THE JOVRNAL

ROYAL ARCHITECTVRAL INSTITVTE OF CANADA

Vol. XIII, No. 8 AUGUST, 1936 TORONTO

FOR FLOORS OF DISTINCTION

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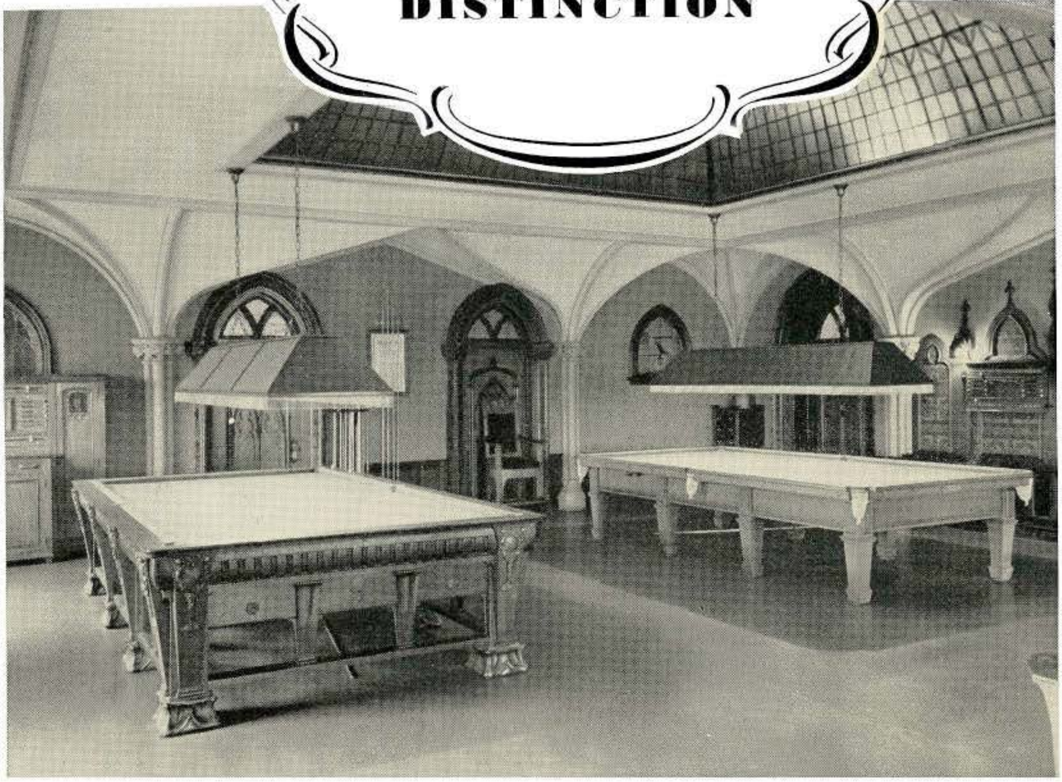

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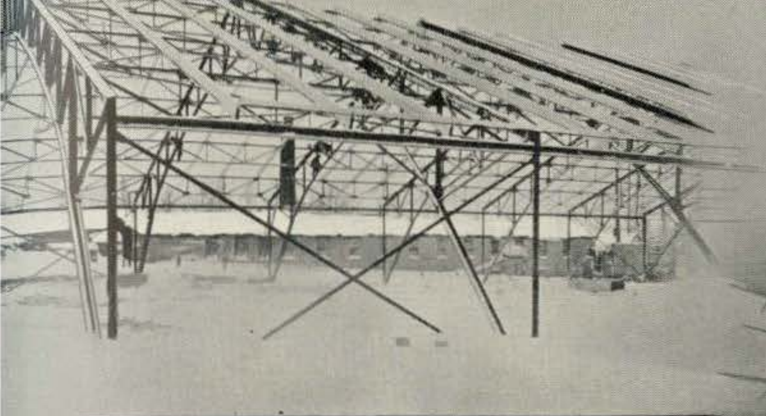

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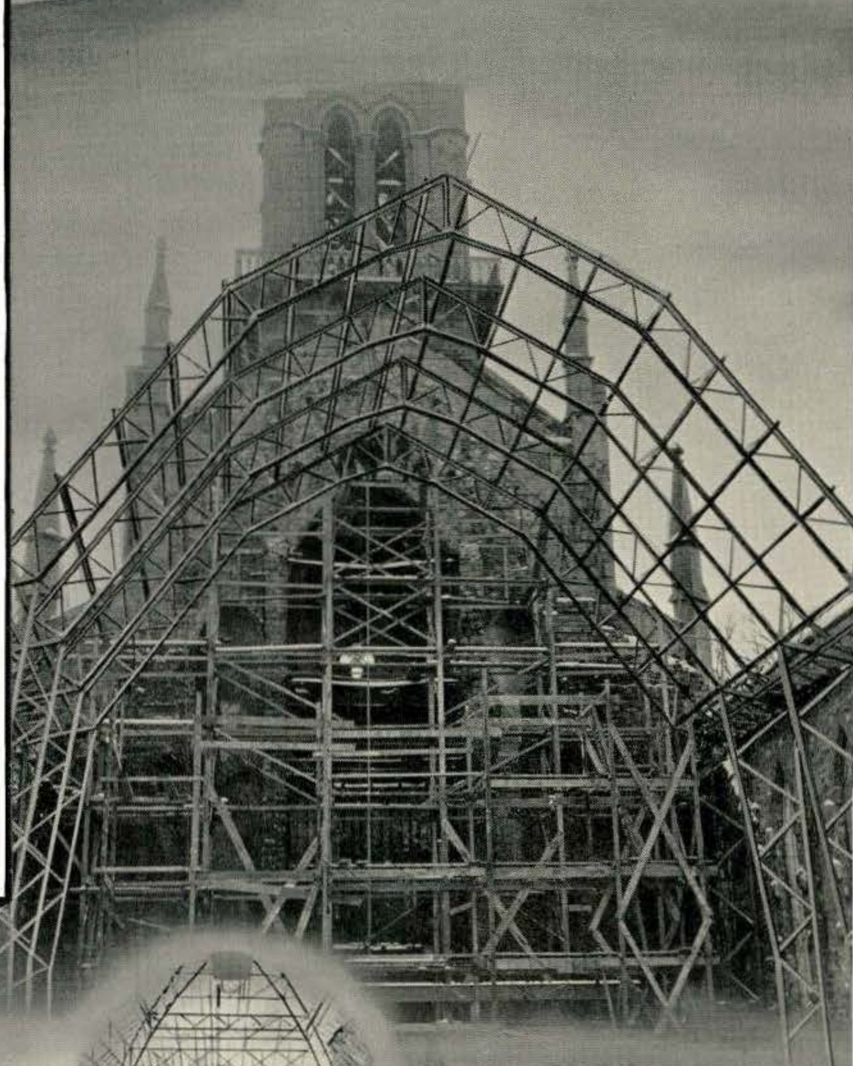

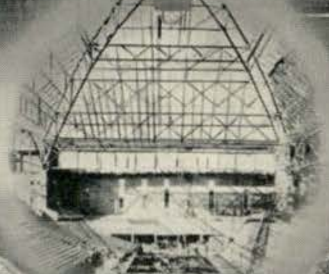

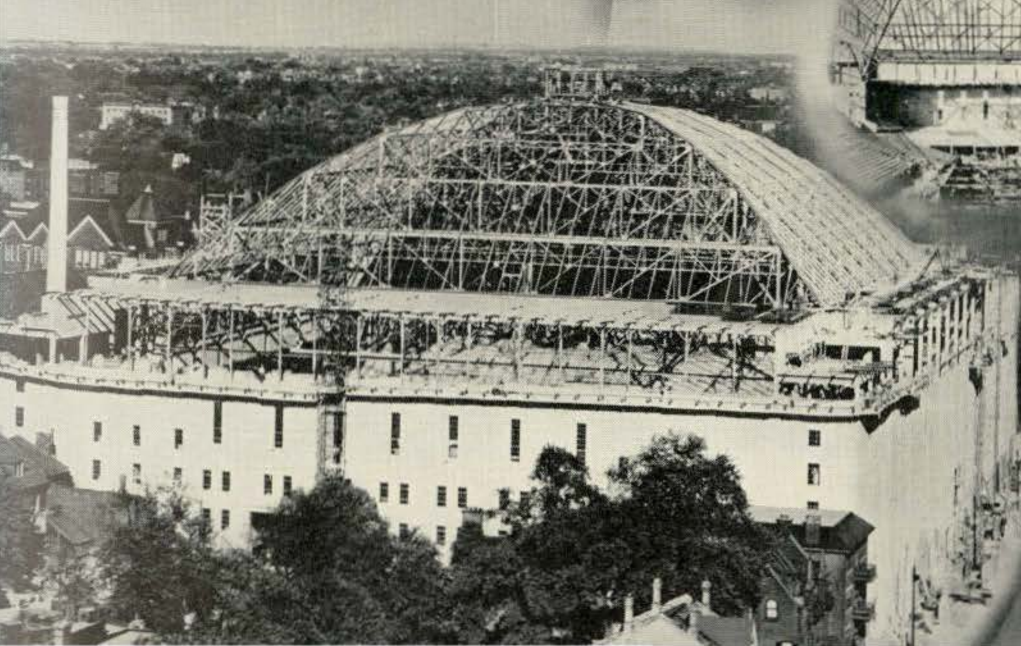

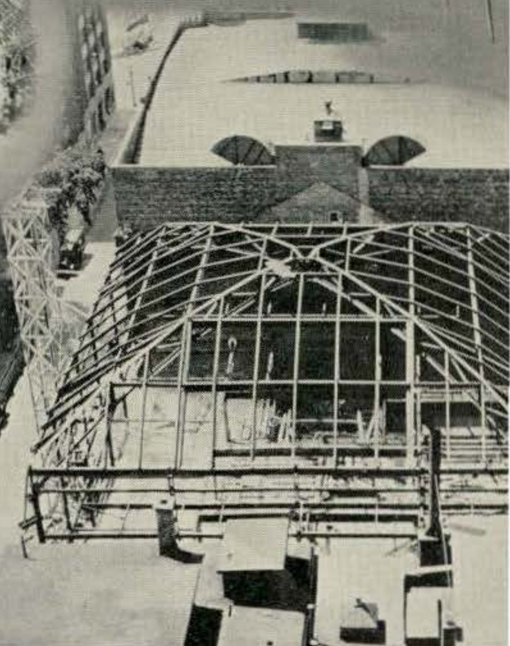

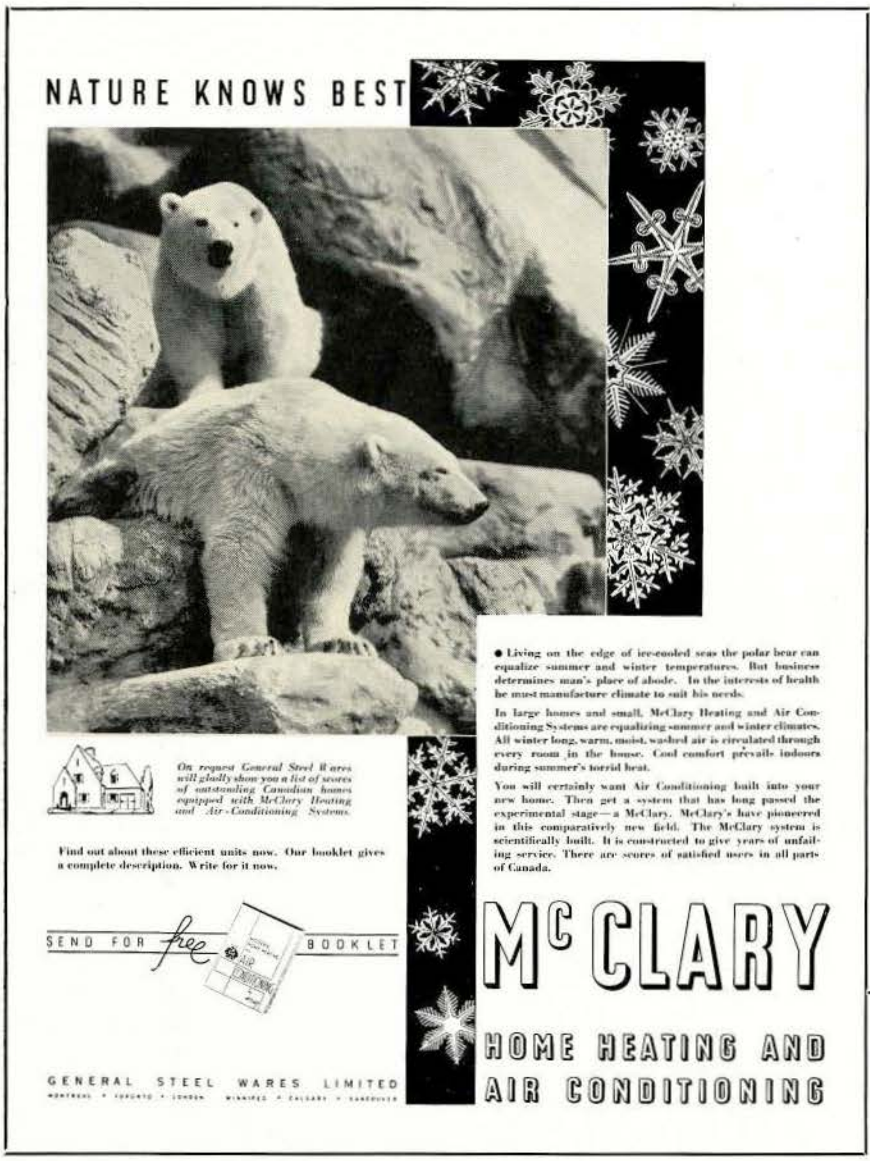

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THE JOURNAL

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CONTENTS

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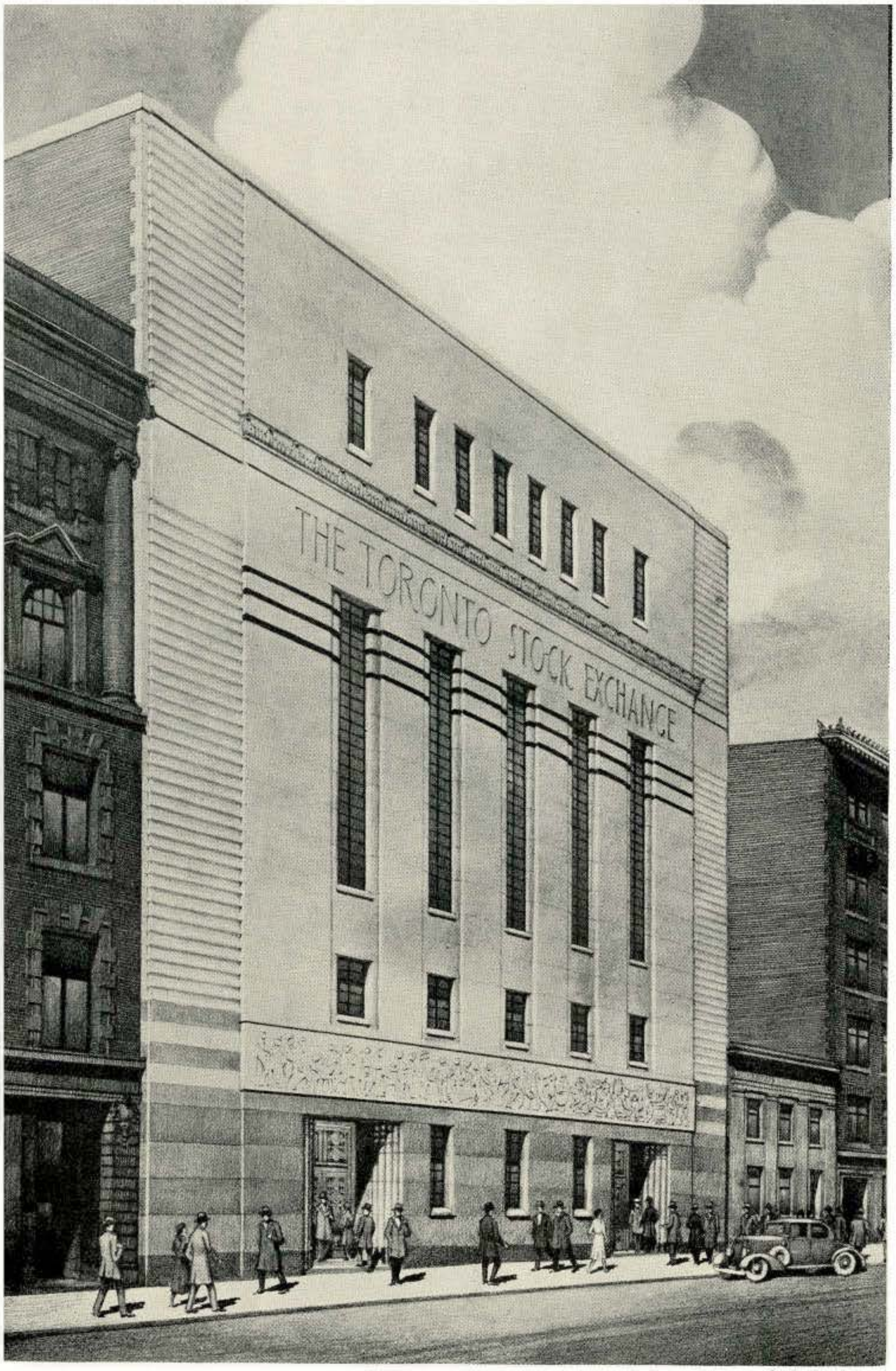


S. H. Maw, Del.

ARCHITECT'S DRAWING OF MAIN FACADE, TORONTO STOCK EXCHANGE

George and Moorhouse, M.M.R.A.I.C., Architects *S. H. Maw, M.R.A.I.C., Associate Architect*

First Storey—Beeton Granite with polished base and alternate courses of fine and coarse honed finish. Upper storeys to parapet—Indiana Limestone. Horizontal Bands—Honed finished granite. Entrance Doors and Grilles—Stainless steel. Windows—Steel sash.

THE NEW TORONTO STOCK EXCHANGE BUILDING

The recent amalgamation of the industrial and mining sections of the Toronto Stock Exchange called for more adequate accommodation and facilities than existed in the present buildings. It was therefore decided to erect a new building on Bay Street in the heart of the financial section of the city, and Messrs. George and Moorhouse, architects, with S. H. Maw as associate, were commissioned to carry out the work.

The new building is to be approximately ninety-four feet wide, one hundred and ten feet deep, and eighty-six feet high. It will be of reinforced concrete and structural steel construction and has been designed to take, when required in the future, two additional storeys with a set-back of nine feet.

One of the attractive features of the main facade is a carved stone frieze between the first and second storeys. This frieze, which depicts the major industries in Canada, will be seventy-four feet long by five feet high. The motifs used in this frieze recur in the murals on the walls of the trading room, and in the discs of the entrance door grilles. The spandrels dividing the windows of the trading room will accommodate the small galleries overlooking the trading floor.

The ground floor of the new building will be devoted to the required accommodation for the members, including a dining room and lounge. The second floor, which begins at the carved frieze and continues to the cornice, will be devoted entirely to the trading room, which will be forty feet in height. The top floor will be given over to the administration offices, and the board and committee rooms. There will be two basements, the first of which will be devoted to the departmental offices and staff accommodation, while the second basement will house the mechanical requirements of the building.

It is expected that the new building will be completed in the Spring of 1937.

SANS ROOF: SANS ARCHITECT*

The Ottawa correspondent of the *Observer* has provided me with a two-point topic. A new Canadian Housing Act provides that where a prospective house-purchaser can furnish 20 per cent. of the cost of building his own home, the loan companies will furnish 80 per cent., of which 20 per cent. is loaned or guaranteed by the Dominion Government. But this Act lays down rigid regulations as to standards of construction and materials, and it was found—when they came to it—that the creations of the ordinary builders were not up to this standard. It was found, also, that the small home-owners could not afford architects. So, "to avoid the marring of the landscape which has taken place in England," the Government—through the Ministry of Finance—instituted a competition in which 526 architects submitted designs for a small, compact, low-cost house. A committee of architects were the judges. From the entries they selected the best five, and these with the next best fifty will be published in book form and sold at fifty cents the lot. This is my first point.

The second point is that the judges actually selected as the best design of all a house with a flat roof, because it was proved to them beyond doubt that the flat roof was eminently suitable to the rigours of the Canadian climate and that *it substantially reduced costs.*

The thoughts that arise out of this are these: it is important that a government, especially when it is lending part of the money, should insist on the proper assistance of trained architects. But here, in Canada, when they come to face up to the problem, they find that people always say that they cannot afford architects.

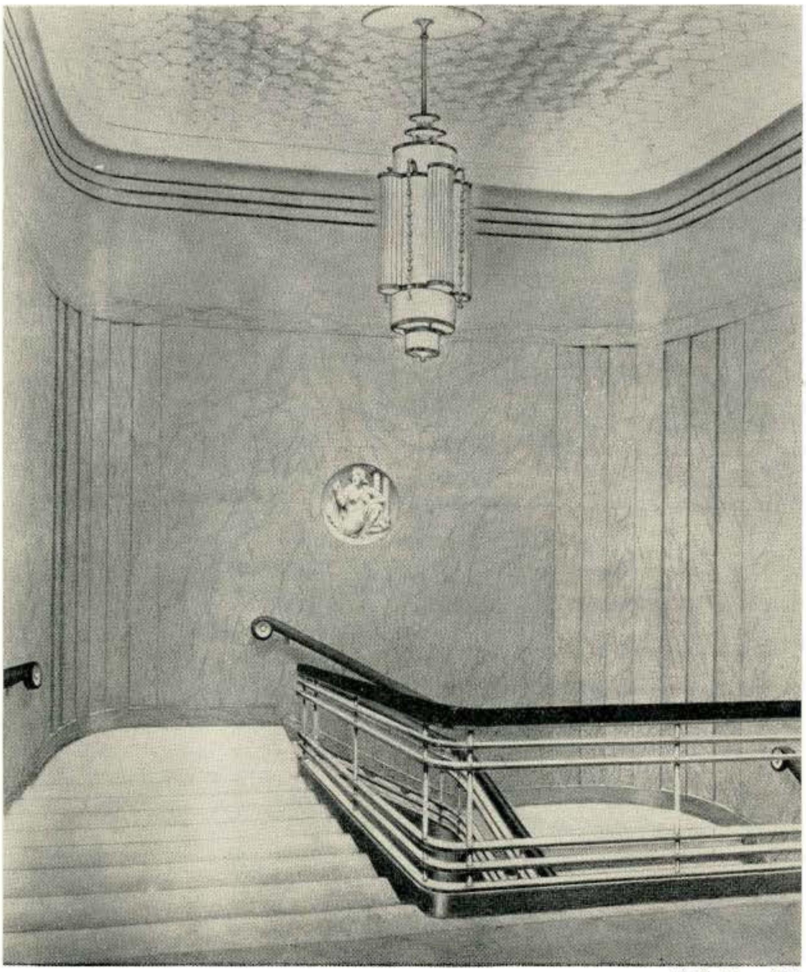
Yet they do not altogether dispense with them, because the choice work of some 526 architects is examined and fifty-five of them have the honour of having their designs put into a book and sold for fifty cents—which the builders and house-purchasers may copy.

I do not know what happens to the architects after their designs have been so honoured. Perhaps the speculative builders who cannot afford a few guineas for an architect's services send a small subscription to a Canadian Architects' Benevolent Fund; for one good turn deserves another. But more likely the builders and prospective owners discover that no one design is quite what they want, but by knocking two of them into one they can make a design of their very own; and, the design being their very own, they are under no obligation whatever. Or perhaps there is some system of royalties under which an architect is allowed to travel round all the suburbs of all the towns of Canada, and if he can recognize his design he is allowed to write to the builder or owner and ask for a copyright fee; only, of course, if the builder has *improved* on the design it would be rather bad form for an architect to expect any consideration. In short, picking the architect's brains is an interesting and profitable occupation,

(*Continued on page 163*)

**An Editorial published in the July 1936 issue of Architectural Design & Construction, London.*

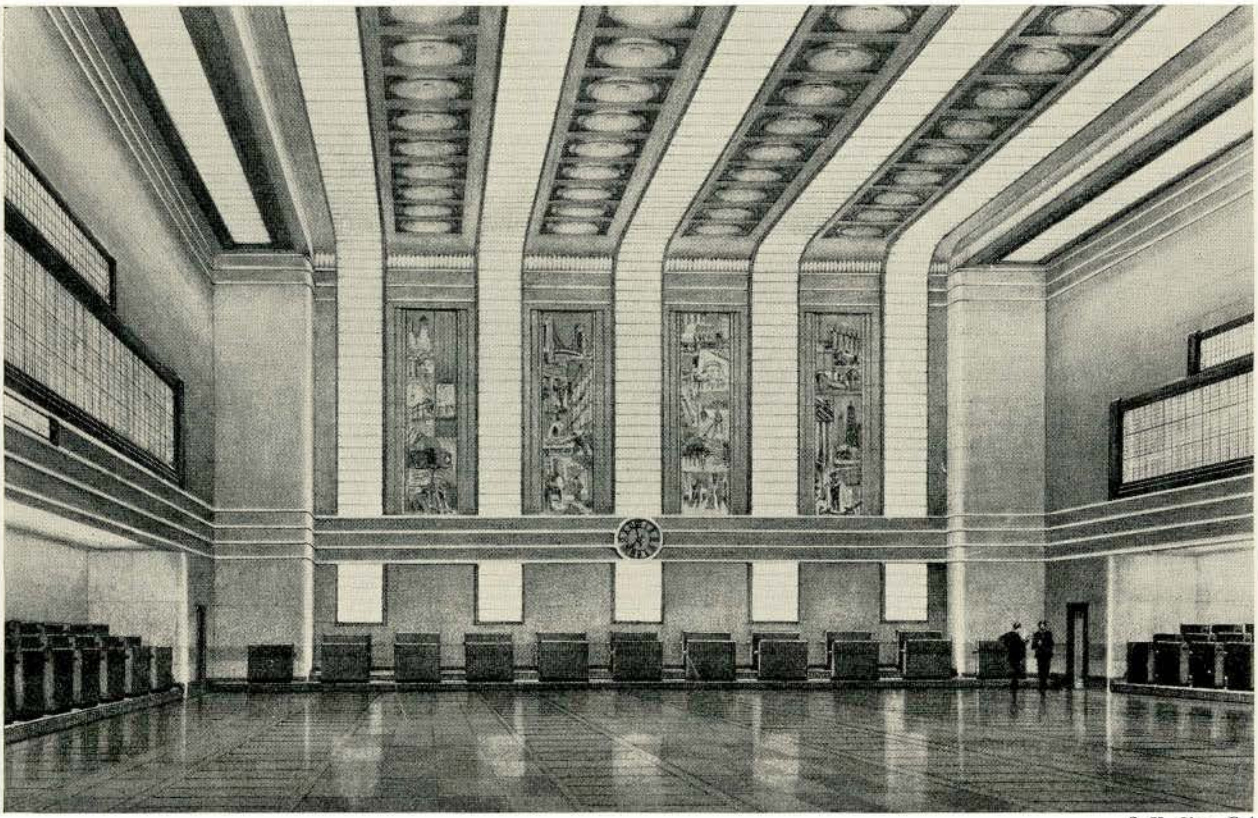
Travertine stair treads with marble risers and strings. Balustrade of stainless steel with hand-rail of black impregnated Birch. Walls of granite d'or marble. Ceiling of cast plaster in hexagonal design. Decorative plaque in cast glass.



Floor of trading room of cork tile in two shades repeating the general lines of the ceiling. Floor border and six foot dado of granite d'or marble. Walls and ceiling of acoustic tile. Windows on east and west elevations are carried across the ceiling in bands of artificial light. Horizontal bands at gallery and ceiling levels of white metal.

S. H. Maw, Del.

ARCHITECT'S DRAWING OF UPPER PART OF MAIN STAIRCASE



S. H. Maw, Del.

ARCHITECT'S DRAWING OF TRADING FLOOR, TORONTO STOCK EXCHANGE

George and Moorhouse, M.M.R.A.I.C., Architects *S. H. Maw, M.R.A.I.C., Associate Architect*

AWARDS IN THE ONTARIO GOVERNMENT HOUSING COMPETITION

WITH the intention of erecting a number of low-cost houses in the suburbs of Toronto, the Ontario Government, early in July, announced a competition open to architects in Ontario for the purpose of securing designs for two minimum cost houses, one of which was to provide accommodation for a family of five, and the other for a family of eight.

The co-operation of the Ontario Association of Architects was sought by the Government in drafting the conditions for the competition, and these were prepared by the Association's Committee on Competitions.

The conditions were as follows:

CLASS "A" COMPETITION
(For a Family of Five)

1. The lot upon which the house is to be erected is assumed to be a level inside lot with a minimum frontage for each house of 30′ 0″ but with an allowance off of 5′ 0″ for a mutual driveway leading to a garage located at the rear of the house. The depth of the lot is assumed to be 100′ 0″.
2. The house shall be designed to meet the requirements of a family of five and shall contain: Living room, dinette, kitchen, three bedrooms each with clothes closet, bath room, and a generous closet on the ground floor.
3. Having in mind the low cost feature of these proposed houses, it is suggested that the designs should permit of the house being built either as a detached or a semi-detached house.
4. A small verandah shall be provided.
5. The total actual cubic contents of the house, including verandah, must not exceed 11,400 cubic feet. The verandah shall be figured at ⅓ its actual cubage.

CLASS "B" COMPETITION
(For a Family of Eight)

1. The lot upon which the house is to be erected is assumed to be a level inside lot with a minimum frontage for each house of 30′ 0″ but with an allowance off of 5′ 0″ for a mutual driveway leading to a garage located at the rear of the house. The depth of the lot is assumed to be 100′ 0″.
2. The house shall be designed to meet the requirements of a family of eight and shall contain: Living room, dining room, kitchen, four bed rooms each with clothes closet, bath room, and a generous closet on the ground floor.
3. A small verandah shall be included.
4. The total actual cubic contents of the house, including verandah, must not exceed 13,500 cubic feet. The verandah shall be figured at ⅓ its actual cubage.

No restrictions are placed upon the designer as to the style of design or type of construction.

Actual cubic contents shall mean the actual space enclosed within the outer surfaces of the outside walls and contained between the outside of the roof and the bottom of the basement floor slab. Dormers, bay windows, etc., shall be included at full cubage.

Unexcavated portions, footings, outside steps, etc., shall not be included in the actual cubage, but where unexcavated portions occur, the cubage shall be taken from the underside of the floor joists or concrete slab.

Should a flat roofed design be submitted, the height for purposes of cube shall be taken from the bottom of the basement floor slab to the top of the parapet walls.

The house is intended to be a minimum cost house. It is essential, therefore, that both plan arrangement and exterior design be plain and without costly ornamentation. Special consideration will be given to the designs embodying these principles.

Competitors were required to show the location of the house upon the property, together with suggested landscaping. The question of orientation was left to the discretion of the designer. A schedule of the cubage and the method of calculation used was also required.

The following were minimum standards required:

ROOM DIMENSIONS

(a) Living room: 150 sq. ft. with a minimum width of 10′ 0″
(b) Dinette: 80 sq. ft.
(c) Dining room: 100 sq. ft.
(d) Kitchen: 80 sq. ft.
(e) Verandah: 60 sq. ft.
(f) At least one bed room in each house: 120 sq. ft.
(g) Single bed room: 80 sq. ft. minimum width of 7′ 6″
(h) Double bed rooms: 100 sq. ft. minimum width 8′ 0″
(i) All bed rooms to have clothes closet: 4 sq. ft.

CLEAR STOREY HEIGHTS

(a) Basement: 6′ 6″
(b) First floors: 7′ 6″
(c) Second floor: 7′ 6″

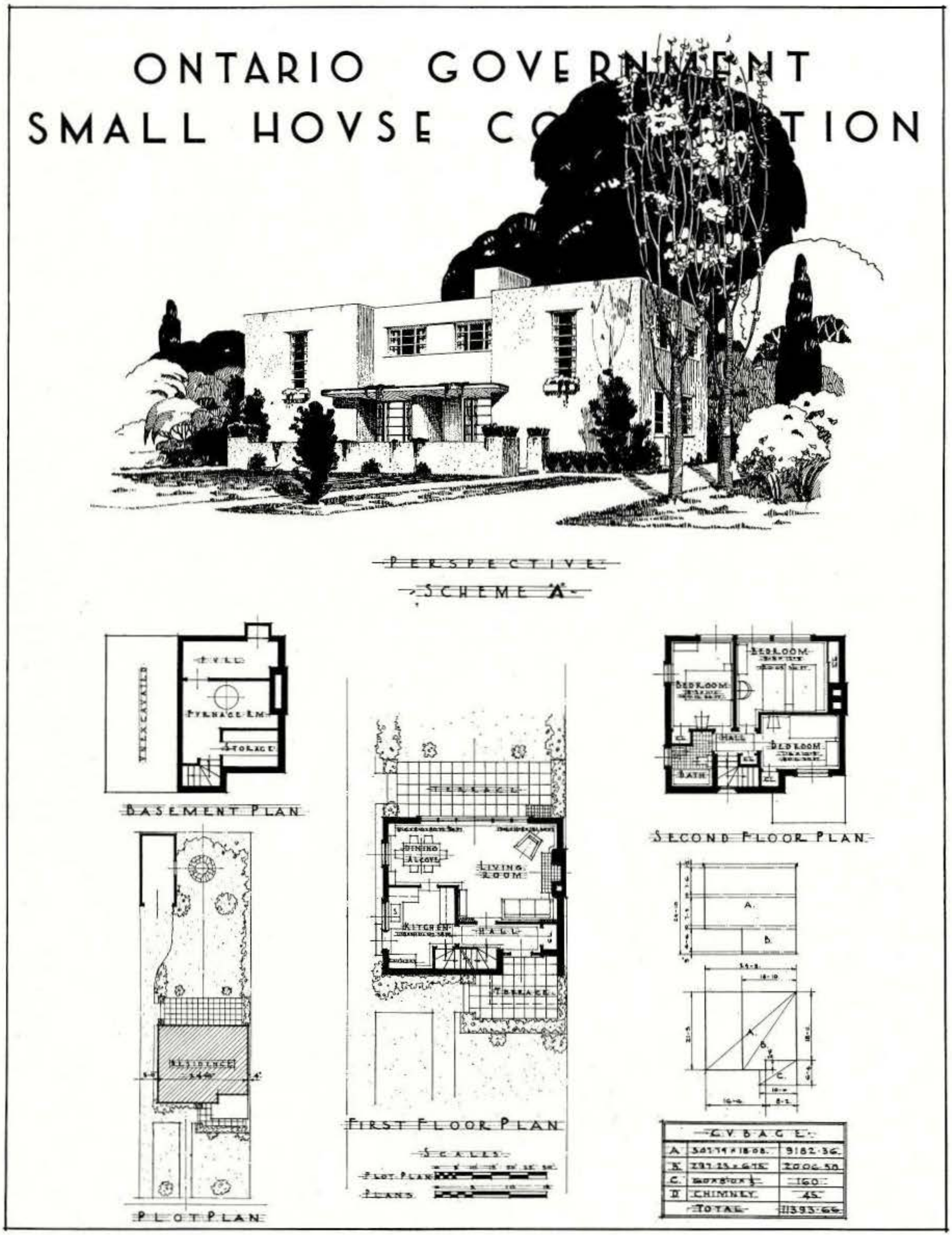
Where sloping ceilings occur, the minimum ceiling height of 7′ 6″ shall apply to at least 50% of the area of the room, the remainder at a minimum of 5′ 0″.

Contestants were permitted to enter as many designs as they desired and were required to send in their drawings without any mark or identification thereon or on the wrapper enclosing the drawings.

The prizes offered were as follows:

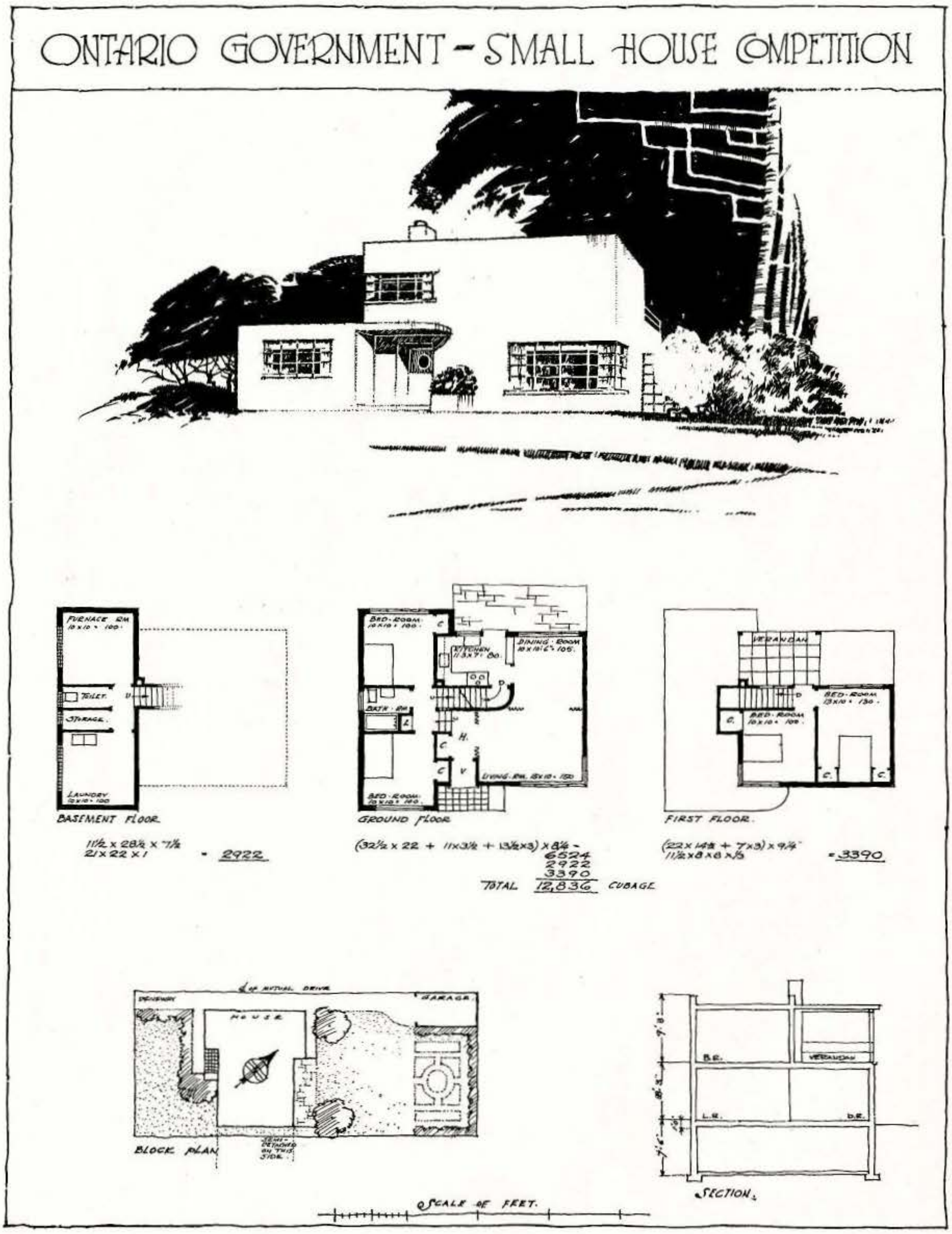
CLASS "A"	CLASS "B"
1st prize—$250.00	1st prize—$250.00
2nd prize—$150.00	2nd prize—$150.00
3rd prize—$100.00	3rd prize—$100.00

The competition closed on July 27th, 1936, and the designs submitted were judged in Toronto by a jury consisting of Murray Brown, president of the Ontario Association of Architects, Professor H. H. Madill and Professor E. R. Arthur of the University of Toronto. The report of the jury, which was addressed to the Hon. David A. Croll, Minister of Public Welfare and Municipal Affairs, read as follows:



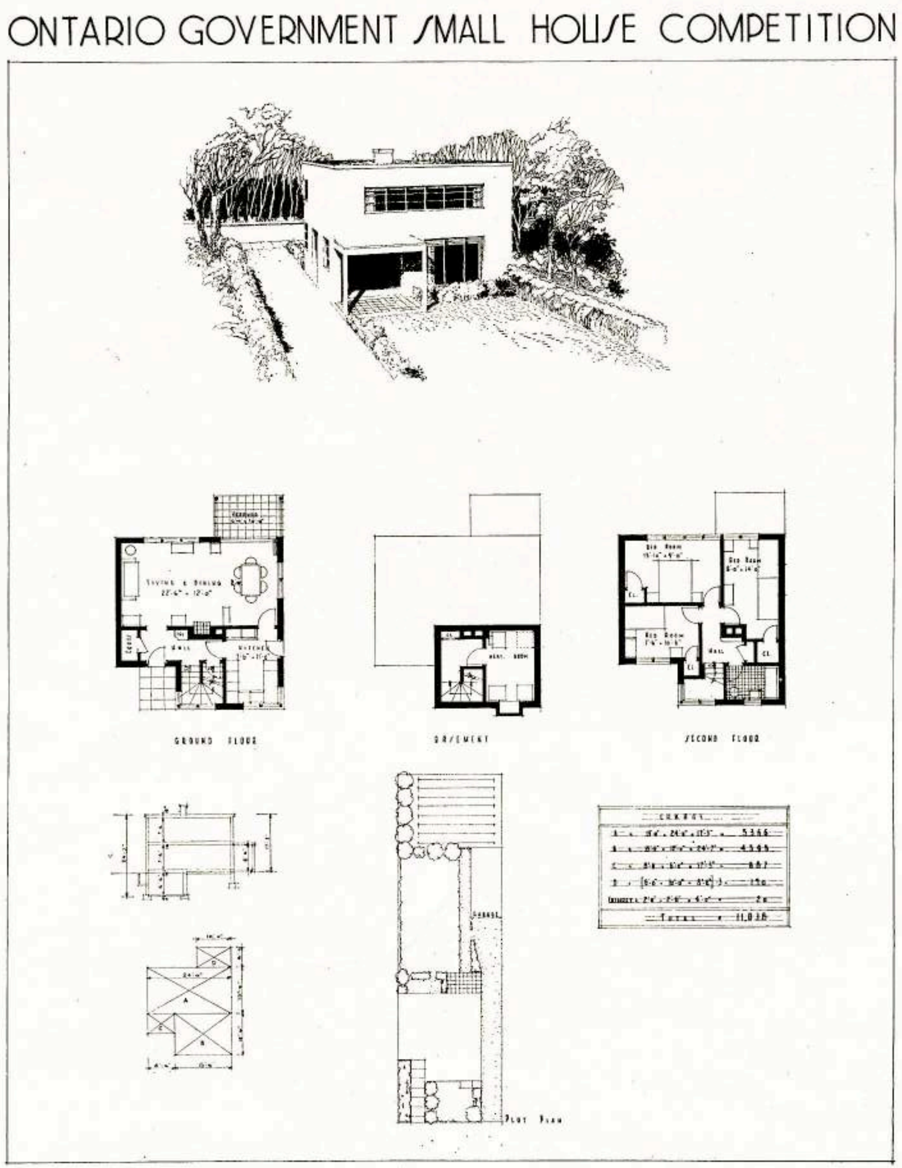
FIRST PRIZE—CLASS A

Harold C. Greensides, M.R.A.I.C., Toronto



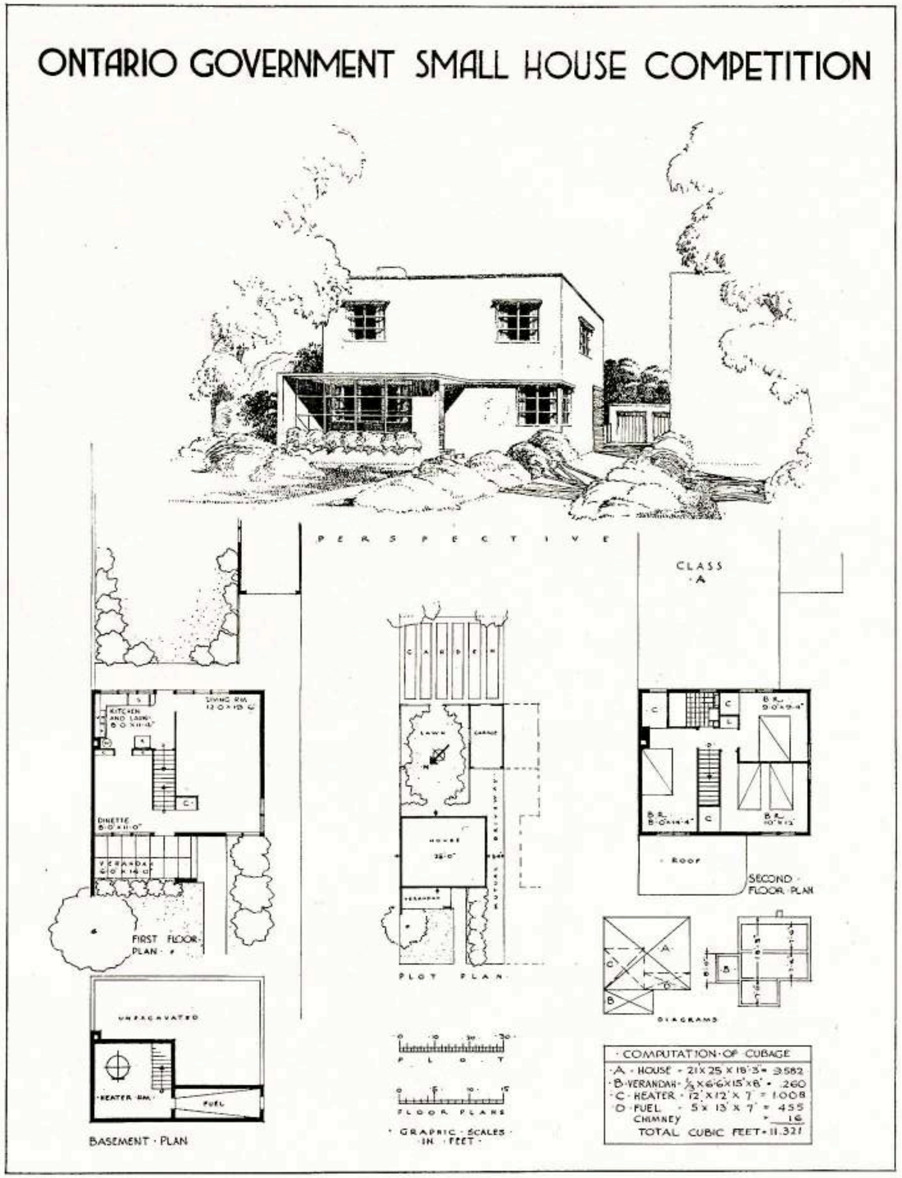
FIRST PRIZE—CLASS B

W. Ralston, M.R.A.I.C., Toronto



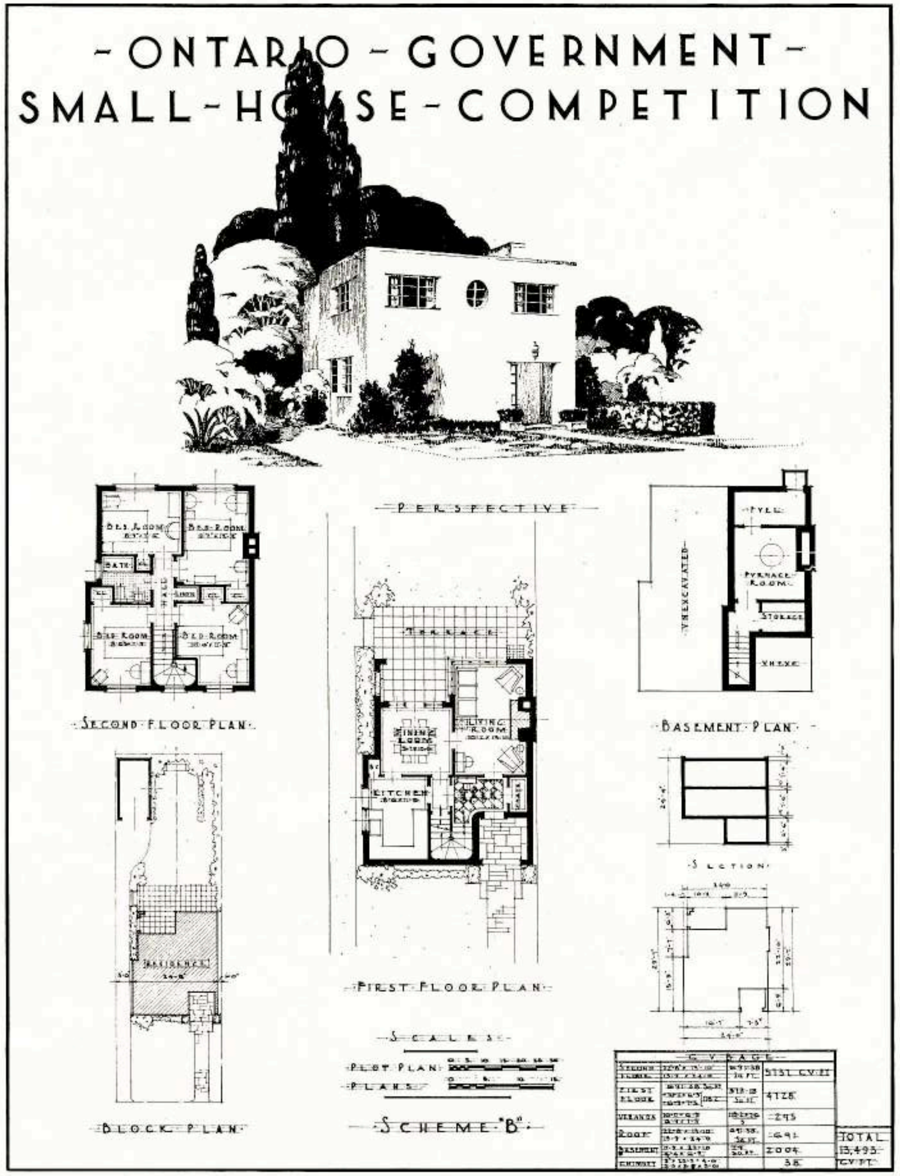
SECOND PRIZE—CLASS A

George K. Pokorny, M.R.A.I.C., Toronto



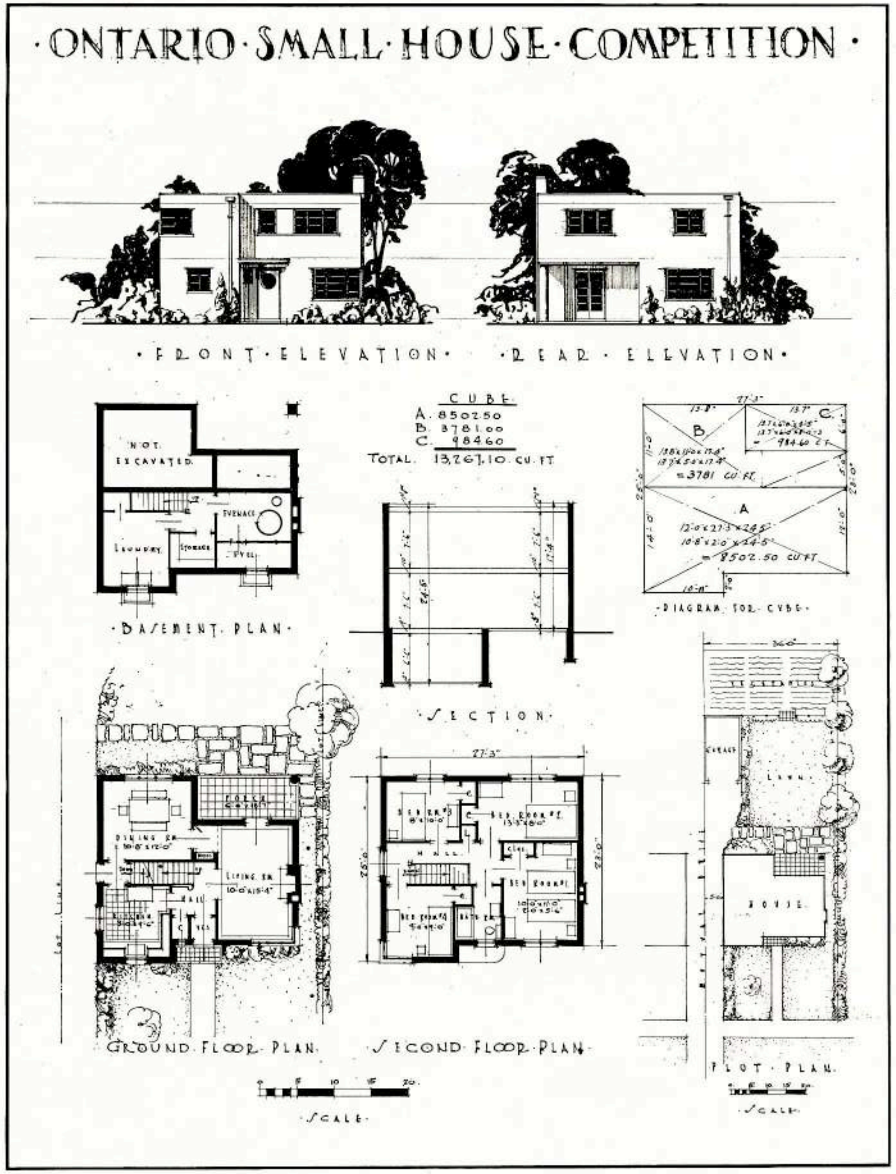
THIRD PRIZE—CLASS A

W. J. Abra, M.R.A.I.C., Ottawa



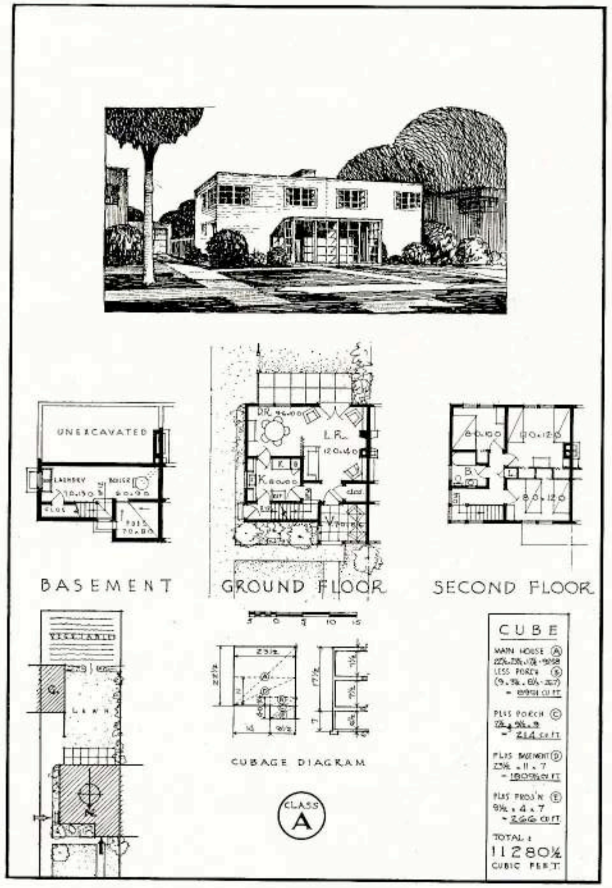
SECOND PRIZE—CLASS B

Harold C. Greensides, M.R.A.I.C., Toronto

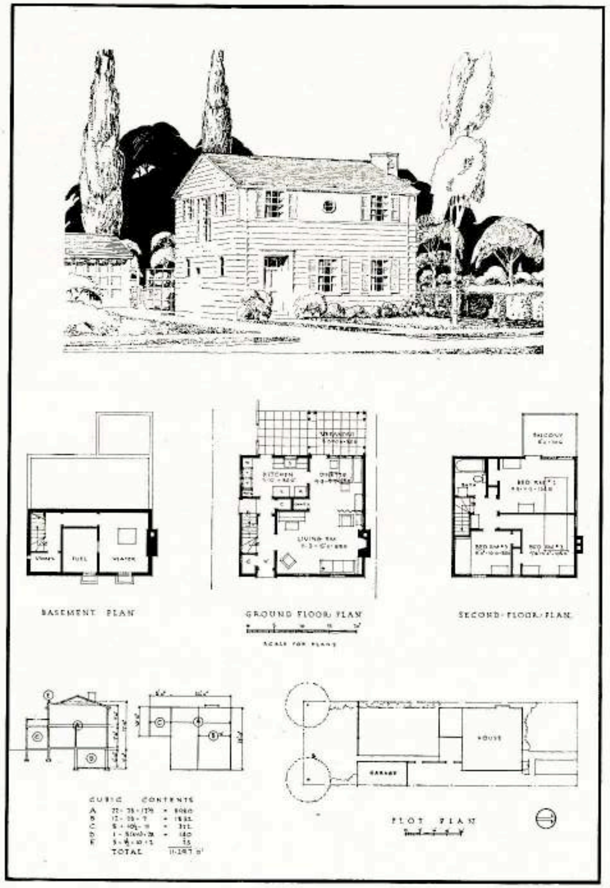


THIRD PRIZE—CLASS B

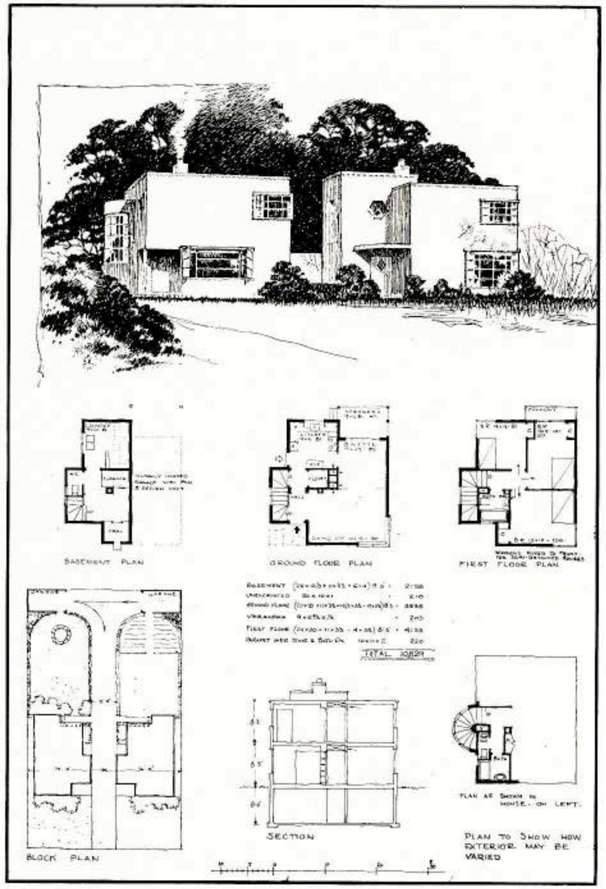
James H. Haffa, M.R.A.I.C., Toronto



COMMENDED DESIGN—CLASS A
Wilkes & Fisher, M.M.R.A.I.C., Toronto



COMMENDED DESIGN—CLASS A
W. A. Mollard, M.R.A.I.C., Toronto



COMMENDED DESIGN—CLASS A
W. Ralston, M.R.A.I.C., Toronto

REPORT OF THE JURY OF AWARD

The Ontario Government Housing Competition produced 109 drawings from architects in Ontario in the two classes, as follows:

Class A, for a family of 5, produced 76 designs.

Class B, for a family of 8, produced 33 designs.

In making their award, the judges gave marks under the following heads:

1. *Plan*. Under this head, weight was given to such considerations as convenience of working, livability, ease of circulation, etc.
2. *Elevation*. Under this head, the judges looked for a pleasing exterior, with adequate light, regardless of architectural style.
3. *Structural simplicity*. It was felt that winning designs should be ones which would not limit the government to any one type of construction. Any scheme that was designed primarily for reinforced concrete or had too many set-backs or projections would suffer under this head.
4. *Possibility of being used as a semi-detached house*. A relatively low mark was given here, as this was not an absolute requirement. In the opinion of the judges, most of the designs would look better if doubled, and the cost of building would also be reduced.

On the whole, Class "A" produced the greatest variety of design and the best solutions. Most competitors realized the character of the houses they were expected to design and needless doors and partitions were eliminated. No great criticism was made of houses where ashes were brought through the kitchen from the basement stairs. Ingenuity of stair planning, rather than comfort, was noticeable in most designs, and the lighting of basement stairs was frequently ignored. The judges felt that, while all the winning designs except one (taking both classes) have winders in the stair, often at both ends, making it dangerous for old people and children and inconvenient for the handling of large furniture, the designs had sufficient interest and merit in all other considerations to warrant the awards. The judges were aware of the difficulty of designing stairs in so restricted an area without resorting to winders except in exceptional circumstances.

A striking feature, in contrast to previous housing in Ontario, is the predominance of the flat roof. Of the 20 designs examined for final consideration, only five had pitched or sloping roofs. It would be safe to say that this proportion (25%) would hold for the whole competition.

The judges attached no structural importance to the design of the roof, whether flat or pitched, but are satisfied that, properly insulated, the flat roof is as efficient and as lasting as any other type.

The competitors are to be congratulated on the general competence of the designs submitted and the accuracy of dimensions and cubage.

The following were the awards made:

Class A

1st Prize—No. 71—Harold C. Greensides, Toronto
2nd Prize—No. 30—George K. Pokorny, Toronto
3rd Prize—No. 17—W. J. Abra, Ottawa

Commended Designs:

No. 56—Wilkes & Fisher, Toronto
No. 78—William A. Mollard, Toronto
No. 79—Wm. Ralston, Toronto

Class B

1st Prize—No. 20—Wm. Ralston, Toronto
2nd Prize—No. 71/2—H. C. Greensides, Toronto
3rd Prize—No. 29/2—Jas. H. Haffa, Toronto

JURY'S COMMENTS ON THE PRIZE WINNING DESIGNS

Class A

No. 71 (Harold C. Greensides) is very compact, with a sense of spaciousness in living room and dining room. The bedroom floor is designed with a minimum of hall space and the bath is placed over the kitchen, with an economy in plumbing.

No. 30 (George K. Pokorny) has combined living room and dining room overlooking the garden at the rear. Light is obtained on two sides. The design has a cube of only 11,038 cubic feet.

No. 17. (W. J. Abra) This plan has the advantage of the straight stair without winders. It has a good living room and separate dining room and the whole plan is contained in a simple rectangle.

Class B

No. 20. (Wm. Ralston). This competitor shows an original and interesting plan, showing great convenience in arrangement. The judges are aware that, while this house has a low cube of 12,836 cubic feet (allowable cube—13,500), the greater perimeter would tend to make this house more expensive than the simple block.

No. 71/2. (Harold C. Greensides). This competitor has a very workable plan, but would improve his scheme by the omission of the partition between living room and dining room. His circular window on the main stair is high and his basement stair is without light.

No. 29/2. (James H. Haffa) is a competent, but not an imaginative plan.

An interesting point in connection with the Ontario Government Competition was the way in which the status of the architect was recognized by making provision for proper remuneration for his services in case his designs were used.

ACOUSTICAL DESIGN IN ARCHITECTURE

BY D. G. McKINSTRY, M.R.A.I.C.
ENGINEERING STAFF, CANADIAN RADIO BROADCASTING COMMISSION

NO SCIENCE allied to architecture has been neglected by the architects as has the science of acoustics. This was not entirely the fault of the architects, as most of the published data, until quite recently, was theoretical, with few practical simple applications. Also, until quite recently, materials advertised as having certain definite acoustical value, from a sound correction standpoint, were few, and hardly suited structurally or aesthetically to incorporate in a practical design. With reliable acoustical data now available on many new materials that are readily adapted to modern building design, and with increasing demand for proper acoustical treatment and soundproofing in modern buildings, this subject can no longer be overlooked, and for the busy architect who does not want to spend the time to study this science thoroughly, but who wants a quick method of determining the amount and type of acoustical material necessary to obtain a predetermined result, the following may prove useful:

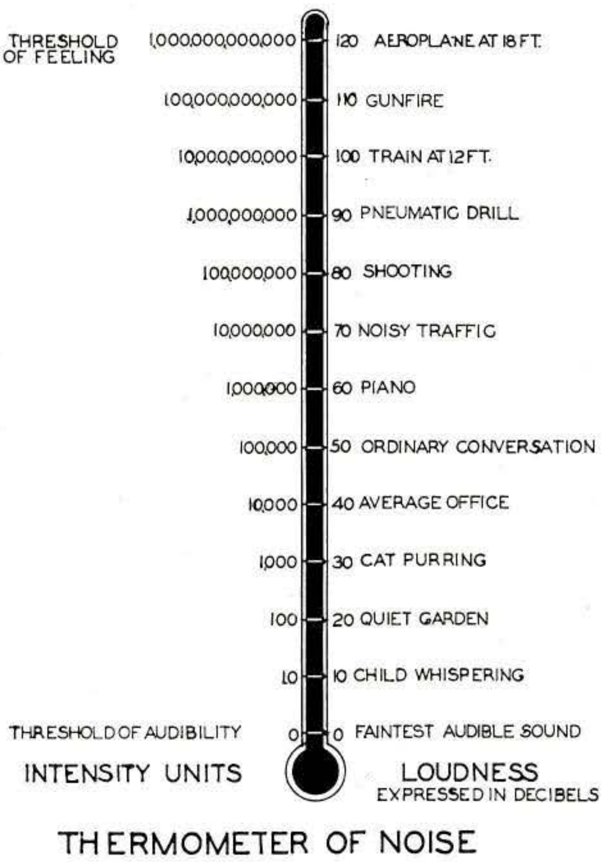


FIGURE 1

Thermometer of noise showing a comparison between intensity units, decibels and common noises.

Acoustics as applied to the average architectural problem can be simplified under two general headings—sound isolation, that is, the control of sound vibrations which are mechanically transmitted by direct physical contact through the building structure, and reverberation control which is control of the time taken for a given sound in a room to decay to inaudibility.

THE DECIBEL

As a "yard stick" in comparing different values of sound intensity, a unit devised by Bell Telephone transmission engineers is used. This unit is called a bel, and one-tenth of this unit, or a decibel, is commonly used in practice. A bel is a logarithmic expression of ratios of two powers, and is simply a convenient method of showing a comparison between their relative values.

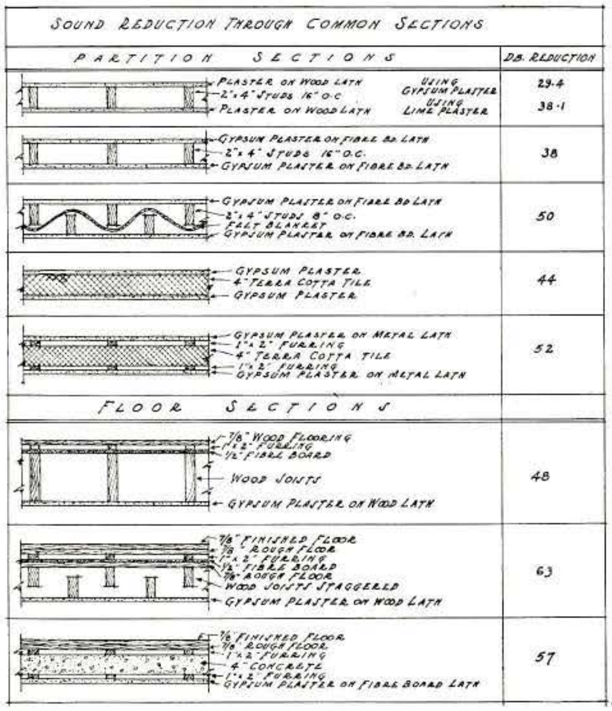


FIGURE 2

Sound reductions in decibels through common building sections.

SOUND INSULATION

The sound insulation values of building sections, except in the case of heavy masonry sections, cannot be satisfactorily determined mathematically, and sound reduction through floors or partitions should be found by building the desired section and having it measured in a sound laboratory. The National Research Council has a laboratory in Ottawa where these measurements can be made.

The sections shown in figure 2 have been measured at a sound laboratory, and the reduction required will determine the most desirable section for a particular application. With an attenuation of 40 decibels through a panel, ordinary conversation can be readily heard. With an attenuation of between 40 and 50 decibels, conversation can be heard but is not intelligible. With an attenuation of between 50 and 60 decibels, conversation is just audible in a quiet room. With an attenuation of over 60 decibels, shouting can just be heard.

In designing a soundproof partition the following general characteristics should be observed. The whole section should be non-homogeneous and contain inert air cells. One or more air gaps should be provided. There should be a layer of insulating material, such as eel grass quilt or felt, and the room surface of the partition should have a sound absorbing surface.

The floors are usually of heavier construction and should have other characteristics. The floor should be of "floating" construction and isolated from walls or partitions.

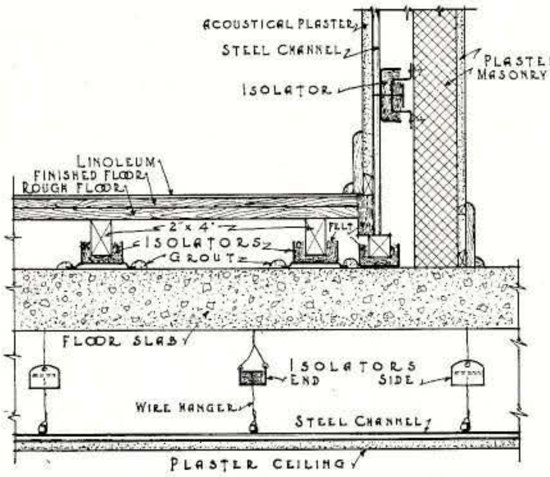


FIGURE 3

Typical section showing one method of floating floors, isolating partition and suspending ceiling.

A material of non-homogeneous nature should be provided between floor covering and floor proper. The floor proper should be of massive or rigid construction, such as concrete, and the ceiling of the room below should be suspended.

ISOLATING NOISES

Other noises may enter a room, such as machine noises and noises through a ventilating system. With machine noises the most satisfactory method is to stop the noise at the source by mounting the machine on a base isolated from the main structure. With noises coming through a ventilating system, either from the fan or from other rooms, the system used by the Canadian Radio Broadcasting Commission has proved very satisfactory. The fans, motors, etc., are mounted on an isolating base. The fan is isolated from the ducts by means of a canvas section. The ducts are constructed of fibre board and lined with Rockwool at the fan end for 16 feet, in both the supply and return ducts. At the fan end the ducts are divided into segments to supply more surface for absorption.

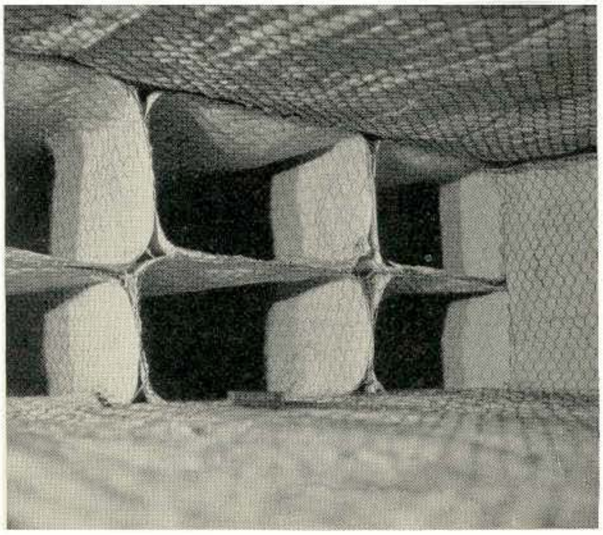


FIGURE 4

Section through air conditioning duct showing construction used by the Canadian Radio Broadcasting Commission to prevent sound transmission through duct.

REVERBERATION TIME

Reverberation time is the rate of time taken for a tone to decay to one millionth of its original intensity, or 60 decibels (10 Log 10^6). The rate of decay varies, high and low tones decaying more rapidly than the middle tones. For this reason in designing rooms to be used for music, it is advisable to figure the reverberation time at frequencies from 128 cycles to 4096 cycles, and design the acoustical correction, so that it approaches the optimum time (shown in figure 5) at all frequencies.

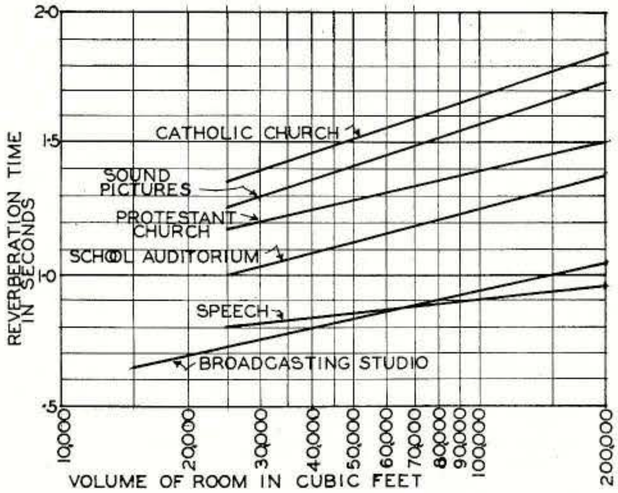


FIGURE 5

Optimum reverberation time for rooms used for various purposes.

METHOD OF DETERMINING THE AMOUNT OF ACOUSTICAL CORRECTION NECESSARY

To find the amount of acoustical correction required to give a desired reverberation time, the following procedure is simple and satisfactory for rectangular rooms without balconies, etc.:

(a) Determine the optimum time for the room from curve. (Figure 5).

(b) Determine the total surface area of the room, i.e., floor, walls and ceiling in square feet.

(c) Determine the number of O.W.U.'s (open window units) necessary to obtain the desired reverberation time. An open window unit is the customary way of expressing a square foot of surface from which there is no reflection of sound, or which has 100 per cent. absorption. Recently the term "Sabine" has been substituted for O.W.U.:

i.e.:

(1) Take a rectangular room of 30,000 cubic feet, or 20′ x 30′ x 50′.

(2) From figure 5 optimum time is 1.25 seconds.

(3) Surface area of room is 6,200 square feet.

(4) $-\text{Loge}\ (1 - a) = X$.

(5) Formula $\dfrac{.05 \times \text{Volume}}{\text{total surface} \times -\text{Loge}\ (1 - a)} =$ Time in seconds.

(6) Formula applied to this case.

$$1.25 \text{ seconds} - \frac{.05 \times 30{,}000}{6{,}200 \times -\text{Loge}\ (1 - a)} = \frac{.24}{-\text{Loge}\ 1 - a}$$

$$\text{or } -\text{Loge}\ (1 - a) = \frac{.24}{1.25} = .19$$

(7) From table figure 6 prepared from formula developed by Dr. Carl Eyring find a or average unit absorption for value of .19 of $-\text{Loge}\ (1 - a)$; in this case it is approximately .173.

(8) Total O.W.U's required to give time of 1.25 seconds in the room is, therefore, $.173 \times 6{,}200 =$ 1,072.6.

(9) Supposing the floor area, or 1,500 square feet, is covered with linoleum which has an absorption coefficient of .03, then the number of units used up on floor will be $1{,}500 \times .03 = 45$.

(10) This leaves 1,072.6 minus 45 = 1,027.6 units which must be absorbed by the walls and ceiling.

(11) The same procedure as was used for the floor is used for the walls and ceiling, adjustments being made by changing the type or quantity of absorbent materials if the total number of units is greater or less than is required, that is, supposing the walls and ceiling were covered with Rockwool, which has a coefficient of .65 at 512 cycles, the area covered is 4,700 square feet, so the absorption is $.65 \times 4{,}700 = 3{,}055$ O.W.U's, which is much more absorption than required; so a material such as acoustical plaster with a coefficient of .3 at 512 cycles is tried. This gives $4{,}700 \times .25 = 1{,}175$ O.W.U's, which comes very close to the desired number of 1,027.6 O.W.U's required, and would be used in this case if a plaster surface is satisfactory.

VALUES OF a FOR DIFFERENT VALUES OF $-\text{Loge}\ (1 - a)$

$-\text{loge}\ (1 - a)$	a	$-\text{loge}\ (1 - a)$	a
0.010	0.010	0.260	0.229
.020	.020	.270	.237
.030	.030	.280	.244
.040	.039	.290	.252
.050	.049	.300	.259
.060	.058	.310	.267
.070	.068	.320	.274
.080	.077	.330	.281
.090	.086	.340	.288
.100	.095	.350	.295
.110	.104	.360	.302
.120	.113	.370	.309
.130	.122	.380	.316
.140	.131	.390	.323
.150	.139	.400	.330
.160	.148	.410	.336
.170	.156	.420	.343
.180	.165	.430	.349
.190	.173	.440	.356
.200	.181	.450	.362
.210	.189	.460	.369
.220	.197	.470	.375
.230	.205	.480	.381
.240	.213	.490	.387
.250	.221	.500	.393

FIGURE 6

Table showing the relation of a to $-\text{Loge}\ (1 - a)$.

It will be seen that this method is much more practical, from a designer's point of view, than the conventional method. In the conventional method the room is designed, and a tentative amount of absorbent material included. This is tried by formula, and if the resultant reverberation time is too long or short, more or less absorbent material is placed in the room, and again tried by formula. This is repeated until the amount of absorption in the room gives the desired time.

SELECTING MATERIAL

Selecting the proper sound absorbing material for a particular application and placing it in the proper place in a room varies according to the results desired. In an office a material having a low coefficient of absorption used on all walls and ceiling, would be preferred to a material having a much higher coefficient but used only on the ceiling, although from the formula the reverberation time is the same in both cases.

In radio broadcasting studios materials are often placed so that most of the absorption is at one end

FIGURE 7

Corner of Canadian Radio Broadcasting Commission Studio showing rockwool ceiling and acoustical plaster walls combined to obtain acoustics and appearance.

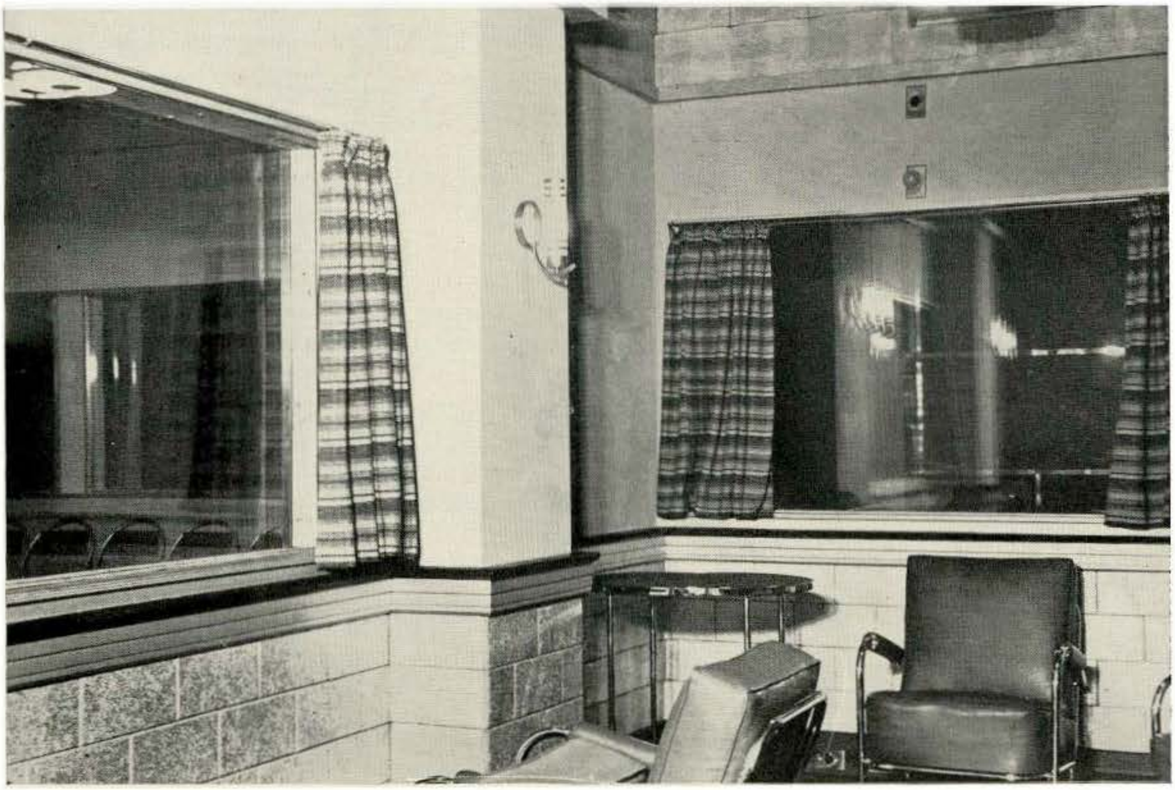


FIGURE 8

Corner of Canadian Radio Broadcasting Commission Studio showing acoustex dado, acoustical plaster walls and fibre board above plate rail for acoustics and appearance.

of the studio where the microphone is located, so that the back wall acts as a sounding board, and the microphone receives plenty of direct sound but very little reflected sound from the dead end of the room.

The appearance and absorption coefficients of a material will determine its suitability for a particular design. Usually a combination of materials is most satisfactory, both from an acoustical point of view and a design point of view, than one type of material used throughout.

CHARACTERISTICS OF MATERIALS

Sound absorbing materials of a particular nature usually have common absorption peculiarities, that is, acoustical plasters have very little absorption at the low frequencies, and a great deal of absorption at the high frequencies. Loose materials, such as Rockwool or Asbestos, have a higher coefficient at the low frequencies, and the coefficients at the higher frequencies are slightly greater. Porous materials, such as fibre board, if cemented to a solid wall, usually follow the curve of plasters, but if nailed to furring strips the characteristics change entirely. The change is caused by absorption through panel resonance, and depends on the centering of the furring. Plaster to a much less degree exhibits the same characteristics if on furring.

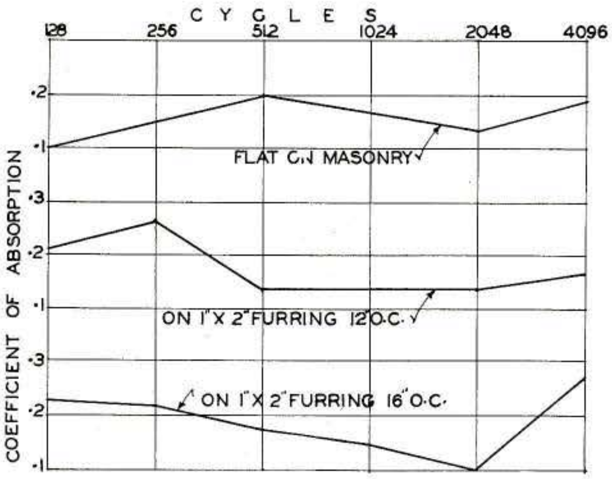


FIGURE 9

Changes in the absorption characteristics of ½" fibre board effected by changing the centering of the supporting furring.

CORRECTING POOR ACOUSTICS

When designing a room or investigating the cause of poor acoustics in a room, the architect should make special note of the following, which are the usual causes of poor acoustics:

(1) If the ceiling of a room is curved, the sound will be inclined to focus at one point and leave dead spots in other parts of the room. Rooms for music should never be designed with curved ceilings, but if the ceiling is already in place and it is desired to correct this condition, the most satisfactory method is to cover the ceiling with highly absorbent material.

(2) If there is an echo in a room, it can usually be corrected by placing absorbent material on distant surfaces and making breaks in projections in the walls and ceiling, such as pilasters and beams.

(3) Insufficient sound in an auditorium can be corrected by building a reflecting surface of such materials as plaster or wood behind the source of sound. In large auditoriums this is not usually sufficient, and a public address system should be installed.

(4) Distortion is usually caused by a poorly designed soundboard. A soundboard should be designed with the battons spaced at irregular intervals.

(5) Masking sound, that is, sound other than that to which the attention is directed, can usually be corrected by having the doors and windows well fitted, the ventilating system insulated and enclosing partitions with an insulating value of 50 db.

MEASUREMENTS

The National Research Council recently built a modern sound laboratory at Ottawa, so that it is now possible for Canadian architects to have materials measured for sound absorption, or sections measured for sound transmission. It is a good practice and one which the Canadian Radio Broadcasting Commission (one of the largest users of acoustical materials in Canada) follows, to state in the specification that all acoustical data and analysis must be based on results of tests carried out in the laboratories of the National Research Council at Ottawa, on sample sections, in the case of sound insulation or isolation, or on sample areas of a particular sound absorbing material, in the case of sound correction.

DEPARTMENT OF ART, SCIENCE AND RESEARCH

CONDUCTED BY B. EVAN PARRY, F.R.A.I.C.

BUILDING SCIENCE QUESTIONS AND ANSWERS

PLASTERING ON SAND-LIME BRICKS

During the past few years the production of sand-lime bricks has markedly increased in this country and, as a reflection of this growth in production, an increasing number of inquiries is being received relating to various properties of the bricks. One type of question often raised refers to the suitability of the bricks for plastering, and frequently reference is made to a prevalent opinion that the bricks offer special difficulties. It is thought that some of the objections which have been raised are due to a natural hesitation on the part of operatives, when faced with an unfamiliar backing.

REPLY:—

The effective adhesion of a plaster to a surface depends mainly on two factors, viz.: "true adhesion" to the surface and the mechanical key provided by rough pores, undercut scoring, joints, etc.

The adhesion due to mechanical key is, of course, important over lathing, but over solid surfaces it is seldom effective. This is due to the fact that, unless a portion of the plaster penetrates deep cavities in the surface and interlocks with the material, a definite mechanical key is not formed (*i.e.*, undercutting is essential).

Raked joints in a brick wall act to some extent as a mechanical key, though they are not very effective in this particular respect since they are not undercut appreciably. Benefit is, however, derived from raked joints, probably chiefly in distributing shrinkage stresses uniformly and so reducing the tendency to the formation of large cracks and local breakdown of adhesion.

The large pores of a rough-faced brick or a breeze partition slab may provide some key, if filled by the plaster.

A third factor which is sometimes of great importance in affecting the ultimate adhesion of a plaster is the subsequent crystallization of salts derived from the background at the wall face just behind the plaster. This effect is not manifested during the actual plastering operation, but becomes evident later, often after a long time.

In relation to plastering, sand-lime bricks differ from many clay bricks in that they have level and uniform surfaces. They probably vary in suction from make to make over a somewhat narrower range than do clay bricks; there is none so impervious as a clay engineering brick and few, if any, as porous as an underburnt clay brick. In any one make they are more uniform than the majority of clay bricks.

Owing to the uniformity of the bricks, the joints with sand-lime bricks are often narrower, better filled and finished off closer to the surface than with many clay bricks. The fact that normal sand-lime brickwork is frequently considered sufficiently good to stand without plaster work in corridors, staircases, etc., illustrates this general uniformity. Because of this uniformity, comparatively little mechanical key can be expected on a surface of sand-lime bricks.

Good adhesion of plaster is secured under conditions, such that (1) the material of the bricks is easily wetted by the plaster, (2) the plaster comes into the most intimate contact with every portion of the surface, and (3) the suction is sufficient to secure effective contact of brick and plaster, but not so great as to withdraw the moisture from the plaster and so leave a semi-dry layer next to the brick surface.

One reason why a somewhat porous surface texture is preferable to one that is glazed, is that the former not only increases the effective area of adhesion but provides what may be regarded as a large number of minute undercut mechanical keys, if the plaster makes really intimate contact without being unduly dried out.

There is no doubt that the surface of a sand-lime brick is as readily "wetted" by plaster as any burnt clay, and more easily than certain glazed surfaces.

The suction of a sand-lime brick, as stated above, is in general comparable with that of average clay building bricks. A brick must not be too "thirsty" or it will dry out the plaster unduly; nor must it be too wet or of too low a suction, for a moderate degree of suction is, as stated above, a great aid in ensuring effective contact between the brick and plaster. The moderate but uniform suction over the surface of a sand-lime brick wall is favourable for obtaining a high degree of intimate contact with, and of true adhesion to, the plaster.

With regard to the risk of plaster failure due to the crystallization of soluble salts, it can be stated that, as a class, sand-lime bricks rarely contain more than traces of such salts.

The absence of these salts is also beneficial if the plaster is to be decorated immediately with oil paint. Building Research Bulletin No. 11, "The Effect of Building Materials on Paint Films," published by H.M. Stationery Office, London, 1934, price 3d. net, deals with this problem.

In general it may be stated that there is no evidence that the bricks are in fact difficult to plaster or that there is any special liability to subsequent failure of plaster.

Moreover, experience with sand-lime bricks in countries where they have been in general use for a long period affords no indication of difficulties in this connection.

It appears desirable to emphasize that the remarks with respect to plastering on sand-lime bricks only apply to products of good quality. The British Standard Specification No. 187—1934 (which may be obtained from The British Standards Institution, 28 Victoria Street, S.W. 1, price 2s. 2d., post free) provides users with a means of ensuring the supply of good quality bricks.

For information on the general characteristics of sand-lime bricks, reference may be made to Building Research Special Report No. 21, "Sand-Lime Bricks," which may be obtained from H.M. Stationery Office, price 1s. 3d. net.

SANS ROOF: SANS ARCHITECT—*Continued from page 149*

and one which we can recommend to all sound business men; though in England the system is already so well established that it hardly needs further encouragement.

Yet, somehow, something ought to be done to preserve such a body of men who can show the builders and the public how money can be saved. And, considering that they have saved the whole cost of a roof, could we not give a small proportion of the money saved to them as fees, and thus buy their personal services? The problem is how to preserve this species of money-savers and yet at the same time avoid paying their fees. Damn it all, man! They've got to live somehow—even though they are only a sort of artists.

F. E. T.

NOTES

Dr. John A. Pearson, F.R.A.I.C., of Toronto, left on August 14th, for a visit to England and France. Dr. Pearson expects to return to Toronto about the middle of October.

* * * *

Percy Edward Thomas, F.R.I.B.A., was re-elected president of the Royal Institute of British Architects at the annual meeting of that body held on June 22nd, 1936.

* * * *

Robert H. Macdonald, F.R.A.I.C., of Montreal, addressed a meeting of the Chamber of Commerce in London, Ontario, on July 24th, on the subject of Building Societies.

* * * *

Dr. Ernest I. Barott, F.R.A.I.C., of Montreal, left on August 1st for a visit to Europe. Dr. Barott expects to return to Montreal early in September.

* * * *

In the recent birthday honours list of His Majesty King Edward VIII, a knighthood was conferred on Guy Dawber of London, England, past president of the Royal Institute of British Architects.

* * * *

Peter L. Cleveland, son of the late C. Barry Cleveland of the firm of Darling, Pearson and Cleveland, architects, Toronto, who has been studying in London, England, at the Architectural Association School of Architecture for the past two years, has been awarded the Houston Maintenance Scholarship given by the Royal Institute of British Architects for the session 1936-37. He will continue his studies in London at the same school for another two years.

* * * *

The Ontario Association of Architects has made arrangements for another series of radio talks on architectural subjects. These broadcasts, which will be under the joint auspices of the Association and the Department of University Extension, University of Toronto, will be given over station CRCT Toronto, during the months of October and November.

Seven architects were arrested following the collapse of a grandstand at Bucharest, Roumania, when some twenty-five people were killed and over four hundred injured. An eighth architect committed suicide before the police arrived.

* * * *

Of interest to the architectural profession is the following excerpt from a memorandum issued recently by the Dominion Fire Prevention Association:

"Not to be ignored in the volume of the dwelling loss is the flimsy character of practically all speculative building. Private operators, financial institutions and building contractors, actuated by reasons far from philanthropic, have undertaken the construction of dwellings which were sold on the down payment of a small sum, the balance to be met as rent over a term of years. The purchaser usually did not know a joist from a lath, nor wish particularly to learn. So long as the colour of the paint, the plan of the breakfast nook and five dollars worth of shrubs planted around the entrance pleased the lady of the house, Mr. Purchaser signed on the dotted line. The story is very familiar. After a few years, the rains descended, nor did they stop at the roof. Moisture came up through the cellar floor, corroding the furnace and working general havoc in the basement. Soon the house began to settle and deep gashes opened in the plaster. Eventually the house reverted to the mortgagees and went on the market a second, third and fourth time until in the end the Canadian public through the insurance companies, became the purchaser."

* * * *

CORRECTION

In the announcement which appeared in the July issue of THE JOURNAL of Mr. Percy E. Nobbs' new book on Design, the price was incorrectly given as $9.50. The price of Mr. Nobbs' book is $6.25, and orders may be sent to the office of THE JOURNAL.

OBITUARY

A. M. CALDERON, F.R.A.I.C.

Captain Alfred Marigon Calderon, well known architect of Edmonton and distinguished veteran of the Grear War, died on July 18th, in Victoria, B.C., after an illness of six months. He was seventy-five years old at the time of his death.

Captain Calderon was born in London, England, in 1861, the son of Phillip Calderon, a member of the Royal Academy. He came to Canada as a young man and practised for a time in Ottawa where he married Miss Helen May Bate in 1896.

Practically the first work he did after completing his articles was the designing of the late Alma Tameda's residence in London. After the death of the owner, this residence was purchased by public subscription and presented to the Nation because of its beauty and unusual design. Among Captain Calderon's better known architectural achievements in Edmonton are the Rene Le Marchand Apartments, and the Edmonton Club.

Captain Calderon was a former president of the Alberta Association of Architects and was held in high esteem by his confreres who elected him a "Life Member" at the last annual meeting of the Association.

Prior to coming to Canada he was a member of the famous Artists' Rifles in London for more than eight years. Despite the fact that he was fifty-five years of age, he answered the call to the colours in 1916 and left for France with the First Battalion, Edmonton Regiment. He served on the Western Front with the Forty-ninth Battalion. In all, his military career covered eighteen years in the ranks and thirteen years as a commissioned officer.

Besides his wife, he is survived by two sisters and two brothers living in England.

J. B. K. FISKEN, M.R.A.I.C.

Architect, yachtsman and walking encyclopedia, Keith Fisken's death on July 20th, owing to his quiet and always cheerful disposition, makes a gap in Toronto which will be very difficult to fill.

Mr. Fisken was born in Toronto on June 20th, 1888, and was educated at Huron Street Public School, the old Trinity Church School on Alexander Street, and Trinity College at Port Hope. He graduated from the School of Science of the University of Toronto as a Bachelor of Arts.

Very early he developed the ability for drawing and design and shortly after leaving University made a trip to Europe, where he visited and sketched most of the well known cathedrals. He spent some years in the office of Darling and Pearson, following which he entered private practice at 23 Scott Street, Toronto.

He was a great yachtsman and sailed regularly at the Royal Canadian Yacht Club and in the races of the Great Lakes Racing Association.

Mr. Fisken was a member of the Ontario Association of Architects, the Canadian Club, the Royal Canadian Yacht Club and many other associations. He was a bachelor and is survived by his mother, one sister and three brothers.

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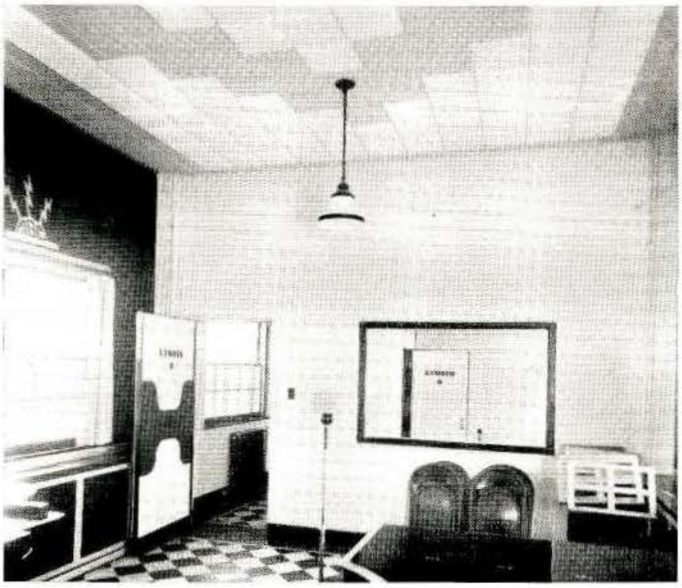

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