RAIC JOURNAL

Serial No 349, Vol. 31, No 9

The Institute does not hold itself responsible for the opinions expressed by contributors

ROYAL ARCHITECTURAL INSTITUTE OF CANADA

J. F. SULLIVAN, PUBLISHER

All correspondence should be addressed to the Editor

EDITORIAL AND ADVERTISING OFFICES, 57 QUEEN STREET WEST, TORONTO 1

EDITORIAL

An issue on schools is as good a time as any to ask what we have accomplished in school design in Canada in the last ten years or less. Various reports on schools have been published since the war, and some, like the one authorized by the Department of Education in Ontario, had considerable influence. It, like others, recommended the one storey elementary school and the abolition of the basement. There was nothing new about such a recommendation as one storey examples could be studied in England, Scandinavia, Switzerland and the United States. All the report did was to draw the attention of the Department, school boards and architects to such schools, and the advantages which they had to offer in terms of child and teacher comfort. "Comfort" was the keynote in the new conception of the school, and its influence was, and still is, far reaching. The floor on one level was considered preferable to the stair, even one storey in height, and relief from eye strain produced a whole series of ceiling designs, and boosted the sale of glass in sheets and in blocks, both ordinary and directional.

In the post-war rush to get schools built, few architects have had time for contemplation, or for a re-examination of the basic principles upon which the new school was built. Original assumptions are still accepted as gospel, and research is still concentrated on natural and artificial lighting. All will agree that the new school is a vast improvement on the psuedo-gothic and neo-georgian designs that preceded it, and no one would argue that function and comfort are not better watchwords than style and symmetry.

After less than a decade of one storey schools, it is perhaps early to ask where we go from here. One does, however, get the impression that we are in a cul-de-sac. The story is told of a well known Toronto architect who visited the art gallery with a friend. On exhibition were some fifty or more photographs of schools, and our architect seized the opportunity to point out one of his own creations in which he showed pardonable professional pride. Flushed with pleasure, he decided to buy a catalogue, and his embarrassment can be imagined when he found that the school was not his at all. The story is true – we were an eye witness. This *Journal* shows some extraordinarily skilful essays in the manner of Mies van der Rohe. We know of others, and wonder whether the hand of the master which, already, is strikingly evident in factories throughout Canada and the United States is going to be laid on a host of new schools throughout the country. Then, indeed, will we have uniformity. It has been said that modern architecture will develop like gothic, not from the works of giants like Le Corbusier, but out of the work of thousands of anonymous architects each of whom adds his mite to the creative efforts of the whole. That being so, we may be showing an unreasonable impatience. However, in the hope of starting an argument in these pages, we shall persist in this editorial in asking questions and raising doubts. In all the reports we have read, the one storey school is alleged, without concrete evidence, to have the cardinal merit of cheapness. Proof would require carefully prepared working drawings of one and two storey schools with identical accommodation and finish, and a contractor adequately paid to make estimates. We would not introduce the subject of cost except that when we see large schools with what seem like interminable corridors, we wonder whether we actually have achieved physical comfort and efficiency in the one storey school; and if it be true that we increased cost, it is time we reviewed both comfort and cost. In so doing, let us stand solidly behind the basementless school, and reject any above two storeys. Research, such as it has been, would give ample support to both those points of view.

It has always struck us as curious that neither the bright young architects nor the illuminating engineers, who guide us on matters of light, can agree at all on the proper orientation of a school. We have some friends, whose judgment we respect, who insist that a school should be on an east west access, while others, equally conscientious, make claims for north south. Naturally, many sites demand a compromise in orientation, but on the ideal site there is no unanimity of opinion. We have reached a stage where a pitched roof on a school is hailed in the architectural press as a striking innovation, and sculpture in cement that would not do credit to a junior student in an art school is accepted as the North American answer to the joy and humanity of the best examples in Sweden and Switzerland. We have referred elsewhere to comfort. It is early in the season to look for tidings of comfort and of joy, but perhaps that is the combination that we need most in our schools.

Report of the Pilkington Glass Scholar, 1950 Part II

Irving Grossman

Procedures

The carrying out of a housing project in the County Council takes place in somewhat the following manner. The Valuers Department, whose position is perhaps analagous to that of the client in the normal architectural practice, selects the site which, according to the London Plan, is ready for development. Preliminary investigations are made as to cost, and whether acquisition will be made by negotiation or by compulsory purchase, which the Minister can enforce. When this is decided, the Town Planning Department, which is also under the Architect-to-the-Council, is approached, and requested to make a layout of the area, from which can be determined the economic feasibility of the proposed scheme. Working within the density and zoning regulations of the Plan, numbers and types of dwellings are determined, and related to land and service costs, and if the layout appears reasonable, the valuers proceed to negotiate the land. The Architects Department is now brought into the picture. Mr Lewis would study his schedule of progress, and allocate this new job to one of his many groups of architects, which would be ready for new work. This group, of perhaps six to ten people, would study what the town planners have suggested, and, from what I observed, more than likely disagree with their layout. They would commence to replan it, according to their own principles of town planning, but maintaining the required accommodation figures. Negotiations would then be made between these three departments, until all would agree on one plan, with the valuers generally having the last word. On one project, in which I was involved, the location of a shopping centre was a point of argument, that carried on for several weeks. The architects and planners agreed on its being situated in the centre, to act as the focus for the whole; the valuers, who were more keenly aware of the business end of it, insisted on its facing the outer streets, to catch the passing trade – it was finally located in this manner.

The final scheme would now be presented with perspectives, coloured drawings, and a model, to the Housing Committee for approval. At the same time, public enquiry would be held in the locality of the project, during which any complaints are heard. Such might be made by the local residents, the taxpayers associations, or even by the local Borough Council, who might have objections to the whole idea. Such objections even by individuals can override the decisions of the Council, if they are reasonable, although this does not happen too often. Another project on which I worked, had several eleven storey blocks, one of which was close to a neighbouring home. The resident complained that this would deprive him of his privacy, and, after prolonged legal dispute, he won his case. This building is now erected only eight storeys high. I am sure some moral can be drawn from this.

If the scheme presented met all requirements, the Housing Committee would pass approval on it, and it would then sit before the Council. Since the Committee is appointed by the Council, its approval would generally imply that Council's approval would follow. The working drawings would then be commenced, and the scheme dated for construction.

Organization

The Housing Division, which has hundreds of architects on its staff, is divided into small working groups. Authority is distributed through a hierarchy of graded officials. The general policy is to feed work to a group so that, at any one time, it is engaged on three jobs – one at the design stage, one in working drawings, and one under construction. It can be seen that such a timed schedule of work gives one ample opportunity for wide experience. But the lack of a real client, often gives the whole procedure the semblance of school work. Because of the numerous negotiations that are inevitable, a project can take several years, from the time of its design, to the stage of completed construction. This is one of the discouraging aspects of working at the Council, but, as the Division is relatively young, with the usual redundancies of large scale organizations, this can be understood. Equally understandable though can be the feelings of frustration which must arise in the architects who cannot sustain this protracted period of waiting, and delay, of red tape and complicated procedures. Outbursts of discontent, quietly carried out in the corner, with typical English restraint, are not entirely uncommon.

One group of architects is particularly devoted to the development of type plans. These are based on the requirements of the various kinds of accommodation needed. Once approved, these plans are supposed to be used by architects on any one scheme; they are, so to speak, to assemble them into buildings, and then 'treat' the buildings as they see fit. Massing, elevations, and the disposition of buildings with relation to one another, are left to the ingenuity of the group. The first type plans evolved did not result in this logical procedure at all. As the department had just been formed, and there was little precedent with regard to structural systems, services, materials, or techniques, these plans, when they were carefully looked into, were found to be somewhat inadequate. What happened then, was that each building was being designed from scratch, as every one developed his own new type plan. This was, of course, artistically gratifying to those concerned, but resulted in a great deal of duplicated work within the department, and, consequently, considerable waste of time and effort. When I left the department however, the situation was being changed, the plans were being revised, improved, and the word from up top was that they had to be adhered to – strictly. For those who felt that their considerable creative talents and skills were being wasted on this mechanical task of assembling and treatment, this was of course a source of unhappiness. Yet, one must judge fairly, that the earlier system was nothing but inefficiency, as satisfying to the creative instincts as it was.

Architecture of the State

At this point one could raise the question of whether government architecture, because of the sizes of staff, and the complexities of administration and organization, can ever reach an artistic level comparable to that attained in the work of individual architects; whether the use of type plans, which is necessary in any attempt to harness the forces of hundreds of architects, does not in itself limit the results to an efficient monotony.

From my own experience in the Council, and from what I gained through discussions with others, who had been there several years, I did feel that the size of the organization had inherent disadvantages to the creative architect, which were detrimental to the production of good design. The most striking one at the time was perhaps the element of indecision, which haunted the various ranks of authority, paralysing any quick actions that were often deemed necessary. The fear of assuming responsibility before checking with one's superior, could result in lengthy, unreasonable delays in progress, but even worse, could result in an attitude of caution, one which discouraged anything that was different from the already accepted, because of the necessary red tape it would involve in order to become accepted. Thus, good ideas could possibly be crushed at the bottom of the ladder of authority, ideas, which, had they ever reached the top, would probably have received favourable judgment. Such restrictive attitudes were not necessarily formed with conscious intent on the part of any individuals, but seemed to exist by the very nature of the organization, and the system.

In the case of a type plan which was developed by a group of strong minded architects, a plan which introduced a maisonette entirely new to the Council, considerable controversy was raised over its values, amongst the different levels of authority. When the group had persistently followed up the idea, a full sized mock up unit was built. This was furnished and equipped, and then the Housing Committee itself was led through it, for approval. Enthusiasm was expressed by all, and the plan has now been adopted as a new type. But the price paid for this was an immense amount of valuable time, not counting the energy that was expended in overcoming the resistance.

Many housing projects that have been designed by private firms of architects show more imagination, and vigour of concept than those which have come out of the Council till now. But, in light of what I have said, concerning the time the department has been in operation, and what is now coming off the boards, I am sure that this will soon change, and the new work will be recognized as an influence to be admired, and reckoned with. It seems to be a matter of the personalities involved–in their ability to organize efficiently, in their ability to recognize the new techniques which our time makes available for building, in the new forms that arise out of these, and above all, in their foresight and understanding of the implications of large numbers of people being housed in close quarters. If the leaders of any organization possess such qualities as they do in the Council, then the problems of administration must fall naturally into their place with time as they do in any large concern, whether it is private or publicly owned.

The schools of the Hertfordshire County Council are surely proof of this. These are produced also by state architects, and are the most elegant, precise, and visually pleasing schools that I have seen in a long time. Yet they are all based on standard details, modules in plan and elevation, and machine processed materials.

In spite of anything I have said of a critical nature, I should still like to state that during my two-year stay at the Council, I found for the first time, an architectural atmosphere, that was thoroughly saturated with social conscience, and high ideals. Unlike a private office, which has the inevitable troubled air of overhead, and the investor client, the Council was a place of work, in which the product was always evaluated in terms of human comfort – physical, visual, and spiritual. Economy was of course a factor, but not the factor, as it somehow must be, when the initiative stems from the desire of an individual to make profit. In this lies the strength of state architecture.

Ideologies

I was not long at the Council before becoming aware of the existence of two distinct schools of thought that activated all the planning. One, labelled the Swedish school, was the most dominant and produced work which had obvious affinities with that of Scandinavia. This influence had been easily assimilated after the war, when the need for housing was urgent, and there in Scandinavia could be seen such a fine set of examples. The tie with the sentimental English attachment to the cozy cottage in the country was not difficult to make either. As for the International school, very little precedent in the field of housing was available for English architects, examples from which any sort of principles could be as easily drawn. It was not long then, before the housing estates were dotted with such small houses, or low, sprawling, multiple dwellings – abundant with natural wood, carefully worked out in detail, with friendly balconies, a "romantic" disposition of masses on the ground, and the whole camouflaged in a tracery of green ivy and planting. This was the traditional castle, human, intimate, independent as much as possible, but, consequently, generous in its overall land consumption.

The second school believed that although the advantages of the small dwelling unit could not be denied, as a background for family life, the problems that faced England were of such magnitude, that the question of the shelter was one that had to be considered in much larger terms than just what was desirable for each person. Again, the implications of number. Furthermore, any sentimental ties with the past had to be discarded, if these did not harmonize with the current problems; problems which in fact were inherited from the past. The unhealthy life in the urban areas of the country was not due to any basic faults in what the cities could provide, but rather to the fact that the city was not understood as a functioning organism, and its natural characteristics were being distorted, and its vast potential unrealized. The architects and planners of this group, believed that freshness, and boldness were needed if these possibilities were ever to be released – the sickness had to be challenged and uprooted rather than pacified by escapes into the secure symbols of the past. Densities of population had to be related to coverage of land by buildings, and open spaces between them (it is known that over 50,000 acres of agricultural land is being devoured by building each year in England).

Housing, as a building activity, had to be closely integrated with industry, and the full use of mass production methods, and standardization, had to be made. This was to lead to a more intelligent understanding of the machine aesthetic. (Although England had been the leader in the Industrial Revolution, its building techniques are still relatively primitive.) It was felt that only in this way could the country survive the critical condition it was in. The principles of Le Corbusier are of course the guiding spirit of these architects who indeed are not alone in their thinking, for planners the world over have realized how prophetic his ideas of twenty years ago have been. One can imagine the shock received by the other members of the department, when they were faced by these somewhat fanatic young gentlemen. But in spite of differences in philosophy, they were given their reign, though not without having to fight for it, and their ideas were put into practice on several projects. This tolerance impressed me. The projects are those which I have previously mentioned as worthy of high praise.

The narrow front maisonette, which they introduced, was achieved as a means of collecting numbers of dwelling units, all basically similar, worked into a simple, repetitive structural unit, and so collected together that the amount of land coverage was reduced to a minimum. The height of the buildings in which these were gathered was at the time I left, limited to eleven storeys, but I have heard that pressures are being applied in an effort to raise this to seventeen. The overall building is simple in conception, complex in its outward expression of an inner complexity of human life, honest in its structure, and dramatic in its formal strength. Not unlike L'Unité d'Habitation in aesthetic concept, it is to stand over the ground to be surrounded by the green blessings of nature. In working with these high density blocks, I was delighted to see how these open parks were actually realizeable, for with the density of any project rigidly laid down, one had of necessity to create open spaces if one built higher. Of course the question of who was to pay for the maintenance of this newly found park was always put forward as an argument against these buildings. But it was felt, that just as the buildings were part of the state's responsibility, so should the state embrace within its benevolent arms, these park spaces, which were as important to the well being of the people, as the buildings themselves.

It will be interesting to watch the skyline of London change in the next few years, as these new forms take shape on the landscape – expressing a new force, which this time has stemmed from the common man.

Conclusions

That Canada is the country of the future has been said more than once. But what this future really turns out to be, depends entirely on what is planned for it right now. With respect to what I have said then, I believe that the following conclusions might be made, that apply to our scene of continual growth:

The problem of housing is most urgent today, and can only be solved by the authorities, as has been proven during the past decades in other countries.

Housing in any community must be considered as part of a detailed, controlling plan of growth for that community. Such a plan must be achieved by legislation, and not by the uncontrollable activities of private enterprise. Such legislation can only be brought about through the efforts of enlightened authority, which is placed in its position of authority by public vote. Such public vote can only be intelligently used, if the public is interested in the affairs of state.

This interest, if it does not exist, can be greatly encouraged by the active participation in these affairs of the architects and planners, who, as leaders in the community can educate the public through the various media of communication. This must be the social responsibility of the architect. The same responsibility must be shown toward his profession, about which I have already spoken in my introduction.

Regarding the form of housing, I believe it can be stated that:

The single house cannot in itself provide the solution to the problem of housing thousands of people. The reasons for this do not lie in any deficiencies of the single house as such, but rather in the implications of number.

Large numbers of single houses, on single lots, can only result in excessive land consumption, in expensive roads and services, in the removal of the countryside further from the city dweller, in the burdens of maintenance which are beyond the economic reach of many, and visually, in the heartless, monotony of suburbia, which no planner can avoid – the million dots on the horizon.

This can only hinder the efficiency of the city as a functioning organism, by adding to its already complex system of communications and transportation, and in doing so, adding an infinite number of hours spent in travelling to and from work. Such time spent, consumes energy, which should be directed to other more fruitful activities.

In the intelligent use of the multiple dwelling, lies one answer to this situation. Many years of research and study by architects, planners, and sociologists, have produced new insight into the characteristics of this form of dwelling.

The multiple dwelling cannot be the only form of housing, but does provide a suitable type of shelter for certain proportions of the population, at certain stages of their life; this does not preclude family life.

The concept of the multiple dwelling involves certain elements, which must be present, if such a dwelling is to be considered fully realized. The two most important of these elements are the communal amenities which serve the number of people within the dwelling, and the open green space about the dwelling, through which these inhabitants can move, safely in nature.

The bias which exists against multiple dwellings, especially as a place for family life, stems largely from the fact that most existing examples of such dwellings are lacking in these two fundamentals . . . they are conspicuous by their absence.

Multiple dwellings, by virtue of their size and bulk, provide an element of interest, and scale on an otherwise horizontal landscape. In a housing project such masses, when properly disposed, can create a focus for the whole, and diversity of form. In this, lies the answer to the formal problem of reconciling the multiple character of housing—the type plan, and the machine product, with man's innate love for variety and contrast.

"Quelle tumulte dans l'ensemble, quelle unite dans les details!"

Interior view of "mock up" showing living, dining area and glass wall to private balcony.

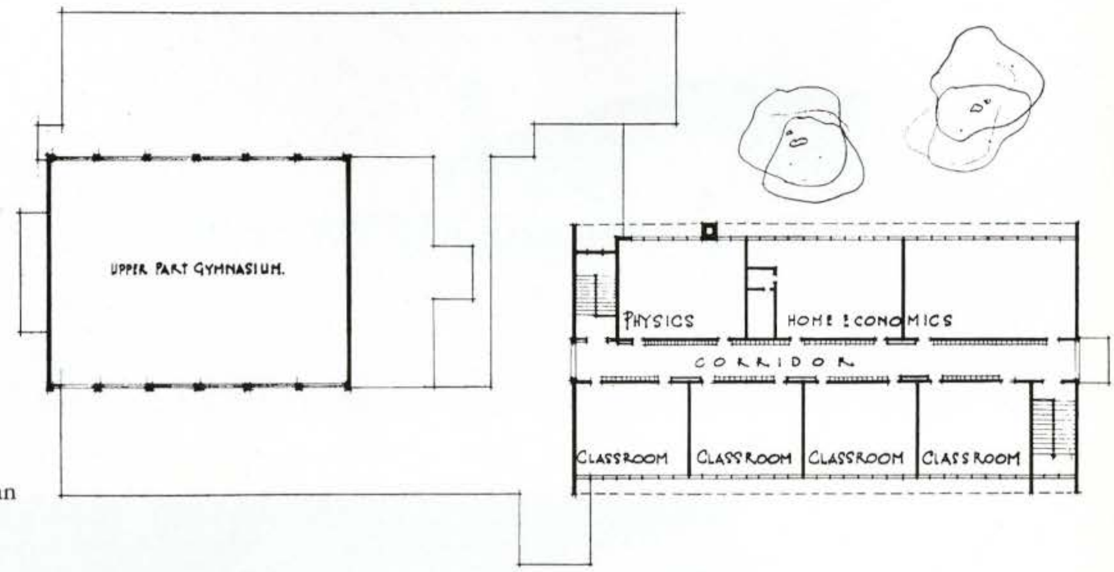
Full size "mock up" of a narrow front maisonette which was built by the Council before its acceptance, as a typical unit for eleven storey apartments. This is now being used in Bentham Road and Roehampton housing projects.

FOX PHOTOS LTD.

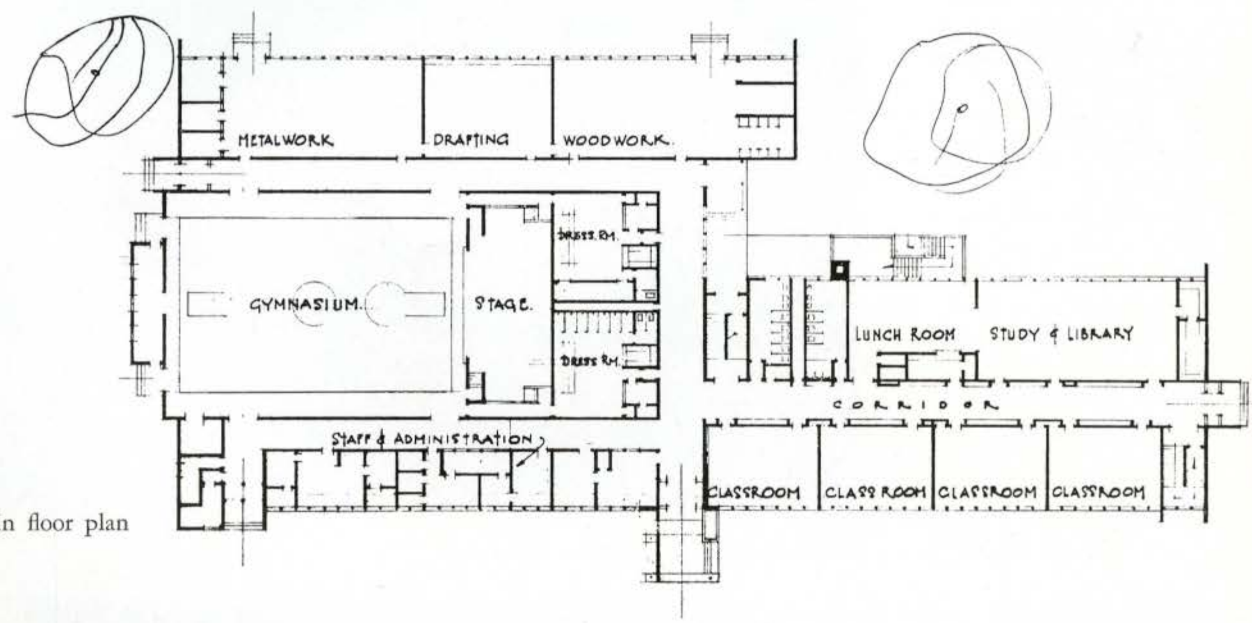
Junior Senior High School, Qualicum, British Columbia

Architects, C. B. K. Van Norman and Associates

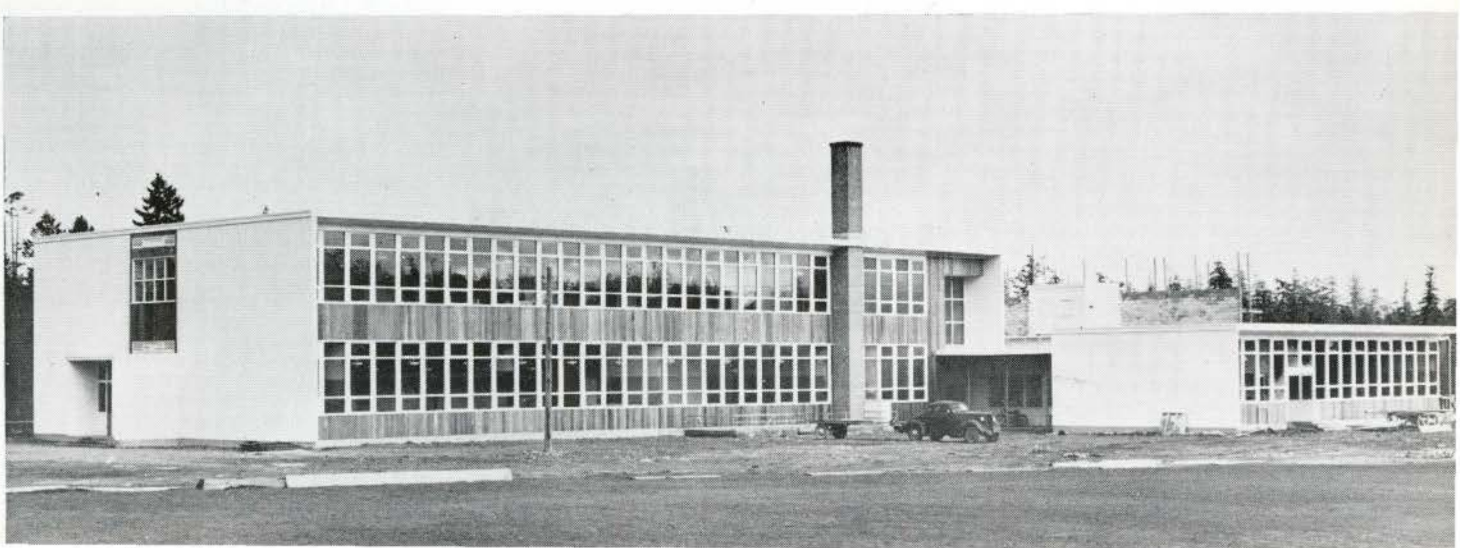
Structural Engineer, John H. Read
Mechanical Engineer, D. M. Drake
General Contractors, Qualicum Construction Co. Ltd.



Second floor plan



Main floor plan



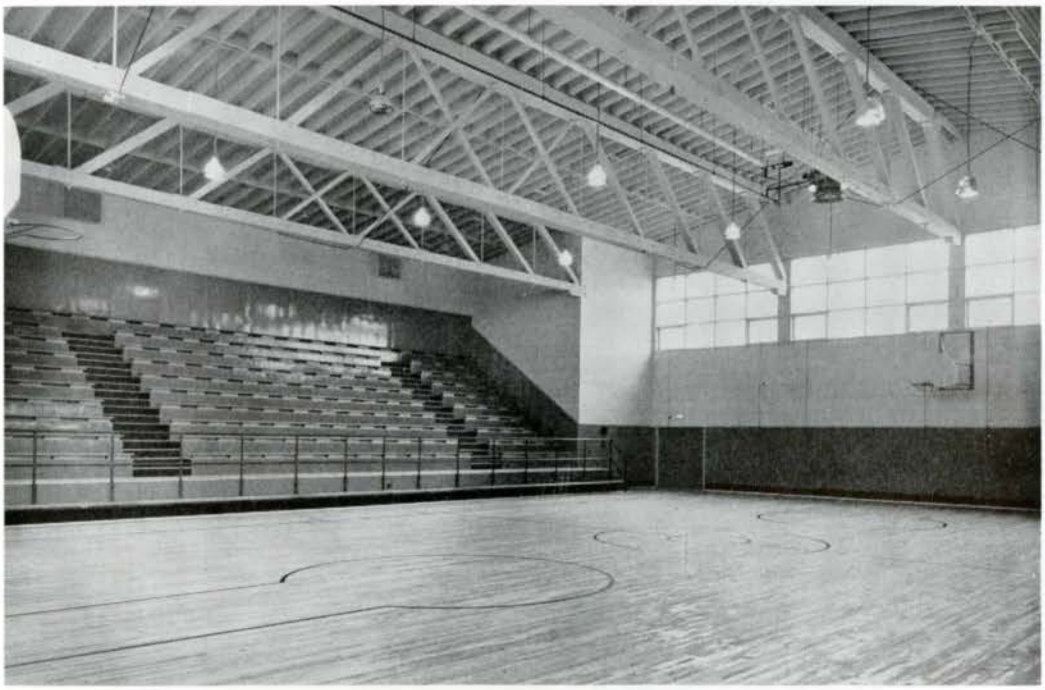
Addition to Fort St. John High School, Fort St. John, British Columbia

Architects, Gardiner, Thornton & Partners

General Contractors, Bennett & White Construction Company Ltd.

View from north west

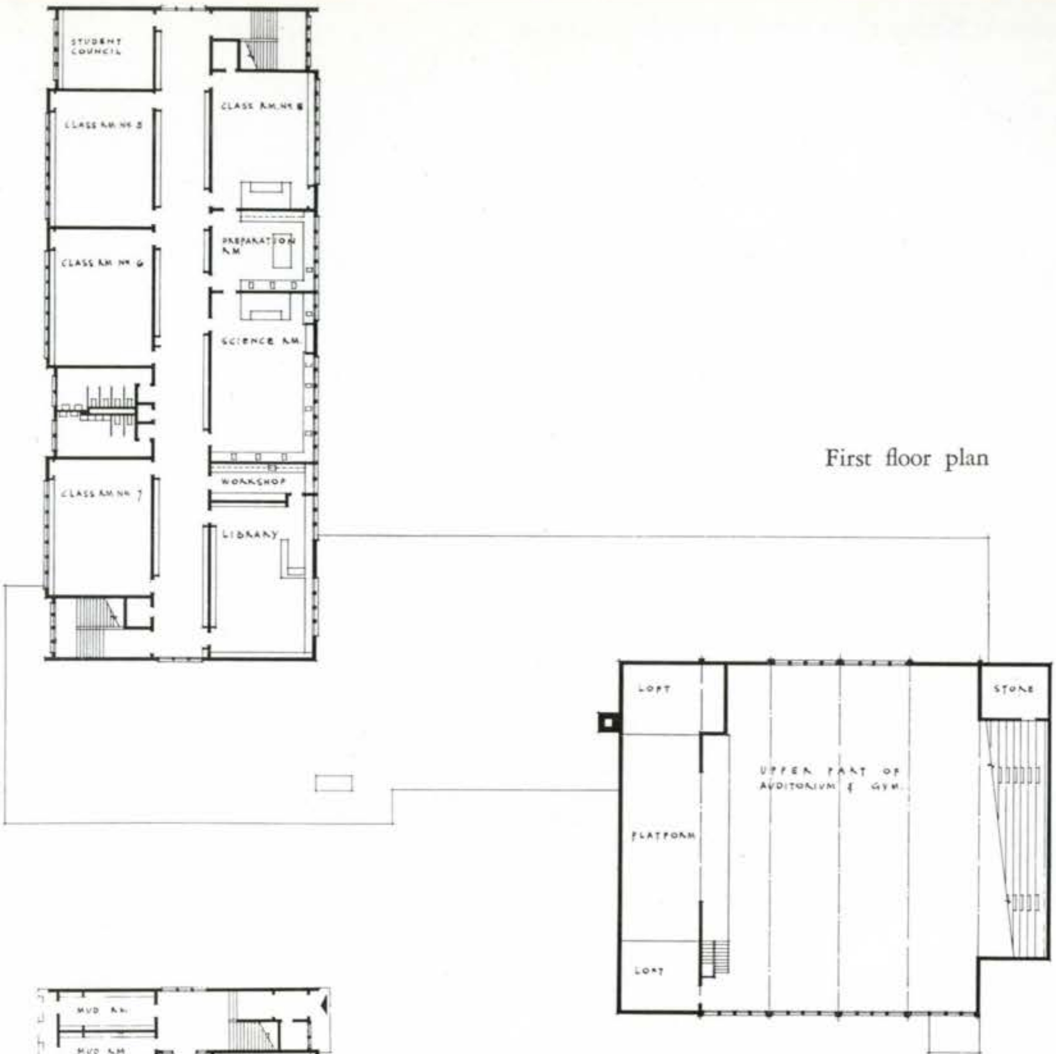
First section comprised general offices, domestic science and shops built in 1951-52. The present addition consists of classroom block and gymnasium.



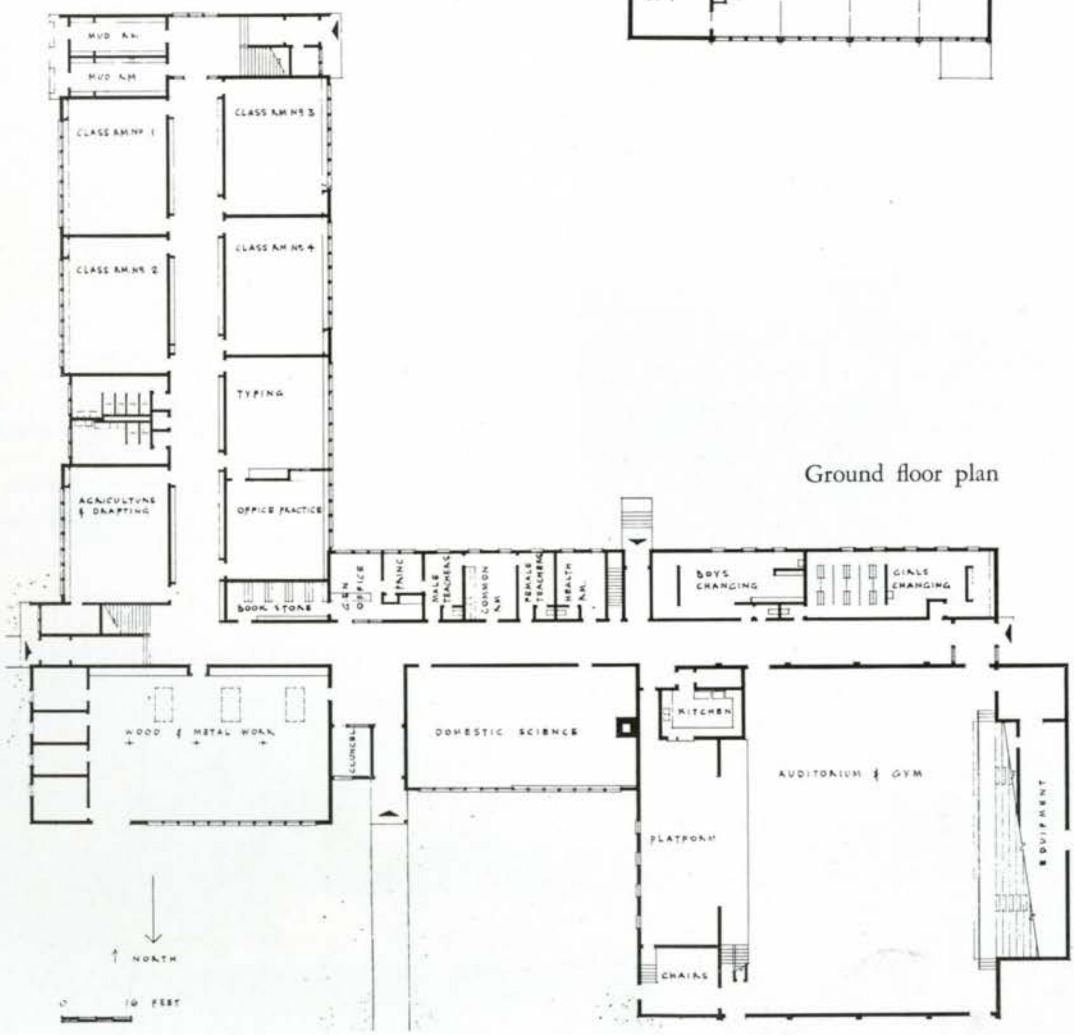
SCHUBERT'S PHOTO SHOP

Auditorium and gymnasium

View from north east



First floor plan

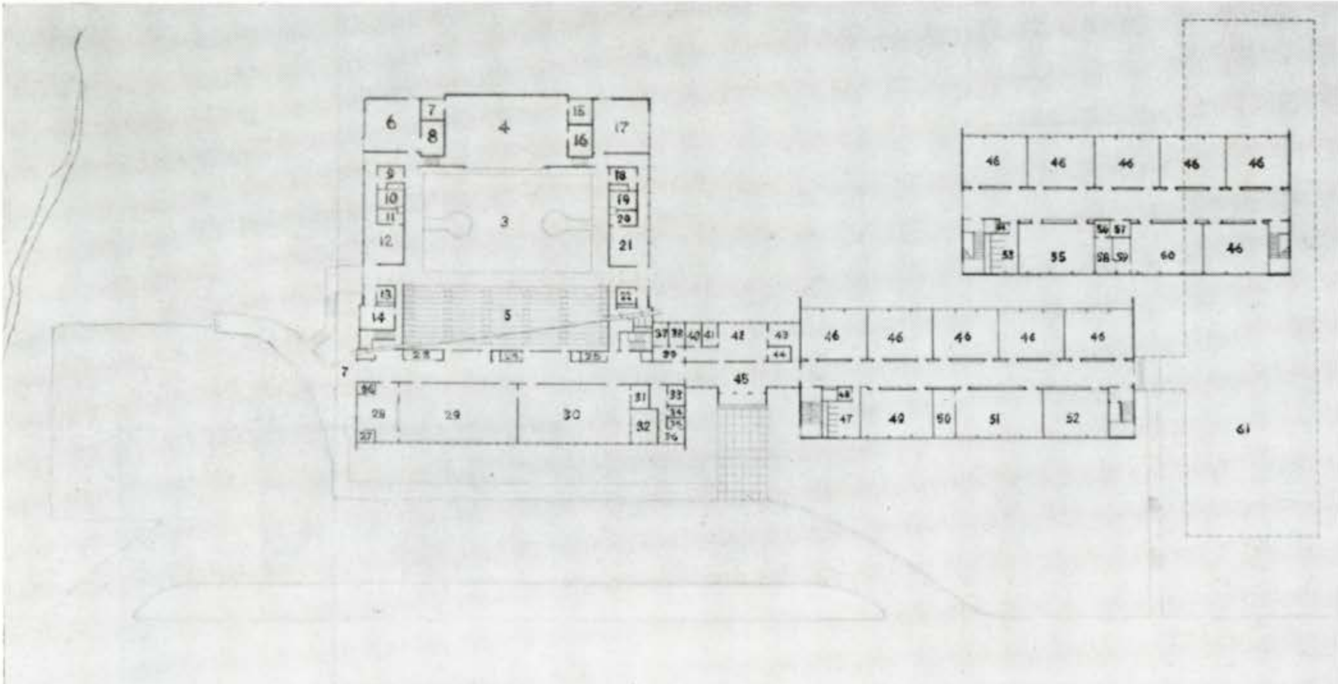


Ground floor plan

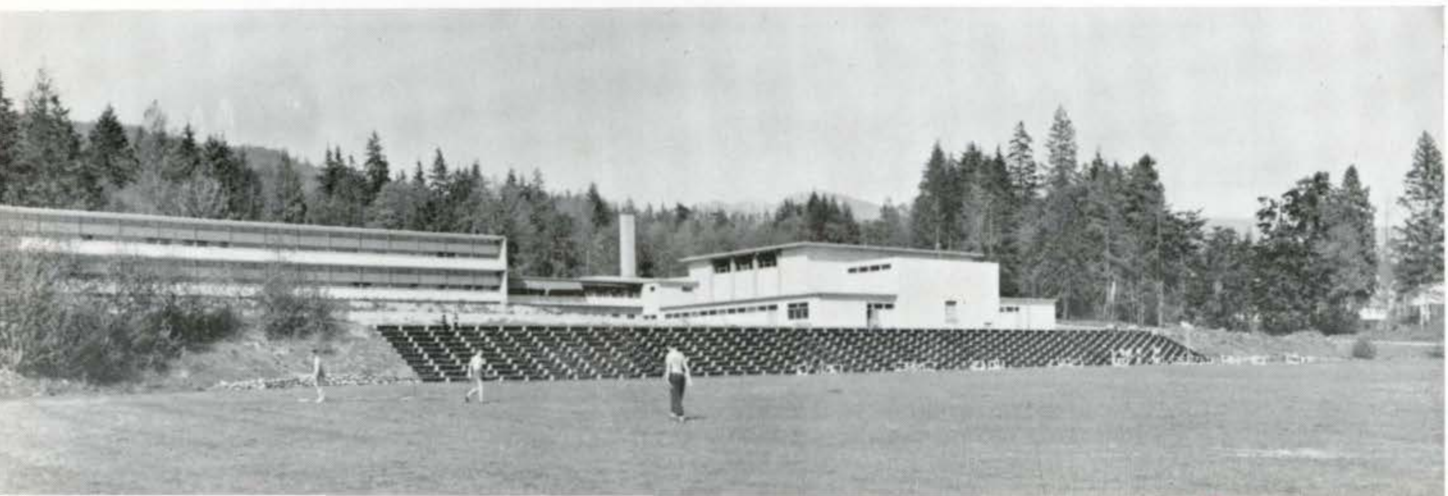
West Vancouver Senior High School, British Columbia

Architects, Sharp & Thompson, Berwick, Pratt

Structural Engineer, F. W. Urry
General Contractors, A. R. Grimwood Ltd.



1 Parking
2 Bus entrance
3 Gymnasium
4 Activity room and stage
5 Bleachers
6 Field equipment storage
7 Dressing room
8 Gym equipment storage
9 Instructor
10 Showers
11 Drying area
12 Locker room
13 Toilet
14 Basket room
15 Dressing room
16 Stage storage
17 Remedial room
18 Instructor
19 Showers
20 Drying area
21 Locker room
22 Toilet
23 Check room
24 Projection room
25 Concession
26 Storage
27 Office
28 Kitchen
29 Lunch room and study hall
30 Library
31 Conference room
32 Work room
33 Bedroom
34 Toilet
35 Store room
36 Doctor's office
37 Counsellor
38 Counsellor
39 Waiting
40 Machine room
41 Vice-principal
42 General office
43 Principal's office
44 Stationery store
45 Main entrance foyer
46 Classroom
47 Girls' toilet
48 Janitor
49 Bookkeeping room
50 Practice
51 Typing room
52 Staff room
53 Boys' toilet
54 Janitor
55 Science and chemistry lab
56 Weight room
57 Dark room
58 Chemistry preparation
59 Physics stores
60 Biology and physics lab
61 Future addition

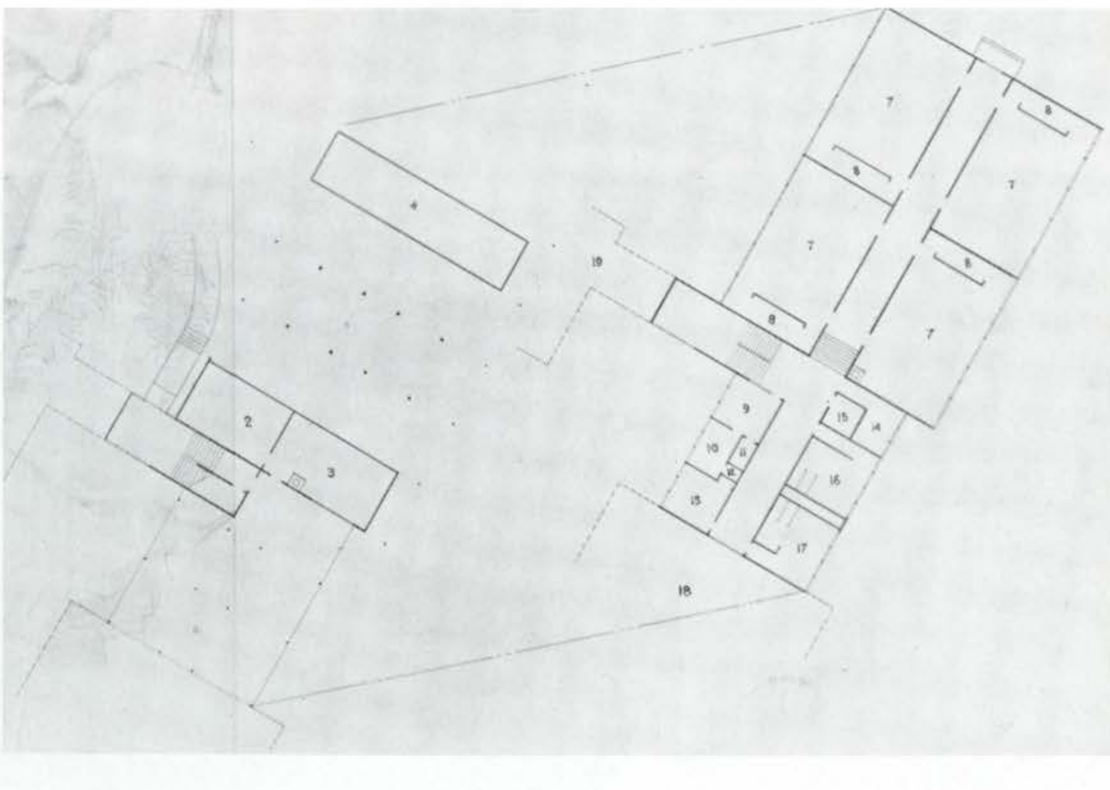


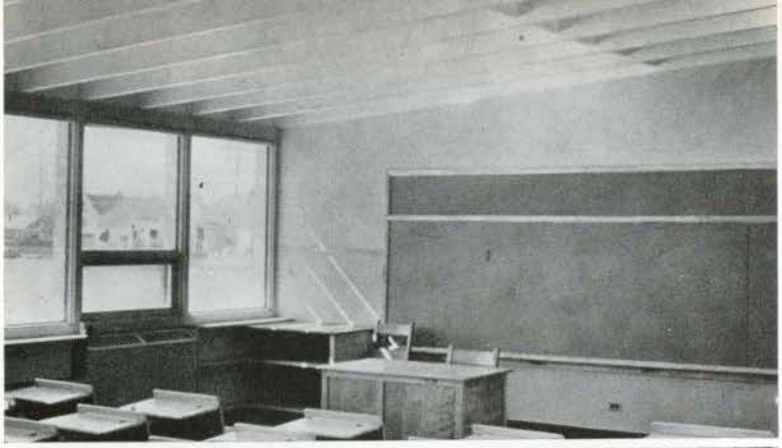
West Bay Elementary School, West Vancouver, British Columbia

Architects, Sharp & Thompson, Berwick, Pratt

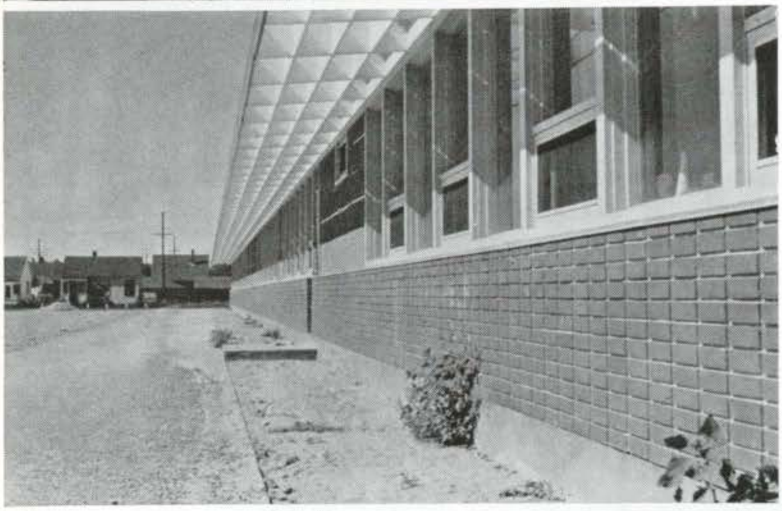
Structural Engineer, Victor Thorson
General Contractors, Adee & Son Construction Company (First unit)
Narod Construction Ltd. (Four room addition)

1 Main entrance
2 Storage room
3 Boiler room
4 Foundation pylon
5 Open space
6 Converted play area
7 Classroom
8 Coat area
9 General office
10 Principal's office
11 Stationery stores
12 Closet
13 Staffroom
14 Kitchen
15 Janitor
16 Girls' toilet
17 Boys' toilet
18 Future classrooms
19 Future activity room

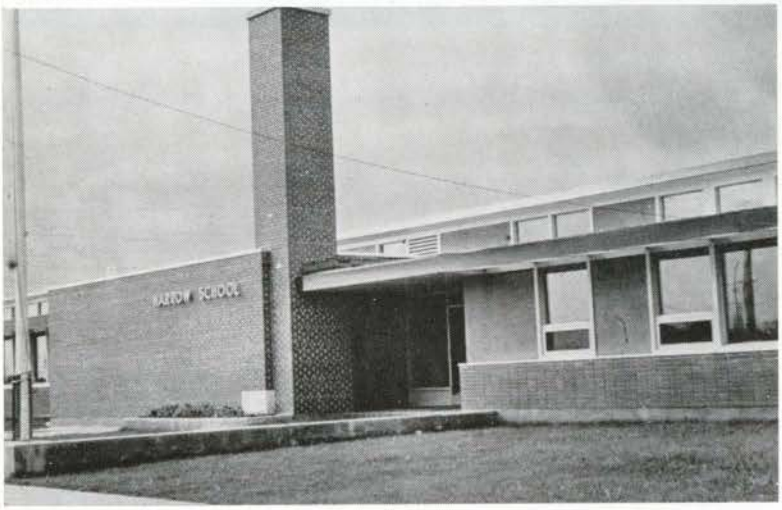




Typical classroom



Rear elevation

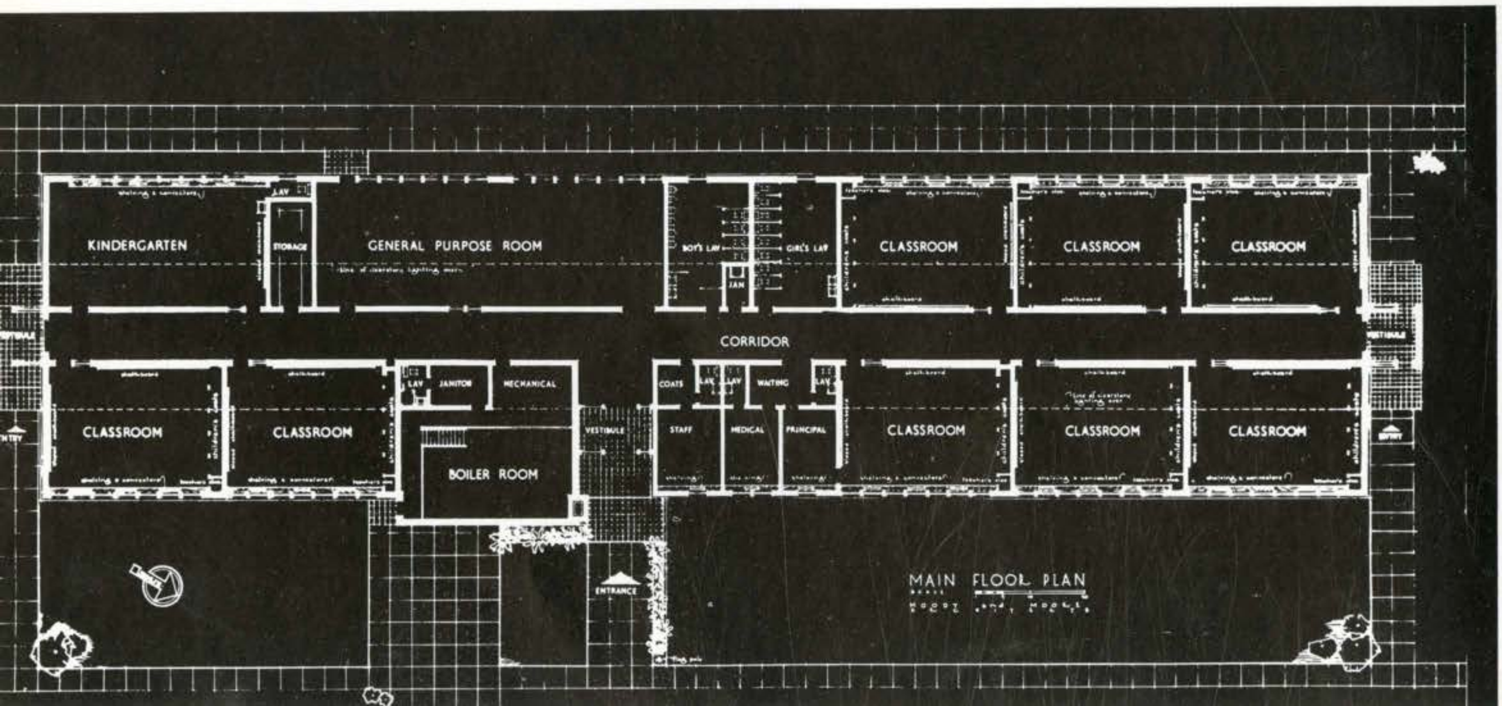


Main entrance

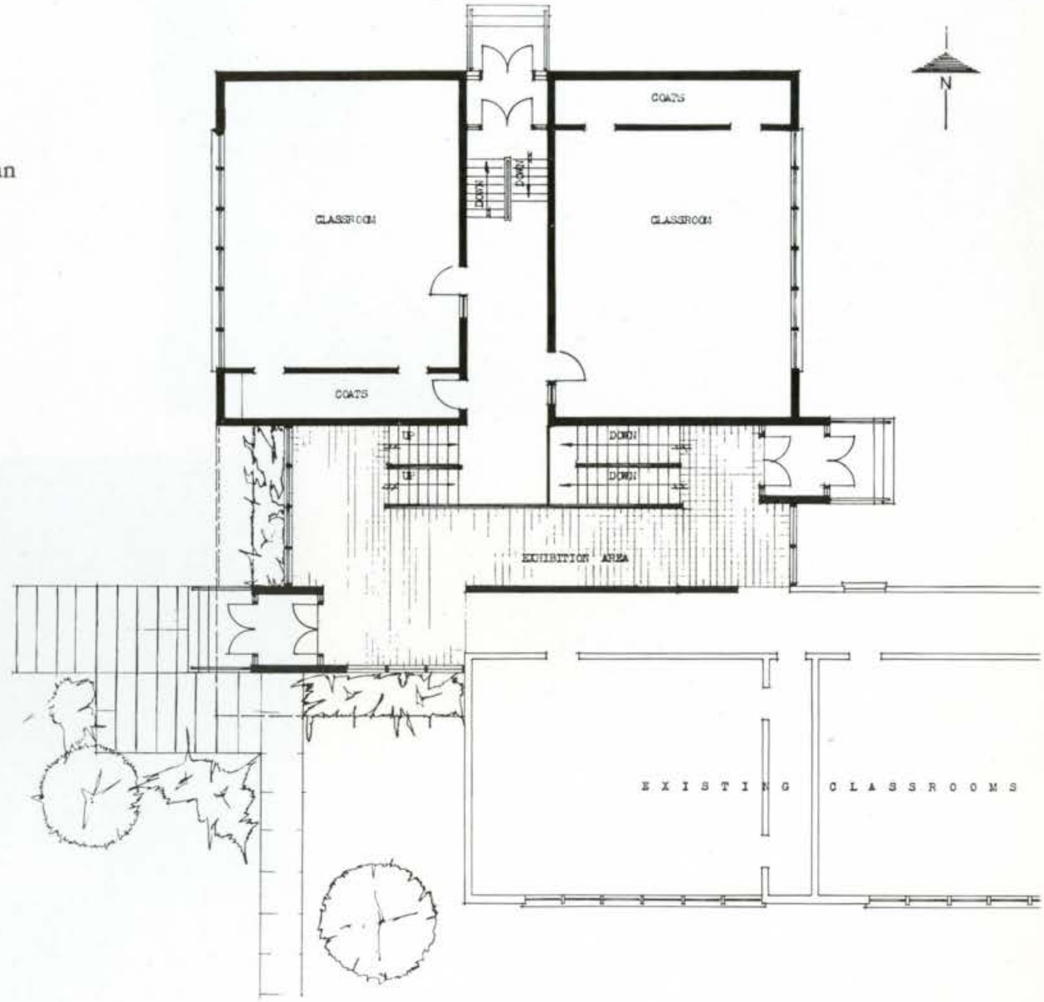
Harrow School, Winnipeg, Manitoba

Architects, Moody and Moore

Structural Engineers, Cowin & Co. Ltd.
General Contractors, Swanson Construction Co. Ltd.



Ground floor plan



Addition to St. Ignatius Elementary School, Winnipeg, Manitoba

Architects, Northwood, Chivers, Chivers & Casey

General Contractors, Malcom Construction Co. Ltd.

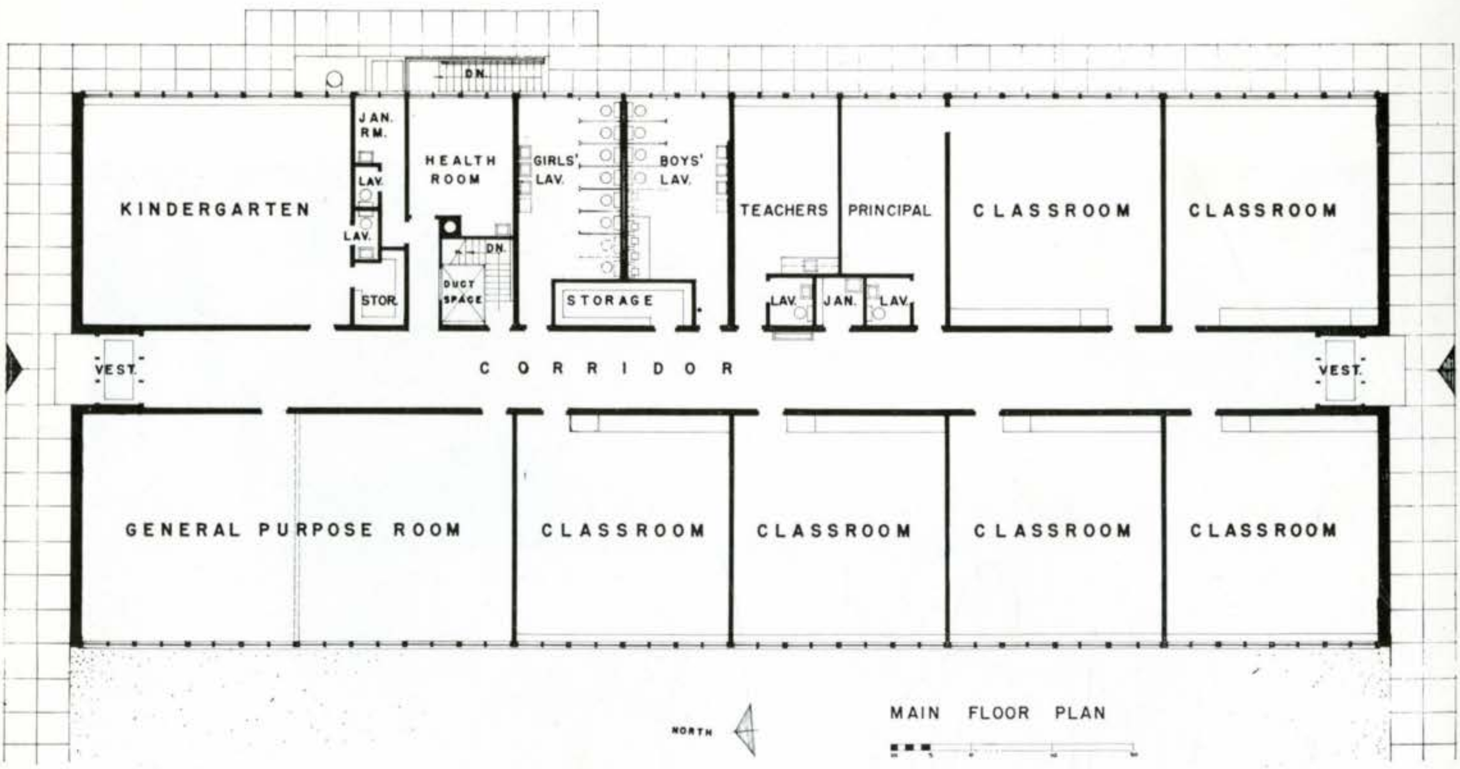
PORTIGAL & AYERS

PHILLIPS-GUTKIN & ASSOCIATES LTD.

Kent Road School, Winnipeg, Manitoba

Architects and Consulting Engineers
Green, Blankstein, Russell and Associates

General Contractors, Peter Leith Construction Ltd.



Elementary Schools in Greater Montreal

D. B. Sutherland

DURING THE PAST FIVE YEARS, the Protestant School Board of Greater Montreal has been engaged in the construction of seventeen new elementary schools, together with eight major additions to existing buildings – the program involving the employment of twelve architectural firms and fourteen general contractors. This article will discuss some of the basic principles which have guided the program and, by way of illustration, will present the plans of two representative projects.

Some Basic Principles and Standards

Objectives The primary purpose of a school building is to provide a place where children can receive the basic education which plays an essential role in their progressive growth. Thus, the school building must provide the space and a suitable environment wherein children, with the guidance and help of their teachers, can grow mentally and physically in their social relationships; where these children can discover their talents and aptitudes and, proceeding by successive steps, develop their natural faculties to their full ability. Thus, in this process of education, we have three components;—first the child, the all important ingredient; next the teacher, the essential catalyst and, finally, the building which shelters their activities.

In addition to the school's purely educational function, in many communities it is desirable to make provision for community activities, thus permitting these rather expensive plants to be used for functions during the evenings and at other times.

Pupil Capacity In Montreal, it has been our experience that what is locally known as a "two-track" school, (two grades each from I to VII plus a kindergarten) provides the optimum size. These schools, with a capacity of five hundred and fifty to six hundred pupils, can usually be located within reasonable walking distance of the pupils' homes and this size permits efficient administration by the principal. Further, in the event that enrolments in an area decrease after a number of years, one or more of these comparatively small units can be closed, thus facilitating the adjustment of school capacity to requirements. The following discussion will apply particularly to this type of school.

Site and Orientation Every effort is made to provide a site of at least four acres for each elementary school. A larger site of up to ten or fifteen acres could be utilized to advantage but the high cost of city land and the scarcity of undeveloped space precludes areas of this size. In locating the building on the site, the following principles are considered:

a) Wherever possible, classrooms and other teaching spaces are so located that sunlight enters the room at least part of the day. Hence, classrooms usually face east or west; kindergartens face south east or south, whilst north exposures are utilized for gymnasia, administration areas, music and visual education rooms, etc.
b) The building is located as far as possible away from noisy streets, railways, airport runways and light obstructions.
c) The building is so placed as to permit maximum utilization of the playground areas.

Space Arrangement The number and type of rooms is governed by the educational program which is offered in the Montreal Protestant Schools. Thus, in a typical "two-track" school we provide the following spaces:

a) Teaching Areas – fourteen classrooms, kindergarten, music and visual education room, home and industry room.
b) Physical Education and Recreation Areas – gymnasium, stage, locker and shower rooms, instructor's office and apparatus storage, play areas, etc.
c) Administrative Area—principal's office, general office, book storage, library, medical rooms and washrooms.
d) Staff Area – which includes a teacher's lounge, kitchen, dining area, cloakroom and washrooms. In Montreal, it is customary for teachers to travel long distances to their schools and remain there throughout the day, and thus more extensive facilities are provided than might be required in smaller communities. On the other hand, it is not usually necessary to make provision for pupil's lunches.
e) Communication and Service Areas, including corridors, stairways, toilet rooms, storage rooms, boiler rooms, etc.

The skilful arrangement of these spaces, which consequently affects the function of the school and the eventual cost of the building, is perhaps the most important work of the architect. The problem is to group these areas in such a way as to provide maximum utilization, having due regard to orientation and other site conditions and then enclose them in an envelope which is aesthetically pleasing.

Whilst we have found no perfect solution to this problem, the plans which accompany this article may illustrate some of the features of good space planning. The following points are of particular interest:

a) Non-teaching areas are kept to a minimum consistent with the requirements of the educational program. It is felt that teaching areas, as noted above, should be at least 40% of the gross area and it has been possible to achieve 45% to 50% in recent designs. Thus, corridors are double loaded, foyers kept to the minimum and the size of offices, storage spaces and similar areas is strictly limited.

b) The administration area is located near the centre of the school and the main entrance. The book storage adjoins the general office, and the principal's private lavatory is so arranged as to be available to male teachers on the staff.

c) Wherever possible, spaces are used for two or more functions. Hence, a common waiting area serves both the office and the medical rooms, the teachers' kitchen is located near the gymnasium so that it can serve at night functions, and, in more recent buildings, it has been found possible to combine the stage and the music-visual education room. The gymnasium is used for physical education, for assemblies and concerts, as an inside play area and, in some instances, as a pupils' lunchroom. A careful examination of the teaching program indicated that it was only necessary to provide one locker room and shower room for both boys and girls, as this area is never required by both sexes at the same time. The home and industry room is provided with special furniture for crafts and handwork and may be used as a library or a spare classroom.

Teaching Areas The most important area in any school is obviously the classroom. A number of layouts have been designed and two of these, designated as Type "B" and Type "D" are illustrated with this article. Both classrooms provide a sink and work counter, storage space for teaching supplies and books, a magazine rack, a teachers' closet and ample pinup space. The Type "B" features prefabricated storage and coat units, provides a small work space and is generally considered to be the superior classroom. However, it is considerably larger and more costly than Type "D" and has the disadvantage, particularly in one-storey buildings, of necessitating long, somewhat rambling structures which occupy a considerable portion of the available land area.

Kindergartens are required to accommodate up to fifty pupils and feature large window areas and resilient floors. These rooms are designed with two distinct areas in mind – one section for those activities which involve sitting, the other section for supervised games. Where possible, separate toilets, coat space and a separate entrance are provided.

Building Construction As noted above, schools are built for children and this involves considerations which are peculiar to that type of building. Some of the more important:

a) Children are smaller than adults. Thus, equipment, mounting heights of such items as chalkboards, wash basins, etc., must be scaled accordingly.

b) Children are curious and sometimes destructive. Anything which can be unscrewed, pried or shaken loose or otherwise unfastened, will eventually fail. This requires careful attention to such details as valves, pipe supports, handrails, mirrors, thermostats, etc., particularly where these items are located in spaces not under supervision.

c) There are psychological factors peculiar to children. For example, in the case of younger children coming to school for the first time, an intimate home-like atmosphere is desirable. Again, younger children like bright colours, whilst older pupils are more content with pastel shades.

The type of construction employed must also give consideration to the provision of a satisfactory environment in the teaching areas and other spaces; the future maintenance of the building and the various civic and municipal codes which may be applicable.

The following lists some of the principal features of our elementary schools. No attempt is made to discuss the various structural systems, exterior and interior partitions, etc., as these have varied to suit the building codes applicable in each municipality within the Board's territory.

a) Roofing – twenty-year bonded roofs with galvanized iron flashings are provided.

b) Fenestration–both glass block windows with a vision strip underneath and clear glass windows have been used. The glass block windows using prismatic type block have the advantage of giving better light distribution across the room but complicate the ventilation problem. However, where mechanical exhaust ventilation is provided, this has caused no difficulty, nor have these panels created any appreciable maintenance problem. Double glazing, not necessarily in a single sash, is standard practice and windows are so arranged to permit draft-free ventilation. These requirements have led to numerous solutions, none of which is entirely satisfactory.

c) Interior Finishes – floors in corridors and washrooms are usually terrazzo, in the classrooms they are asphalt tile or linoleum, in the kindergarten, rubber tile and in the gymnasium, hardwood.

Where concrete or similar masonry block is used for interior partitions, these are left exposed and painted. Ceramic tile dadoes are used in the washrooms and, in some cases, in the corridors and stairwells. Wherever practical, the ceiling structure is left exposed and painted. It has been found that tongue and groove lumber or plywood forms and the various precast materials give a satisfactory finish but the use of steel forms is not recommended. Where fireproofing of steel requires a hung ceiling, either plain or acoustic plaster is employed. Here again the use of plasterboard, while quite satisfactory on partitions, does not seem to give good results on the ceilings. The walls and ceilings of the medical area, offices and teachers' rooms, are usually finished with plaster or plywood.

Acoustical materials are applied to the entire ceiling and sometimes to upper walls in the corridors, gymnasium and music-visual education room. In the classrooms, the amount of this material utilized is limited to that actually required to eliminate reverberation. It is usually applied at the edges of the ceiling or to the upper walls, thus leaving the centre of the ceiling hard for better sound reinforcement.

d) Painting and Colour – rubber base or oil paints are used throughout, except on acoustical material and pinups. Generally, it has been found that three sprayed coats of rubber base paint give the most satisfactory finish on concrete block and similar material. Careful attention is paid to the colour schemes for the painted surfaces, floor tile, toilet partitions, ceramic tile, etc., in order to provide a variety of bright, cheerful finishes. Modern industry produces materials in an abundance of colours and designs and a little time and thought given to their selection can make a tremendous difference to the appearance of the building. The days of the dark brown and green institutional colours are, we hope, gone forever.

Mechanical and Electrical Requirements

a) Heating – All recent schools have been provided with forced hot water heating supplied by boilers, which, except in very small schools, are fired with bunker oil. Generally, two large boilers burning heavy oil and each rated at 65% of the load and a smaller boiler burning light oil are connected to a common header. Domestic hot water is heated by a converter supplied from this header and, thus, the light oil burner can be used in the spring and fall and can also be used for fuel oil heating and as an emergency standby. Convector radiators are used throughout the building and the temperature in classrooms and other important areas is controlled by individual thermostats. This system of control has been found definitely superior to zoned systems and is well worth the additional cost.

b) Ventilation – The effects of good or bad ventilation are not easily measured and for this reason it is not possible to establish fixed standards based on the average physical response by individuals. Generally, we provide exhaust ventilation only, allowing about four changes per hour in classrooms and ten changes per hour in lavatories. In gyms, the ventilation is designed primarily for cooling, that is to remove the heat gain when the room is used by a large audience. Great care is required in selecting fans and designing ducts so that noise is kept to a minimum.

c) Electrical–The "two-track" school normally requires a 600 ampere 220 volt service. Lighting in classrooms is usually fluorescent, designed for 20-foot candles maintained but in other areas both fluorescent and incandescent fixtures are utilized. Power costs run about $0.02 per Kwh and there is no doubt that fluorescent lighting, while more costly in installation, is more economical over a long range period.

Site Development It is our practice to include rough grading only in the contract, with finish landscaping being done by separate contract or our own forces. However, at least a preliminary scheme for site development is required if the building and the entrances are to be advantageously located. In evolving this plan, we observe the following general principles in so far as cirmcumstances permit.

a) Building entrances are kept well above adjacent city sidewalks. Drainage is always away from the building perimeter.

b) Asphalt pavement about 10 ft. wide is provided around at least three sides of the building.

c) Two paved areas for free play (one for junior and one for senior pupils) are provided. It is considered desirable to provide eight to ten square yards per pupil with part of this area adjacent to a blank wall. Paved surfaces are constructed of 4″ to 6″ macadam base plus 2½″ of hot asphalt. A heavier base is used under driveways.

d) A grass area for free play and for organized games such as softball and soccer is provided. Here again we would like to provide at least 20 sq. yds. per pupil and, if land were available, we would double this area and use different sections in alternative years, thus permitting the grass to recuperate.

Exterior The objective is to achieve a pleasing appearance, suitable to the surrounding residential area without unnecessary and costly embellishment. Fancy doodads, the colonial columns and the modernistic sunshades are expensive and have little, if any, functional value. The result is a measure of the architect's ability to achieve beauty of form by the skilful arrangement of mass and the careful use of exterior finishes.

Costs Needless to say, economy is of utmost importance and every effort is made to reduce the building cost without sacrificing the essentials required for the educational program, or without resorting to materials and equipment which will require excessive maintenance.

In the above notes, we have mentioned such basic principles as the limitation of non-teaching space and the elimination of unnecessary embellishment. Considerable savings are also realized by leaving the structure exposed, (a classroom with concrete block walls and concrete slab ceiling serves its purpose just as well as one with plaster walls and expensive hung ceiling) and we urge our architects not to overdesign the electrical and mechanical systems and other parts of the building.

Some Examples of Recent Construction

The building program has included fifteen "two-track" schools and, with the exception of Merton, which has twelve instead of fourteen classrooms, all of these buildings have the same planned capacity. These schools have gross areas of from 30,000 to 42,000 sq. ft. with costs running from $9.30 to about $17.00 per sq. ft.; these differences being attributable to varying site and market conditions and to the educational thinking and financial considerations which prevailed at the time the plans were prepared. Thus, there has been a variation in approach, ranging from the "idealistic" to the "economic", yet each building is a distinct and original design which represents an acceptable solution to our elementary school problem.

The space available will not permit the presentation of all these plans and whilst all have features of merit and interest, the two schools shown will serve to illustrate some of the general characteristics of this program.

Westbrook School represents a studied effort to design a school containing the necessary educational facilities at the lowest possible cost. In order to achieve this economy, the ventilation system has been modified to provide exhaust through the corridors, shorter classrooms have been utilized and the structure is left exposed. Perhaps the most notable feature of this building is the compact arrangement of the various spaces which is well illustrated by a study of the sections. The school is of fully fire resistant construction and includes terrazzo floors and ceramic tile dadoes in washrooms, corridors and stairways. The building contains 33,400 sq. ft. and cost about $9.30 per sq. ft.

Merton School which was built in two stages, is included because it represents an excellent plan of a workable one-storey school. Type "D" classroom was first used in the second section of the building. Other features include the use of precast concrete slabs as a ceiling finish, the modernfold type door at the proscenium opening and the use of special cement enamel applied directly to haydite block in the corridors and washrooms.

General

I think it must be obvious to the architects who have studied the subject that there is no pat answer, no magical, wonderful solution to this problem of building schools and that at best, any plan is a skilful compromise of the various requirements. Here, in Montreal, we do not pretend to know all the answers, rather we feel there is a great deal of work to be done and that, with the expert help of our architects, we must continue to seek better solutions to the fundamental problem of providing adequate educational facilities for as few dollars as possible.

A few general notes, based on our local experience and not necessarily applicable to other localities or situations may be of interest:

a) First, we feel it is essential that an architect understand something of the process of education and the educational program if he is to create a satisfactory design. With the larger school boards, it is possible to establish special departments which will service the architects and give them this necessary and vital information. Where this service is not available then the architect must contact the original sources by questioning the teachers, principals, caretakers, maintenance personnel and, on occasion, the school pupils.

b) The preparation of the preliminary drawings is the most critical phase in the construction of the school and this aspect of the work is well worth the effort and time required to produce complete, well considered plans. In our experience, no acceptable plan has been achieved in less than three attempts and five, ten or more revisions may be required. The work by our architects during this period testifies to their patience and enthusiasm.

c) The complete detailing of working drawings and specifications results in closer figuring, fewer extras and smoother relations with the general contractors. Here again, time and effort pay dividends.

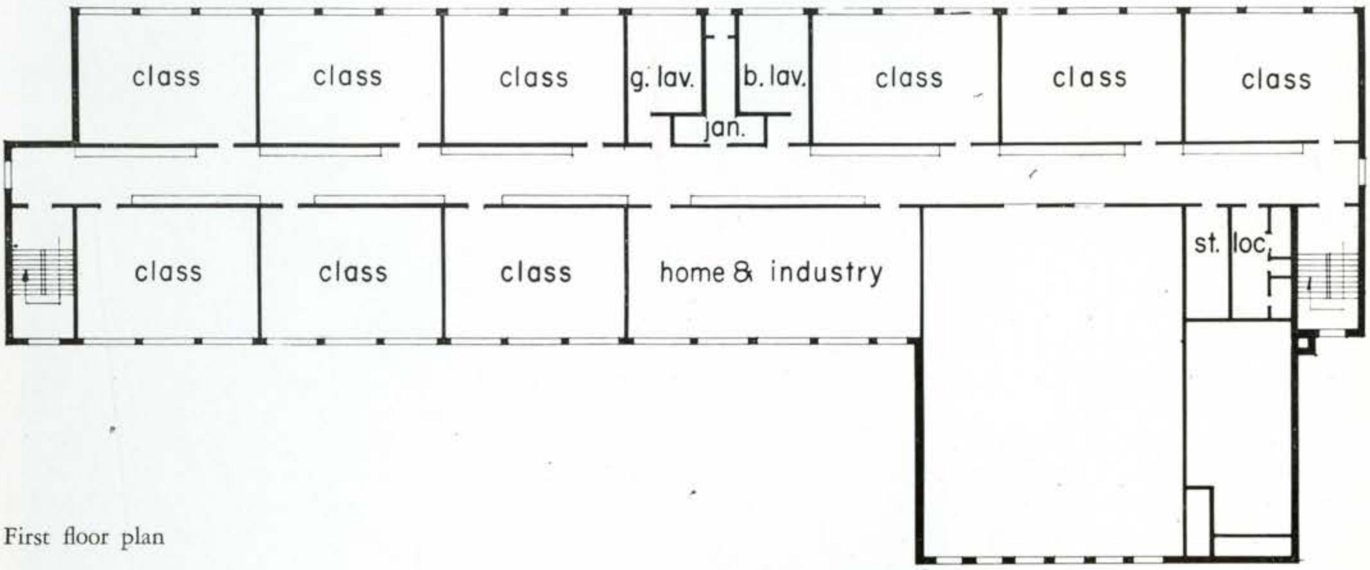
d) Where fully fire resistant construction is required, reinforced concrete appears to offer some advantage, largely because the structure and roof slabs can be left exposed. However, the use of structural steel is probably cheaper in areas which do not require extensive fireproofing.

e) Our experience indicates that two-storey buildings are generally cheaper than single-storey structures. The cost advantage of using wood frame or similar construction for single-storey buildings, even in areas where this construction is permitted, does not appear to be as great as is generally supposed and may be largely offset by increased maintenance and fire insurance rates. Two-storey schools have the additional advantage of being more easily adapted to uneven sites and conserving larger areas for playground use.

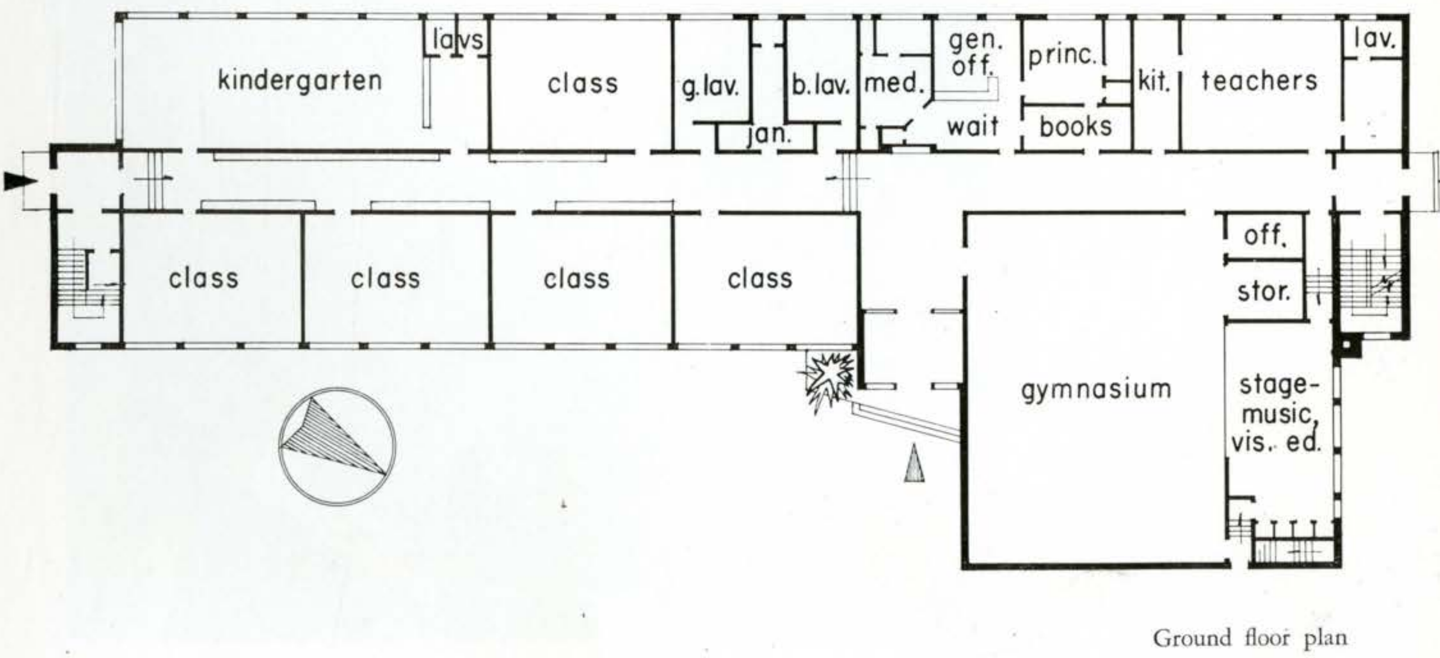
A final observation – in designing schools, architects have a unique opportunity for they are thus permitted to share in the future education of many thousand children. The merit of their work will survive, not so much as the brick and stone of the building fabric but as a beneficial influence on the lives of our future citizens. This is a challenge worthy of their finest efforts, nothing but their best will suffice.

Westbrook School
Greater Montreal, Quebec

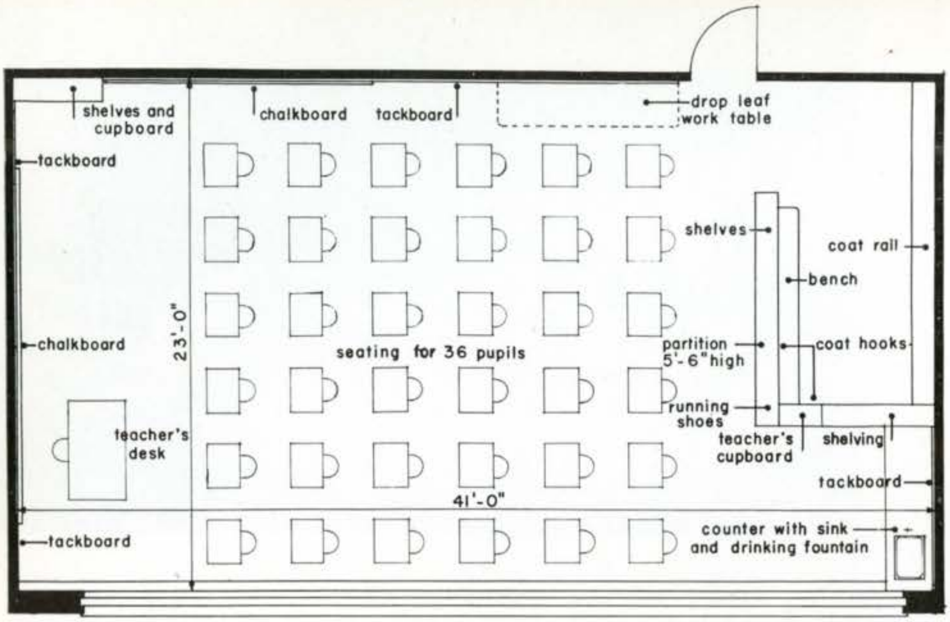
Architects, De Belle & White



First floor plan



Ground floor plan



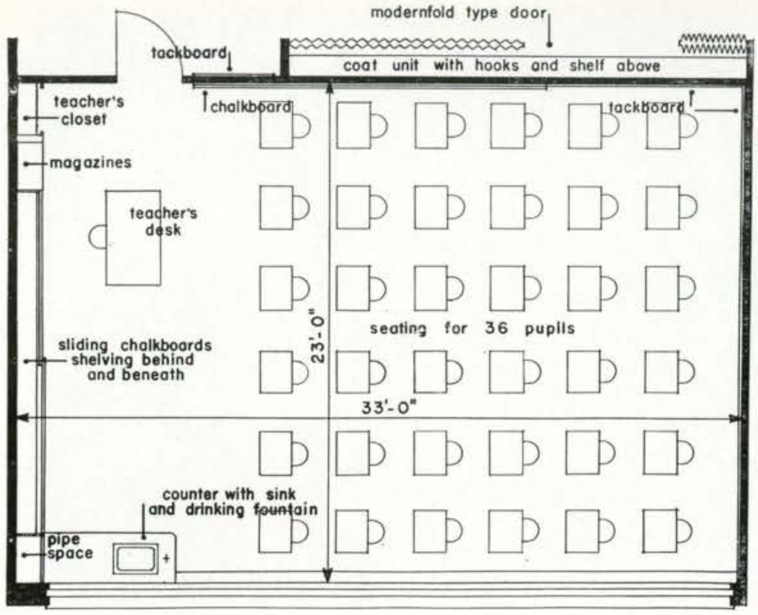
Classroom Type "B"

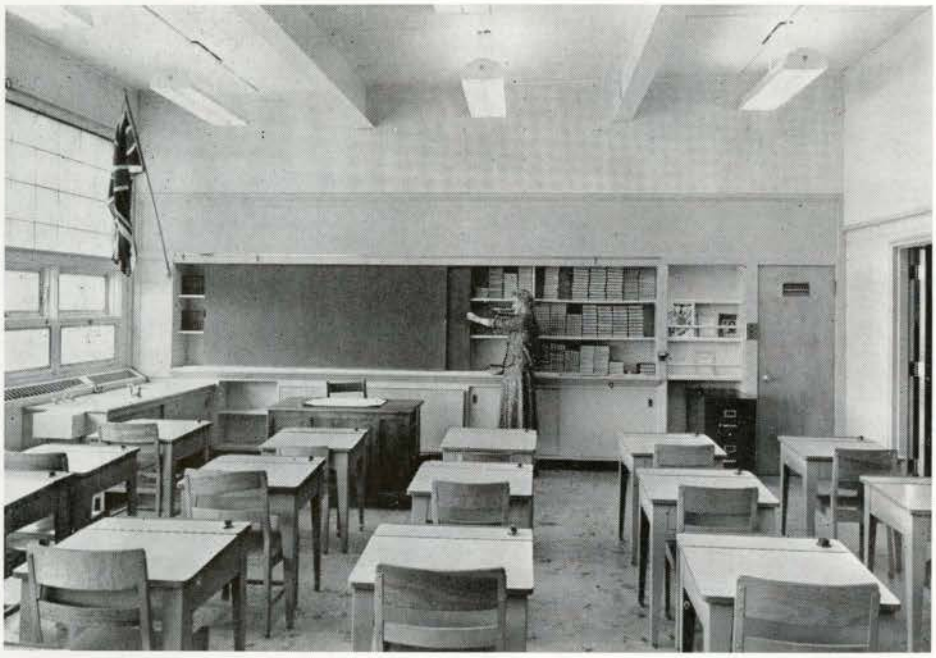
Activity space

DON LANGFORD

Pupils' coat space

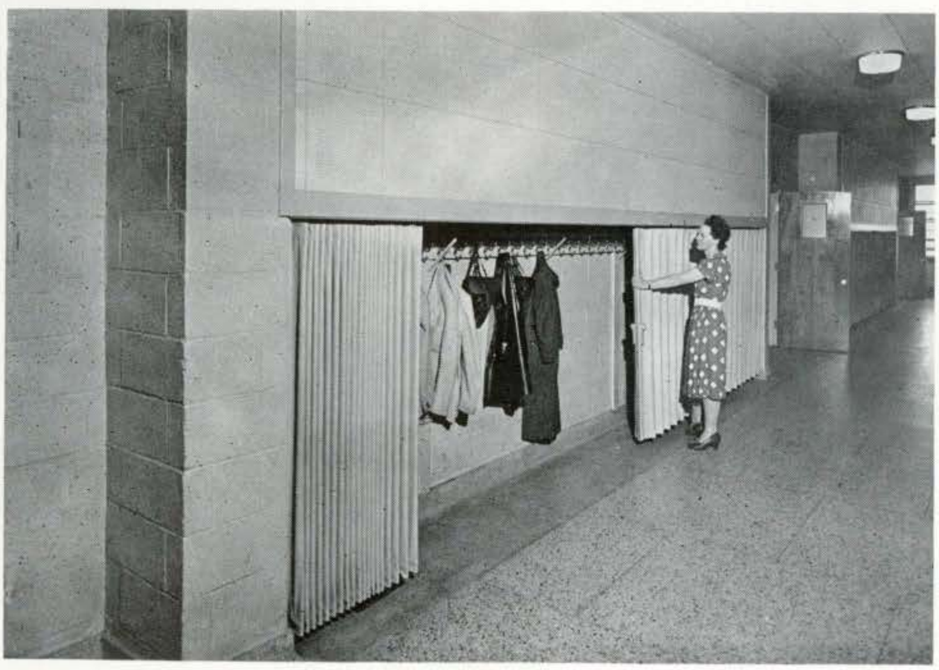
Classroom Type "D"
Merton School





Front of room

HAYWARD STUDIOS

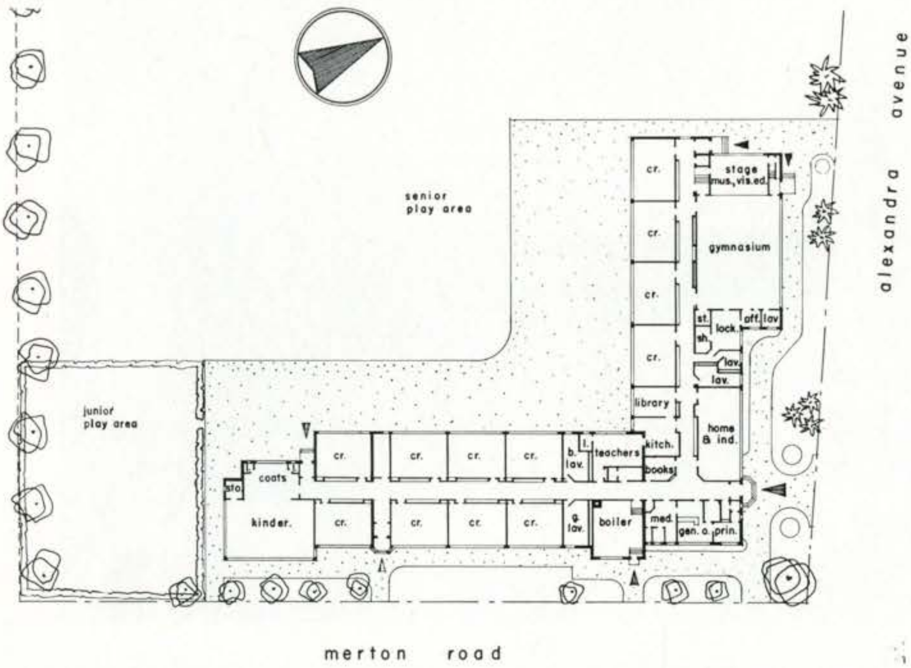


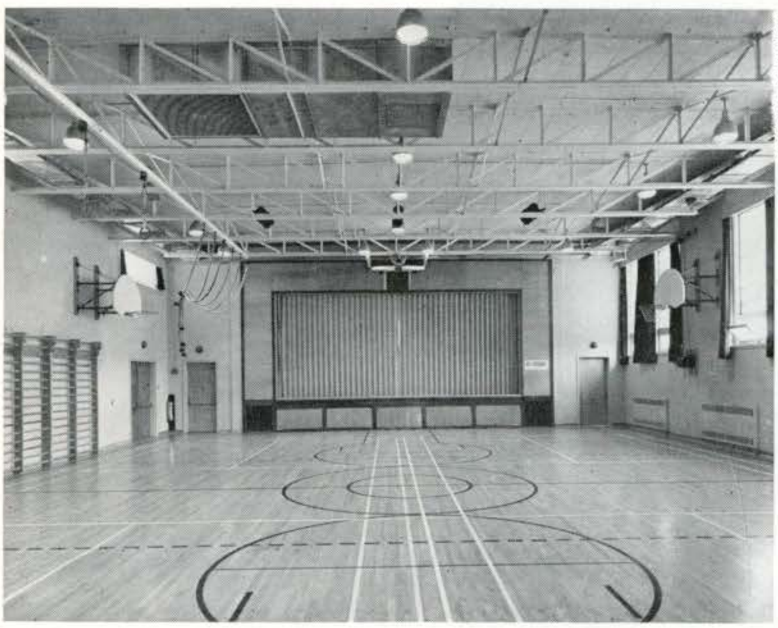
Corridor wardrobe unit

Merton School, Greater Montreal, Quebec

Architect, W. R. B. Bertram

Kindergarten





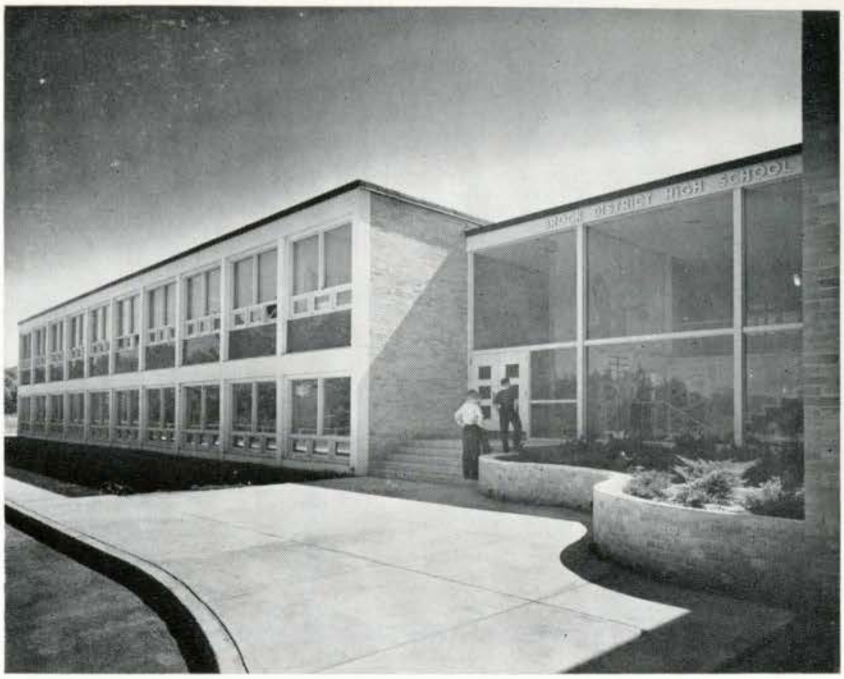
HAYWARD STUDIOS

Gymnasium facing stage and music-visual education room

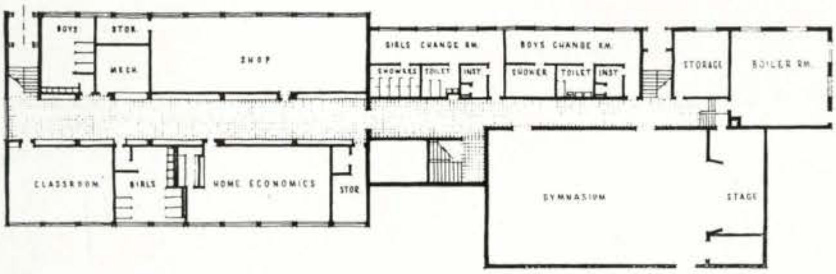
Brock District High School
Cannington, Ontario

Architects, Shore & Moffat

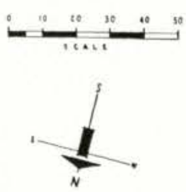
Structural Engineer, Ralph C. Manning
General Contractors, T. J. Colbourne Construction Ltd.

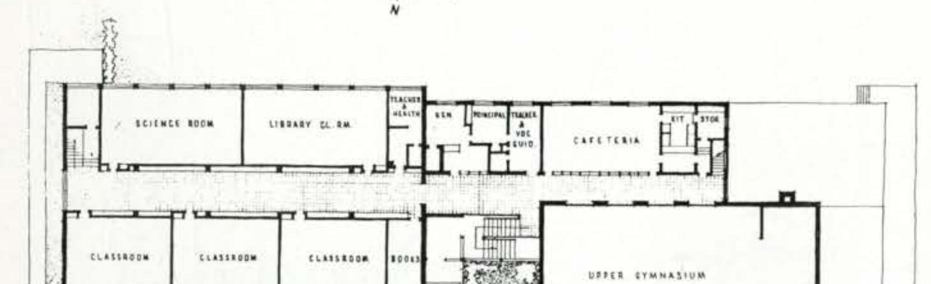


FREDERICK CROUCH



Second floor plan

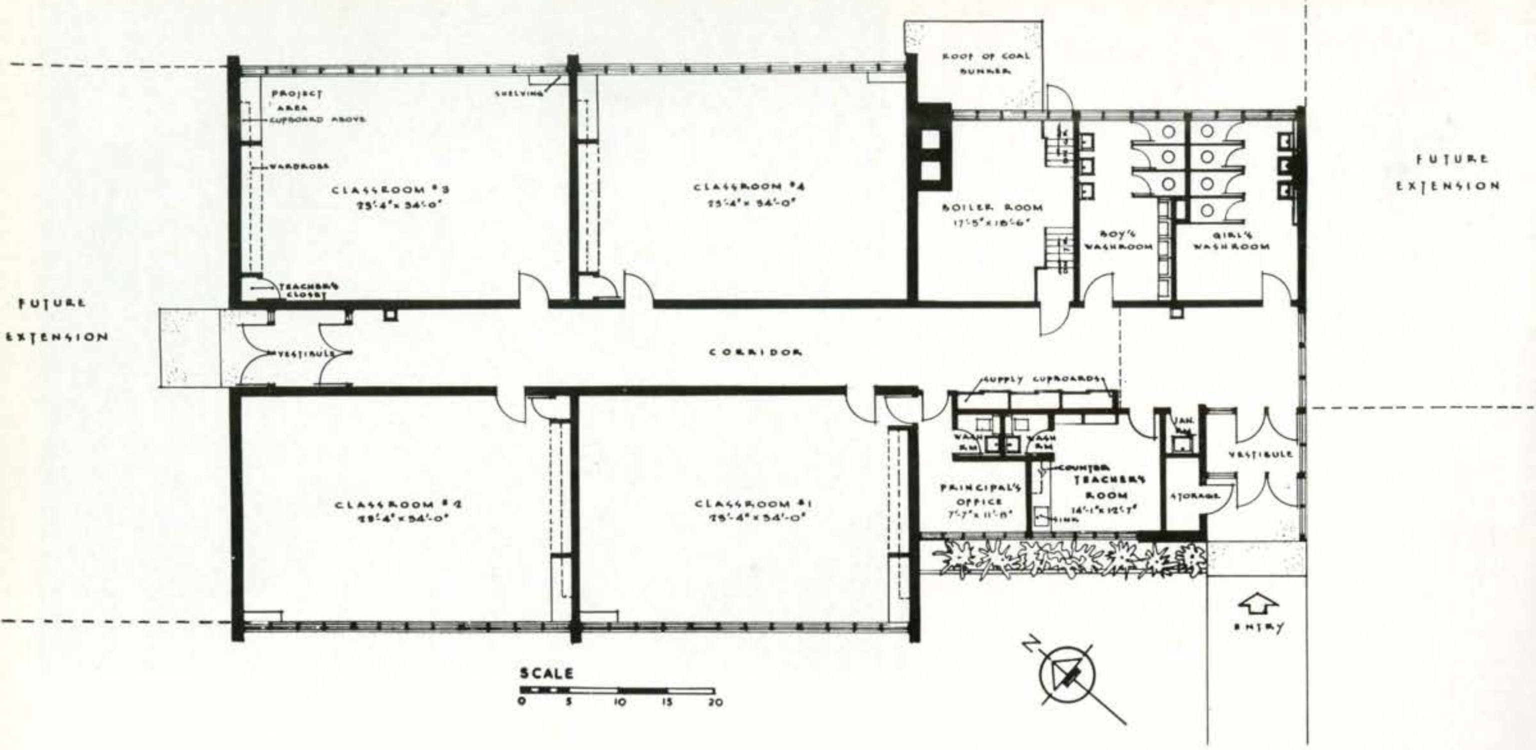




First floor plan

Built at a time of an acute steel shortage, this school was constructed in two sections; the classroom wing of fire resistive concrete frame construction allowing large window openings in the classrooms and the balance in exterior brick faced bearing wall construction. This enabled the project to progress in spite of an anticipated delay in acquiring reinforcing steel.

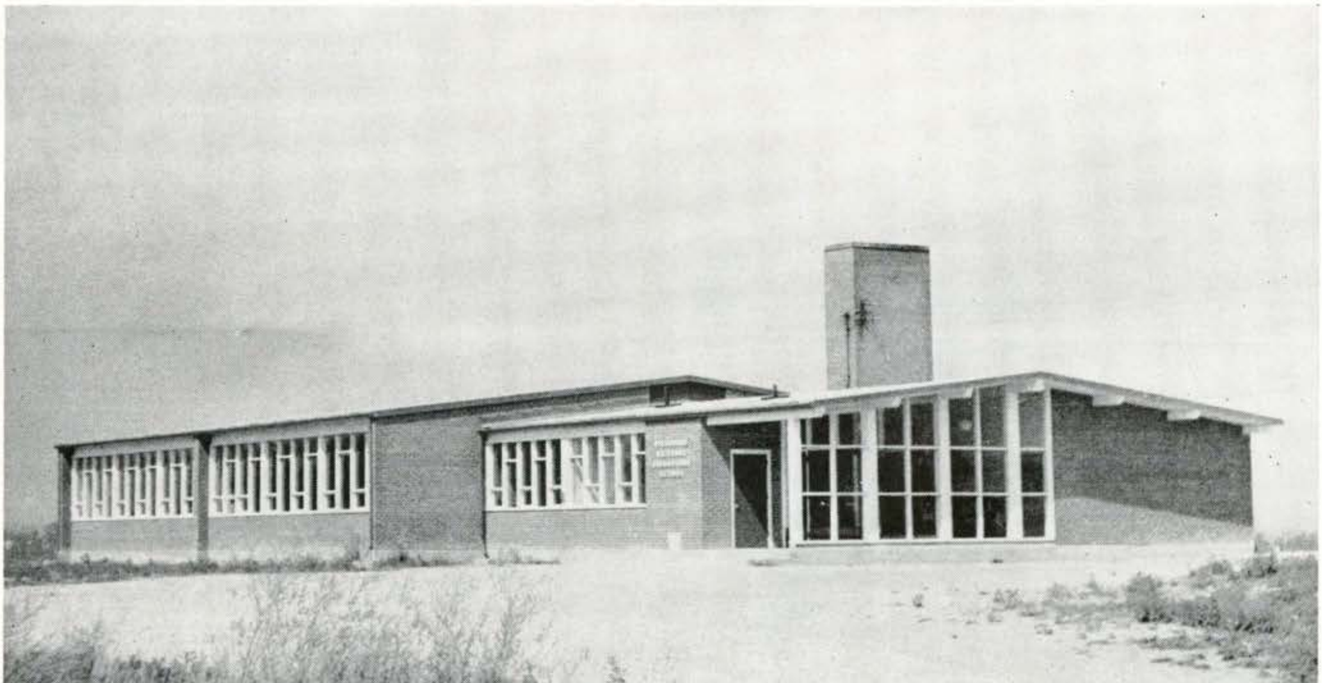
Set into a sloping site, the school is related to the grade by entrances at half level between floors. This arrangement minimizes conjestion of large groups entering or leaving the building. A large bright entrance gives access to the Administration lobby and the gymnasium lobby and the upper corridor serves as an observation gallery to the gymnasium at the lower level. The entrance is finished in fir and features sculptured figures.



Fairport Beach School, Township of Pickering, Ontario

Architects, Parrott, Tambling & Witmer

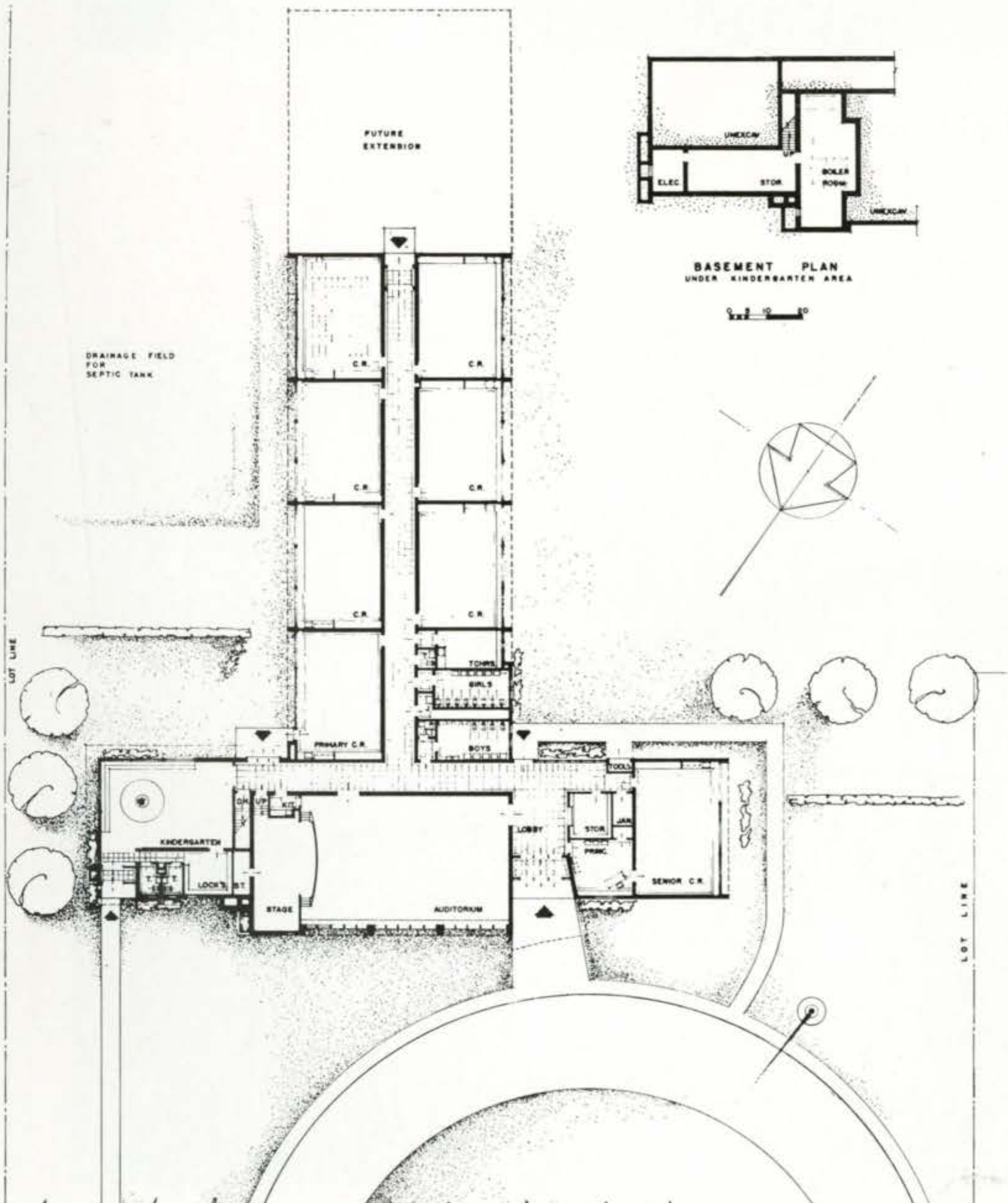
Structural Engineers, Wallace, Carruthers & Associates Ltd.
Mechanical Engineers, R. P. Allsop & Associates Ltd.
General Contractors, Bennett-Pratt Ltd.

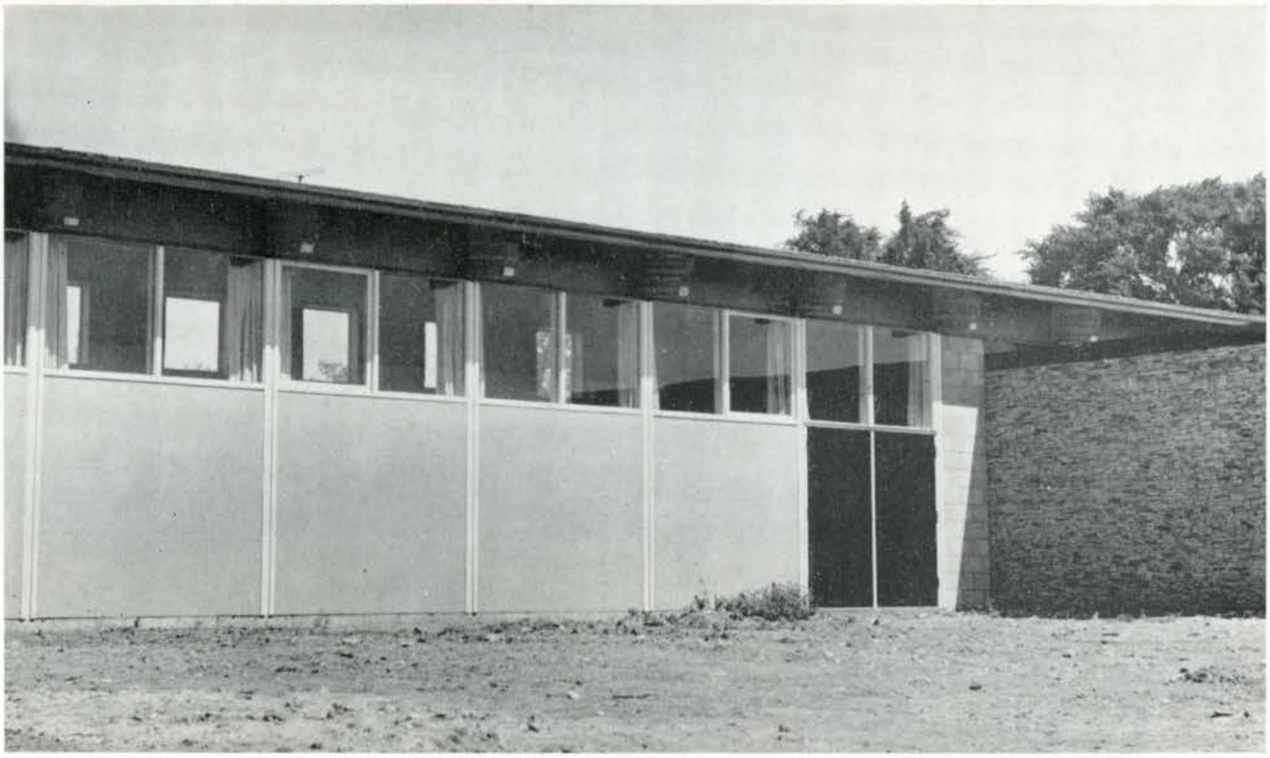


Port Perry Elementary School
Port Perry, Ontario

Architects, Parrott, Tambling & Witmer

Structural Engineers, Wallace, Carruthers & Associates Ltd.
General Contractors, John and Alex Scott

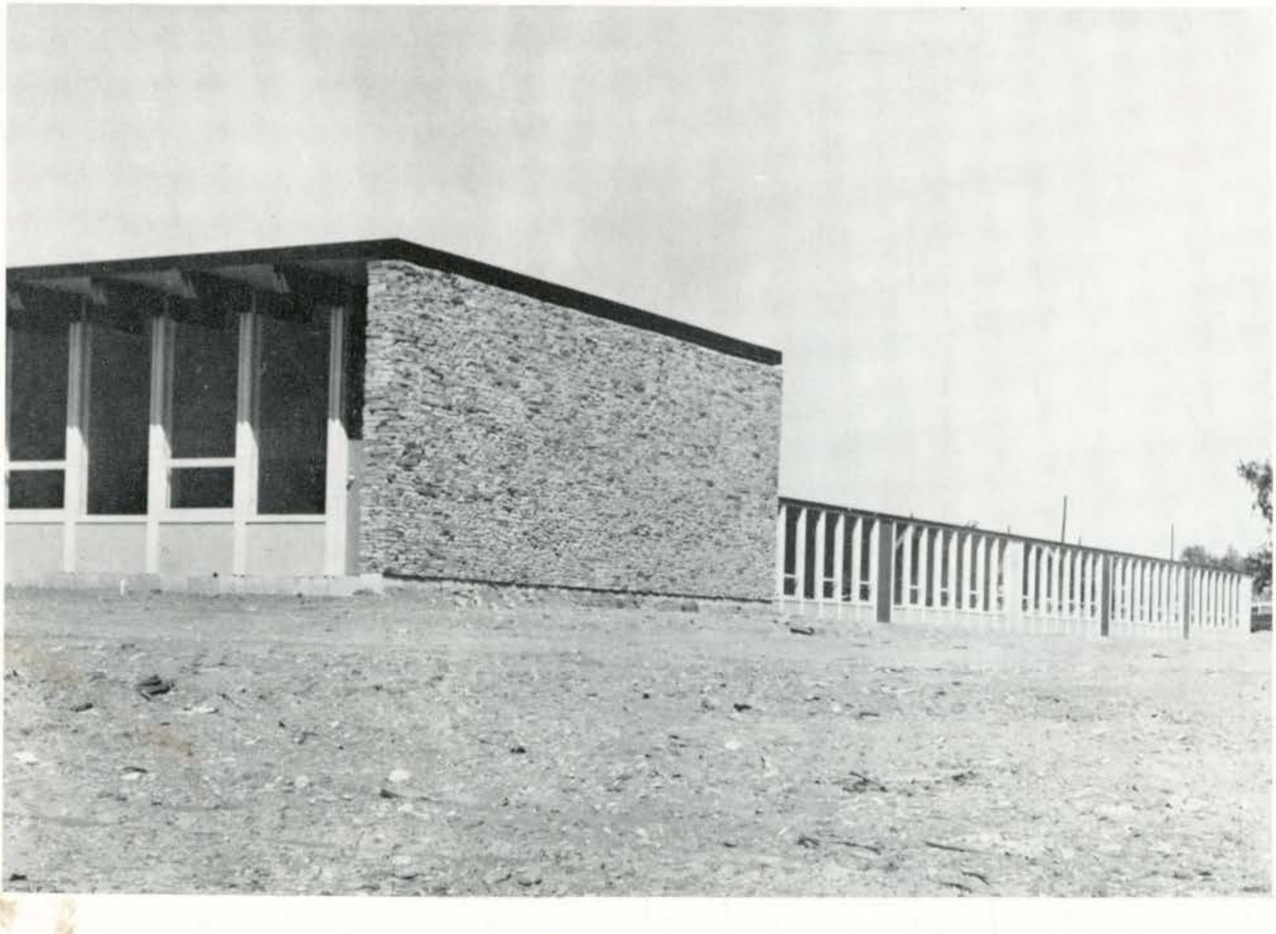




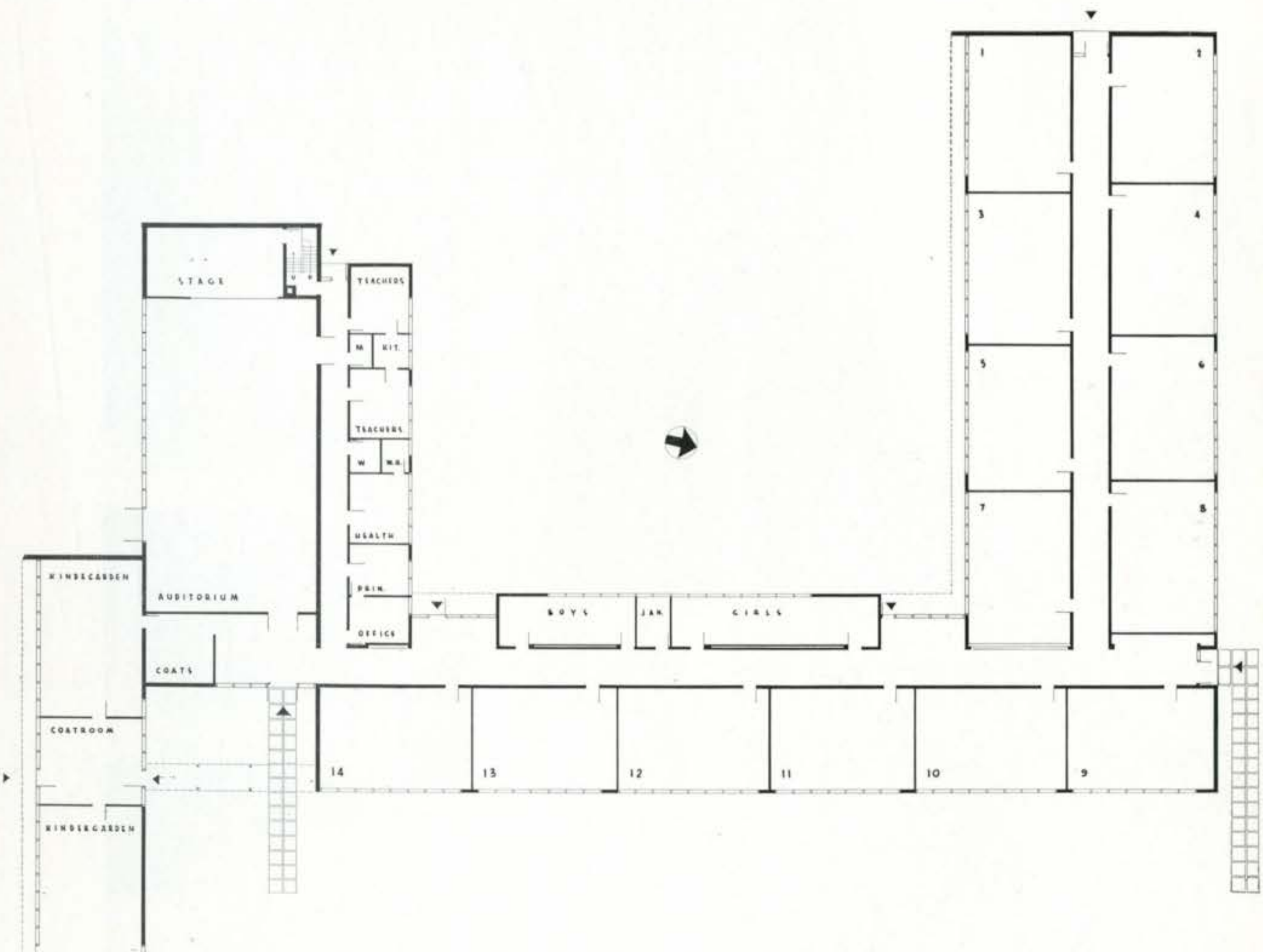
Ajax Elementary School, Ajax, Ontario

Associate Architects, W. J. McBain and Kent Barker

Structural Engineers, Wallace, Carruthers & Associates Ltd.
General Contractors, Hughes Construction Co. Ltd.



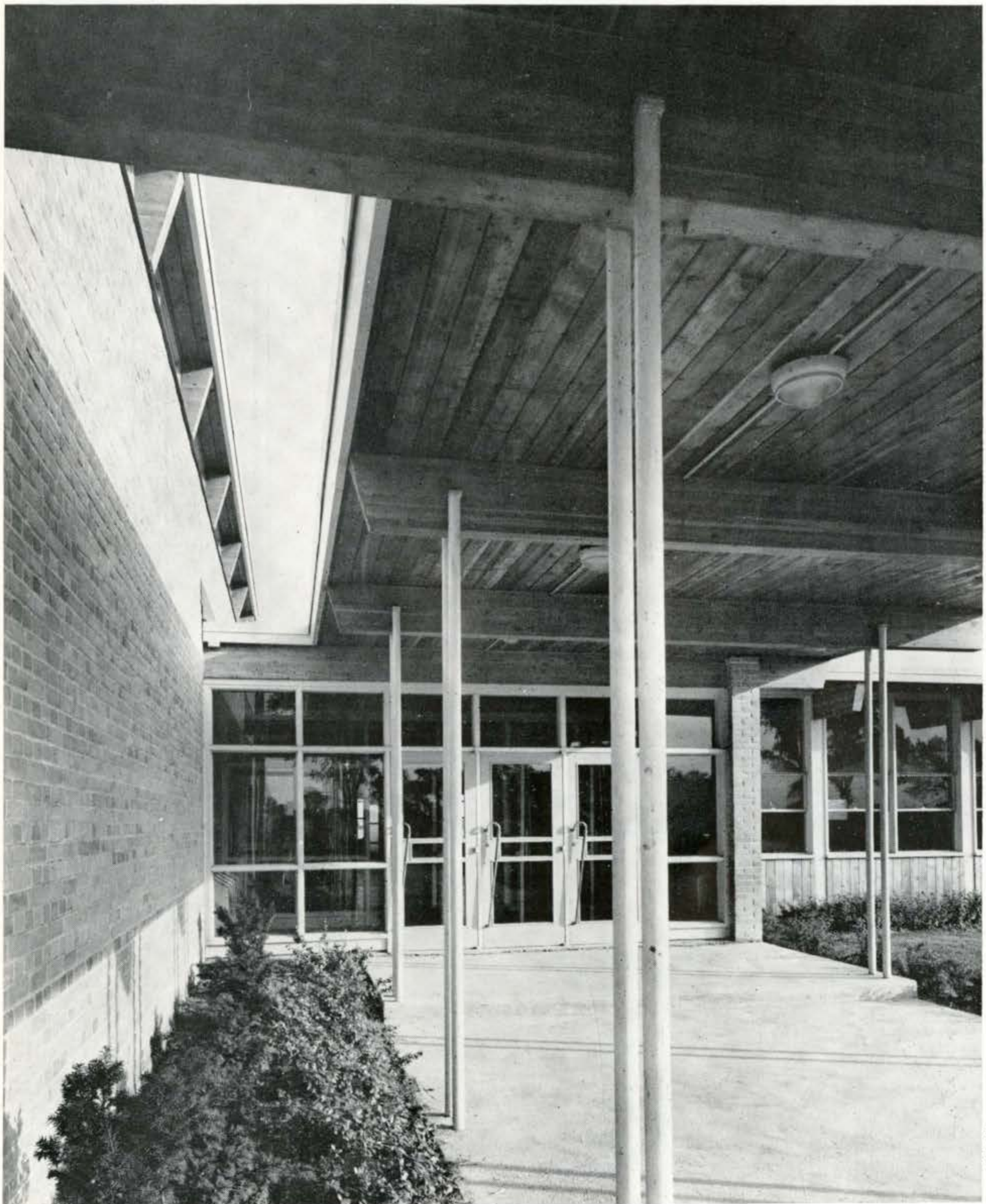
Main entrance



West Glen Public School, Etobicoke, Ontario

Architects, Page & Steele

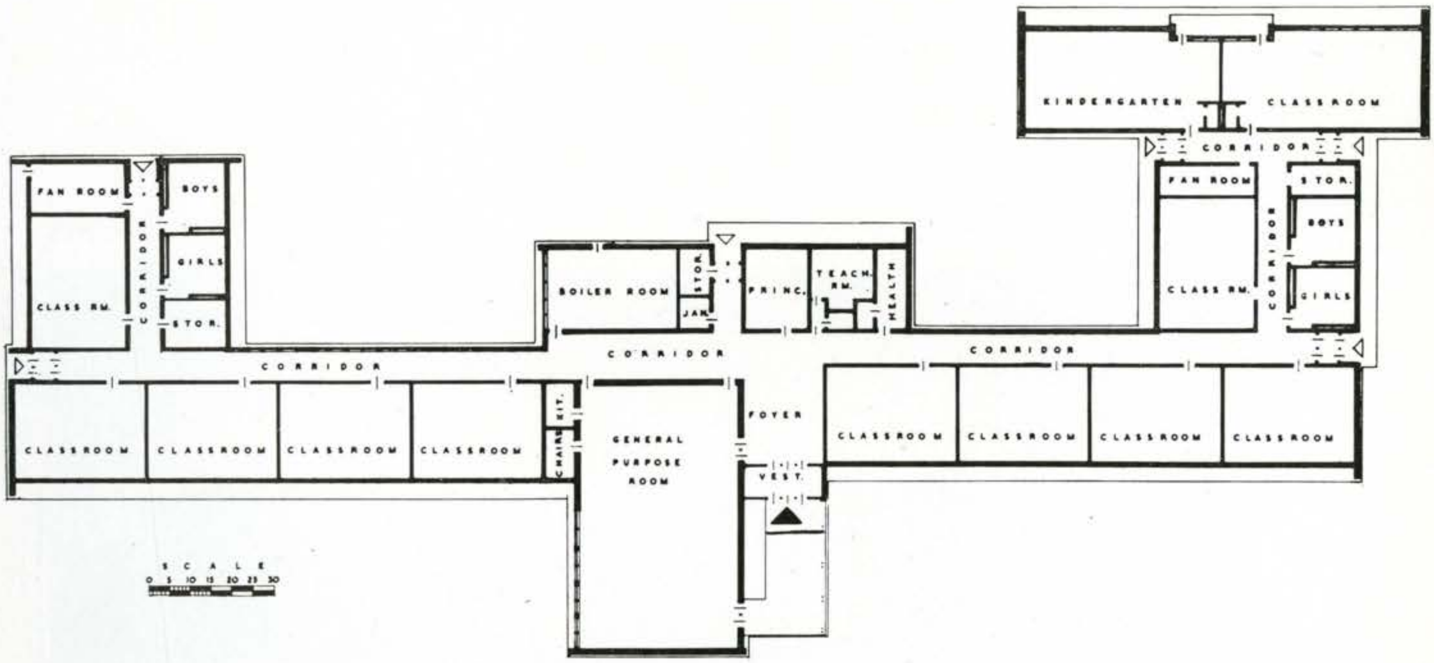
Structural Engineers, Hooper & Yolles
Mechanical Engineer, John H. Ross
General Contractors, W. A. Brown Construction Ltd.



PANDA

PANDA

Principal elevation



Main entrance

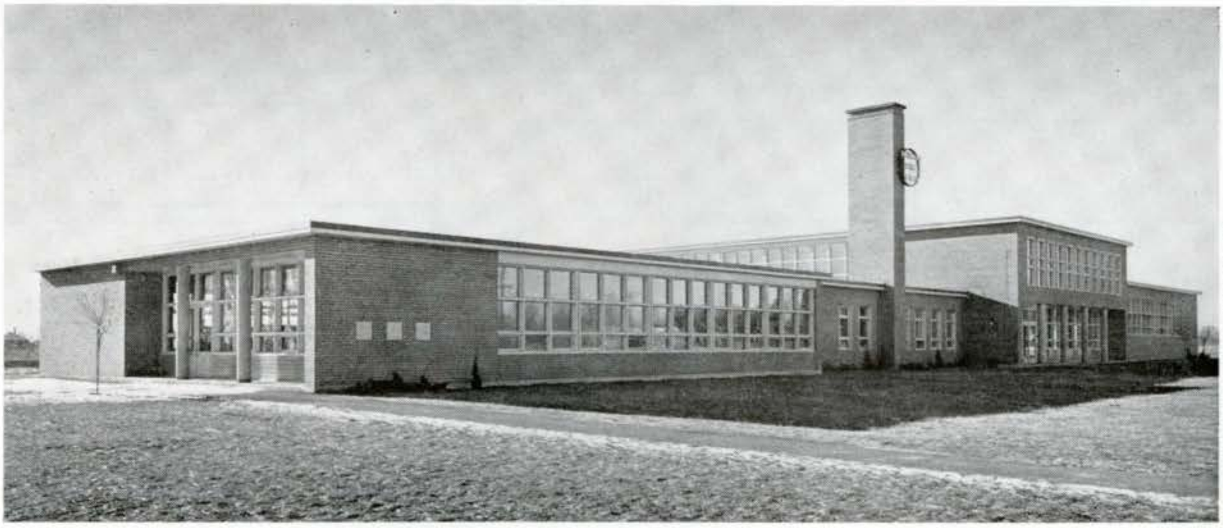
Foyer — walls, natural brick; stairwell, white; display case and clock, blue.

Norseman Public School, Etobicoke, Ontario

Architect, Gordon S. Adamson

Structural Engineers, Wallace, Carruthers & Associates Ltd.
Mechanical Engineers, R. P. Allsop & Associates Ltd.
General Contractors, Dalton Engineering & Construction Co. Ltd.

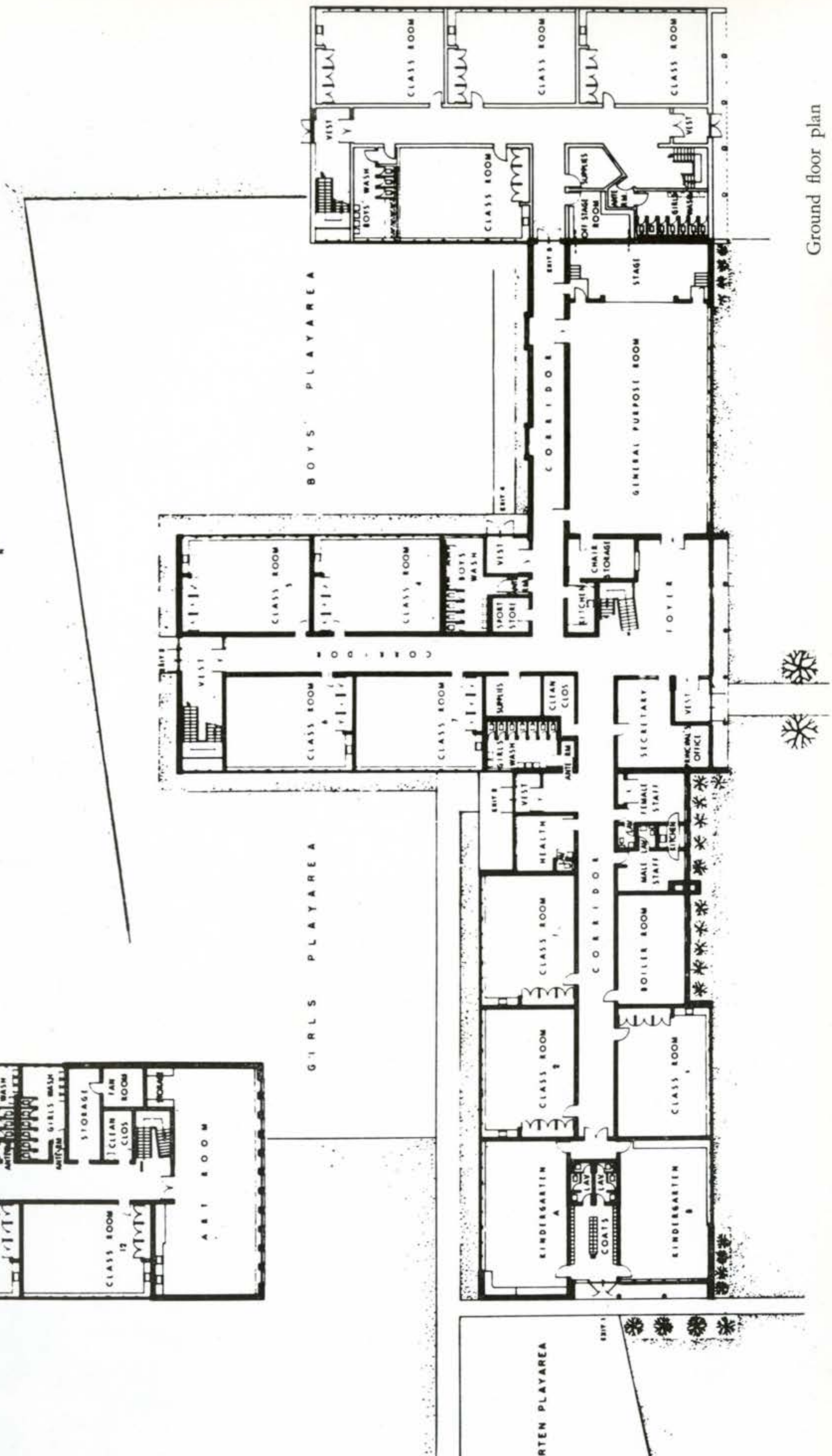
View before landscaping



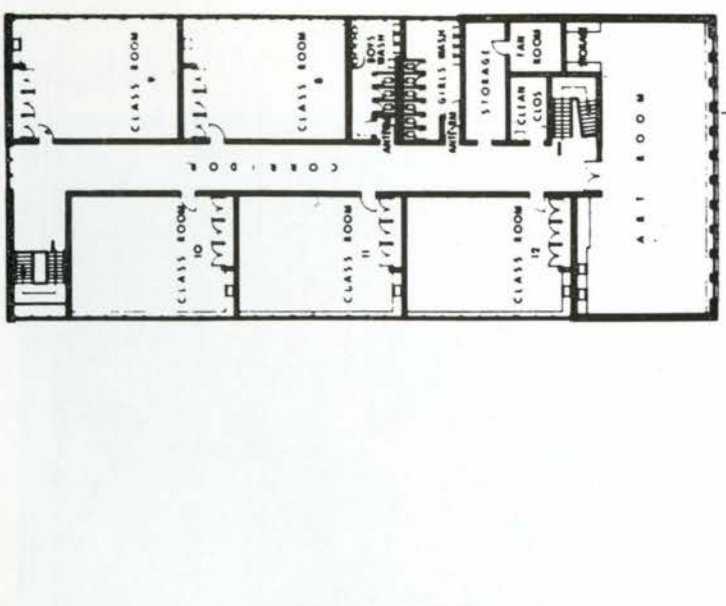
MAX FLEET

Typical classroom

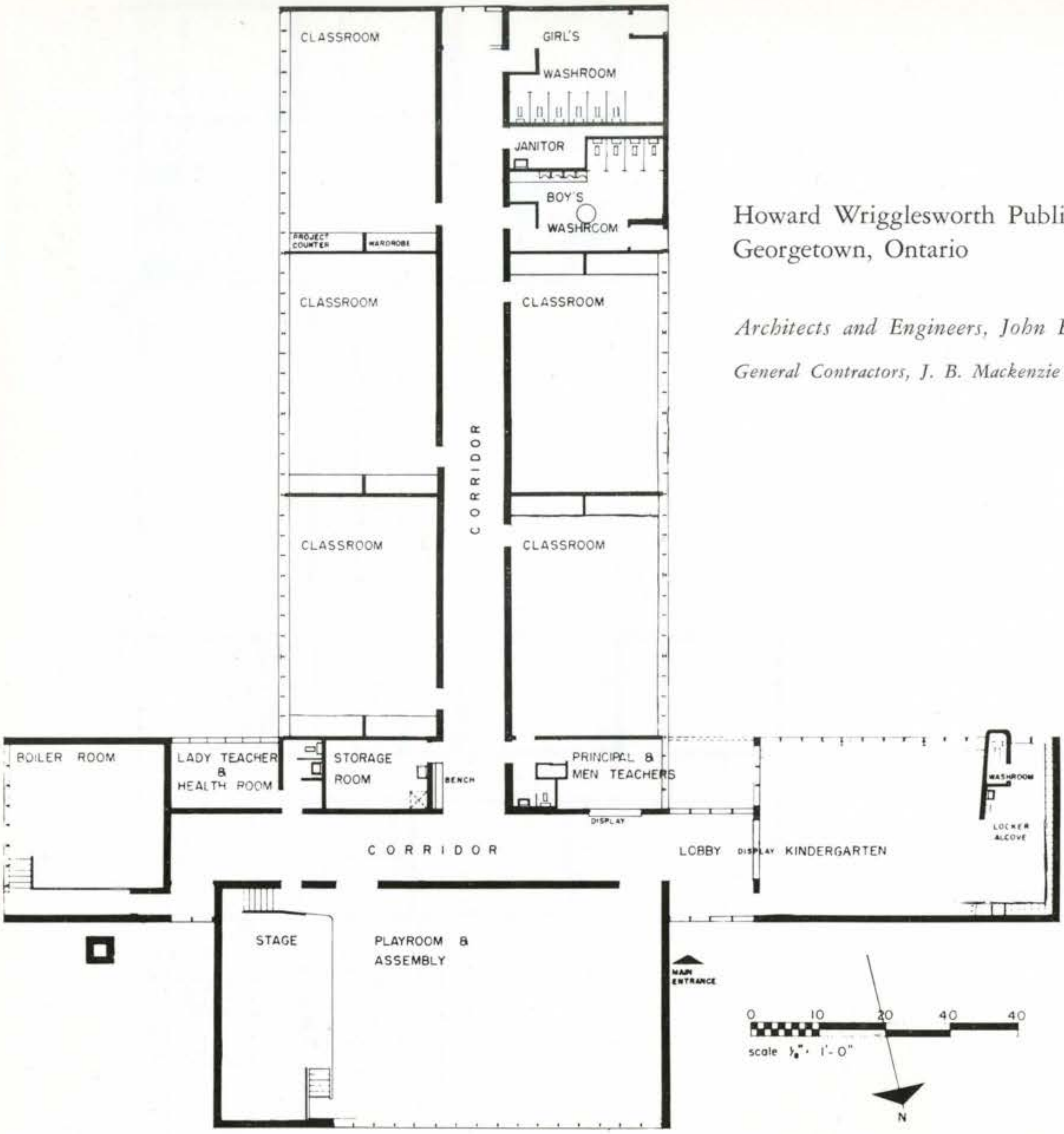
Kindergarten entrance



Ground floor plan



Second floor plan



Howard Wrigglesworth Public School
Georgetown, Ontario

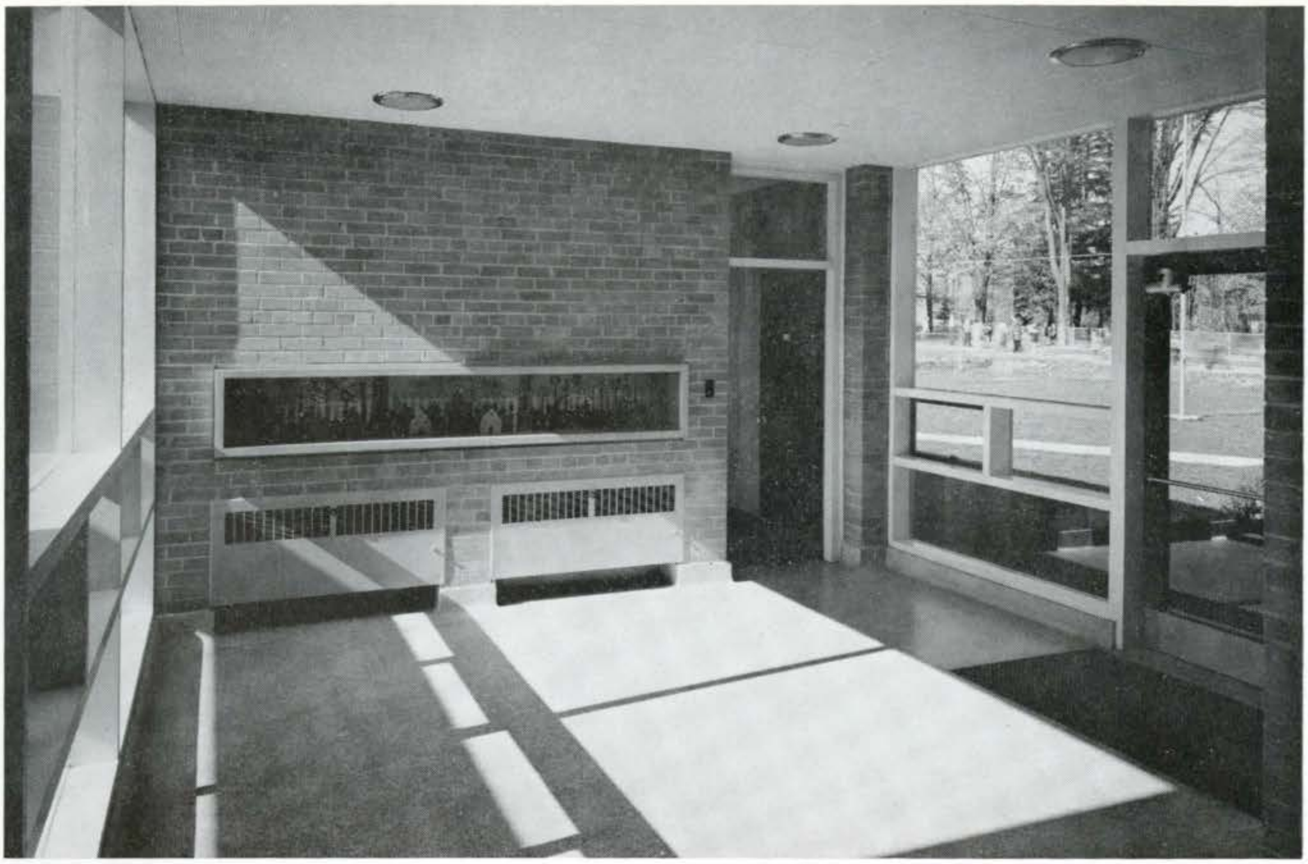
Architects and Engineers, John B. Parkin Associates

General Contractors, J. B. Mackenzie & Son

Exterior view from north with kindergarten wall on right of entrance lobby, and playroom-assembly to the left.

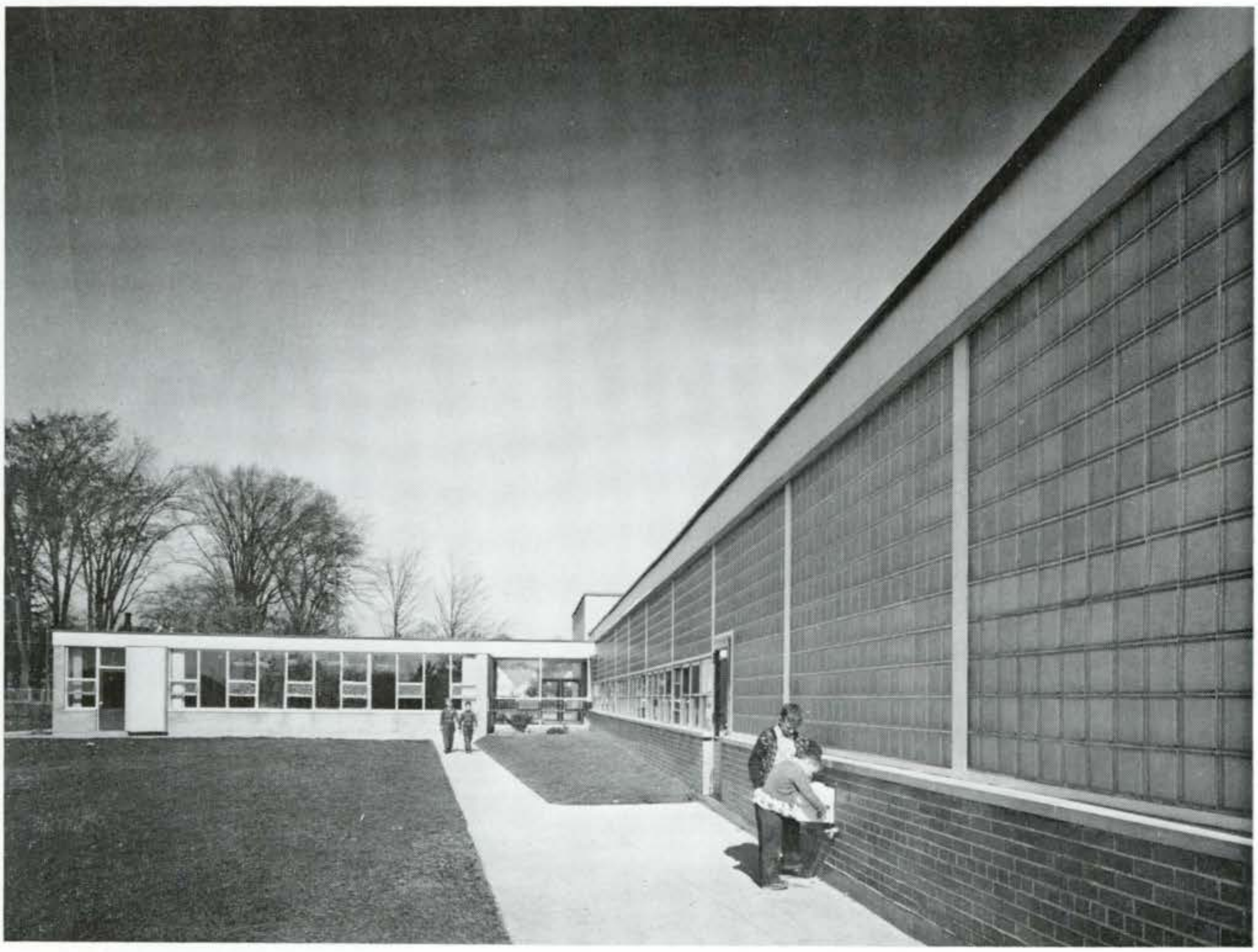
Kindergarten

PANDA



View of entrance lobby showing door to kindergarten wing and display panel which is filled from kindergarten. Terrazzo floor. Main entrance door to right.

Exterior view from south west showing kindergarten wing to left of entrance lobby, and classroom block to the right with washrooms at foreground.



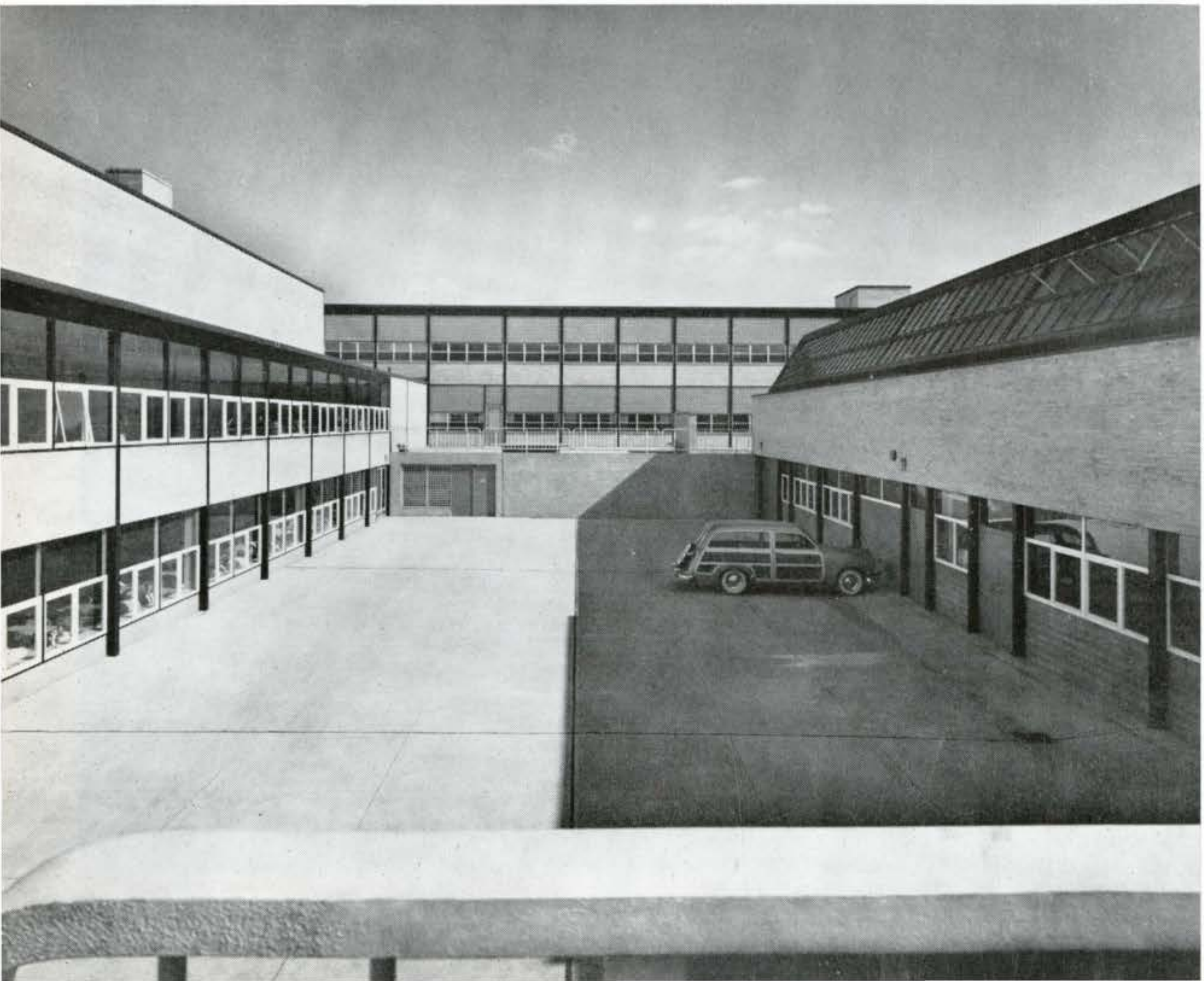
George Harvey Vocational School, Toronto, Ontario

Architects and Engineers, John B. Parkin Associates

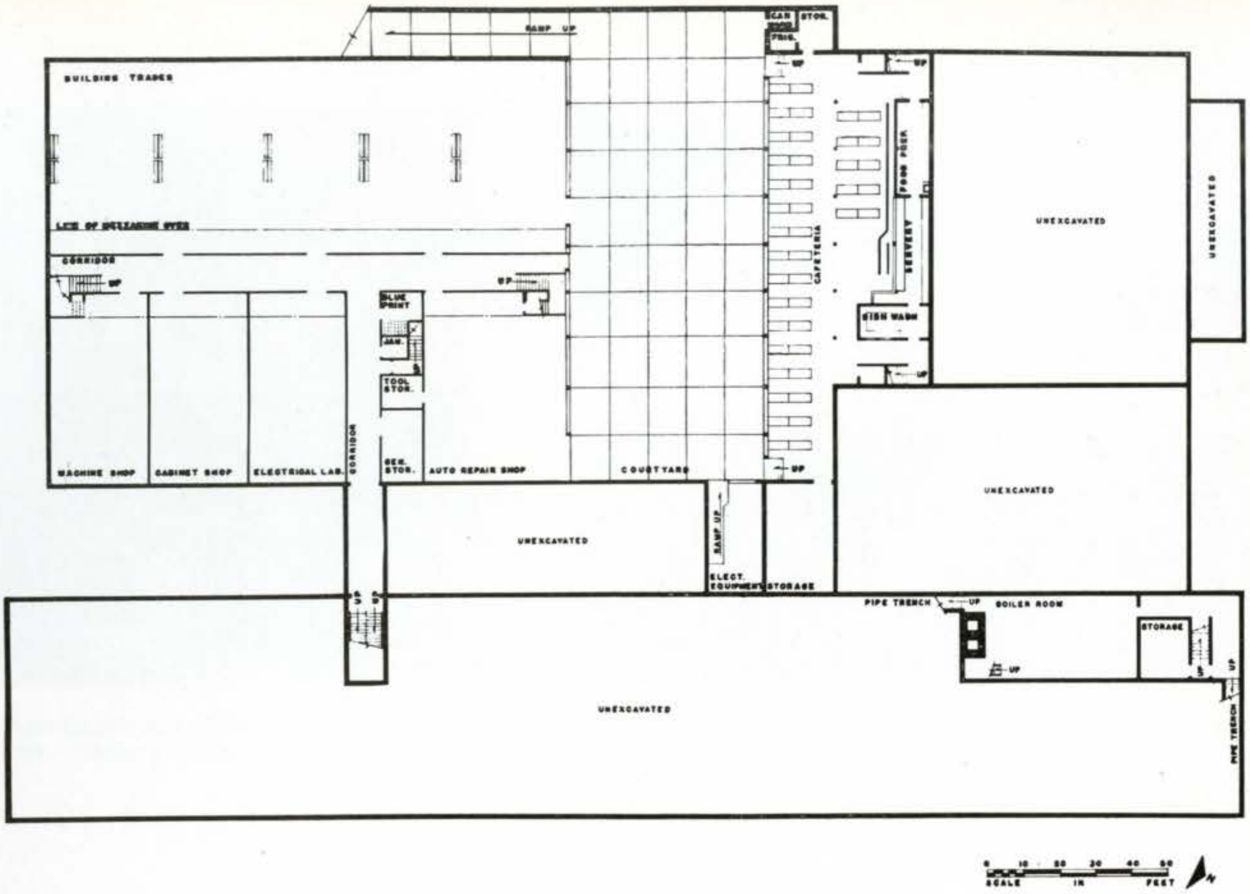
General Contractors, Bennett-Pratt Ltd.

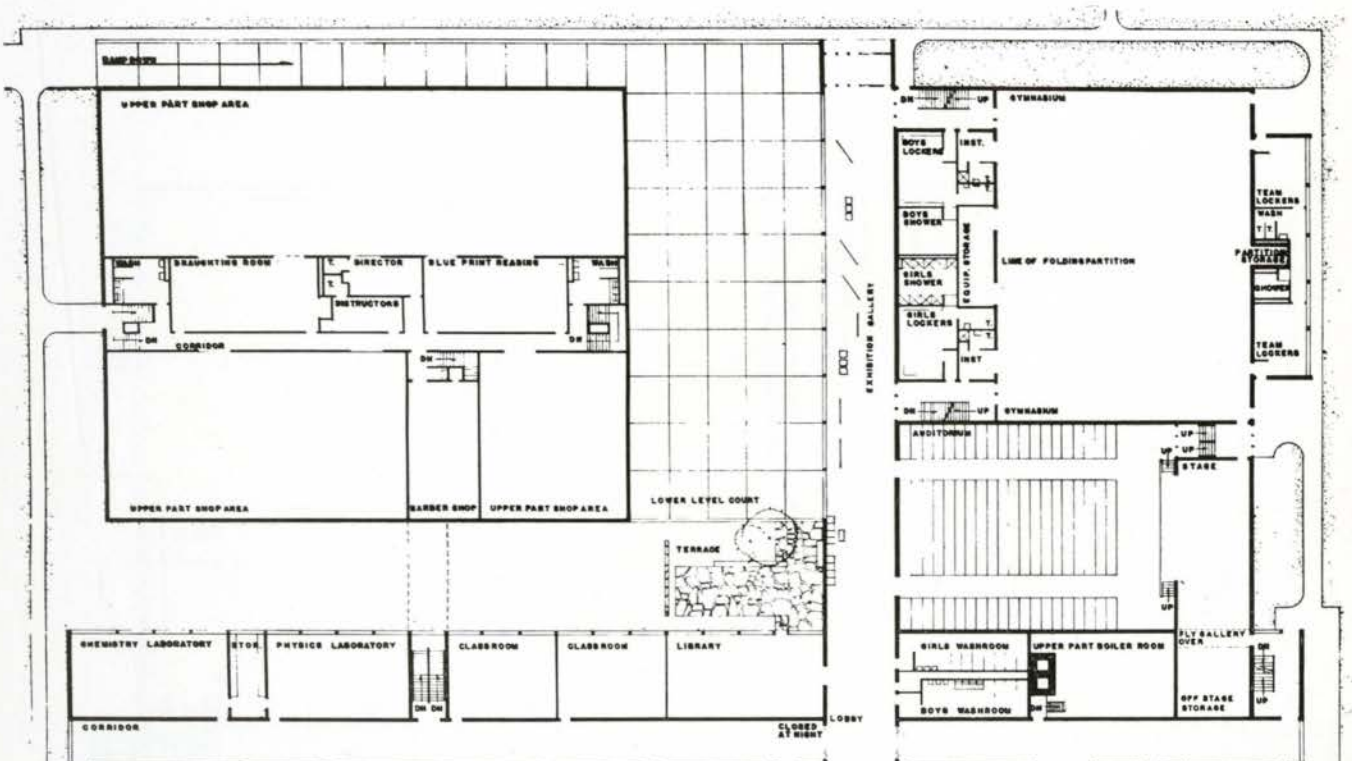
Aerial view from south east with fifteen-year old Hydro Administration Building in lower left corner and our York Township Hydro Garage and Service Stores Building in upper right corner, which is to expand east and west. Playground at centre left behind workshops with sawtooth roofing and end of gymnasium-auditorium block. Main entrance from Keele Street. Shops to expand southerly behind old Hydro building 100%, i.e., 30,000 sq. ft.

View of lower interior court looking east toward classroom block with exhibition gallery over cafeteria on the left, and shops area over auto repair shop and building trades area on the right. Upper terrace at classroom end is accessible from library and contains benches.



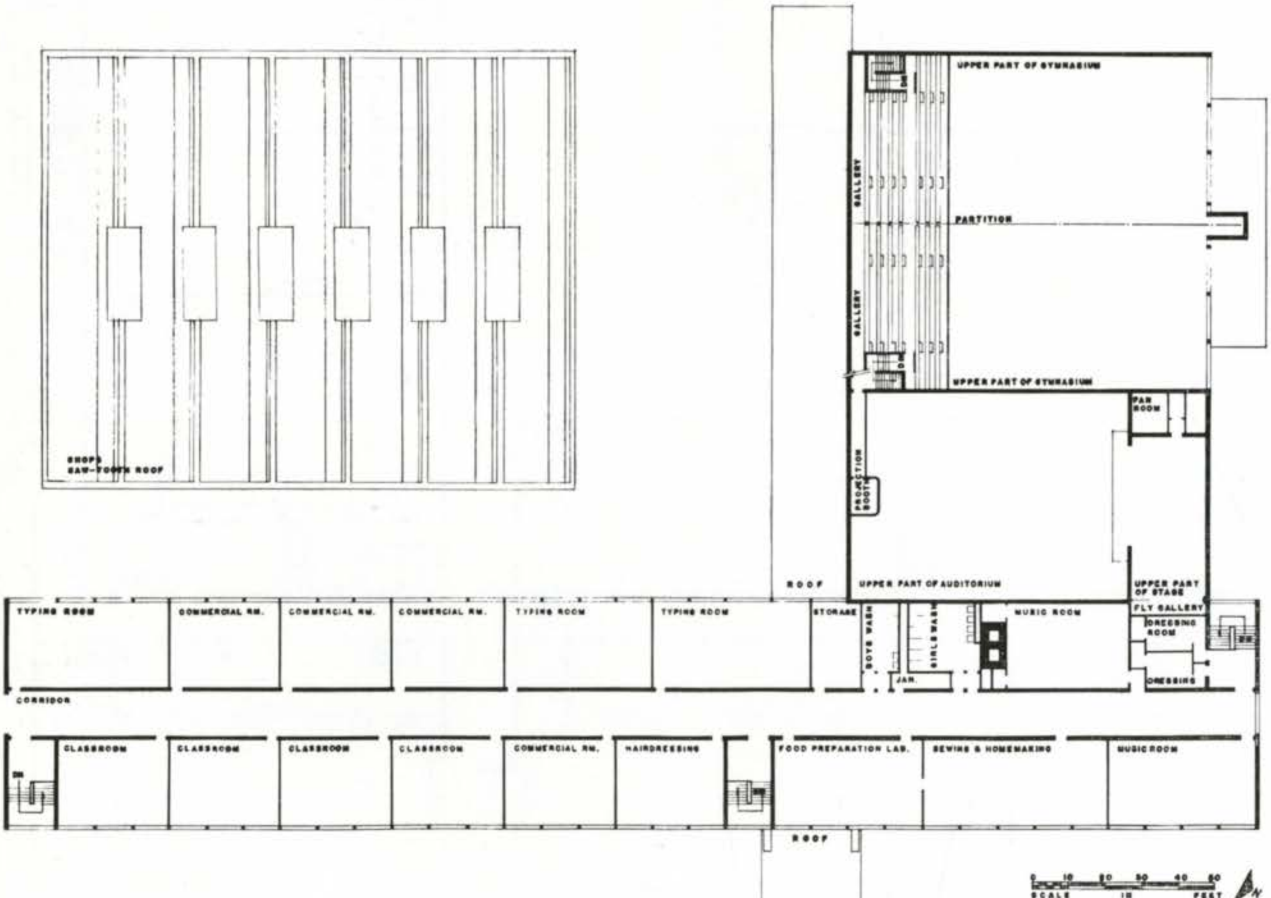
PANDA


BUILDING TRADES
RAMP UP
CORRIDOR
BLUE PRINT
JAN.
TOOL STOR.
GEN. STOR.
MACHINE SHOP
CABINET SHOP
ELECTRICAL LAB.
AUTO REPAIR SHOP
COURTYARD
CAFETERIA
SERVERY
DISH WASH
UNEXCAVATED
ELECT. EQUIPMENT STORAGE
PIPE TRENCH
BOILER ROOM
STORAGE
UP
0 10 20 30 40 50
SCALE IN FEET


UPPER PART SHOP AREA
DRAUGHTING ROOM
DIRECTOR
BLUE PRINT READING
INSTRUCTORS
CORRIDOR
BARBER SHOP
UPPER PART SHOP AREA
LOWER LEVEL COURT
TERRACE
EXHIBITION GALLERY
GYMNASIUM
BOYS LOCKERS
BOYS SHOWER
GIRLS SHOWER
GIRLS LOCKERS
EQUIP. STORAGE
LINE OF FOLDING PARTITION
TEAM LOCKERS
AUDITORIUM
STAGE
CHEMISTRY LABORATORY
PHYSICS LABORATORY
CLASSROOM
LIBRARY
LOBBY
CLOSED AT NIGHT
GIRLS WASHROOM
BOYS WASHROOM
UPPER PART BOILER ROOM
FLY GALLERY OVER
OFF STAGE STORAGE
VAULT
WASH
PRINCIPAL
GEN. OFFICE
VOCATIONAL GUIDANCE
HEALTH
MEN TEACHERS
WOMEN TEACHERS
VESTIBULE
0 10 20 30 40 50
SCALE IN FEET

View looking down into east half of shops area from gallery over administration and draughting centre core area.

Physics laboratory looking south, with storage room common to chemistry laboratory beyond — seen near door to corridor.



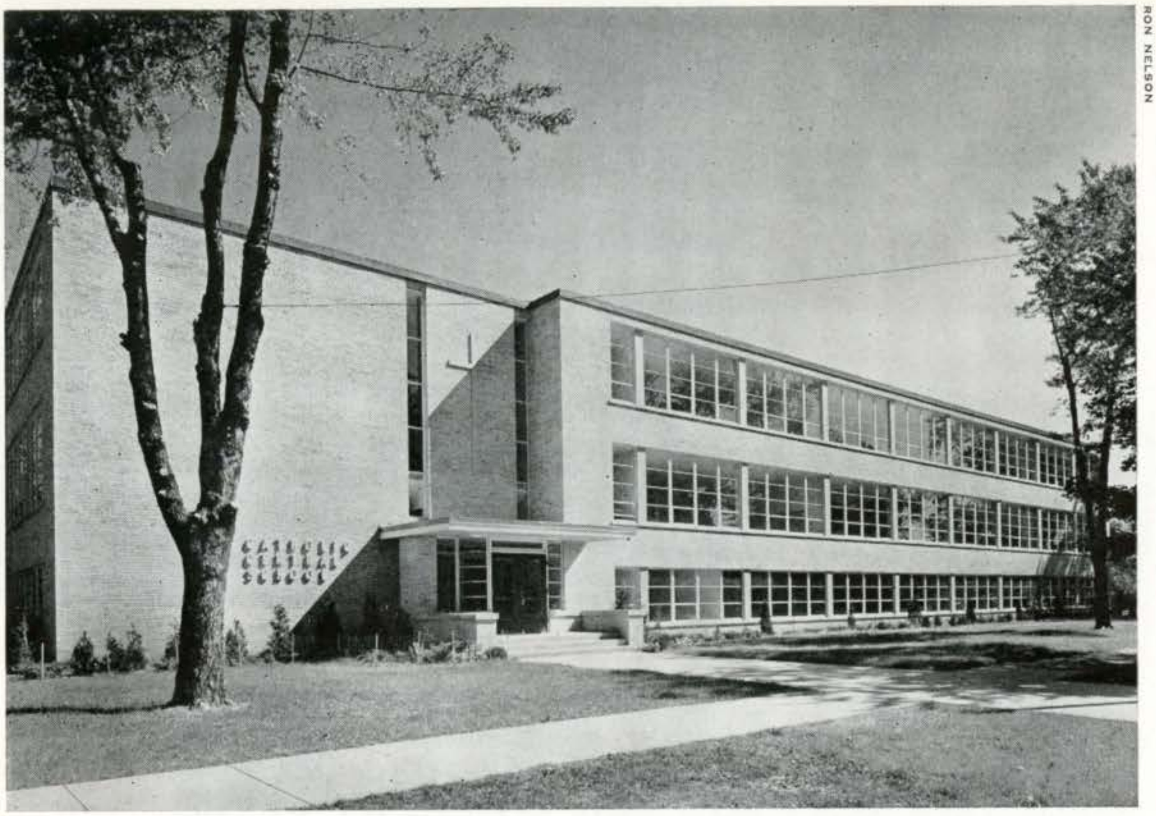
Second floor plan

Interior of double gymnasium from gallery, showing dividing partition moving into position. Note welded steel columns and beams with precast concrete slabs roofing. Walls of natural buff brick.

PANDA

View of auditorium looking toward stage. Auditorium seats five hundred. Walls brick and painted steel, with natural walnut plywood on either side of stage; ceiling and projection box, plaster and rubber on aisle floors.

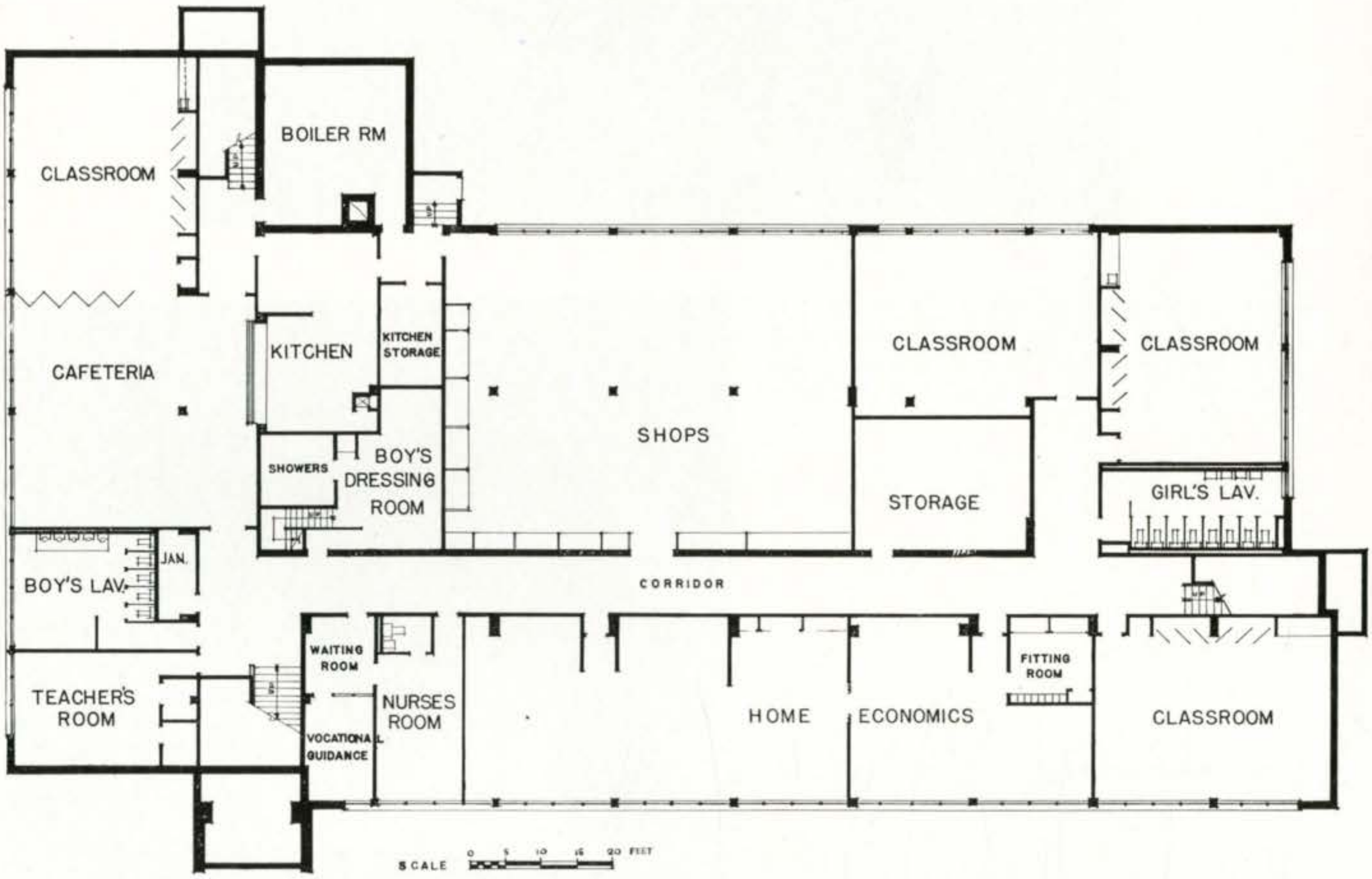
Night view of main entrance, looking down exhibition gallery, off which to the right are doors to auditorium and double gymnasium.



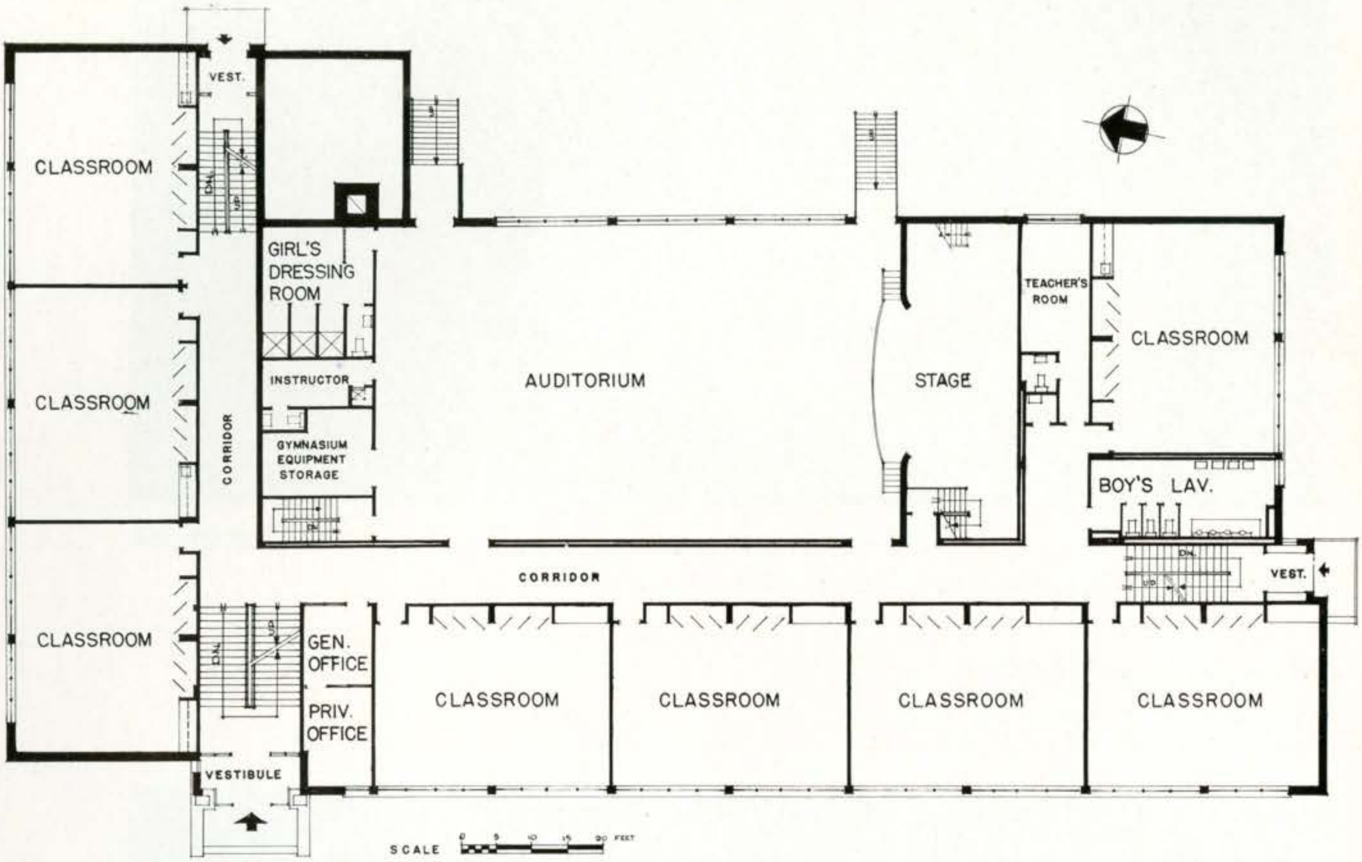
Catholic Central School, London, Ontario

Architect, Charles H. Gillin

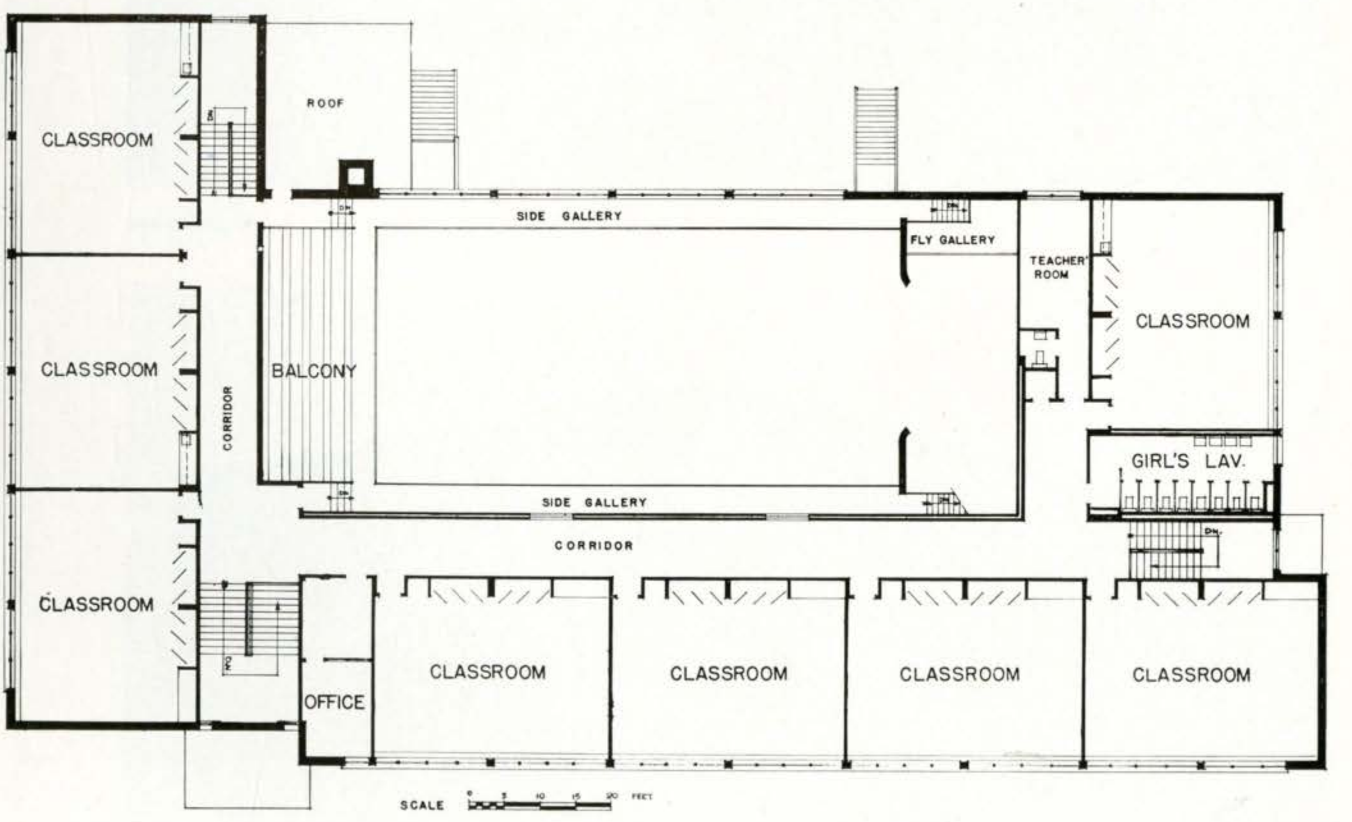
Mechanical Engineers, M. M. Dillon & Co.
General Contractors, Putherbough Construction Co.



Ground floor plan



First floor plan



Second floor plan

Entrance hall

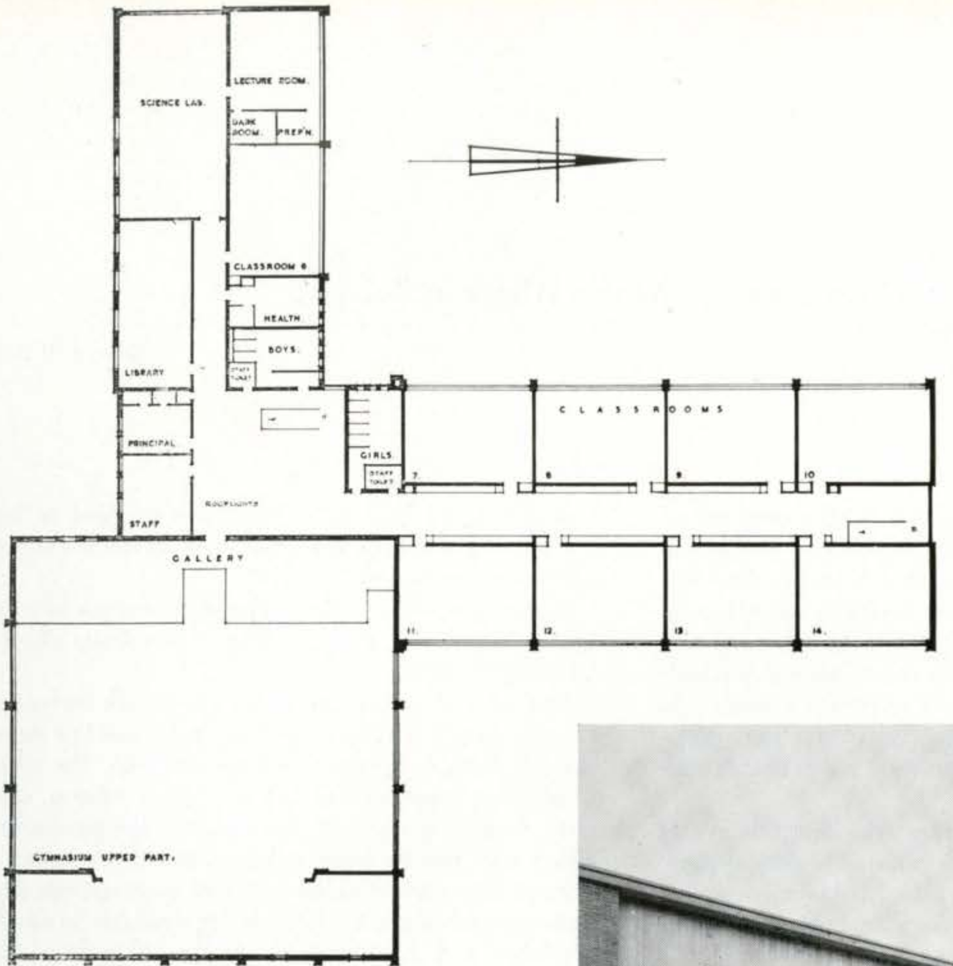
Southern Victoria Regional School, Andover, New Brunswick

Architects, Stewart and Howell

Associate Consulting Engineers, Kearns and Bromley
General Contractors, Richard and B. A. Ryan Ltd.

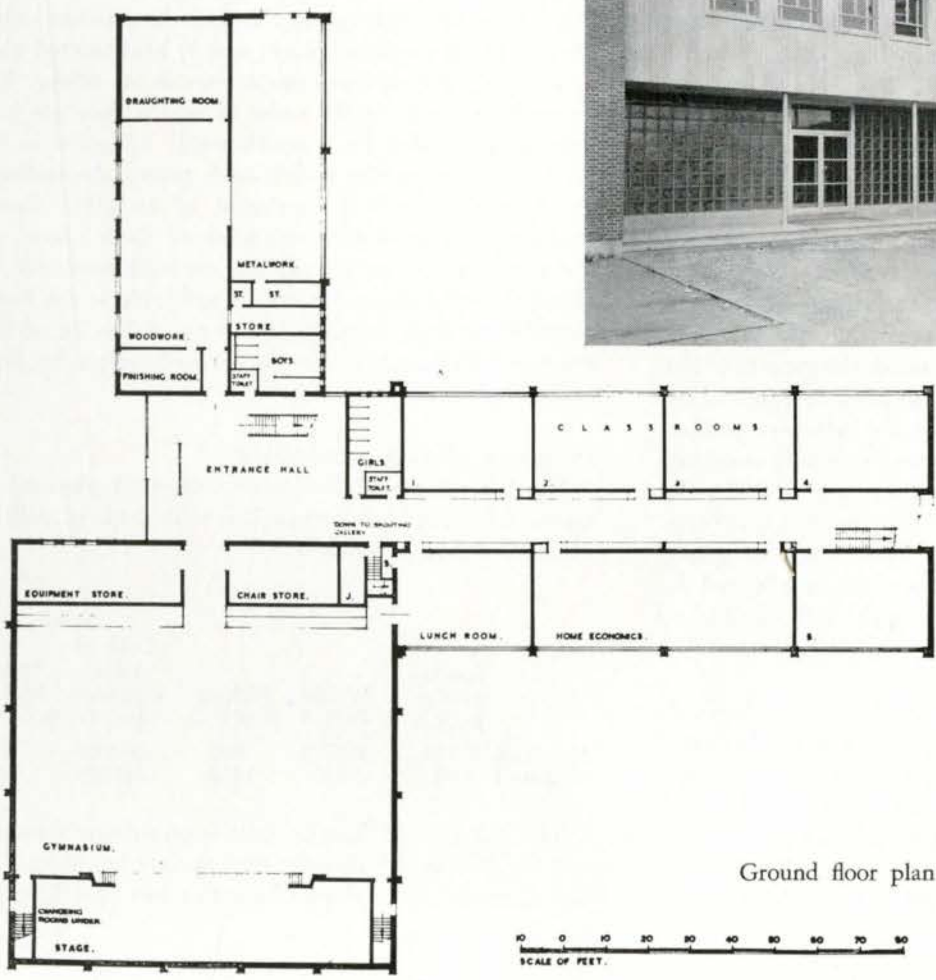
Gymnasium

View of gymnasium from south east



Upper floor plan

Main entrance



Ground floor plan

The Use and Potentialities of Structural Aluminum Alloys in Building

Joseph B. Singer

THROUGHOUT THE LAST HUNDRED YEARS, the progress of science has contributed to the development of new building materials and techniques. Research in this field has produced materials with unique qualities, complementary and often superior to existing products. The range and variety of different materials and constructional methods which have thus greatly increased, made the evolution of new design conceptions possible, and were often conducive to the growth of new architectural forms and expressions.

The advent of aluminum is of a comparatively recent date. Aluminum has been used in various building applications for over fifty years, but its most marked advance has taken place during the last two decades. Progress in metal technology, improvements in the purity of aluminum and the development of new alloys stimulated expansion of the aluminum industry. Furthermore, fabricating techniques, jointing methods and surface protection have undergone revolutionary changes, which all have had a considerable bearing on the use of aluminum and its alloys in building. But although the application of aluminum has extended to almost every conceivable building component, its use for structural purposes has been on a very limited scale only.

Structural aluminum alloys were originally developed for the aircraft industry during the First World War. Lightness and strength were then of a primary importance, since war needs overruled the economic aspect of the enterprise. During the post-war period, the growth of aluminum industries in many countries became a part of the national strategy. At the same time, the increased production of light metals led to a more intensive search in various other fields of engineering applications and, by 1932, aluminum alloys had emerged as building construction materials of considerable potentialities. The experience gained from the aircraft industry had been slowly adapted for building applications, and only since the last war, had an appreciable progress of aluminum alloy structures taken place.

In general types of structure, where the choice of materials is dictated by competitive prices, the high cost of aluminum is still a limiting factor; in order to achieve an economical structure, the inherent properties of aluminum alloys, i.e. lightness, strength, durability and appearance have to be fully utilized. Generally, the most economical aluminum alloy structures are those with a high dead/live load ratio, structures exposed to highly corrosive atmospheric conditions and structures requiring a large degree of prefabrication.

Before proceeding with a detailed analysis of various types of structures, the properties of aluminum alloys will be briefly outlined.

Commercially pure aluminum has a high corrosion resistance, but owing to its relative softness and low strength, it is not suitable for structural applications. The addition of alloying constituents, such as copper, silicon, manganese, magnesium or zinc, can result in the production of alloys with greatly improved mechanical properties. Aluminum alloys are divided into two main groups of cast and wrought alloys, the latter being available in non-heat-treatable and heat-treatable forms. Aluminum alloys, which can be used for structural applications, can be grouped under the following headings: 1) non-heat-treatable aluminum-magnesium alloys, 2) heat-treated aluminum-magnesium-silicon alloys and 3) heat-treated aluminum-copper-magnesium-manganese-silicon alloys. Their strength increases in the order in which they are listed, though there may be a considerable variation in their mechanical properties within each group, depending on the condition or heat treatment of an alloy. Broadly speaking, the corrosion resistance of these alloys, with some exceptions, lowers as their strength increases. The above wrought alloys are mainly available in the form of extruded sections, forgings, sheets and tubes. In addition, some cast aluminum alloys can be used for sundry fittings and components.

Properties of Aluminum Alloys

Physical Some of the more important physical constants of aluminum in comparison with those of mild steel are reproduced in Table 1:

TABLE 1

	Specific gravity gm/c.c.	Weight lb./in.^{3}	Melting point (°C)	Coeff. of linear expansion, per °C	Young's Modulus lb./in.^{2} x 10^6
Aluminum	2.706	0.0978	660	.000023	10.3
Mild steel	7.85	0.283	1350	.000012	30.0

The influence of these properties on structural members will be discussed under the appropriate headings. Attention should only be drawn here to a low specific gravity, which is the most important characteristic of aluminum. This property has a considerable bearing on any economy that can be achieved by reduction in the weight of structural components.

Mechanical

a) Strength in tension. The stress-strain curve of aluminum alloys differs from that of steel; while the curve of steel is represented by a straight line up to the elastic limit, where the yield point can easily be established, the curve of aluminum alloys does not exhibit a definite elastic limit. (Fig. 1) For design purposes, the point of departure from the elastic range has to be therefore defined. A point is chosen at which a permanent elongation can be measured; the stress at which this elongation is equal to a specified percentage of the original gauge length, is called 'proof stress'. The specified percentage in America is 0.2% and in Britain 0.1%. The resultant stresses representing the American and British practice, show only 2-3% difference between their numerical values.

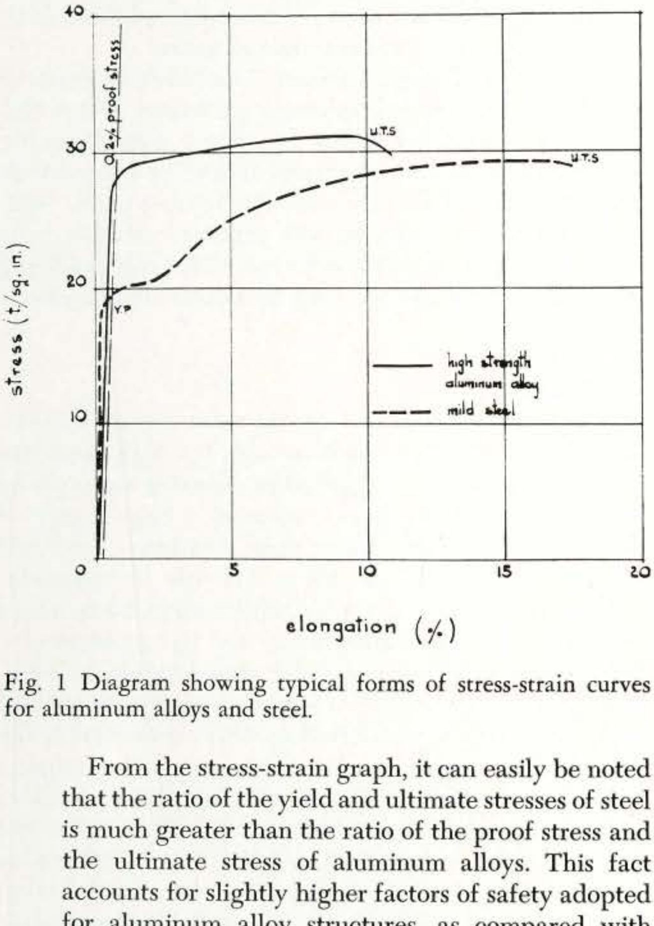


Fig. 1 Diagram showing typical forms of stress-strain curves for aluminum alloys and steel.

From the stress-strain graph, it can easily be noted that the ratio of the yield and ultimate stresses of steel is much greater than the ratio of the proof stress and the ultimate stress of aluminum alloys. This fact accounts for slightly higher factors of safety adopted for aluminum alloy structures, as compared with those of steel.

b) Strength in compression, shear and bearing. The tensile and compressive stress-strain curves are similar, but in the latter, the ultimate stress is slightly higher. The type of alloy determines the relationship between the tensile and shear stresses, but generally, the shear stress is about 60% of the tensile stress. The bearing strength of aluminum alloys is approximately 1.5-1.8 times their tensile strength.

c) Modulus of Elasticity. It is apparent from the stress-strain graph that the elongation per unit increase of stress is much higher in aluminum alloys than in steel. In fact, the Modulus of Elasticity of aluminum alloys is about one-third of that of steel, which accounts for a much higher deflection of aluminum alloy structural members.

d) Thermal expansion. The coefficient of thermal expansion for aluminum alloys is approximately 1.9 times that of steel. An allowance should be made for movements due to temperature changes and adequate expansion joints provided. In composite structures, expansion joints should also be allowed for in positions where aluminum alloy members butt against other materials.

e) Critical heat temperature. The temperature at which aluminum alloys lose their strength affecting the stability of the structure is 100-225°C, depending on the type of alloy. The critical heat temperature of steel is 600°C. From these figures, it is clear that the fire risk of aluminum alloy structures is greater than that of steel and although insufficient data are available, it must be assumed that for fire resistant construction, aluminum alloy members require thicker encasements than equivalent steel members.

f) Durability. Aluminum alloys are much more durable than structural steel, but their corrosion resistance depends on the type of alloy. The most durable structural alloys are Al-Mg work hardening alloys and Al-Mg-Si solution heat-treated and fully heat-treated alloys, which require a protective treatment only in urban and sea-coast areas or indoor positions with a severe atmospheric pollution. Fully heat-treated Al-Mg-Si alloys need protection in all conditions, except in dry indoor atmospheres. Al-Cu-Mg-Mn-Si solution and fully-heat-treated alloys should be protected in all conditions.* Pure aluminum is sometimes used in the form of a coating on the Al-Cu-Mg-Mn-Si alloy sheets and plates.

Design of Structural Members

From the outset, it must be emphasized that only design which takes into the account the inherent properties of aluminum alloys, can produce an economical structure. Among these properties, the comparatively low value for the Modulus of Elasticity of aluminum and its effect on deflection has a considerable bearing on the design of structural members. An aluminum alloy member deflects almost three times as much as an equal strength steel beam of identical cross-sectional area. Consequently, deflection rather than stress may often determine the design of beams, and the cross-sectional dimensions of the beam may have to be adjusted to maintain deflection below the permissible amount. In practice, it can be seen that standard sections have greater flange and web areas and a greater depth than equivalent steel sections, to allow for a higher deflection of aluminum alloys. These standard sections are designed to give a reasonable degree of efficiency under varied loading conditions and their cross-

* These recommendations, which are very conservative, are based on the Report on the Use of Structural Aluminum Alloys in Building by The Institution of Structural Engineers.

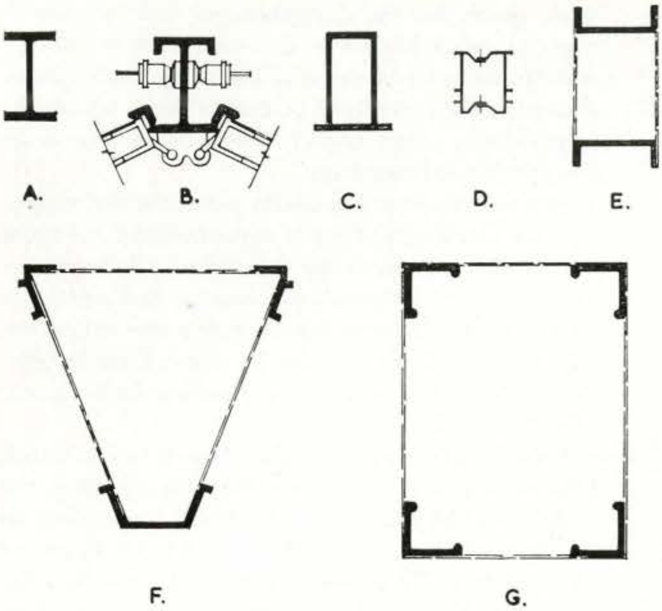


Fig. 2 Aluminum alloy struts — Typical examples:
A. H-section
B. H-section pilaster with provision for a door frame (Brabazon hangar, Bristol)
C. Box section ("Alframe" buildings, S.M.D., Ltd.)
D. Built-up section with provision for window units (Bristol prefabricated schools)
E. Two-member battened and laced strut
F. Three-member strut (Dome of Discovery)
G. Four-member strut

sectional proportions are intended to satisfy the various requirements, accordingly. It is, however, possible to design special sections to suit specific loading conditions. The extrusion process lends itself very well to the production of such sections, including various intricate forms. Appropriately shaped extruded sections can replace built-up compound members and be designed to incorporate some required mechanical features or door and window frames. (See Fig. 2, B and D.)

Deflection can also be reduced through the use of a continuous construction. Since the deflection of a beam with fixed ends is only one-fifth of that of a simply supported beam, the utilization of continuity in structural design may allow to reduce the depth of the section.

Aluminum alloy struts and columns are designed in the form of single extruded sections or built-up members. Typical examples of the former type are H-shaped and hollow box sections. Built-up members are divided into directly connected sections and battened and laced struts. (See Fig.) Battened and laced struts are usually built up of two, three or four members, which are strengthened with battens and lacings. A two-member strut comprises of two channels or 'bulb' angles with riveted batten plates, or lacing bars. A three-quarter strut is built up of specially extruded sections to suit the requirements. An example of it, as used for the Dome of Discovery, Festival of Britain, is shown in Fig. 2F. A four-member strut is usually made up of four 'bulb' angles, which are jointed and strengthened with battens and lacings, or both. Large portal frames can be erected from these types of built-up members, the examples of which are London Airport and Hatfield de Havilland hangars, England.

In spite of a considerable amount of research, the welding of aluminum alloys has not yet reached the advanced stage of steel welding techniques. There are still many difficulties to be overcome before welding becomes an established method of jointing, particularly since some of the alloys most suitable for structural applications are difficult to weld satisfactorily. The Report on the Structural Use of Aluminum Alloys in Building published by The Institution of Structural Engineers (London, 1950) does not recommend welding for any stress-bearing parts of structure.

At the present stage, riveting is considered to be the most suitable method of jointing. Riveting can be carried out with three types of rivets: a) solid aluminum alloy rivets, b) steel rivets and c) tubular rivets. Aluminum alloy rivets are available in various sizes of up to 1 in. dia. and in several forms, such as snap-conical or small pan-headed and rounded or flat countersunk. It is advisable to use aluminum alloy rivets of the same composition as that of the jointed material to ensure durability of the connection. In the design of riveted connections, a larger number of smaller diameter aluminum alloy rivets is required than in the case of connections between steel members.

For painting aluminum surface, a zinc chromate type of primer is recommended. In damp conditions, where aluminum alloy members come in contact with dissimilar metals, the surfaces to be jointed should be treated with one or two coats of a zinc chromate type of paint. Similarly, members in contact with alkaline materials, e.g., concrete, mortars or brickwork, and with acid-containing woods should be painted with two coats of bituminous paint.

Applications

As it has already been said, the most economical aluminum alloy structures are those with 1) a high dead/live load ratio, 2) structures exposed to corrosive atmospheric conditions and 3) structures requiring a large degree of prefabrication. Under these three headings, structural applications of aluminum alloys will now be examined.

Roofs and top storeys are the most common cases, where high dead/live load ratios occur, and the problem of a light-weight structure is a major consideration. In addition, buildings on soil with a low bearing capacity are also included under the same heading, since a reduction in the weight of the structure is here also of great importance. When comparing the cost of an aluminum alloy structure with an equivalent steel structure, the weight of the two materials plays an important role. The weight differences between these equivalent structures can only be interpreted as theoretical figures, since most structures consist of a framework and complementary parts, such as supports, foundations, etc. It is clear that the use of a lighter framework and components will result in some economies in the cost of foundations; other factors, such as the cost of transport, ease of erection and maintenance should also be taken into account.

Aluminum alloys are only economical for long or short span roofs, but not for medium spans. A saving in long span roofs is derived from the fact that as the span increases, the weight of steel members increases proportionately more than that of aluminum alloy members. Short span aluminum alloy roofs are ecomonical up to 25 ft. in length, particularly when the trusses are mass-produced. The extrusion process is here of great advantage; specially designed sections are extruded, the cross-sectional area of which is comparatively small.

Aluminum roof trusses, portal frames, domes and space frames, have all been used for spanning large areas. The best known examples of long span roofs are the Dome of Discovery (span 342 ft.), the de Havilland hangar at Hatfield (span 200 ft.), the London Airport hangar (span 125 ft.), all in England, and the dome over the Ford Motor Company's Rotunda Building (span 93 ft.).

In the Dome of Discovery, the roof design involved special sections, which were readily extruded from aluminum alloys; a box plate girder and leg struts supporting the dome were fabricated from steel. In this way, much heavier steel members were introduced in positions, which did not affect the roof, and the advantages of this light-weight roof (4.41 lb. per sq. ft., including sheeting, purlins, rafters and ribs) were thus utilized.

The Rotunda Building dome is also an interesting example of a very light-weight construction. The dome weighs 8½ tons only, which is equivalent to 2½ lb. per sq. ft. Aluminum alloy struts, 29-35 in. long, and cold riveted into triangles, form the basic units of the dome structure.

The frameworks of both the London and Hatfield hangars have been built up of a series of aluminum alloy portals. The Hatfield hangar is perhaps the most important building in which structural aluminum alloys have been used, and it merits therefore a more detailed description. The main structure consists of twelve portal frames at 30 ft. centres, with an overall height of 55 ft. The upper and lower booms of the portal girders are stiffened by saw-tooth trusses at 10 ft. centres. The north light roof construction is employed, and the roof is covered with an aluminum roof decking and bituminous felt. The portal frame bases are fixed to reinforced concrete foundation blocks by means of four 2 in. dia. holding-down bolts. All primary and secondary members of the frame are built up of bulb angles, back to back, which are jointed by means of ⅜ in. or ½ in. gusset plates. Structural sections and gusset plates are produced from Al-Mg-Si alloys on account of their high strength, corrosion resistance and ease of fabrication. All riveted connections have been fabricated in the shop; sherardized or galvanized black steel bolts have been used for site connections. It is estimated that for the span of 200 ft., the structure weighs only about one-seventh of the weight of an equivalent steel structure.

The erection of a top storey, or any other superstructure, depends largely on the amount of additional loading, which the existing building can carry. A conventional steel framework may be too heavy, and an extensive reinforcing of the building not economical; consequently, a saving in weight of the new structure may justify fully the use of aluminum alloys. A top storey added to the Radcliffe Infirmary, Oxford (England), and a 3-storey cooling tower erected on the top of the Manhattan's Continental Can Building, New York, are two examples of this type of application. The weight of the aluminum alloy framework, which the old brick Infirmary building has to support, is 12 tons, in comparison with an estimated weight of 20 tons for an equivalent steel frame. The 3-storey cooling tower structure weighs 22 tons, as against 61 tons for an equivalent steel structure, which the existing building could not carry. All framing members have connections with aluminum alloy gusset plates, bolts and nuts, and the frame is covered with 18 gauge aluminum panels bolted to it. Weight for weight, it is calculated that the cost of the aluminum alloy frame is four times the cost of an equivalent steel frame; this is offset, however, by the fact that the weight of equivalent steel is nearly three times that of aluminum.

A structure built on soil with a low bearing capacity requires specially designed foundations. The use of light-weight structural frame may allow to decrease the size of the foundations and result in appreciable savings. For instance, aluminum alloy has been chosen for the framework of a new store building in Georgetown, British Guiana; the store is built over a volcanic pit which necessitates a design with minimum dead loads.

Durability of suitably treated aluminum alloys in the corrosive environment of industrially polluted atmospheres and coast areas has been established through past experience. Under these severe conditions, the initial high cost of aluminum alloys may be outweighed to some extent by reduced maintenance costs.

Aluminum alloy structures are most adaptable for prefabrication. Several types of prefabricated bungalows have been produced in England and America, many of them specifically for export. The production of aluminum bungalows by the Bristol Aeroplane Company has led to the development of prefabricated schools and today, nearly five hundred school units have been built in England. These single storey schools, based on a 4 ft. grid dimension, are designed complete with aluminum alloy extruded stanchions, roof trusses, walling and windows.

Apart from schools and bungalows, large prefabricated structural members are produced for the erection of factories, workshops, stores and other types of buildings. These standard components are easily transported to the site and rapidly erected. Aluminum alloy structures built for not easily accessible places, such as the Valot Refuge hut at the summit of Mount Blanc, Switzerland, have also been completely prefabricated to facilitate their assembly.

Aesthetically, aluminum alloy frameworks convey the effect of lightness, inherent strength and elegance. This effect is enhanced by the slenderness of aluminum sections and their bright metallic finish.

The potentialities of aluminum alloy structures have been very little explored in this country; it may be a sobering thought that most of the pioneering work in this field has been carried out in England from imported Canadian aluminum, the cost of which amounts there to about six times that of steel.

"Design in Scandinavia" — an Exhibition

George Swinton

VITRUVIUS' PRINCIPLE that architecture should meet three requirements – utility, strength, and beauty, is equally valid for the products of industrial art and handicraft. There is no division possible, no separation into utilitarian production for use and non-utilitarian design for beauty. As in architecture, so in industrial design, the product is the result of an interaction between form and function.

In the near past, the gospel of the Bauhaus had persuaded us towards a concept of unilateral design relationship: "form follows function" and "the beauty of an object lies in its most functional form" obliterated all other concepts of aesthetic form (which were disposed of as being either aristocratic or mere formalistic beauty). Essentially was this the situation on this continent, and, partly, still is. Gradually functionalism, though still embraced by educators and design officials, is giving way to a powerful regenerative movement which accepts the mysterious and unpredictable human qualities in design: beauty arising out of the extra-functional areas of the mind, expressing (and arousing!) human delight in enrichment – enrichment within the limits of the object and without destroying or distorting the meaning of context (which is the function of the object).

Though perhaps functionalism would have died a natural death (as much as suffocation can be considered natural), design from Scandinavia had much to do in bringing it about so soon. It is, therefore, most timely that we should be able to view a comprehensive exhibition of work produced in the four Scandinavian countries, to be shown in Toronto at the Royal Ontario Museum from October 19th to November 21st, and then in Ottawa at the National Gallery and the Design Centre from December 17th to January 21st.

"Design in Scandinavia", comprising some seven hundred items of glass, ceramics, wood, metals, textiles and furniture, was organized and financed by the Governments of Denmark, Finland, Norway and Sweden, at the request of twenty leading art museums in Canada and the United States under the auspices of the American Federation of Arts. Starting in Virginia in February, 1953, it will travel for almost four years to cover the continent from coast to coast.

Four national committees proposed representative articles from each country, and then a jury, made up from one member of each committee, made the final selection, choosing items to form an accurate cross-section of contemporary design for the Scandinavian home, and ranging from costly hand-executed works to inexpensive mass-produced articles.

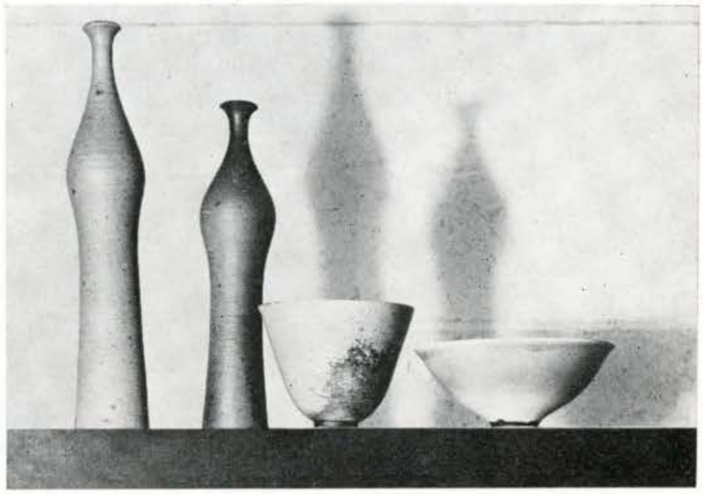
Furthermore, a four-nation competition was conducted to produce a scheme for the installation of the exhibit as one unit with its own portable and flexible display machinery consisting of cases, tables, platforms and lighting. The winning plan by the Copenhagen architect, Erik Herlow, is so outstanding that it has set new standards for exhibition display and is well worth special mention.

The success of Herlow's plan lies in its utmost simplicity, achieved by self-contained "packaged" units which maintain their identity in any surroundings yet can be adapted to any ground plan. No museum fixtures are necessary, each installation works independently of walls, ceilings, or floors, with no tools required to set them up. The basic unit consists of a glass case supported on a folding base frame of anodized aluminum. The structural members of the case are also of aluminum, with permanent ends, top, and bottom of formica panels. In transit, the glass sides of the case are protected by sliding formica panels which, when removed, serve as open table tops during display periods. Objects displayed in each case are packed in it by means of a series of thick foam rubber pads (cut to fit the case) with numbered recesses for each item.

When assembled (see illustration), cases and tables together with screens and platforms can be arranged in infinite variety and thus be fitted to any ground plan. Its additional beauty is that practically no storage space is needed while the exhibition is on display as more than nine-tenths of the actual packing cases form the individual units of the installation. When in transit, the entire "package" of numbered cases stacks up neatly into two blocks fitting cosily into two pre-selected moving vans. Could Hans Christian Andersen have planned it any better?

But then, in a very general sense, is is precisely the spirit of Andersen that is so strongly felt in this exhibition, as in all Scandinavian design, though it may be altogether wrong to talk about "Scandinavian" design. Each of the four countries has its own traditions and its native folk designs on which the contemporary designers are not hesitating to draw confidently. This, itself, is typically Scandinavian: to be deep-rooted in heritage and folklore, and to assert one's individuality in the well-known limits of the familiar. No doubt this has contributed also to the sureness which manifests itself in the solid handicraft-like look of

Designed by Herman Bongard
Produced by Hadelands Glassverk, Norway



Designed by Aune Siimes, Finland

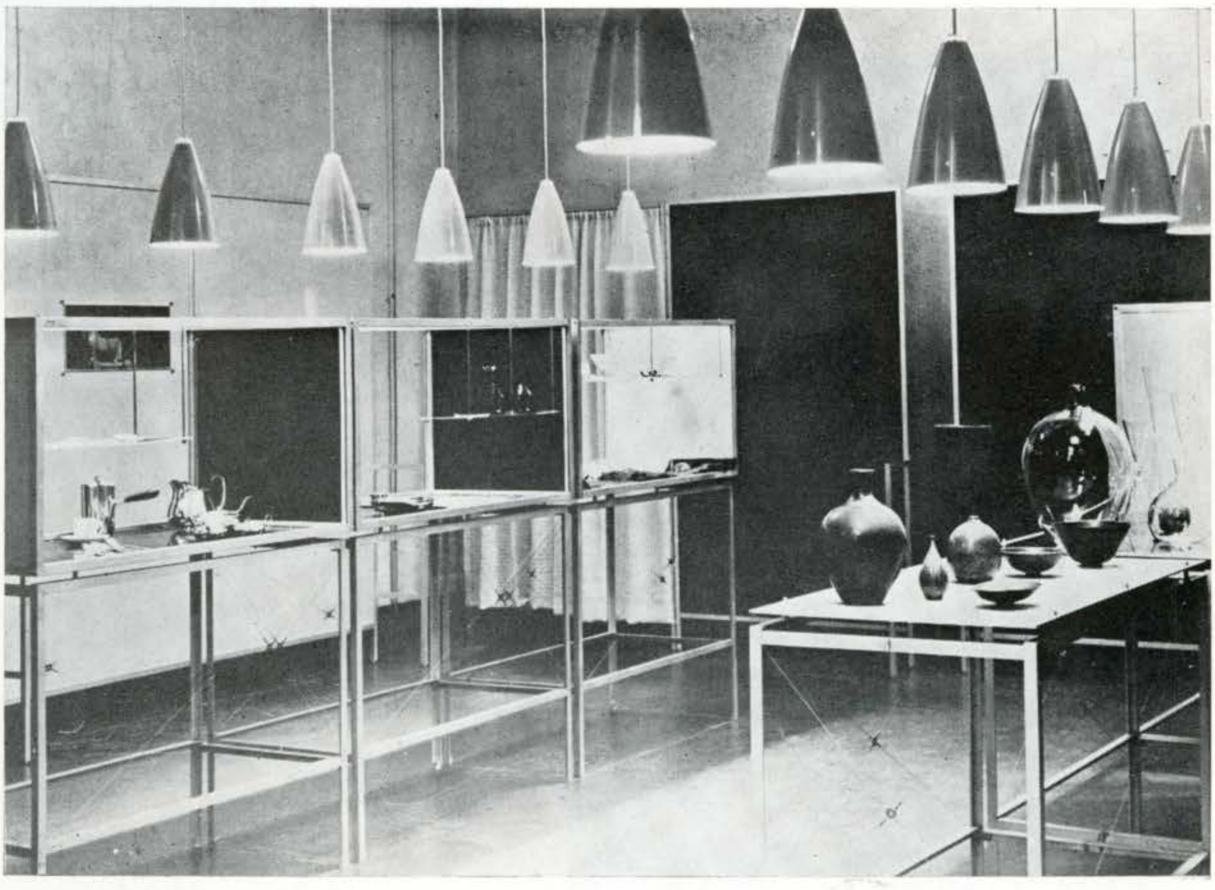


Exhibit installation designed by Erik Herlow, Denmark
Produced by AB Nordiska Kompaniets Verkstader, Nykoping, Sweden

Scandinavian manufacture, achieved at the price of "slow" development compared to New World sensationalism. Yet Scandinavian furniture will fit in any interior because of this conservatism, which avoids the gadgety, different-at-any-cost modernism that requires a special (and very inflexible) architectural setting.

Also contrary to our concept of largely anonymous industrial design, (usually executed by a staff of specialists) Scandinavian designers enjoy the utmost benefits of a highly respected profession, with the individual practitioners receiving personal recognition from the design-conscious general public. Here are a few of the best known names: Erik Herlow, Arne Jacobsen, Finn Juhl, Axel Salto, Hans Wegner in Denmark; Alvar Aalto, Ruth Bryk, Kay Frank, Dora Jung, Toini Muona, Tapiovaara, Tapio Wirkkala (who also designed the handsome exhibition catalogue) in Finland; Herman Bongard, Arne Hiorth, Aage Schou in Norway; Erik Fleming, Stig Lindberg, Bruno Mathsson, Arthur Percy, Astrid Sampe, Skawonius, and Elias Svedberg in Sweden.

It is, of course, the interrelationship of age-old craft knowledge, continuous tradition which is the knowledge and use of indegenous historical forms, and the individual creative mind which have brought about the refinement of Scandinavian objects for daily use. It inevitably expresses the gaiety and human warmth of people delighting in the enrichment of forms (not to be confused with merely knowledgeable aesthetic elements of design), and it ultimately brings about a close relationship of mutual respect between producer and consumer: the form does not merely follow the function, the function derives its life from the form.

Workchairs in steel frame and plywood. Levers under seat and back to adjust height and angle. Back, seat and arms can be upholstered.

Designed by Elias Svedberg
Produced by AB Nordiska Kompaniet
Stockholm, Sweden

Armchair in teak and ratan

Designed by Hans Wegner, Denmark
Produced by Johannes Hansen
Copenhagen, Denmark

NEWS FROM THE INSTITUTE

GOVERNOR-GENERAL WILL OPEN NEW OAA BUILDING

His Excellency, the Right Honourable Vincent Massey, will formally open the new Ontario Association of Architects Headquarters Building, 50 Park Road, Toronto, on Saturday, October 9th, at 4:00 p.m. After the opening ceremony, members and their wives will be received by His Excellency.

The opening of the new building realizes a long standing dream of the members, and is a milestone in the history of the Association.

The President and Council of the Ontario Association of Architects extend a warm welcome to members of other provincial associations who find it possible to be present on this occasion.

CORRESPONDENCE

From the Rt. Hon. the Earl of Athlone, K.G., G.C.B.

Kensington Palace
13th July, 1954

Dear Carroll,

I have now received the Medallion and Collar of my Honorary Fellowship of The Royal Architectural Institute of Canada and write to thank the members of the Royal Institute and the College of Fellows for having so kindly thought of sending them.

As you say in your letter, it must have been because of the difficult days of the war that I had not had the pleasure of receiving these in 1941. I am all the more grateful for them now.

Yours sincerely,

Athlone

CALENDAR OF EVENTS

An exhibition, "Design in Scandinavia", will be shown at the Royal Ontario Museum, Toronto, from October 19th to November 21st, and at the Design Centre, Ottawa, from December 17th to January 21st.

ONTARIO

The editor suggests that the Ontario Letter should do "something for the unity of the profession". In considering northern Ontario perhaps the best way to develop this suggestion is to point out a serious gap in architectural professional unity. Since opening in North Bay three years ago I have been amazed at the complete absence of any professional intercourse in this area. I have met only one other northern architect; at the last OAA convention there was only one other northern architect in attendance and we did not even meet.

I think there is a real need for something in the nature of "professional unity" in this area. I do not mean a leather arm-chair club meeting twice a month, or even a northern convention delegation with a separate hotel room. I think there are many real problems affecting northern architects which are not present in southern Ontario.

First of all, I do not think that there is any argument that there is a definite triangular area (from North Bay to Moosonee to Sault Ste. Marie) which has a specific character – geographically, economically, and socially. This regionalism finds expression in the oft-repeated plans to establish a separate province of Northern Ontario, a new University of Northern Ontario, or a separate Minister for Northern Ontario in the provincial cabinet. Northern Ontario, with its Canadian Shield landscape of rock, pine, and birch; its economy of mining development and railway extension, has often been linked to a "sleeping giant". Its sleep is fitful, subject to single industry economics, and its architecture is atrocious.

There are perhaps two basic reasons why, this area, with its clearly defined regionalism, has not developed a good architecture. Firstly, the north's large employers use chiefly non-resident or non-architectural services in the design of their buildings. The federal and provincial governments nearly always employ Department of Public Works architects or large Toronto firms for their architectural service. The large mining companies, usually directed from Toronto or Montreal, employ their own mining and civil engineering staffs. The results of such service cannot develop a good regional architecture.

The second reason is the old stand-by, "client ignorance of architectural service". This is so much worse than the same problem in the south that it is pathetic. For example, an intelligent and sincere school board member recently asked me what size of concrete mixer did I have to install concrete floors in the school under preliminary discussion. Because the large employers use non-resident firms, the general public in the north consider "Toronto experts" the only real answer to their architectural problems. This lack of confidence in northern architects will never yield anything more than a fringe architecture.

Individually, the firms of the north can only plug away at small, indifferent jobs, hoping to instil a better design quality under more stringent cost budgets than their competitors from the south. This situation cannot be cured by railing against bigger southern firms or against the lack of opportunity to produce better architecture. I believe the architects of northern Ontario should take a positive collection position; we need to lobby the Department of Public Works, the large mining executives on the basis of better service; even to the point of producing larger jobs in association. We ought to prepare and carry out a public information campaign through the small towns and cities in this area.

There are many difficulties in achieving this needed professional unity; long distances, the relative "smallness" of individual firms, the preoccupation with outside competition, and so on. But these problems will have to be met someday and the sooner a start is made the easier will be the task. By becoming producers of a good regional architecture, we would be contributing more towards the unity of the profession in Ontario than by being poor second cousins with little or no link with our southern relatives.

William A. Gibson, North Bay

FROM THE WOLFVILLE ACADIAN

There was considerable animated debate in the Nova Scotia Assembly on a bill to increase the penalty under the Architects' Act from $200 to $1,000 for a first offence and $2,000 for a second offence against the provision that an architect must be employed on all construction jobs costing over $60,000.

The proposal was sharply attacked by a CCF member on the ground that it was strengthening the hold of privileged groups upon the people. We are unable to understand the object of his argument.

We hold no brief for architects, but it appears to us to be sound common sense to ensure that a building costing over $60,000 should be properly designed. A building of that value would be of considerable size, and there are certain strains and stresses concerned in its construction which can only be computed by a competent architect. We cannot envisage any sensible person starting such a work without an architect's guidance.

Large buildings not properly designed have been known to collapse either during construction, or soon afterwards, with consequent loss of life to those engaged on the building, or its occupants.

It appears to us to be sound policy on the part of the government not to allow any unauthorized person to start on the construction of a large building without some guarantee that it is able to stand all the strains to be thrown upon it, and the only way to enforce such a provision is to attach a heavy penalty to its infraction.

We would have thought that all members of the Assembly would have welcomed the revision of an act designed to protect the public from the danger of ill-constructed buildings.

PRIZES AND AWARDS

The School of Architecture, The University of Manitoba, announces the following awards made at the end of the session, 1954.

Fifth Year
- University Gold Medal to R. D. Gillmor
- RAIC Medal to Carl Pfister
- Bachelor of Architecture Thesis Prize of $50 to R. D. Gillmor
- Indiana Limestone Institute Competition Prize
  - First Prize of $250 to R. D. Gillmor
  - Second Prize of $150 to Carl Pfister
  - Third Prize of $100 to J. B. Sutherland

Fourth Year
- Isbister Scholarships in Architecture
  - $80 to A. M. Bowers
  - $60 to H. M. Cawker
- Manitoba Association of Architects Scholarship of $150 to C. de Forest
- Canadian Pittsburgh Industries Scholarships
  - $150 to C. de Forest
  - $100 to J. C. Stovel
- Ralph C. Ham Memorial Scholarship of $200 to A. J. Mudry
- W. Allan McKay Memorial Scholarship of $100 to A. H. Hanna
- Kool Vent Awning Prize of $150 to W. R. Lort
- Victor Boyd Memorial Bursary in Architecture of $100 to Lorne Nelson
- Special Bursary in Architecture for 1954-55 of $100 to Gerhard Blum
- J. G. Fraser Ltd. Summer Sketch Prizes
  - $7.50 to Lorne Nelson
  - $5 to C. de Forest

Third Year
- Atlas Asbestos Company Competition
  - $100 to H. J. Kinoshita
  - $100 to A. J. Hennessey
- Manitoba Association of Architects Scholarship of $150 to H. J. Kinoshita
- David Lacey Cowan Memorial Bursary in Architecture of $100 to Harold Saxby
- J. G. Fraser Ltd. Summer Sketch Prizes
  - $5 to H. D. Kalen
  - $5 to H. J. Kinoshita

Second Year
- W. G. McMahon Ltd. Scholarship of $100 to N. J. Metz
- Donald Spurgeon MacLean Memorial Bursary of $100 to Valdis Alers
- J. G. Fraser Ltd. Summer Sketch Prizes
  - $5 to J. R. Cook
  - $5 to Valdis Alers

First Year
- Sidney Alexander Adams Memorial Bursary of $100 to W. J. Toporek

CONTRIBUTORS TO THIS ISSUE

Joseph B. Singer graduated from the University of Glasgow with a Bachelor of Science degree in Architecture in 1949 and became an Associate of the Royal Institute of British Architects a year later. Born in Poland, he came to Britain during the war with the Polish Air Force. Always interested in new materials and techniques, he wrote a book on "Plastics in Building" (Architectural Press, 1952), several sections on aluminum for "Specification" and contributed articles to many technical magazines. After working on traditional, as well as prefabricated aluminum, steel, concrete and plastic buildings in Britain, he came to Canada last January and settled down in Hamilton.

D. B. Sutherland Mr Sutherland is Superintendent of New Buildings for The Protestant School Board of Greater Montreal. Unfortunately, a complete biographical sketch of Mr Sutherland was not available for this issue but will be published later.

George Swinton came to Canada from Austria in 1938. During World War II he was in the Far East in the Intelligence Corps of the Canadian Army, Psychological Warfare Division. On his return he completed his studies at McGill University, Montreal, and continued to study art and design in Montreal and New York. For two years he was curator of the Saskatoon Art Centre and, then, in 1950, he became an instructor in Graphic Arts and Design at Smith College, Northampton, Massachussetts. He returned to Canada in 1953 to substitute for Andre Bieler as resident artist at Queen's University, Kingston. During the past summer he has been the assistant chief of the Industrial Design Division, National Gallery of Canada, and is now appointed to the Department of Art, University of Manitoba.

FUTURE ISSUES

October	Houses
November	Hospitals
December	OAA Building