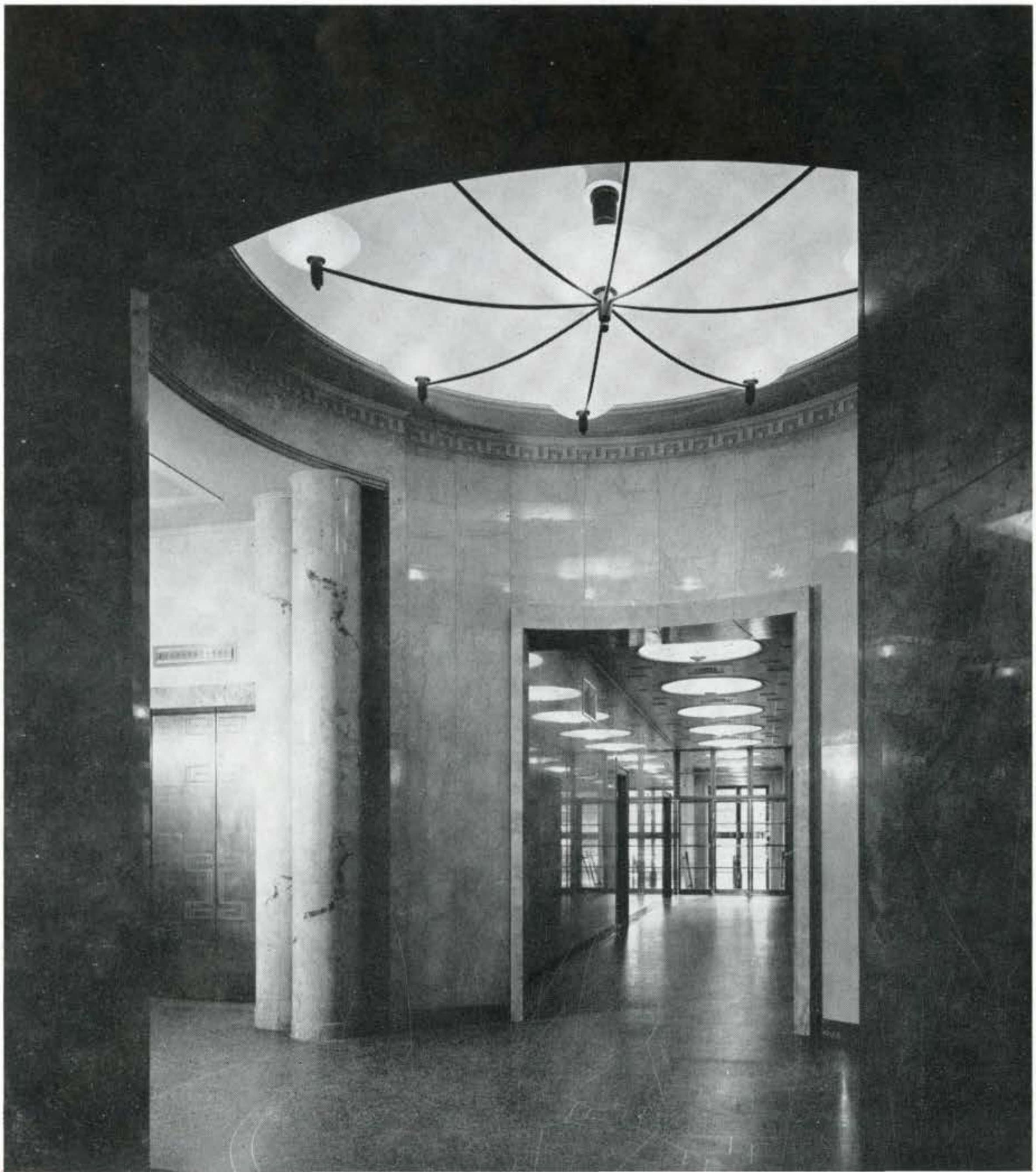
Elevator doors

WARNER BROS.

Entrance foyer

Medical centre


Rotunda on first floor



*Entrance foyer to office space*

*Lounge*

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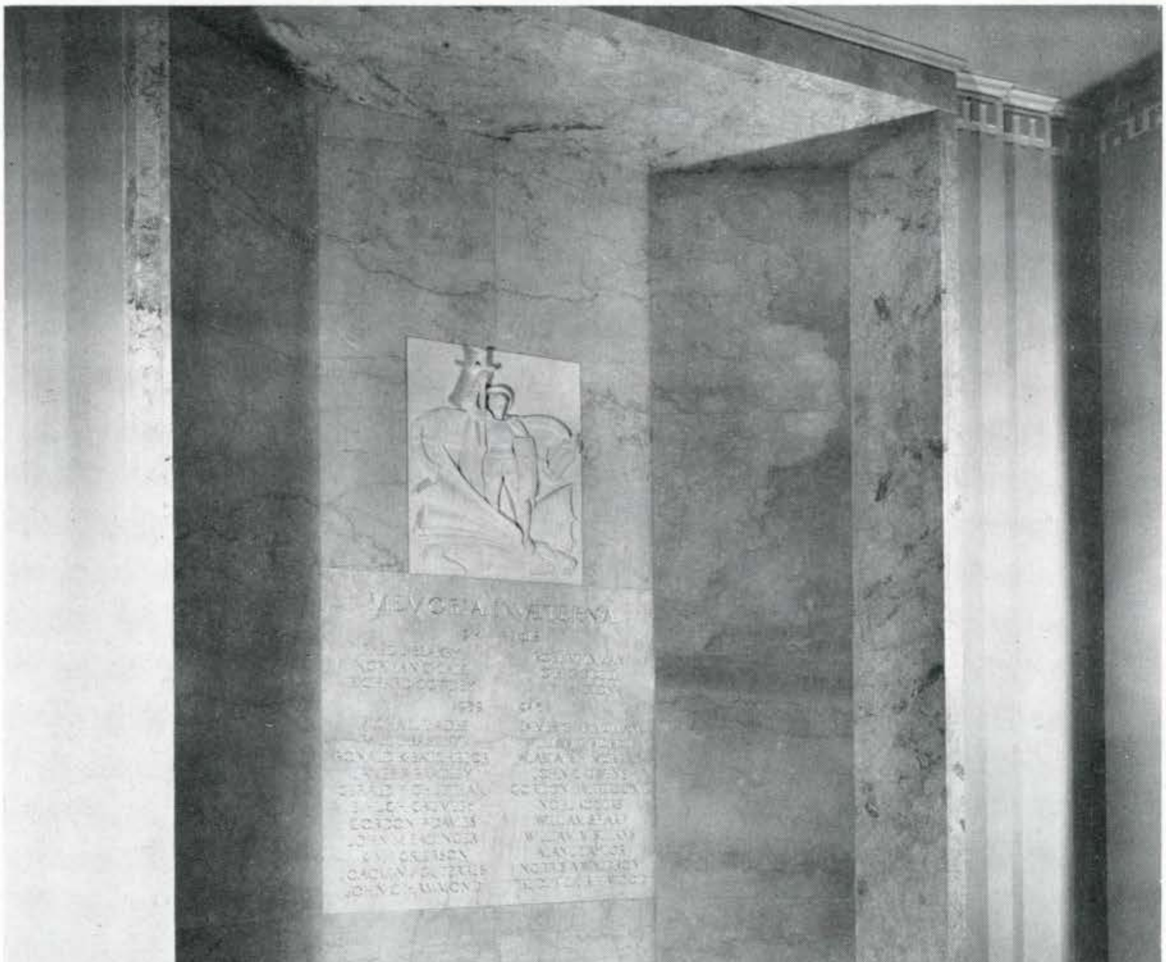
*Entrance to board room*

*Memorial tablet in entrance foyer*



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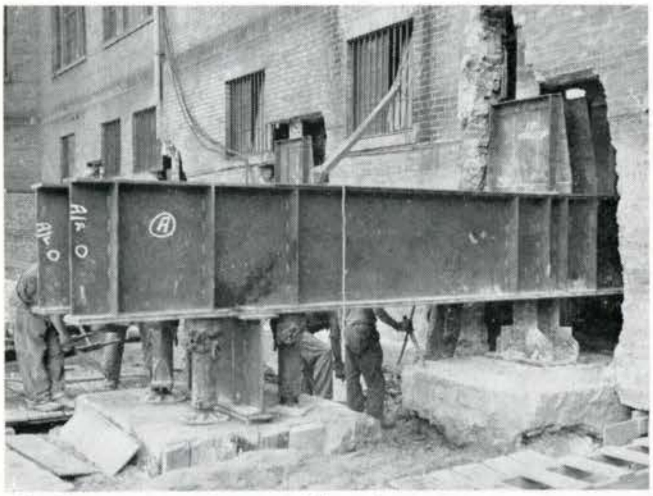
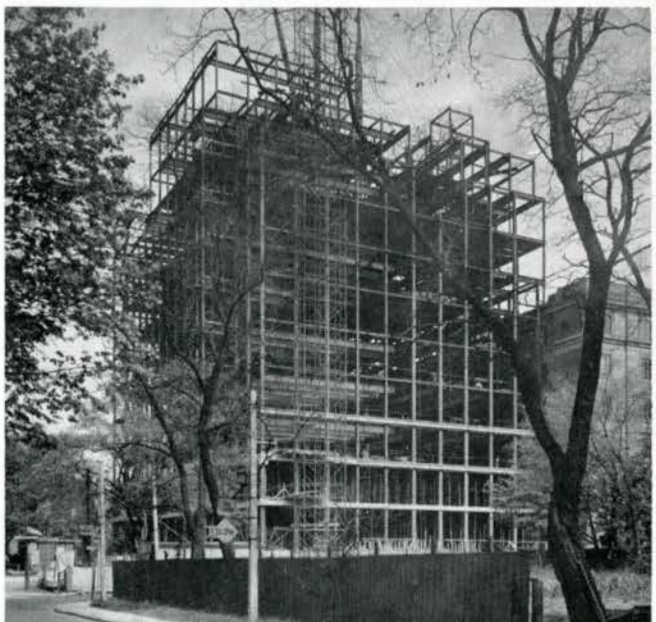


*This illustration is a close up of the underpinning operations on one of the existing columns. Note the heavy brackets on the columns and the jack under the girders resting on the temporary footings.*

PANDA

*This illustration shows a general view of the underpinning operations on the north wall of the existing building. Note the beam left at the existing building.*

*This illustration shows steel being erected for the seventh floor. The long girders at 10 foot centres can be seen clearly. The exterior columns rest on top of the concrete foundation walls at the first floor level.*



PANDA

*This illustration shows the steel frame nearly completed. At the right of the picture can be seen one of the girders at the eighth floor which was cantilevered out over existing building.*

## Structural Features

Clare D. Carruthers

ONE OF THE MAJOR OFFICE BUILDINGS constructed during the last two years was the addition to the Manufacturers Life Insurance Company building on Bloor Street East. This addition is of a size that to a great degree dominates the original building. It is situated directly behind the original building but, except at the foundation level, there is no structural connection between the new and the old. There was no structural provision made in the original building for any addition.

After excavation, the first structural work on most buildings is the construction of the foundations. The foundation for this structure was on an excellent clay till. The soil value was taken at 3 tons per square foot which was a conservative figure for this material.

The trickiest part of the foundations was the underpinning of certain old column footings and, at the same time, increasing the size of some of these footings to take the new columns closely adjacent to the existing. There were ten footings that had to be given this treatment. Brackets were welded to the existing columns. Temporary footings were installed inside and outside the existing building north wall. Steel beams were installed under the brackets with the end bearing on jacks set on the temporary footings. The load of the existing columns was jacked onto the temporary footings and the old footing removed or underpinned with a new and larger footing. The base plates were set using dry-pack concrete rammed into place. After this had sufficient strength the load was put onto the new footing. This operation had to be carried out before the excavation for the sub-basement near this location could be completed. The sub-basement of the new building was kept far enough away from the original building to keep the line of pressure in natural soil.

The deepest part of the excavation was at the elevator pits which are situated practically at the centre of the building. This section of excavation was forty-two feet below the first floor. To keep the line of pressure from passing through air or backfilled soil, normally footings are stepped up from the deepest to the highest. To do this on this building would have meant that a great number of the footings would have been carried down much below the depth required to have them bearing on good soil. To avoid this, considerable areas of the footings had the space under them backfilled with weak concrete after cleaning out all loose soil. This concrete was much stronger than the original soil. By this means, the level of the footings was raised from five to ten feet. In some cases, pit walls to be designed for pressure from footings. The footings were spread footing type with many taking multiple column loads. The largest single footing was 16′9″ square.

The general framing of the building was poured slabs on a structural steel frame. Precast slabs were used for certain temporary slabs and for parts of the penthouse roof. The elevators and stairs are concentrated in a central core. On three sides of this core are fifty foot clear spans. Between the core and the existing building, the spans are smaller, about 20′ 0″, and are spaced to fit the framing of the existing building and to keep the load on columns in this area to a value that would keep footings to a smaller size in order to reduce the amount of underpinning.

A careful study was made of the method of framing the fifty foot spans. Normally, long spans have girders at relatively wide spacing, twenty-five to thirty feet. It was found that, in this case, the use of wider spacing was more expensive than the scheme adopted of spacing the beams at ten foot centres. The building was faced with limestone and the extra wall cost offset the extra cost of steel. Ten feet was used since it was the unit used for window spacing. The beams spanning the fifty feet were 30″WF, giving a depth of construction from top of rough slab to bottom of fireproofing of 37 inches.

An underfloor duct system was required but at fairly wide spacing. It was decided to use metal underfloor ducts placed in the structural slab. This required a minimum depth of slab of 5½″. It was found that by making this slab of lightweight haydite concrete (108 lbs. per cu. ft.) that a very real saving was made in the cost of the fifty foot steel beams, sufficient to pay for the extra cost of this type of concrete with a good percentage over. Lightweight concrete was used throughout the slabs of this building.

Below the first floor, the fifty foot spans were not required. Additional columns were put in, reducing the fifty feet to about thirty-five feet. This effected a good economy in steel for the first floor and basement and reduced the floor to floor height which, in turn, reduced depth of excavation and basement walls.

Between the seventh and eighth floors, the new building was carried approximately two feet out over the existing building. The existing roof slab was about five feet above the new seventh floor. At the eighth floor, the steel framing was cantilevered out over the top of the columns below in order to pick up the columns above. From the bottom of these cantilevered beams, a hanger in the form of a small steel H column was carried down to just above the existing roof. Steel beams were placed between the bottom of the hangers and these carried the new wall. Between the underside of these beams and the top of the existing roof slab, a space of approximately 2" was left in order that deflection of the new beams would not overload the existing construction. This necessitated a complicated framing system at the eighth floor since the new walls, the existing building walls, and the column layout at this point did not fit any pattern. The result was many offset beams.

Throughout the building, the columns were of steel H section of the regular rolled sizes. In no case were the loads of sufficient magnitude to require plated or built-up columns. The heaviest load was on the columns near the north-west and north-east sides of the core where the change in direction of the 50 foot span required heavy rolled sections to receive the 50 foot spans, and, under these girders, the column load built up to the total of 1,600,000 lbs. On all the exterior columns and where possible on the interior columns the size of the column was maintained as closely as possible from top to bottom. That is the dimension parallel to the web was maintained. The width of the column was allowed to vary. This simplified the framing to a great degree.

In the fabrication and erection it was recognized that, as far as field work was concerned, the amount of noise should be reduced to a minimum. This lead to the decision to have all shop work rivetted and all field work welded or bolted. Generally the field connections were welded. There were no rivetting guns used on this project. While this system of connecting structural steel does not give the maximum economy that is possible with an all-welded structure, it does form a very satisfactory method of erecting steel in an area which is closely adjacent to office buildings, hospital or similar class of building where the noise of rivetting hammers would be very objectionable.

With a field welded structure, the amount of wind bracing was considerably reduced over what it would have been using beams with standard rivetted header connections. Wind bracing was not a major factor on this building even though it is the equivalent to twelve storeys in height. Additional stiffness was introduced in certain bents through the use of split I beam type connections or plates welded to the top and bottom of the beam and to the column in order to get a rigid connection. In addition, where possible, K bracing was introduced in elevator shafts and the side of stair wells or duct spaces. The wind bracing was by no means a feature of the structure.

The structural steel was fireproofed by the use of terra cotta tile 2" thick pastered, or with vermiculite plaster on metal lath. In certain locations, such as around elevator shafts, stairwells, the beams were fireproofed using tile, and again in certain basement areas the beams were fireproofed using tile. The 30" deep beams over the 50 foot span was a natural for the use of the vermiculite plaster on metal lath, which today is recognized as an economical and efficient method of fireproofing structural steel. Columns are fireproofed generally with tile or masonry but in certain locations had the vermiculite on metal lath. Spandrel beams were fireproofed with concrete.

Before commencing design, a careful investigation of the live load requirements of the building was made. In general, the floors were designed for 150 lbs. live load on slabs and 100 lbs. live load on beams and columns. On the third floor it was decided to increase this loading to 200 lbs. on the slab. This was in order to take care of a heavy filing load and possible heavier business type machines. This investigation did indicate that, in many cases, the live load of 50 lbs. allowed by the Code is not sufficient for modern office buildings. The use of heavy business machines and stacked areas of files indicates a load considerably greater than 50 lbs. a square foot is required. This is particularly true of the slabs between beams. It is not so true of the beams themselves or of the columns and foundations.

In addition to the main building, there was a new addition to the boiler house and alterations to the existing boiler house. This required extensive underpinning. The new addition to the boiler house required a room with approximately 20 foot headroom. This required the underpinning of the east wall of the existing building. The roof of this boiler room was designed for the traffic of motor cars and trucks. The roof was waterproofed by using roofing membrane covered by a 3" concrete slab reinforced with mesh.

Probably the more interesting feature of this part of the project was the alterations to the existing building. The new cooling tower was placed on top of the existing building which necessitated the introduction of new steel framing above the existing roof to carry the cooling tower. The existing framing was for a roof only. Below this roof, it was decided to lower the existing floor of the present boiler room which required the extension of the interior columns down to this new level. All of this work was carried out without serious trouble and without interruption to the operations of the existing plant.

## Electrical and Mechanical Services

G. Lorne Wiggs

When the author's firm was retained to design the electrical and mechanical services of the Manufacturers Life Insurance Company building, the architects had developed a typical floor plan having a centre core surrounded by office space which would be fifty feet wide without columns. They stated that the building was being planned to be a truly modern office building, designed for maximum flexibility of office arrangement, efficient operation and low maintenance costs. An additional requirement was that it should have good lighting, acoustic ceilings and year-round air conditioning.

As mentioned in a paper published in the R.A.I.C. *Journal* of September 1948, the author's firm had set up their own research installation to test the performance of aluminum panels for radiant heating and cooling. Mr Charles S. Leopold, consulting engineer, of Philadelphia, was retained to work in collaboration with the firm on the radiant heating and cooling, as well as the air conditioning.

Of all the electrical and mechanical equipment in the building, the ceiling system is at the same time one of the most original and latest developments in office building construction. It combines radiant heating and cooling, recessed fluorescent lighting, acoustic treatment, and concealed sound or paging loud speakers, as well as diffusers and ducts for the supply of conditioned air. Of all these elements, experience had shown that the location of the radiant heating and cooling panels is not particularly critical. Neither is the location of the air supply diffusers and of the acoustic treatment. On the contrary, the location and spacing of the luminaires is critical if uniform light intensity is to be obtained over the entire floor area. Besides this, the placing of the luminaires was limited to a large extent by the window spacing. Finally, the spacing of the loud speakers for the sound system must be reasonably uniform. Combining all the elements into a ceiling pattern which would be reasonably uniform in arrangement and of good appearance in large open areas, yet be adaptable and flexible enough to accommodate partition changes without affecting the lighting, heating or cooling, or the ventilation, required very careful planning. In fact, it requires much more than the usual cooperation that occurs between the architects and the engineers working together on a project.

In planning the ceiling it was, therefore, necessary first to fix the type, size and spacing of the lighting units. It was decided to adopt recessed fluorescent luminaires, using instant-start lamps, without either louvres or glass, so as to give the highest possible efficiency and lowest operating and maintenance costs. With the windows on ten foot centres, in order to obtain uniform lighting and an attractive ceiling pattern, it was found necessary to place the luminaires in rows on five foot centres. Then, except along some exterior walls and in a few places surrounding the centre core of the building, it was found that six foot units on ten foot centres best suited the floor plan. Where six foot units could not be utilized, the luminaires were reduced to four foot units.

Next, a band of radiant heating and cooling panels, generally three feet wide, was placed around the perimeter of each ceiling for the purpose of supplying radiant heat to offset the heat loss in winter and to provide radiant cooling to absorb the heat gain through the walls in summer. Following this, the location of the conditioned air supply diffusers was fixed in line with and between the ends of the luminaires, giving a ten foot by ten foot spacing of the diffusers.

In such large floor areas as occur in the Manufacturers Life building, the heat given off the occupants and the heat produced by the lamps can readily be taken care of along the exterior walls, but it is usually a problem difficult of solution in the large interior spaces. In this case, the problem was solved simply and effectively by the creation of the design of a luminaire having water-cooled reflectors to absorb the heat emitted from the lamps and its ballasts, and a water-cooled flat ceiling extension forming part of the unit to absorb the heat given off the occupants in its vicinity. A section through this luminaire is shown in Fig. 1.

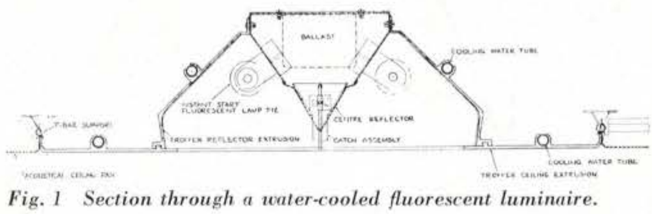



*Fig. 1 Section through a water-cooled fluorescent luminaire.*

The remainder of the ceiling was then made up of perforated steel panels. These were covered with pads of acoustic material except immediately below the loud speakers for the sound system.

The complete ceiling serves as an effective and convenient covering for concealing all the many water pipes, air ducts and electric wires run in the space between the con-

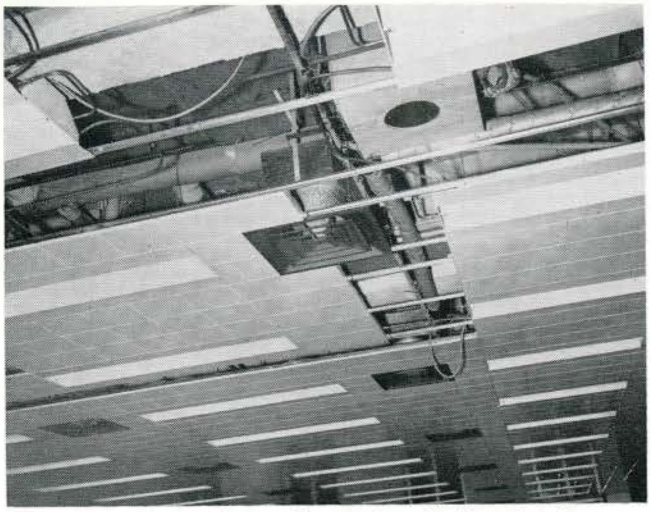


*Fig. 2 View of partially complete section of ceiling, showing water-cooled luminaires, loud speaker, diffuser and their connections.*

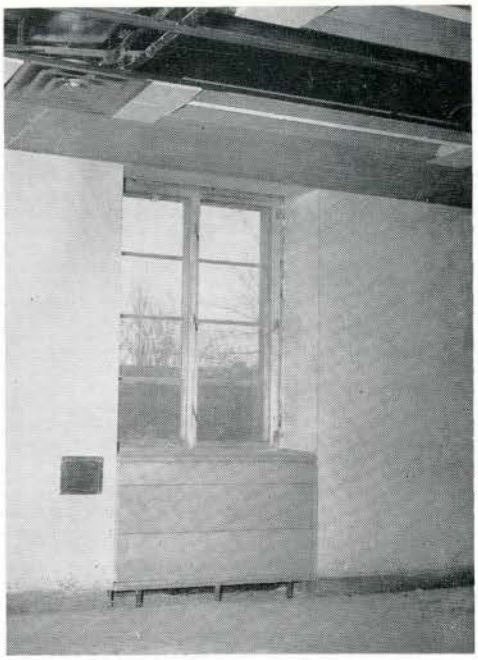


*Fig. 3 View of window, showing peripheral radiant panel, diffuser and luminaire at top and sill panel at bottom.*

crete floor slab above and the finished ceiling. Due to the fact that the perforated ceiling panels are all readily removable, it is a simple matter to get to anything concealed in the ceiling space at any time.

Fig. 2 shows a portion of a partially complete section of the ceiling. In the lower portion of the picture, the six foot luminaires may be seen on the left and four foot units to the right, with the square diffusers between the luminaires. At the top of the picture, the cooling water connections to the luminaires may be seen, as well as a loud speaker for the sound system. Some of the many electric wires and pipes, both insulated and bare, concealed above the finished ceiling, may be seen as well.

In addition to the radiant panels around the perimeter of the ceiling, a radiant panel is also placed under each window, as may be seen in Fig. 3. These panels provide radiant heating in winter and radiant cooling in summer to offset the heat loss or heat gain through the windows. The panels around the perimeter of the ceiling may be seen at the top of the picture. It also shows the relation between the luminaires and the windows.

All of the radiant panels are aluminum extrusions, made in Canada, designed jointly by Mr Leopold and the author. The luminaires were similarly designed and made. The perforated acoustic ceiling panels, for the first time, were of Canadian manufacture. Thus, practically all of the ceiling system was fabricated in Canada.

The radiant panels are all aluminum extrusions having copper tubes imbedded in them, through which warm water is circulated when the panels are required to emit radiant heat and chilled water when the panels must absorb heat. Because of the variations in demand for heating and cooling, the piping for the radiant panels is divided up into twelve circuits for the window and peripheral panels, and one for the interior troffer panels. The piping for the former panels is zoned according to the orientation of their adjoining exterior walls and is further sub-divided according to the service of the panels. Four circuits, each for a different orientation, are provided for the sill panels under the windows. Four circuits, also each for a different orientation, are provided for the ceiling panels around the perimeter of the building. Each of these eight circuits is provided with its own thermostatic control, circulating pump, heat exchanger and connection to the chilled water circuit. Four more circuits, each for a different orientation, are provided for radiant panels designed to offset the effects of solar heat in summer and to be shut-off in winter. Each of these four circuits is thus provided with a circulating pump and a connection to the chilled water circuit. Three of these circuits are equipped with solar heat controls. The thirteenth and largest circuit is connected to the troffer cooling panels in the interior of the building. This circuit is furnished with a circulating pump which circulates chilled water through these panels the year round as long as the building is open. The temperature of the water in these panels is controlled by means of a lighting load compensator, in turn activated by a current transformer connected to one of the main lighting feeders. Fig. 4 is a view of the equipment room containing most of the above mentioned equipment. On the left may be seen the pumps, heat exchangers, controls and their connections for the first eight mentioned circuits, while on the right may be seen the four pumps, controls and connections for the solar zones. The last mentioned and largest may be just seen at the rear of the right hand set of pumps.

The chilled water is cooled by means of a single 800 ton centrifugal refrigerating unit in the machine room adjoining the boiler room in the service building. Part of the chilled water is fed directly to the cooling coils in the basement air conditioning units, and the remainder to the dehumidifying air washers in the penthouse. The chilled water return from the penthouse is connected to a heat exchanger, which serves finally to chill the cooling water supply to all the radiant cooling panels, the initial chilling being performed by panel water cooling coils located just after the air washers in the penthouse. These panel water cooling coils serve as the initial reheaters for the fresh air, with the final reheating of the fresh air being performed

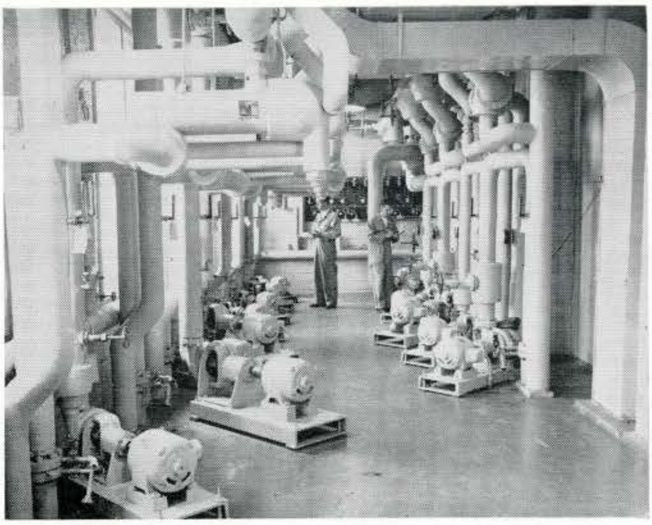


*Fig. 4 View of equipment room on tenth floor, showing circulating pumps, converters and controls for radiant heating and cooling.*

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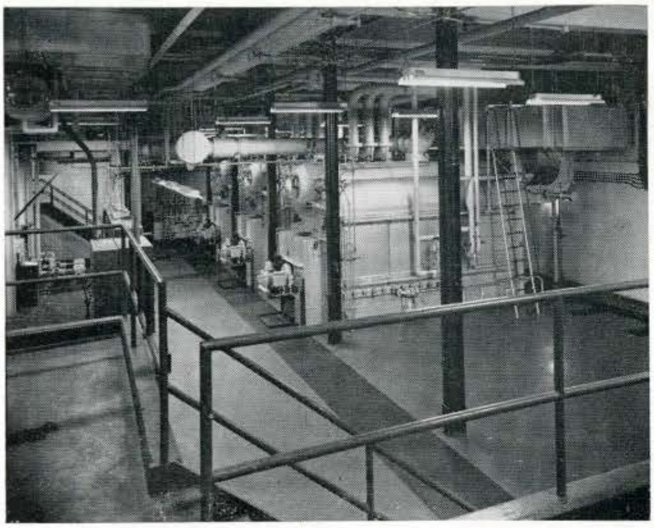


*Fig. 5 View of boiler room, showing the three boilers and their oil burners. The end of the boiler panel may be seen at the left.*

by water-heated reheating coils.

The conditioned air supply system is typical of any first class air conditioning system, with a few exceptions. The air circulated through the areas having cooling panels is only a small part of that which must be circulated by a conventional system. Also, the conditioned air is supplied at both a constant temperature and a constant humidity the year round, except in a few special instances. The fresh air is taken into the building through four central air conditioning units. In each unit, the fresh air, in winter, passes through a bank of steam-heated preheaters but in summer it by-passes them. It is then mixed with some recirculated air and passes through a set of cleanable air filters which take out the bulk of the dust in the air. The air then passes through an electrostatic precipitator which removes substantially all the oily soot in the fresh air and the balance of the dust from the mixture of fresh and recirculated air. From the precipitators, the air enters a two-bank air washer which not only further purifies the air but which humidifies the air supply in winter and dehumidifies it when required in summer. In addition, each air washer cools the conditioned air in summer through the medium of the chilled water circulated through it. On leaving the air washers, the air then passes through the bank of initial reheaters, which partially reheat the air and which, at the same time, partially cools the panel cooling water. The air then is passed through the final bank of reheaters, which are steam heated and which bring the air supply up to the desired, constant air temperature. The conditioned air then goes to the supply air fans which blow it through vertical ducts to branch ducts run around all floors of the building and thence through the draftless ceiling diffusers.

The conditioned air installation is divided up into a number of separate and distinct systems, one of which supplies conditioned air to the original portion of the building, one for the lounge on the ground floor, another for the cafeteria on the second floor, one to take care of the kitchens as well as the conditioned spaces in the basement and sub-basement, while the last and largest system provides the conditioned air for the new section of the building.

The entire radiant heating and cooling system and conditioned air system is controlled automatically by means of an elaborate and extensive control system. Except in a few instances, this is a pneumatic system, while appreciable use has been made of recorder-controllers.

The installation was designed originally so that the peripheral radiant heating and cooling panels were to be controlled by means of outdoor thermostats, while the sill panels were to be controlled by means of electric thermostatic elements fixed to the inner surface of the inside panes of glass. The solar panels on the east, south and west sides are controlled by means of "electric eyes" which face east, south and west respectively. Each of these measures the heat from the sun and automatically lowers the temperature of the solar panels as the intensity of solar heat increases, and vice versa. At the present time, the panels are not so controlled, but further experience with the installation will show whether the controls should be left as they are or should be changed back to that shown on the contract drawings.

A separate heating system has been installed in the pavement of the ramp down to the shipping and receiving room, as well as of the driveway outside the shipping and receiving room. This system consists of a series of pipe coils imbedded in the pavement and filled with an anti-freeze solution. This solution is heated whenever it snows and so keeps the ramp and driveway free of snow and ice.

For the heating of the building, of the hot water and of the air supply, a new central low pressure steam boiler plant was installed in a new boiler room in the service building. This boiler plant consists of three water-tube steam boilers, each having a continuous rating of 7500 pounds of steam per hour. The boilers are equipped with fully automatic oil burners to burn heavy fuel oil. Two 10,000 gallon heavy fuel oil storage tanks are provided, as well as one small light fuel oil tank.

A single instrument and control panel for all the boiler instruments, oil burner controls and a number of indicating and recording instruments, is installed in the boiler room. It is provided with boiler meters, $CO_2$ recorders, draft gauges and two smoke density indicating and recording instruments. Steam pressure gauges, water pressure gauges, feed water temperature gauge, oil pressure and temperature gauges, etc., are also placed on the panel board.

### Plumbing System

The plumbing system, like the heating and cooling of the building, is thoroughly modern and contains many features new in Canadian office building construction. One of the new plumbing features is the fact that all plumbing fixtures are wall-hung, while all water closets and urinals are provided with flush valves which may be either hand or foot operated. In the same way, all the wash basins and drinking fountains are wall-hung, while even the toilet partitions are hung from the walls and ceilings and do not come down to the floor. Thus, the cleaning of the washrooms is greatly simplified. The lavatories are all equipped with spray combination supplies and have open strainers.

The washrooms are equipped with recessed, stainless steel paper towel units, which have both towel dispensers and used towel receptacles. Each washroom is equipped with its own liquid soap dispensing installation, consisting of a soap dispenser in each lavatory piped up to a central liquid soap container. Fig. 6 shows a typical ladies' washroom, which is neat, large and spacious. The men's washrooms are furnished with seatless water closets in place of urinals, as well as the required number of water closets with seats. As a result, it is a simple matter to convert a men's washroom into a ladies' washroom as the ratio of male to female employees changes.

*Fig. 6 View of women's typical washroom.*

Drinking fountains are located throughout the office spaces and a circulating chilled drinking water system with its own refrigerating machine is installed.

The cleaners' closets are provided with service sinks partly set into the floor so that the water containers on the cleaners' trucks may be quickly and conveniently dumped into the service sinks.

Three large hot water storage tanks and heaters are located in the sub-basement. One heats all the hot water required in the kitchen and cafeteria, while the second heats the domestic hot water required for the lower three floors of the building as well as the basement and sub-basement. The third is a standby for either of the first two. In the same way, two hot water storage tanks and heaters are located in the penthouse, one to serve to the top nine floors of the building, with the other as a standby.

A very large water storage reservoir is located in the upper part of the penthouse. It is divided into two compartments, so that it may be cleaned without depriving the building of water. It is also arranged so that about one-third of it is used to take care of the fluctuations in domestic water demand, while the remainder serves at all times as a water reserve for fire-fighting purposes. Two house pumps, located in the sub-basement, pump the water to the water storage reservoir in the penthouse, while a large fire pump is installed to boost the water pressure in the stand-pipe system when required for fire-fighting purposes. A standard sprinkler system has been provided in the basement and sub-basement to protect the two floors from fire. A hose and stand-pipe installation serves the remainder of the building.

### Electric System

The electricity is supplied to the building by the Toronto Hydro Electric Commission, at 120/208 volts, 3 phase, 4 wire and 60 cycles from the network system through Hydro transformers located in a transformer vault in the service building. The main switchboard is located adjacent to the transformer vault. It is split into two sections because of the Toronto Hydro requirements, one for the electric supply to the lighting units and convenience outlets, and the other for the power supply. The board contains the main air-break circuit breakers for the "light" and "power" sections, an air-break circuit breaker for the diesel engine driven emergency lighting sets, a breaker for the 750 HP motor on the refrigerating machine, as well as a number of smaller breakers.

From the main switchboard, "power" and "lighting" feeders run to the service building, and through a walk-through tunnel to the main building. The latter feeders consist of 1000 mil, circular mil conductors bound together in groups of four, so as to keep the reactance drop as low as possible. The lighting feeders running through the tunnel terminates at a lighting distribution switchboard in the sub-basement of the main building. This switchboard is provided with four air-break circuit breakers, with space for two more. The four breakers are each connected to a low reactance type bus duct riser located on one side of the centre core of the building. In addition, this switchboard contains a section which is equipped with push buttons and indicating lights, each connected to a different motor in the building. By this means, the operator in the sub-basement can see which motor is in operation and can stop but not start any of the motors. All the motors must be started at their locations. This insures that each motor must be seen each time it is started, while at night all the motors can be shut down quickly and conveniently.

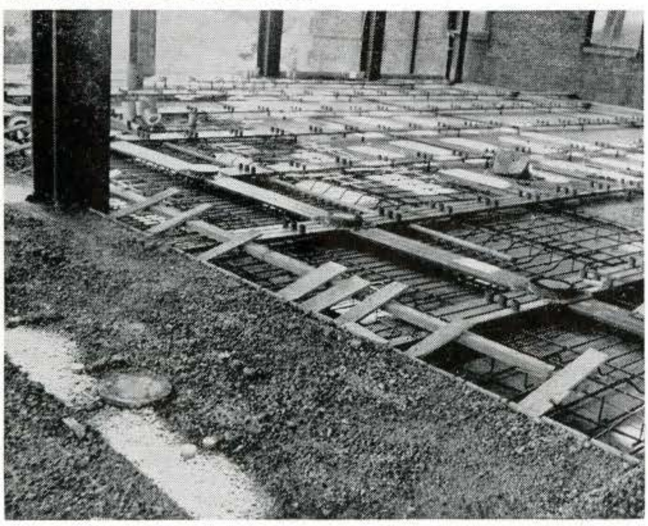
As mentioned earlier in the description of the ceiling system, the lighting units are laid out, in general, on a 5′ x 10′ spacing. The outstanding feature of the lighting units is the fact that they are equipped with instant-start fluorescent lamps operated at much lower mil-ampere ratings than standard for the lamps used. This was done after the author tested the fluorescent lamps at ratings of 120 mil-amperes, 200 mil-amperes, 300 mil-amperes and 450 mil-amperes. As a result, a low rating was selected so that the surface brightness of the lamps and of their reflectors was low enough to eliminate the necessity of providing louvres for the troffers. The lighting system was designed for a present intensity of 35 to 40 foot candles, maintained. According to recent tests, the maintained values are approximately 45 foot candles. The luminaires are, in general, of the open type with provision for the future installation of plain or ornamental glass or curved prismatic lenses. In the executive offices, the lounge, the library and lecture rooms, the luminaires are now equipped with albalite glass. It is interesting to note that the washrooms are lighted to about 25 foot candles with fluorescent fixtures, as opposed to the normal 5 to 10 foot candles normally provided by incandescent fixtures in such rooms.

A triple, steel underfloor duct system, having preset inserts, is provided throughout the building for the telephone, signal and electrical convenience outlets at desk locations. These ducts are run on 6 foot centres, forming loops around the centre core. These loops are fed from four panel centres located on the four sides of the core, by means of both ducts and conduits to various junction boxes. The preset inserts occur every two feet along the duct runs. A good idea may be formed of the installation from Fig. 7 which shows part of the underfloor ducts before the reinforced concrete floor slab is poured and part after.

### Sound System

A two function sound system has been installed so as to provide a low-level paging service and a "wired music" distribution. The method of mounting the loud speakers has been described and illustrated previously. The amplifiers and controls for the sound system are located adjacent to the telephone switchboard so that the paging services may be operated from that point. The system is selective in that one or more zones, up to a total of 24, may be paged simultaneously. Specific zones can be paged as necessary without interrupting the music being played throughout the rest of the building. A portable amplifier can be plugged in to the system to provide for special programs in the lounges and lecture rooms.

*Fig. 7 View of triple, steel underfloor duct system, both before and after pouring concrete floor slab.*



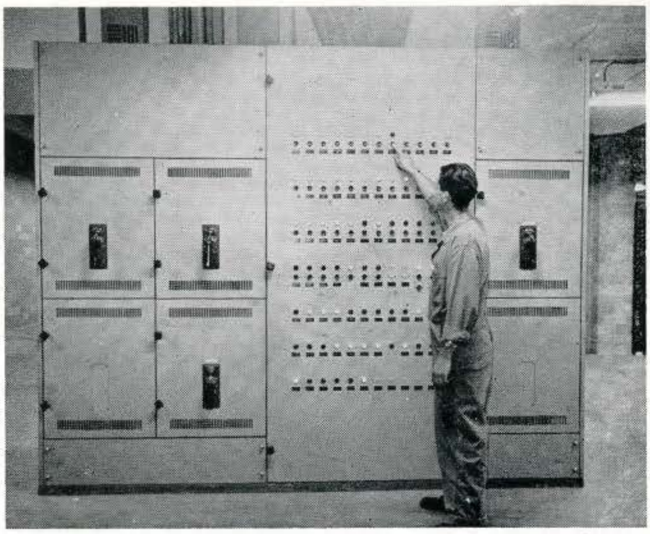


*Fig. 8 View of electric control panel in sub-basement, showing lighting breakers, and also indicator lights and "stop" switches for all electric motors in the building.*

### Clock System

A clock system of the recently developed electronic self-regulating type has been installed throughout the building. It consists of a master clock and transmitters located in the sub-basement. The transmitters superimpose a supervisory impulse on the mains of the lighting switchboard. Thus, an electric clock, located anywhere on the system, is automatically regulated without the necessity of installing separate wiring for the clocks.

### Fire Alarm and Protective System

The building is equipped with an electric fire alarm and watchman's supervisory system, as well as both sprinkler alarms and vault burglar alarms. This system is tied in to an annunciator in the boiler room and to the Dominion Electric Protection central station.

### Operating Results

The new and largest portion of the building has now been occupied for a complete heating season, the staff having moved into it in October, 1952. The staff moved into the older rehabilitated section of the building during the months of June and July, 1953. Thus, the entire building was occupied during the hot spell which occurred during August, 1953, when the outdoor temperatures were reported by the Meteorological Office to have reached 100° F.

While some adjustments were being made during the above period, both the radiant heating and cooling system proved to be very satisfactory. During the winter, when the initial adjustments were being made, little difficulty was experienced in obtaining a fair balance and regulation of the building temperatures. Before the hot spell of August, most of the adjusting of the complete cooling installation had been made with differences in temperature, throughout the conditioned section of the building, not exceeding 1°F. As a result, when outdoor temperatures climbed to 100°F., the comfort conditions being maintained in the building were exceptionally good. The formal opening of the building took place Monday, September 28th, 1953.

## Panel Cooling Application for the Air Conditioning

**Charles S. Leopold**

BACKGROUND

THE PANEL COOLING SYSTEM as applied in the Manufacturers Life was developed in 1946 for a then proposed 40-storey office building for Time, Inc., in New York City. The problem consisted of finding a method which would have less effect on steel design, utilize less floor space, and require less distance floor to floor than other applicable methods.

More heat can be conveyed in a given size of conductor by water than by air. It was considered that if the air could be reduced to that required for the control of humidity, control of odors, and ventilation, the additional function of carrying a major part of the cooling effect could be assumed by a water circuit.

Panel cooling for this latter function had been considered in the past and been substantially rejected because the part played by high temperature radiation was not appreciated, and conventional calculation indicated that the coolant would have to be maintained too close to the room dewpoint for safety in avoiding condensation.

Theoretical consideration, corroborated by test, indicated that even when cooling a fraction of a ceiling the panel and coolant temperatures could be maintained at a temperature which avoided the possibility of sweating.

Three rooms with a south exposure and one adjacent room in the interior on the thirty-second floor in Time's present quarters were equipped with a test installation of panel cooling, which was a prototype of the method used in Manufacturers Life. The system had operated approximately three years at the time the method was recommended for the new Manufacturers Life building. Note is made of the courage of the architects, Marani & Morris, and the owners, Manufucturers Life Insurance Company, in agreeing to this first large-scale application of a new method.

The selection of this system was in part dictated by the desire to integrate the air conditioning of the old and new office buildings. On this basis, panel cooling, when considered in conjunction with the structural provisions, provided some saving in initial cost over systems which offered comparable comfort.

In a wide office building, the local effect of outdoor temperature and insolation can be compensated at or close to the skin. The remainder of the interior space presents substantially the same cooling problem summer and winter as there are no heat losses and the heat gain from people, luminaires, and business machinery is not dependent on the outside temperature. There is no need for heating in the interior of a large building. The design follows from this analysis.

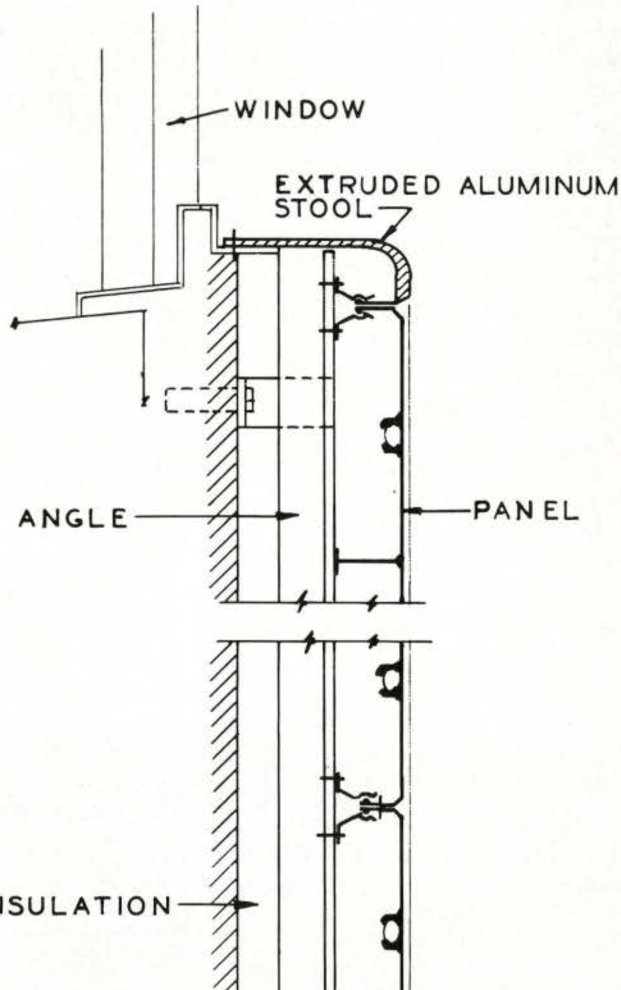



Fig. 1 SILL PANEL DETAIL

### For Sun, Wind, and Outdoor Temperature Effects

Beneath the window there is an aluminum panel, Fig. 1, of sufficient heating capacity to prevent the formation of down-drafts at the window in cold weather, and to compensate for radiation from the occupant direct to a cold window at such times as there is not direct sunlight and only limited sky shine. This panel is installed primarily for heating but it is of additional use for cooling in hot weather. The temperature of these panels is controlled by a thermocouple attached to the inside of the window glass. The thermocouple is shielded from the direct rays of the sun by a small metal disc on the outside of the pane, directly in front of the thermocouple.

This portion of the installation compensates for all outside effects other than for that portion of the solar radiation which penetrates the glass and enters the room. In the ceiling adjacent to the outside wall there is a continuous band of cooling panels, Fig. 2, approximately 3 ft. wide. The temperature of the water to these perimeter panels is controlled by photoelectric means which lowers the water temperature as sunlight gets brighter. This control is used in warm weather and in cold weather until the outside temperature approaches zero. At some selected outside temperature, these panels can be used for supplemental heating in order to avoid raising the temperature of the sill panels to a level which may not be comfortable for those sitting quite close. During the past winter, which was relatively mild, the ceiling panels were not used for heating.

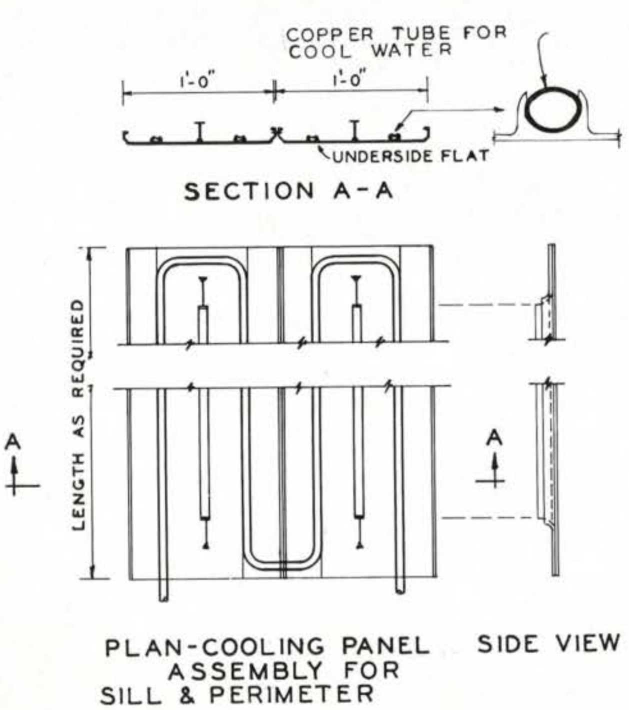



Fig. 2

### For the Interior Heat Gains and Ventilation

The entire interior of the building, starting approximately 3 ft. in from the skin, as previously noted is a cooling problem and is handled in part by the ventilating air, approximately 40% of that required if there were no panels, and in part by ceiling panels which form the reflector of a luminaire. In the test installation for Time, previously mentioned, flat panels – similar to those used for the perimeter – were placed in the ceiling in a formal pattern occupying about 35% of the ceiling area. When Manufacturers Life decided to adopt a uniform recessed fluorescent lighting system, it became logical to make the ceiling panel in part the reflector of the luminaire, as shown in Fig. 3. This design has the engineering advantage of trapping more of the energy for lighting at the source, and the aesthetic advantage of reducing the number of types of elements which form the ceiling.

The air for ventilation is delivered throughout the year at constant temperature, in the low 60's, except for a brief period in the morning prior to occupancy. The light panels are controlled at a substantially constant temperature, summer and winter, in the middle 60's. There is a control connected to a representative electric feeder which takes care of the morning start-up period, lowering the water temperature as the lighting load increases.

This system does not operate as a panel heating system or radiant heating system, as the terms are customarily used, as no means of heating is utilized other than the under-sill panels and, in extreme cold weather, the perimeter 3 ft. of ceiling.

### Cooling the Water for Panels

Cooling of the water for the panels is accomplished, in part, by a finned copper coil in the discharge of the dehu-

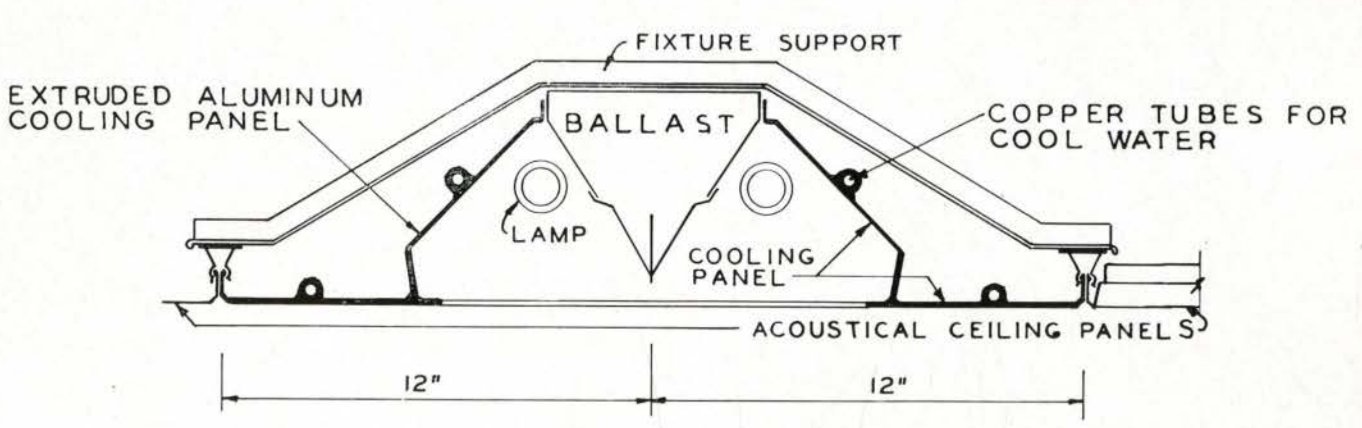



Fig. 3 **SECTION OF EXTRUDED ALUMINUM LIGHT PANEL**

midifier, and, in part, by a supplementary shell and tube interchanger utilizing the water leaving the dehumidifier as a coolant. The air leaving the dehumidifier is at approximately 50°; the desired air supply to the occupied spaces is 60° or above. The coil accomplishes the dual function of reheating the supply air and cooling the water to the panels.

Refrigeration is provided by an 800 ton centrifugal refrigerating plant with cooling tower. The coolant is water circulated through chilled water lines from the boiler-refrigeration plant to and through the office building.

### Temperature Control

The controls thus far described do not employ room thermostats. They are responsive to outside conditions and to the amount of power used for illumination. The advantage of such control is that it anticipates the needs before they are actually evident in their effect on room temperature. In the more conventional control there would be a room thermostat for each zone. Neither a room thermostat nor the anticipating controls described can meet the requirements of minor variations in the use of light or the occupancy in a small area. The room thermostat control has the disadvantage of failing to call for a change before the change is noted in the room air temperature.

The foregoing description covers the problems of the general office areas where it is necessary to maintain a constant optimum temperature. Offices of single occupancy present a different problem in that it is permissible that the occupant select the temperature he desires, even though it may not be the temperature which would be most acceptable to a group.

The air conditioning solution for the private offices on the tenth floor is generally the same as that used throughout the building, with the exception that a booster heater has been added in the air supply duct in order to provide individual thermostatic control. The cafeteria and some other points of assemblage are provided with supplemental controls of the conventional type.

Both in the Time, Inc. test installation and in the Manufacturers Life project there has been a definite impression that there was an increased tolerance for lower temperatures than would be acceptable with an all air system. The mean radiant temperature of this building is lower than it would be in a conventional system. This observation is in apparent conflict with the findings for panel heating; namely, that the air temperature may be lowered with increased mean radiant temperature. The contradiction may, in part, be explained by the observation that the air temperature is uniform from the floor to within a few inches of the ceiling, that there is no appreciable air motion or draft, and that the sill panels provide symmetry of radiation. The importance of these observations may overshadow the minor effect of the slightly lower mean radiant temperature or, as is claimed by some observers, a ceiling cooler than the other room surfaces is to be desired.

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1

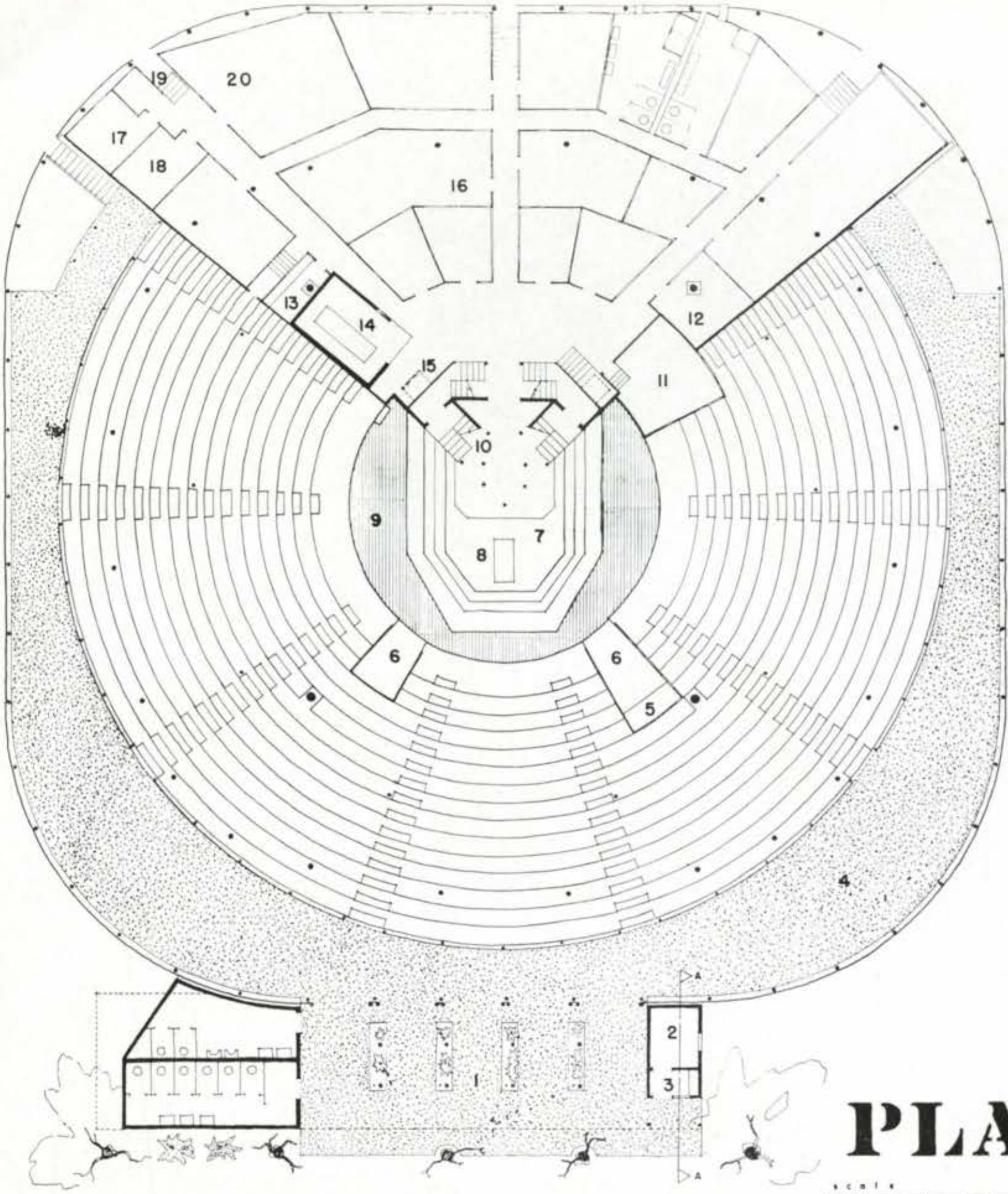
# STRATFORD SHAKESPEAREAN FESTIVAL THEATRE

*Rounthwaite & Fairfield, Architects*
*John Gaffney Construction Co. Ltd., General Contractors*

ON JANUARY 22ND, 1953, we were commissioned to design a theatre to seat an audience of about fifteen hundred persons with backstage facilities for a company of eighty. It was imperative that the entire project be completed in twenty-four weeks, allowing about twelve weeks for work on site.

The Stratford undertaking contained the risk and hazard of a theatrical venture with no sure promise of success, and with no firm source of funds in prospect. In order to meet the completion date, however, it was necessary to establish a design solution with the utmost dispatch, and a carefully scheduled plan for procurements and manufacture had to be put in hand without delay. The design of the theatre was therefore considered in terms of possible financial failure, either, in the course of construction, or, as a result of an unsuccessful first season.

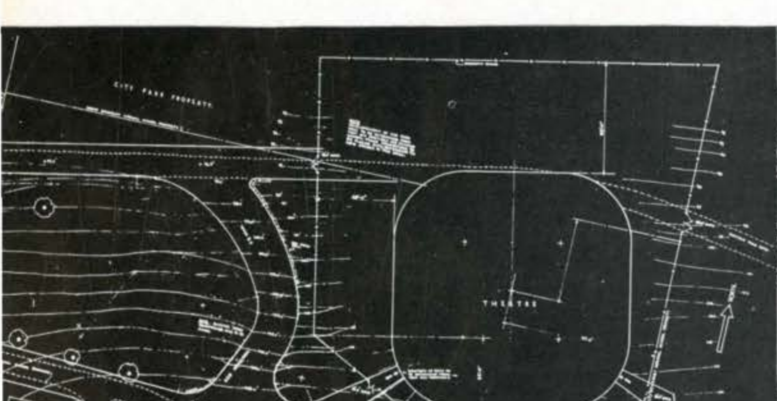
Among these several uncertainties, two very positive offerings emerged in the shape of the theatre site, and the actors' stage. The site is a lovely open park land bordering the Avon River and defined on the south by an avenue of balsam and maple trees. The location of park roads and the fall of the land suggested opportunities for position and relationship of the theatre parts. The stage, designed by Miss



1 Entrance Foyer
2 House Manager
3 Box Office
4 Concourse
5 Control Booth
6 Actors' Entrances
7 Apron Stage
8 Trap Door
9 Theatre Floor
10 Balcony Stair
11 Orchestra Pit
12 Orchestra Room
13 Battery Room
14 Electrical Control Room
15 Electricians' Gallery
16 Actors' Dressing
17 Directors' Office
18 Maintenance Stores
19 Stage Door
20 Wardrobe

# PLAN

2

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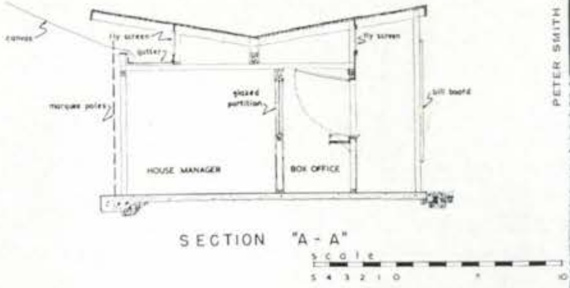



SECTION "A - A"

PETER SMITH & COMPANY

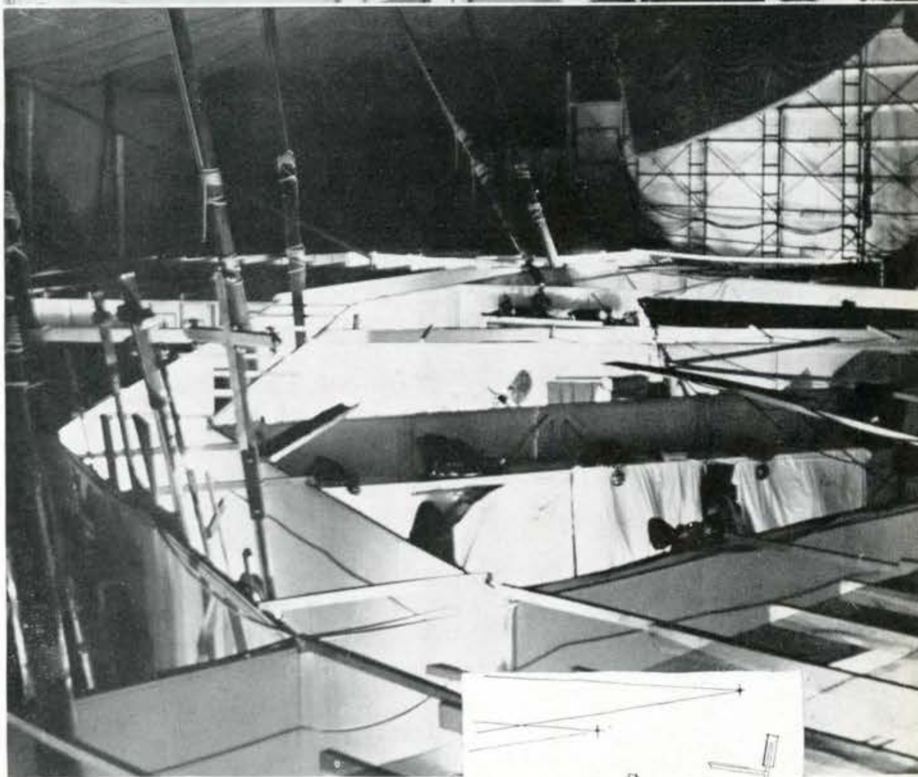
3

1 Stage

2 View of theatre from the west

3 Amphitheatre

4 Backstage



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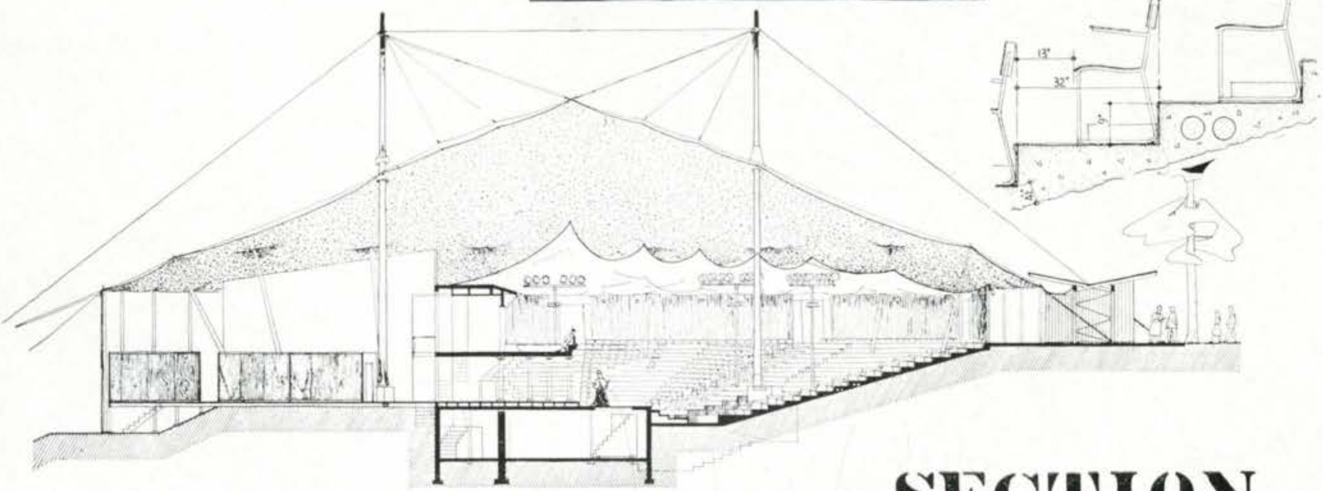


# SECTION

Tanya Moiseiwitsch and Dr. Tyrone Guthrie, was presented in finely proportioned scale model form, accompanied by the most exacting and mysterious requirements with respect to both audience and cast.

The final ordering of the theatre plan followed from demands of the stage in combination with the natural commodity of the site.

The decision to enclose the theatre by means of a very large tent, was prompted by economic necessity. By no other means could walls and roof be achieved in this scale for the erected cost of the tent – about $16,000. Thus, the design of the entire theatre centred around the functions and demands of the stage, the nature of the site, and the use of a tent enclosure of shape, volume, and construction best suited to the theatre space. Having in mind that the tent would be removed and placed in storage in off season, it was necessary to produce a design which would permit winterizing the entire theatre after removal of the tent. This called for a great many special construction devices permitting demountability and removal of the stage, seating, backstage installations, the entire electrical installation and so on. At the same time, demountability worked in favour of the economic purpose of providing the greatest recovery and salvage value in the event of financial failure.

The stage centre was selected as the radius centre of a circular concrete seating amphitheatre 134 feet in diameter, of seven 36 degree sectors, providing a backstage area formed by the remaining 108 degrees of the full circle. The outer perimeter of the theatre assumes the shape of a square with 45 feet radius corners. A false ceiling installed over the entire amphitheatre consisted of dyed and flameproofed cotton sheeting, hung in billowing form from pickup points at the tent roof. Drapery of similar material in contrasting colour covered the entire back wall, with a fabric treatment at the top of each aisle distinguishing exits. The undulating form of the ceiling fabric and the hardness achieved by the flameproofing process, produced an acoustically acceptable ceiling.

In applying a tent structure over the theatre on a sloped site, great difficulty was first encountered in fixing pole positions in plan. Architects are conventionally accustomed to consider columns as plumb. This is not so in a large tent, except for the main centre masts. Pole positions are plotted "in the air" by the tent manufacturer who is primarily concerned with the design of a canvas roof. The footing position of poles in the multi-level amphitheatre, and where variable grades occurred around the rear of the structure, posed geometrical problems of frustrating complexity. The seating plan and ticketing arrangements were settled upon while only approximate pole positions were known.

The tent is a construction of poles and rope, the canvas being sewn to the rope with an excess of fabric sufficient to allow the rope to sustain loads imposed on the structure without transfer to the fabric. The whole structure must allow for constant movement arising from winds and atmospheric conditions. A new tent does not assume its designed size when first erected, but must be stretched for about two seasons before final dimension is achieved. In this case, the tent diameter was three feet less than the designed dimensions, when first erected. The supporting structure of the tent consists of four plumb centre masts stayed with steel wire rope, secured to buried log anchors at eight ground positions. This forms a rigid pole structure from which the roof centre section is suspended. All roof sections are lashed to bail rings, one of which encircles each centre mast, and the masts give support to down hawl rigging used to raise the four centre peaks of the tent. Quarter poles are positioned between centre masts and the tent rim, at all main seam lines of the roof. Wall poles about ten feet apart encircle the tent rim, and over these poles, pass all ropes from tent peaks to the ground stakes. All canvas, cordage, and timber comprising the tent is manufactured to exacting codes applying to large tentage for assembly purposes. The tent roof when properly trimmed is designed to sustain a uniform live load of 38 pounds per sq. ft.

The tent theatre at Stratford must be considered largely as an experimental project. The two main deficiencies experienced by both company and audience were outside noise interference, and the absence of air conditioning. It is not likely that the former can be entirely overcome on the present site, even with the seating enclosed as it was by three fabric walls. The purely mechanical problem of introducing a suitable air change, is more easily solved. For the architects, this experience in the canvas idiom had its moments of reward in the midst of many complications. The architect-client relationship, begun in the spirit of adventure, ended in almost surprising accord in view of the difficult obstacle course negotiated by both. The words of the Bard are recalled with considerable feeling – "All's well that ends well".

*Robert Fairfield*

## The Stratford Shakespearean Festival Theatre

**Cecil Clarke**

*"The theatre should seat about fifteen hundred, with backstage facilities for, say, seventy-five actors, with h and c and all the other usual things. Keep in mind the relationship between the stage and auditorium, which we've talked about; most important. Can't have any footlights, curtains and that sort of thing in the way and, of course, it's to be a temporary affair, for the summer only; but that doesn't mean that it must look at all makeshift; the audience must get the impression, certainly from the inside, that they are in a theatre and quite an imposing one. A tent over something permanent seems to be the answer; for Heaven's sake though, don't let's have an erection looking like the tea tent at a garden party or the tent housing the prize marrows at the flower show. A tent is a tent, it's admitted, but well, it is to be a theatre. Of course, you understand perfectly - - - - -."*

AND SO IT WENT ON, this throwing out of ideas and briefs to the architects for the theatre, Messrs Rounthwaite and Fairfield, of Toronto. I can imagine their heads being in a whirl. The world of the theatre was indeed a strange one to them and there was nothing they could refer to; no standard text books of any kind with the formulae set down in black and white. It was to be new, really new, and had to be hatched right from scratch. The mother hen was the architect and I played the part of the old cockerel, crowing away like mad when I thought that the new chick's upbringing was not quite as it should be; at any rate from a theatrical point of view. In spite of the fact that theatrical people can be infuriating to an almost unbearable degree when they have a particular "bee in their bonnet", it was, I feel, this opportunity for collaboration between the architects and myself which helped the theatre for the Shakespearean Festival at Stratford, Ontario, Canada, to turn out so successfully and enabled the experiment in Shakespearean production, staged within it, to "come off". So often have I known of instances where such cooperation has been neglected, and many theatres, erected with the public amenities, delightful to the eye and wholly satisfactory, but with stages almost unworkable; bad lines of sight and ill-planned use of space in the backstage area, creating endless difficulties in staging and running shows. Even the normal school auditoriums could, with no additional expense, avoid the obvious in design and with a better appreciation of "theatre" turn into something more exciting and practical. I must leave that for now. It has been one of the "bees" buzzing around in my bonnet for some time.

The theatre at Stratford follows no stereotype pattern in design and owes nothing to the usual Italian influenced picture frame or proscenium stage, which appeared at the end of the 18th century. On the other hand, it is not a freak, but has received its inspiration from the past and taken into account the fact that we live in the 20th century. The actual shape of the stage was designed by Miss Tanya Moiseiwitsch, the English theatrical designer, in collaboration with Dr. Tyrone Guthrie, the eminent director. The architects had the difficult task of housing the stage within a temporary theatre and providing all the necessary facilities, and they made a first class job of it.

Why a stage without a proscenium, no curtain, no scenery and all the usual standard equipment associated with a stage? It would take a book to explain why so many directors, designers and actors feel that, for classical plays, particularly Shakespearean, the usual proscenium stage presentation loses so much of the play's value, tucked, as it is, at the end of a box shape building, with the actor having no real contact with the audience and thereby finding it extremely difficult to "get over" to the audience the most important part of the great classics; the words and their meaning. That just touches upon the problem, but this stage, with its platform and different levels, balcony and inner stage underneath it, the trap and entrances from under the audience, has not been designed and erected with any dogmatic idea in mind that it is the only stage upon which the plays of Shakespeare and other classical writers should or can be truly and effectively performed. It is an experiment and must be regarded as such. It endeavours to offer practicalities enabling the plays to be staged in the convention for which they were written. It is happily devoid of any historical accuracies or, for that matter, any historical inaccuracies; intentional or unintentional; to give the literary and history gentlemen cause to take up their pens in wrath. No scenery is used. It can be described as an actor's stage, making him completely dimensional; demanding from him a style of acting where each part of his body must be as expressive as his face. Nowhere on the stage is he out of focus; the audience is on three sides of him and very close. The entrances from under the audience, those at the back of the stage and on to the balcony, enable the action to proceed swiftly, without breaks between scenes. The only change for the audience is one of focus, establishing for them at once a new locale and the mood of the ensuing scene.

The stage is illuminated with forty-eight pageant lanterns from Strand Electrical Company of London, England, and the only change of lighting throughout the performances is made by changing the intensity of all of the pageants at the same time; you cannot play tricks with lights in just one corner of the stage, otherwise you cheat the audience on the other two sides of the effect. I do not suggest for one moment that lighting effects are impossible. Of course not, but they must be introduced with discretion and have a real purpose behind them; not be just "stunts". That is the one danger with this type of stage. The temptation can be to forget that its chief asset is its simplicity and purely functional nature, and attempt to defeat those very assets by imposing tricks of production which swamp the text and the actors. After all, have we not freed the text and the actors from the shackles of the proscenium stage and made it "up to them" to get the play over?

May I conclude by getting one of my "bees" out of my bonnet again for a brief airing? In Canada, you have very few theatres; perhaps rather sadly, it seems at the moment enough to meet the demands of professional groups, until the theatre is regarded as a safe investment for capital. In England, they say we, too, have enough for the time being and everyone is playing safe and waiting to see what television is really going to do to the theatre. Anyway, with controls and the low priority given to the building of theatres, we have not much chance of witnessing anything in the nature of an experiment in theatre design and construction for many years to come. Maybe TV will eventually force experimentation in order to attract people back to the live theatre. It's a ghastly prospect, to think that TV could develop into such a power, but, on the other hand, it may possibly give the theatre a much needed kick in the pants to rouse it from its placid snoozing.

The theatre in Canada has practically no tradition. It is young and, I believe, vital, and, in a few years time, provided it is wise enough to keep its head above water and avoid being pushed under by television, three dimensional and other fanciful films, it will need theatres and architects to design them. Please do not just stick up a theatre, which is a building with a box at one end for a stage. On the other hand, do not think that I mean you should copy the style of Stratford theatre and have dozens of them all over the country. It is a special one, built for a special purpose and must not be regarded as a blueprint for an all-purpose theatre. The possibilities in that field have not yet been fully explored by any means and requires much careful study. Seek advice from four different sources in the theatre, a director, a designer, an actor and a technician. Go into every possible detail affecting every possible type of entertainment to be staged in the building. It is important that the people who have the task of making the theatre do its job, should say whether the essentials are there to help them interpret any form of drama they may have in mind. A real theatre must possess flexibility; so few do, I am afraid. In England, we have loads of tradition behind us and are therefore apt to follow blindly "what's been done before". In Canada, you must not do this; soak up what tradition can offer and then let it be the background knowledge and inspiration for creative and practical designing; not a blueprint to be followed line by line. So many old theatres in Europe are beautiful and we long to be installed in them. "Such atmosphere", we say. Indeed, it's true and atmosphere means a great deal in theatre and must not be forgotten; you cannot play Shakespeare in a place which looks like the inside of a railway station, cold and uninviting. If, however, we did find ourselves in those lovely old theatres, we would very soon find that, before long, they would break our hearts, because they are completely impracticable and frustrating as working theatres. A theatre must never frustrate those who have to make it serve their artistic conceptions. It must be the servant and then, in turn, the people of the theatre can be the servants of the public who, quite rightly, expect good value and, in these days, infinite variety, for their money.

The theatre must be elevated to the safe and wise investment category of the entertainment world. With good directors, good actors and, above all, good theatres, it undoubtedly will.

# NEWS FROM THE INSTITUTE

## CORONATION MEDAL

The *Journal* is pleased to announce that Coronation Medals have been presented to Professor H. H. Madill, O.B.E., V.D., B.A.Sc., F.R.A.I.C., Hon. Cor. A.I.A., Director of the School of Architecture, University of Toronto, and to Professor A. P. C. Adamson, M.A. Cantab., School of Architecture, University of Toronto, and Reeve of Toronto Township in the Province of Ontario.

*If any other architects received Coronation honours, the Journal would like to hear from them.* *Editor*

## CALENDAR OF EVENTS AND NOTICES

Annual Meetings of the Provincial Associations:

Alberta, Macdonald Hotel, Edmonton, January 29th, 1954.
Ontario, Royal York Hotel, Toronto, January 22nd to 23rd, 1954.
Quebec, Chateau Frontenac, Quebec City, February 4th to 6th, 1954.

Council reported considerable progress made in the arrangements for the R.A.I.C. Assembly which is to be held at the Mount Royal Hotel, Montreal, May 11th to 14th, 1954. Mr John Bland, Chairman of the Convention Committee, reported the formation of four sub-committees: Exhibition and Building Materials, Frank Nobbs, Chairman; R.A.I.C. Convention Committee, R. E. Bolton, Chairman; Program Planning Committee, Maurice Payette, Chairman; Convention, Promotion and Public Relations Committee, R. C. Betts, Chairman. The theme of the Annual Assembly is to be The Architect and Industry.

## ONTARIO

I usually leave the monthly dinner meetings of the Toronto Chapter of the O.A.A. with the feeling of an evening well spent. The meeting at which the relative merits of Le Corbusier and Frank Lloyd Wright were discussed was one of the most stimulating, and especially notable for the active and heated general discussion that followed.

The question of Wright versus Le Corbusier seems to start a heated discussion whenever the subject is raised. What is not recognized often enough is that the similarities between the two men are greater than their differences. As a matter of fact, many of the things that were said about one architect could easily have been said about the other. Both Wright and Le Corbusier are concerned with the creation of a new and better environment for man, both are interested in the use of new materials and techniques for the achievements of these ends, and both have evolved a new conception of form and space. Both Wright and Le Corbusier are undoubtedly great architects, and their greatness derives from their search into the nature of the problem and their ability to create forms and spatial conceptions of the highest order. To me, Wright is the greater architect, and Le Corbusier the greater architectural philosopher. Wright's individual architectural achievements are by far superior. Le Corbusier has nothing to compare with the Johnson Wax Administration Building and Taliesin West. Wright's play of form and space is more alive and more powerful, and more daring. Le Corbusier's work on the other hand, and this was most apparent from the slides that were shown at the meeting, is cruder, and his detailing, especially in his latest buildings, almost brutal. On the other hand, Wright provides us with little positive philosophy or principle with which to proceed. Wright really has not solved the relationship of man to machine and of man to the city. It is in this aspect that Le Corbusier has shown us the way. It is Le Corbusier, for instance, who has given us the solution to the multi-storey building, and who has integrated the steel frame and architectural expression. Without Le Corbusier's pioneering there would be no Lever House and no United Nations Building, as we find them today. It is Le Corbusier who has given us an approach to city planning, a method of investigation and of analysis, and a possible solution. Even if some of his principles and some of his solutions are highly debatable, his influence in city planning is being felt at this moment in every part of the world. His basic principles of town planning apply as much today as when they were first stated:

We must de-congest our cities
We must increase the means of getting about
We must increase parks and open spaces.

The segregation of business, industry, and residential quarters, which is now considered an essential part of all town plans, were all advocated by Le Corbusier. However, it is important to realize the limitations of Le Corbusier's philosophy. His plans for "La Ville Radieuse" show some of these limitations. His concept is undoubtedly great and has had a profound influence on our conception of the city; but his skyscraper city, even though it is set in a park has a quality about it that is inhuman. The environment is too regulated, the apartment blocks have lost all contact with the ground, there is no room here for the picturesque or the accidental. While his unité d'habitation in Marseilles is definitely a superb conception and provides living space much superior to those found in most cities today, I still can't see a family with children being happy in a building of this type. Wright's house on two acres of land is too ideal, Le Corbusier's tall apartment blocks too inhuman. Following Wright and Le Corbusier obviously is not going to lead us along a completely logical path, and fortunately we still have to think for ourselves – study the ideas and solutions of the great men of our age and go on from there.

*Henry Fliess*

## OBITUARY

**James Patrick Hynes 1868-1953**

Cynics to the contrary, the good that men do can live after them. Such is the thought which seems to set a keynote for appreciation of the life of James Patrick Hynes, whose earthly labours ended on October the fifth.

One could speak of his practice extending from 1896 over a period of forty-two years, and of his outstanding works, which included many important churches and institutional buildings. Reference must also be made to long and active service in his Mother Church recognized by Papal honour.

One could speak of his unfailing helpfulness to younger architects, and his solicitude for those with whom life had not dealt too kindly. All these were the marks of the man, and by them he will be remembered.

To those who knew him well, his most outstanding characteristic was unselfishness. Personal interest meant nothing if in conflict with what he considered to be the right. His compensation was the enrichment of friendships which appreciated the cost of uncompromising adherence to principle. It was on the bedrock of principle that he played a tremendous part in the struggle for official recognition of the profession. All know the zealous care with which he guarded the prestige so gained.

A record of the offices held by Jim Hynes reads like a history of the development of the profession in Canada. In the R.A.I.C. *Journal* of March, 1931, is an account of a complimentary dinner tendered by his brother architects "In recognition of the distinguished services rendered by him in the cause of architecture in Canada".

On that occasion, the late Mr A. Frank Wickson "Traced the activities of the honoured guest from the time he was the prime mover in the 'Eighteen' Architectural Club; his association with the Architectural League of America of which body he became president in 1907, (incidentally, the only Canadian to have ever received that honour); his very keen interest in the work of the Ontario Association of Architects, of which he was president from 1921 to 1923, and as a charter member of the Royal Architectural Institute of Canada, which was founded in 1907 and of which body he became president in 1926. Through his efforts, Mr Wickson pointed out, the Institute has now become a potent force in the architectural profession throughout the Dominion, and as a result of the progress made under his regime, Mr Hynes was re-elected president of the Institute in 1927 and again in 1928. One of the outstanding accomplishments by the guest of honour, was, he considered, the publication of 'The Journal', a magazine of which the membership was quite proud, and with which Mr Hynes name will long be remembered."

It is twenty-two years since those words were spoken. Time has supported their verity.

In the years which followed, Jim Hynes was no less active. As a member of the Architects' Registration Board of Ontario, later as secretary to the Board and the Ontario Association of Architects, he continued in good works until his retirement in 1944, when he was honoured by appointment as Secretary Emeritus of the Association. Even in retirement his interest in activities of the Institute and the Ontario Association did not wane. It is typical of the man that up to the very end he found peace and relaxation in work on his draughting table.

So for James Patrick Hynes there was no faltering, as he trod the downward slope to journey's end. The profession is the richer for his long sojourn.

*A. J. Hazelgrove*

## REPORT

On October the 9th and 10th the President and Mrs Morris attended the Annual Convention of the New York State Association of Architects which was held at Lake Placid, N.Y. They were the guests of the Association.

The luncheon on Friday, October 9th, was addressed by the President of the A.I.A., Mr Clair W. Ditchy. Mr Ditchy spoke very interestingly and informatively on the work of the American Institute. Mr Morris was presented with a very fine Declaration of Professional Integrity and Service which was composed and inscribed by Mr George Bain Cummings, Secretary, A.I.A. Mr Donald Q. Faragher, President of the Association, was in the Chair and his successor, Mr Adolph Goldberg, was seated at the head table.

In the evening, with some four or five hundred of the members and their wives present, Mr Hugh Ferris addressed the dinner. Mr Ferris was both witty and wise, and his address was a great delight to his listeners. Mr Morris spoke of his admiration for the work of the retiring President, Mr Faragher, which he has personally been in a position to appreciate and he conveyed to the Association the congratulations and good wishes of the R.A.I.C.

It seems to be a pleasant habit of the New York Association to go to Lake Placid at that time of year, and with the trees in the full splendour of their autmun colouring it would have been hard to find a more beautiful place in which to hold a convention.

## SCHOLARSHIP

Applications for the 1954 R.A.I.C. College of Fellows' Scholarship must be forwarded to the Secretary of the Institute by January 31, 1954. Members will recall that the first award of the College of Fellows' Scholarship was made in the year 1950, and that subsequent awards were to be announced every second year. Its value is $1500, and its purpose, the advancement of architectural knowledge through travel, study or research. The Scholarship is open to Canadian citizens who have graduated from a Canadian school of architecture, and who have taken their entire architectural course at a Canadian school or schools. Applications for the award must be made within five years of the date of graduation, and candidates for the 1954 award must submit their applications to the Institute Office by January 31, 1954.

The full Conditions of Award, together with the formal Application Form, may be obtained from the Secretary of the Institute, and any inquiries concerning the Scholarship should be addressed to the Institute Office. Announcement of the 1954 award, if any, will be made at the Annual Dinner of the Institute which is to take place on May 14th, 1954.

Applications are invited from members of the Institute who qualify under the conditions, and who wish to apply for the Scholarship. In addition, it would be very much appreciated by the Officers of the College of Fellows, if members of the Institute would assist in the distribution of the above information by drawing it to the attention of any architectural graduates, who would be qualified to apply for the award, although they have not yet attained membership in the Institute.

## CONTRIBUTORS TO THIS ISSUE

**Cecil S. Burgess** was born in 1870 at Bombay, India. He received his education at the Royal High School, Edinburgh, Scotland, and was articled under Sir George Washington Brown of that city. He was an Instructor in Architecture at McGill University, Montreal, in 1910, and was later associated with Messrs Nobbs & Hyde of Montreal in the design of the Arts and Science Building and the Medical Building for the University of Alberta.

He came west to Edmonton in 1913, and assumed the post of Instructor in Architecture at the University of Alberta the same year. This post he retained until his retirement in 1939, and his retirement marked the closing of the School of Architecture in Alberta.

Mr Burgess has long been active in the affairs of the Alberta Association of Architects, holding many of the offices, including President. He has been very active in town planning work for the city of Edmonton, and his efforts have been largely responsible for the progress of planning in that city. He has also acted as consultant in the replanning of the town sites of Banff and Jasper.

Mr Burgess is well known to readers of the *Journal* by his many contributions to the Provincial Page. He is a Fellow of the Royal Institute of British Architects and also of the Royal Architectural Institute of Canada.

**Cecil Clarke,** Assistant Director of the Shakespearean Festival, Stratford, came to Canada immediately after completing seven years as Production Manager of the Old Vic Theatre. He was active in forming the famous Old Vic School, and acted as an Assistant Director for several years.

He has had many years of experience in the theatre and has become known as one of the top lighting experts in European theatrical circles, having planned the lighting for shows in Switzerland, Holland, as well as all over his native land.

Much of the success of the Festival must be attributed to his organizational genius. Arriving in Canada last January, he immediately set upon the task of contacting the many people who are so necessary to a successful operation. It was through his personality and understanding that so many of the suppliers took much more than a commercial interest in the Festival.

Mr Clarke has worked with Tyrone Guthrie on many Old Vic productions, and has a flair and imagination which admirably suited him for the position which he occupied at Stratford. The opening of Richard III in Stratford celebrated the 100th major production with which Cecil Clarke has been connected.

**Robert C. Fairfield,** partner in the firm of Rounthwaite and Fairfield, Toronto. Formative years variously occupied in and about St. Catharines, Ontario. Graduated from the University of Toronto, School of Architecture in 1943. Employed as Senior Assistant, N.S.H.Q., Ottawa. Member of the A R G O group, Ottawa. Served in the R.N.F.A.A. Commenced architectural practice in 1946.

**Charles S. Leopold,** Engineer of Philadelphia, Pa., is a graduate of the University of Pennsylvania, and has been practising under his own name since 1923. He is the author of numerous works dealing with refrigeration, heating and cooling and "conditions for comfort" in buildings. In a long list of buildings on which he has served as consultant are the Pentagon, Arlington, Va.; Madison Square Garden, New York; U.S. Capitol; Saks Fifth Avenue, New York, and the Laboratory Buildings, Los Alamos, New Mexico.

## ANNOUNCEMENT

A Dutch architect, C. M. Bakker, wishes to form a partnership with a Canadian architect. He is a graduate of the Delft University Institute of Technology, and is a member of the Ontario Association of Architects. He has had twenty years experience in private practice in Europe and in the west. Mr Bakker's address is 122 Ridley Blvd, Toronto. Telephone HU. 8-8162.

## FUTURE ISSUES

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|---|---|
| December | Thesis on Town Planning, by K. Izumi |
| January | Don Mills Development, Ontario |
| February | Students' Union, Victoria College, University of Toronto |
| March | Students' Issue – University of Manitoba |
| April | Hospitals |
| May | Schools |

## BOOK REVIEW

ARCHITECTURAL PRINCIPLES IN THE AGE OF HUMANISM by Rudolph Wittkower. Published by Alec Tiranti Ltd., London, England. Price 25s. 0d.

This little book, and it is only a little book, is composed of four studies of some of the abstruser aspects of Renaissance architecture, "The Centrally Planned Church", "Alberti's Approach to Antiquity in Architecture", "Principles of Palladio's Architecture" and "the Problem of Harmonic Proportion in Architecture".

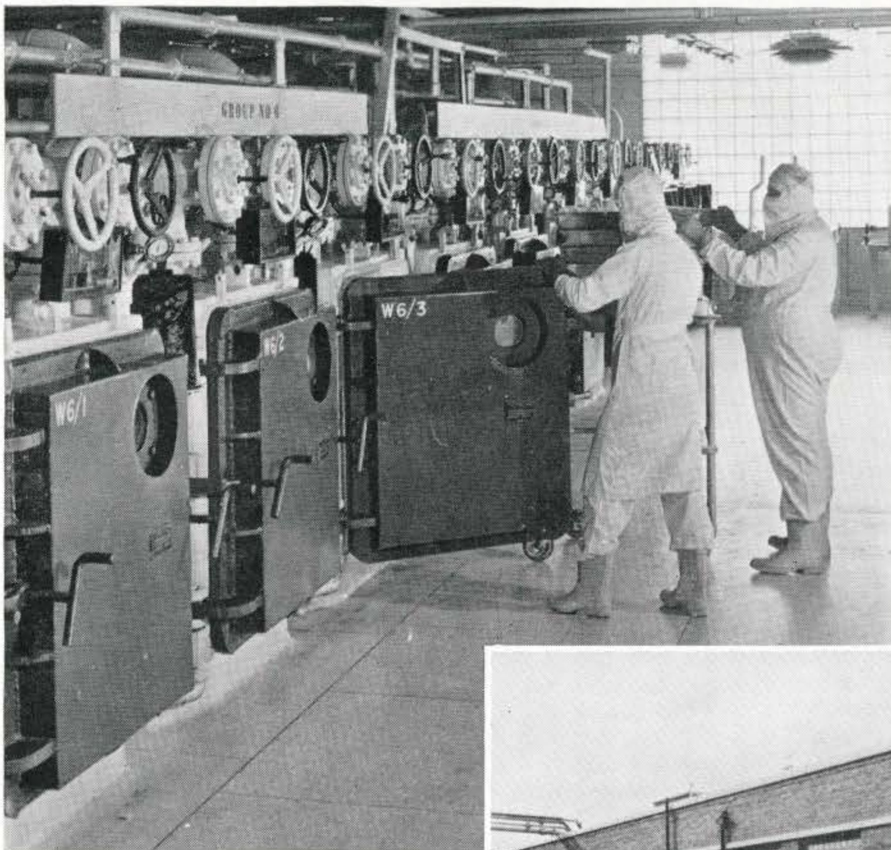
Professor Whittkower's interpretation of the humanist's integration of the macrocosm and the microcosm and the position of the "uoma universale" vis-a-vis such statements of Vitruvius' that "Namque non potest aedis ulla sine summetria" is adumbrated with a great depth of Neo-Platonic sympathy. In particular, the early attitudes of Palladio as "architetto" on his first visit to Rome from Vicenza in 1547 with Trissino, Giambattista Maganza and Marco Thiene as given by Professor Whittkower are enlightening in this regard. One may perhaps take some of his statements concerning Palladio's later "fugal" system of Proportion "cum grano salis"; the early Palladian Villa Godi at Lonedo is shown for instance to have been planned with room sizes based on the progression 16.24.36, which one might, without committing a solecism, consider the same as Alberti's ratio of 4:6:9 which can, as one knows, be expressed in musical terms as a sequence of two diapente. Of course, one might be wrong . . . .

The erudition of architectural historians leaves too many a North American architect whose interest in ratios is limited to the well-known 6:100 – more satisfactorily expressed as 6% – with a glazed look. For the common, or garden, type of "architetto" this book is good escapist reading and should be included as a change of pace with the twenty-five cent paperbacks. For the continuing Vicenzans who still find the cyma reversa a ready source for the 6%, the reading of this book will be very salutory in an esoteric way.

*Anthony Adamson*

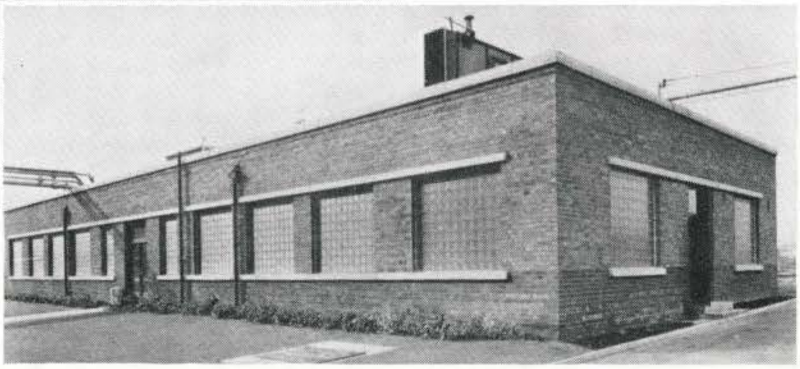
# Facts by Pilkington about Glass

**VOL. 3 No. 11**
**Glass Throughout the World**
**GLASS BLOCK**




*left: Controlling the 'freeze-drying' process at an antibiotics factory in Speke, Liverpool, England.*

*below: Exterior view of the physiological department.*



*By courtesy of the Distillers Company (Biochemicals) Ltd.*
*Architects:* Yates, Cook & Darbyshire.

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This is one of a series of data sheets compiled by the technical department of Pilkington Glass for the information of architectural students.