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CONTENTS

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JOURNAL
R. A. I. C.
APRIL 1948

THE Schools of Architecture, like architecture itself, are passing through a period of transition, and their curricula are under intensive study. Every progressive school in the past has periodically examined its courses, but we fear too often from a wholly professional point of view. Like engineering and medicine, the architectural schools were a part of a university, but were not giving what they could to the university or getting anything like what they could from it. The professional faculties must be frank to admit that in the past they have not given their students that cultural background that students enjoy in the humanities. Their students have not been encouraged to think as they are in the humanities, or to become familiar with the thinking of others. A study of the English language and English literature stopped at high school. If a graduate in any of the professional faculties showed a marked inclination for art, music or literature, it would usually be found to come from a family background, or, particularly in architecture, from the many fascinating by-paths that his profession offered. The example of brilliant teachers like Sir Charles Reilly, whose personal interests went far beyond the narrow groove of the school curriculum, doubtless influenced many hundreds of students.

IN the United States today, some engineering schools are providing as much as 10% to 25% of their courses to subjects of a purely cultural nature, and feel the sacrifice in technical subjects well worth the experiment.

THE schools are faced with two problems. There is already a tremendous load of teaching of a purely professional nature, which, with design in the afternoons, takes up a great deal of the students' time in even a five year course. The student complains, with complete justification, that he has no time for his own affairs, or the extra curricular reading he would like to do. We, in Toronto, have initiated, with doubtful success and frequent violation, a rule of three free Fridays in each term. The only answer to the problem of a proper balance between the professional courses and the humanities will come from the pruning of dead wood, unless the schools follow the example of medicine with two years as a prerequisite in the humanities alone. That, we feel safe in predicting, will be the course in architecture of the future. We should at any rate watch the medical experiment closely as it was not the result of any hasty decision.

THE other difficulty is basic. At least half the present enrolment come unprepared from school to take the kind of course we have outlined. Matriculation standards vary between provinces, but, in all, we get the impression that they are low in English. Over the years we have given the impression that an architect must be proficient in mathematics and, while that is true, we would prefer him to have some knowledge of the English language and of literature. The standard of spelling is today deplorable and, while one might reluctantly pass that by, one cannot but be alarmed at the percentage of students who seem to be completely ignorant of grammar and sentence construction. We have just read some eighty essays in which one finds words like "disassociate", "irregardless", "valuous" for valueless; pages were read in which there were no paragraphs; paragraphs that were quite incoherent, and Sir John Vanbrugh was described as "Architect, wit, dramatist and Courtesan". (Mr. Lawrence Whitler please note). The author of Vathek, and the owner of Fonthill was described, by one student, as Sir Adam Beck. The students come from nearly every province in Canada.

OUR every effort to raise the standard of education in the schools of architecture to a university level will obviously fail if students come inadequately prepared. Any scheme is doomed to failure if English literature and philosophy have to be postponed in the course till the rudiments of grammar have been taught by an already overworked staff. No doubt much of the present evidence of unpreparedness can be traced to the speed up courses in the rehabilitation schools, but inability to write English, and a lack of desire to read it, go back far beyond the recent war. An indication from the schools of architecture to Departments of Education that English is as important to the young architect as mathematics might bring the level of English up to the present high level of mathematics.

THE encouraging thing about the changes in curriculum we have mentioned is that they are not imposed from the top down, but are the results of a common front of staff and students in an attack on a problem too long delayed.

Editor

NEWER CONSTRUCTION METHODS AND MATERIALS

By JAMES GOVAN

OFFSETTING the advantages derived from the increasingly rapid and world-wide spread of information is the danger that the average individual hears and sees more and more but thinks less and less.

The results are frequently bad as regards economics, health and social welfare.

Climatic conditions, structural materials, living standards, etc., differ all over the world and must be carefully studied before building types, construction methods and living conditions suitable in one locality are adopted holus-bolus in another.

The tremendous increase in the number and circulation of periodicals devoted to building in all its ramifications, demands straight thinking on the part of Canadians to make the best use of the infinite variety of products offered by modern science and industry and to develop Canadian architecture uninfluenced by the wants of people living nearer the equator to the extent that is now becoming more and more noticeable.

The publicity given to our shortages in coal, gas, oil, electrical power and wood, and their steadily rising cost of production should prompt us to question the extent of our wastefulness in their use and what help may be available from the two primary sources of heat, viz., sun and earth.

Regarding wastefulness, how will our future civilization be affected by the removal of trees from millions of acres of land unsuited to general agriculture because of sand, rock and other conditions?

Does the conversion of pulp into newsprint for the weighty, but, none the less, frothy editions of U.S.A. papers justify the resulting soil erosion, sand drifting, spring flooding, summer and fall drought and fluctuations in electric power supply?

The excuse that safer building construction materials than lumber have been developed ignores the fact that wood can be combined with gypsum to provide fire-safe structures that will withstand temperatures higher than the melting temperature of brick and which would distort much so-called fireproof construction to such an extent as to render it unfit for use. Fire stopping paints have also been developed which have a good rating by the Board of Fire Underwriters.

The development of laminated wood construction having sectional members made from sawn wood strips or pressed wood fibre indicates that use can be made of trees of lesser diameter than was thought to be practicable just a few years ago.

FIRE SAFE FRAME HUT

One of a number of fire tests conducted in eastern, central and western Canada, in which wood framed huts protected with gypsum were filled with cordwood and the contents burned out. Temperatures ranging above 2600 degrees F. were registered without destroying floor joists, ceiling joists, studs or rafters. In the case illustrated, a spark arrester of No. 9 gauge woven wire placed on top of the wood framed and wood exterior covered chimney was melted in about ten minutes although the fire lasted for four hours.

This possibility suggests that the importation of structural steel to the same extent as at present may not be necessary if and when we make a broader analysis of our national position than can be got from current steel handbooks.

Review and Preview

The advantage of looking backward as well as forward can be noted by referring to three quite definite trends in the use of materials based on manufacturers' propaganda during the past three decades.

The demand for quicker setting masonry mortar to suit faster vertical construction in skeleton-framed buildings resulted in the use of cement and sand mortars and the exclusion of lime or its use in very limited amounts.

This led to changes in municipal building codes which produced more leaky brick and stone work than had ever been produced prior to this change.

Experience under our climatic conditions has definitely shown the need for combining materials in such mortars and using methods of laying up walls that will reduce shrinkage and so prevent moisture from penetrating.

Studies of exterior stucco work made by the writer in Central Canada, on the prairies, in the Maritimes and in

the eastern U.S.A. about twenty years ago, gave clear evidence of the unsuitability of strong cement stuccos, the use of which was then being advocated.

Old lime stucco jobs, dating back about a hundred years, were standing up better than most of the more recent work in which cement alone was the binder.

Paint manufacturers' claims for their stopping coats to be applied on the lime-putty coat of plastered surfaces to prevent lime burning their paint coats are familiar to even the least experienced amateur in building technique. What is not made clear, however, is that any application that prevents lime from affecting paint over it also prevents lime from getting the $C.O_2$ (which was driven off in burning the original limestone in the kiln) restored from the air in the room to be painted.

Examinations of jobs where paints and other surface decoration materials having strong shrinkage or pulling action have been applied over lime putty coat "stopped" as above described, have shown that subsequent peeling has been due to the fact that the lime had never been re-carbonated.

This evidence proves:—

(a) that lime putty coat should not be covered with a stopping coat that will be impervious to air until sufficient time has been allowed to elapse for the $C.O_2$ to recarbonate the lime.

(b) that, if a job must be painted with a material impervious to air and moisture soon after plaster has been applied, no lime putty should be used in the finish coat of plaster.

The significance of these precautions will be appreciated in connection with the use of paint on plastered walls and other surfaces as a "vapour barrier" to prevent condensation in the thickness of such walls etc. (see subsequent reference to this problem in connection with construction methods now being used, especially in prefabricated units).

The foregoing examples of harmful influence, originating under conditions different from ours in many respects, are backed up with another that is of serious moment in connection with our shortage of fuel of different types.

Most of our Canadian Consulting Mechanical Engineers are members of the American Society of Heating and Ventilating Engineers and consequently the data presented annually in the Guide published by that Society are used as the basis for the design of heating plants in Canada.

The following quotations are from a paper "A New Method for Selecting Winter Design Temperatures" by Mr. C. M. Humphreys, Senior Engineer of A.S.H.V.E. Research Laboratories for presentation at the annual meeting of the Society in New York (February 1948).

"The A.S.H.V.E. Transactions give evidence that the importance of accuracy in heat loss calculations has long been recognized. A recent survey indicates that in the 29 volumes from 1916 to 1944 there were at least 74 papers on the general subject . . . Of the 74 papers, 50 pertain to heat transfer through building materials, 22 refer to the subject of infiltration, and only 2 deal with winter design temperatures."

"The data contained in the A.S.H.V.E. Guide are amended in successive issues to keep abreast of progress. It shows that little change has occurred for a number of years in practical knowledge of design temperatures. The 1923 issue contained a table of weather data almost identical in form to that in the latest edition. A recommendation was included in the 1924-25 issue that the design temperature "should be not more than 15 deg. above the lowest temperature on record during the past 10 years." This rule was retained up to and including the 1943 edition. The last four issues contain the recommendation that "a temperature somewhat higher than the minimum or the lowest daily mean on record" be used for design purposes. Then, in contrast to this rule, a map of design temperatures is included indicating design temperatures which, for a few localities, are actually lower than the lowest temperatures on record."

"To be consistent, the several factors used in the calculation of heat losses should be selected with an accuracy proportional to their relative effects upon the final results. With this principle in mind, the importance of design temperatures can be readily illustrated."

"In table 7 of Chapter 14 in the Guide, 1947, the heat losses from the various elements of an insulated house are shown . . . An error of 10 per cent. in the transmission coefficient for the walls, ceiling or glass, or in the infiltration value would result in errors of 3.6, 1.6, 3.7 or 1.1 per cent., respectively, in the final results. An error of 10 per cent. in temperature difference would change the final results by 10 per cent."

"The outside design temperature is too important a factor to be determined by any rule of thumb on the basis of one cold day. Instead, it should be so selected that it will indicate with a fair degree of accuracy, the lowest temperature which is likely to prevail long enough or occur frequently enough in an average winter to justify consideration."

"In the past it has been customary to use outside design temperatures which are too low, and then to correct at least part of this error by using an inside design temperature of 70 deg. F., which is also too low . . . Very few people are comfortable in a home or office heated to only 70 F. The average person in this country finds comfort at about 75 F. in cold winter weather."

"There is no one frequency of recurrence which should be used for the selection of all design temperatures. It will depend upon the type of building or the

purpose for which it is to be used and upon local weather peculiarities."

"The inside design temperatures should be that temperature which will actually be maintained in the heated space."

Summary

"The author suggests that outside design temperatures be defined as the lowest daily mean temperature which is likely to recur frequently enough during the average winter to justify consideration."

"It is suggested that present inside as well as outside design temperatures are too low and also that they should vary with type of construction, *thermal capacity* and type of occupancy."

Canadian Experience

Having regard to the foregoing, attention is directed to two papers giving the Canadian viewpoint on this subject which were presented to the A.S.H.V.E. by this writer, viz.:—

1. "Time Lag as a Factor in Heating Engineering Practice" at the Semi-Annual Meeting of the Society 1929.

2. "Some Observations on Heating Practice" at the Annual Meeting of the Society, January 1933.

It may be that these are the two papers referred to by Mr. Humphreys but in any case they give data to show that the A.S.H.V.E. method of computing the size of heating plants for actual buildings built in Canada would result in 100 per cent. excess plant being installed.

This is quite a bit more than the 10 per cent. surplus in the case with supposed conditions which he uses as an illustration of possible error.

The following summary in our Canadian paper to the A.S.H.V.E. in 1933 published in the A.S.H.V.E. Journal Section of Heating, Piping and Air Conditioning, November 1932, makes an interesting comparison with the quotations given from their Mr. Humphreys' paper last month.

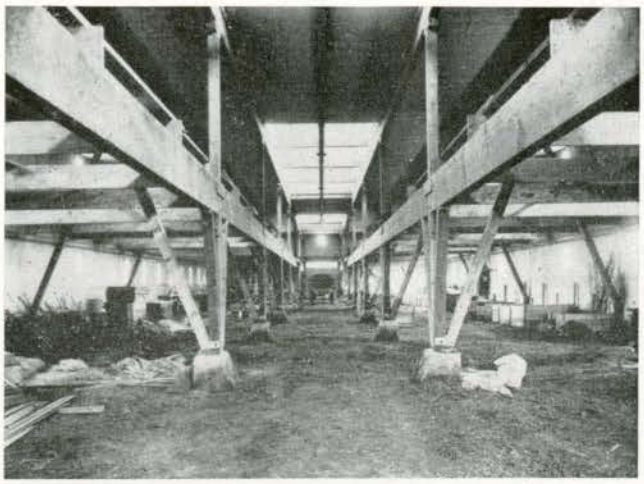
SUMMARY AND CONCLUSIONS

"Some Observations on Heating Practice"

By James Govan, Toronto, Ontario, Non-Member.

"1. Under the extreme variations of temperatures in Canada and the Northern States, the most important factor in determining heating plant size appears to be the outdoor temperature assumed, particularly when well-insulated types of construction are used.

2. Estimates of annual fuel consumption based on outdoor mean temperatures obtained from instruments shielded from the sun (as is the case at most of the Canadian Government Weather Stations) are likely to be seriously in error.



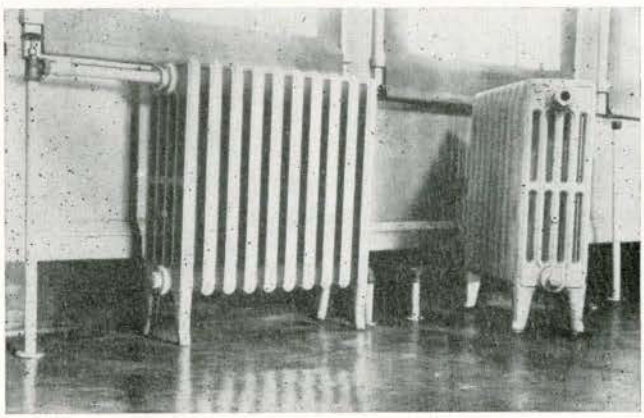
SHERIDAN NURSERIES SHED

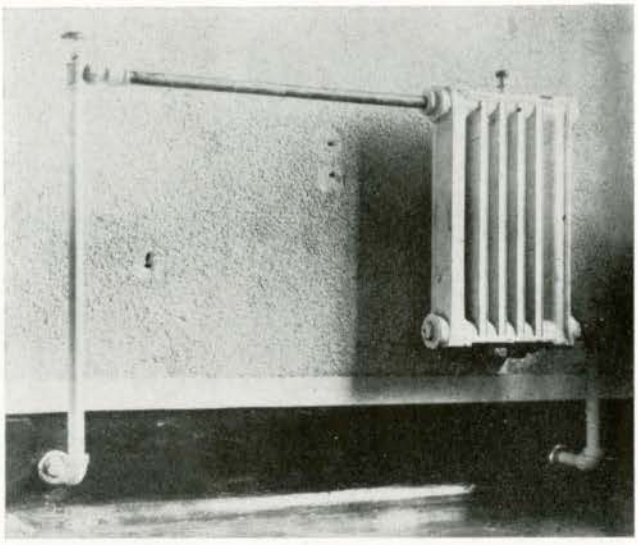
Well insulated and double glazed shed showing floor area on ground of 10,000 square feet, which, together with the sun heat through windows, kept the temperature inside up to 30 degrees F. above zero at nearly 30 degrees F. below outdoors, and 70 degrees F. indoors with 90 degrees F. outdoors. No heating or cooling plant provided.

3. More attention should be paid to balancing the heat retaining capacity in all parts of a building, so as to avoid the necessity of providing a large, uneconomical reserve in heating plant capacity for only rare emergency use.

4. The heat radiating from the uncovered earth floor of the building in winter and absorbed by the earth in summer plays an important part in stabilizing the indoor temperature in the buildings studied by the writer. For instance, in the large storage shed illustrated in Figs. 1, 2 and 3, the earth temperature drops to about 40°F. at a point 6 in. below the surface at the end of the winter.

5. The fact that an indoor temperature of 30°F. or higher has been maintained in a building without any artificial heating plant for three consecutive winters, where the outdoor temperature has dropped to—20°F., and also that 70°F. has been recorded indoors without artificial cooling when the outdoor temperature was 90°F., indicates the need for further investigation to provide reliable data on the flywheel effect of different types of construction."





REDUCTION OF RADIATION IN OFFICE BUILDING

If the building in which this radiation is installed had been of ordinary non-insulated construction with the same kind of windows, the total heating surface required would have been 2.830 square feet. The illustration shows how the amount actually in use was reduced to 847 and ⅔ square feet, a cut of approximately 70%. The results in this building were reported to the A.S.H.V.E. in our papers "Time Lag as a Factor in Heating Engineering Practice," 1929, and "Some Observations on Heating Engineering Practice," 1932.

Other Doubts Re A.S.H.V.E. Guide Formula

Further support for questioning some of the data in the A.S.H.V.E. Guide is given in the following quotation from an article by Mr. Lester T. Avery in "Heating Piping and Air Conditioning" December 1947.

"Isn't it time we abandon the word "Comfort" in air conditioning work? For fifteen years we have read of, and heard discussed, effective temperatures but our literature is silent on the much more important subject of conditions of air for healthful living."

"Changing the humidity may have some bearing on the subject but not nearly so much as panel cooling effect of cold walls, glass block areas, and roofs. There is no use jousting with effective temperature when we disregard entirely the panel cooling effect of cold surfaces."

"One step further would be to run field studies conducted by scientists who will measure and note the various effects of panel heating and cooling as well as effective temperatures and will come up with factual information and not confirmation of preconceived notions."

SIGNIFICANCE OF MR. HUMPHREYS' A.S.H.V.E. PAPER IN CANADIAN ARCHITECTURAL AND ENGINEERING PRACTICE

With the foregoing evidence before them, how long will our Canadian Engineers continue to use in their work data on assumed outdoor temperatures that are so far from being reliable when the thermal capacity of a structure is increased to the extent we have indicated as quite practical?

Canadian owners and architects should know that there is absolutely no need for increased capital expenditure to provide increased thermal capacity because its cost can and should come out of the reduction in expenditure on the heating plant provided.

Work in Canada has been done that proves a 70 per cent. reduction in the capacity of heating plants is quite practical and that 50 per cent. less fuel is required.

More general application of these methods of planning and construction would result in lowered fuel costs which would go far towards reducing our huge payments in the U.S.A. for coal and oil and would help to conserve our Canadian resources.

Sun Heat

The desirability of making the best use of winter sun heat and keeping it out at other seasons can be noted from results obtained by Atkinson in sun boxes at Boxford, Mass., Lat. 40°—40'N. (Toronto 43°—40'N.)

June 30

	Time	Air	Box A, West	Box B, South
	A.M.		Degrees Fahr.	
1	7.7	78	62	64
2	9.17	82	78	88
3	10.42	82	88	102
4	11.42	84	94	110
	P.M.			
5	1.12	84	102	112
6	2.17	86	118	110
7	3.17	84	138	104
8	4.27	84	144	100
9	5.27	80	.....	98
10	6.27	72	112	88
11	6.57	67	102	85

Remarks.—No hoods on boxes. No shields for thermometers in boxes.

8. The temperature of 144° recorded in Box A is the highest which the thermometer registers.

9. Glass in A misty so that thermometer cannot be seen.

July 7

	Time	Air	Box A, South	Box B, East
	A.M.		Degrees Fahr.	
1	6.11	55	48	85
2	7.00	63	55	108
3	7.31	68	60	115
4	9.36	82	84	132
5	10.41	86	96	122
6	11.41	86	106	112
	P.M.			
7	12.41	88	112	106
8	1.26	90	112	102
9	3.01	88	108	98
10	3.51	84	100	94
11	4.46	98	98	96
12	5.41	92	94	92

Remarks.—No hood on boxes. Perfectly clear day.

11. Air thermometer in direct sunlight.

12. Air thermometer in direct sunlight.

August 7

	Time A.M.	Air	Box A, South	Box B, East
			Degrees Fahr.	
1	7.45	68	61	121
2	8.35	72	68	130
3	9.00	71	73	130
4	9.35	76	81	129
	P.M.			
5	12.10	81	105	108
6	1.45	83	104	102
7	4.40	77	96	90
8	6.35	68	84	80

Remarks.—

3. Sun behind thin clouds.

6. Sun behind clouds.

October 24

	Time A.M.	Air	Box A, South	Box B, East
			Degrees Fahr.	
1	6.19	32	32	32
2	7.00	36	33	45
3	7.46	39	42	70
4	8.11	41	50	80
5	8.31	42	58	87
6	9.04	44	70	92
7	9.31	45	79	93
8	10.46	50	101	85
9	11.51	52	116	74
	P.M.			
10	12.11	55	119	72
11	1.11	57	123	68
12	1.38	58	125	67
13	1.55	59	125	67
14	2.11	59	124	66
15	3.03	58	107	64
16	4.41	53	84	60
17	6.31	46	63	52

Remarks.—Remarkably clear day.

December 22

	Time A.M.	Air	Box A, South	Box B, East
			Degrees Fahr.	
1	9.47	16	56	45
2	10.57	20	88	46
	P.M.			
3	12.52	24	114	38
4	1.42	25	115	44
5	3.22	24	94	33

Remarks.—Clear day.

4. The reading in Box B is probably an error.

These data are taken from "Orientation of Buildings or Planning for Sunlight" by William Atkinson.

To take advantage of winter sun heat, houses on streets running north and south should not all be kept to a uniform line at the street frontage. They should be staggered to provide the least obstruction on the south side.

This indicates the desirability of having lots running east and west longer than north and south lots. Where staggering of homes is not practicable because of bad lot planning, southern sun should be let into some portions through lantern windows rising through the roof, so treated as to make shutting out summer sun heat easy and not too expensive.

In this connection short wave solar radiation passes through glass as radiant energy and without change of wave length. Inside the room it is absorbed by the walls, floor and other objects and re-radiates as long wave radiant heat. Glass is opaque to this type of radiation and consequently the emission of heat from the enclosure is impeded.

Barriers to sun heat input should, therefore, be placed outside windows and not inside. An effective example is "Koolshade Sun Screen" which is a fly screen mesh that reflects radiant energy but does not darken a room any more than ordinary fly screen mesh.

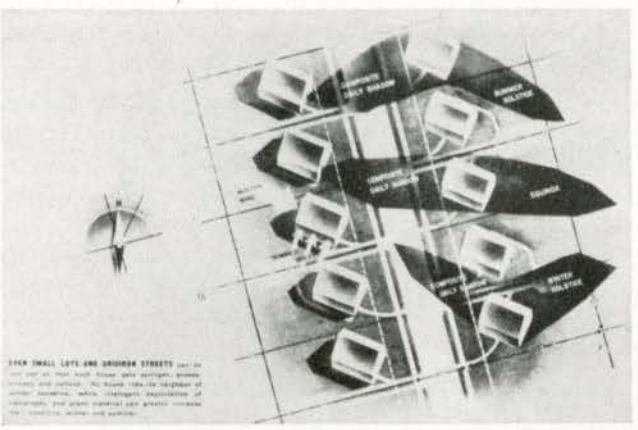
Studies of Sun-heating are being made at Massachusetts Institute of Technology regarding which we are greatly indebted to Mr. A. C. H. Dietz, Room 5, 209 Cambridge 39, Massachusetts and also at The Pennsylvania State College School of Engineering under the direction of Mr. F. G. Hechler. The results of these studies should be watched by those interested in the utilization of radiant energy.

Heat From the Earth

The illustration of the storage shed which gets all the heat for the work done in it from the earth floor is an example of the simplest use of this source of heat.

Of course there are not many buildings in which the inside temperature could be allowed to drop down to 30 deg. F.

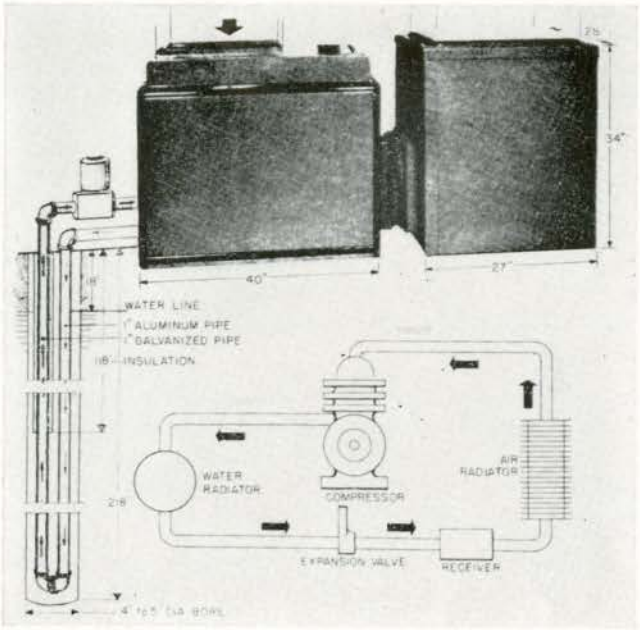
However, the more recent developments of the Heat Pump referred to in 1854 by Lord Kelvin as "tomorrow's method of heating" are proving that it is a practical



STREET PLANNING FOR SUNLIGHT

Even small lots and gridiron streets can be laid out so that each house gets sunlight, breeze, privacy and outlook. No house robs its neighbours of winter sunshine, while intelligent exploitation of topography and plant material can greatly increase their livability, winter and summer.

Courtesy, The Architectural Forum, March, 1947



HEAT PUMP

Typical diagram of heat pump using temperature of water in well and reverse cycle of refrigerating machine for heating and cooling buildings.

source of heating and cooling for both large buildings and small houses.

Reverse cycle refrigeration is most practical when called upon to cool as well as heat buildings all in one quiet, automatic, fuelless operation.

Conceivably it may be used to power every utility in the small house except the cooking stove. Like the household refrigerator the heat pump merely takes excess heat units from one spot and ejects them into another. In cold weather the heat pump removes the heat units from outside air or well-water or from pipes buried in the earth under or around the building and, by compression, packs them more tightly into the inside of the building.

In hot weather, the process is reversed. In either case, the refrigerant is the vehicle of heat transfer.

In summer cooling the cold refrigerant is passed through a coil where it picks up excess heat from the inside of the building. It passes through the compressor into an outer coil which is bathed in outside air or water. Here the refrigerant gives up much of its heat. The cycle is complete when the refrigerant is passed through an expansion valve where its temperature drops sharply. It is now ready to move another load of heat units.

In winter heating the cycle is reversed. The refrigerant is forced through the outer coil where it picks up heat from the outside air or water or earth. Turning to vapor in the process, it then passes through the compressor which sharply raises its temperature—a refrigerant entering the compressor at 5 deg. F. may leave it at 120 deg. F. Entering the inner coil it gives up heat and from there it passes into the expansion valve and on back to the outer coil.

Canadian applications have already demonstrated the practicability of this principle for combining heating and cooling in one plant without the use of fuel under well below zero conditions.

Radiant Heating and Cooling

Wide fluctuations of temperature in Canada, not only from summer to winter but also from day to day, should make us question the wisdom of depending almost entirely on raising and lowering the air temperature in our buildings.

When the average temperature of the clothing and the exposed surface of a normally clothed male is 81 deg. F., the ordinary heating system in a building is not needed to heat the occupants. What is needed is a healthy system of controlling the rate at which the body gives up the heat which is generated from the oxidation of food stuffs.

The same degree of comfort can be maintained in a room having a low air temperature and a high mean radiant temperature as can be maintained with a higher air temperature and a lower mean radiant temperature.

The lower the air temperature can be kept indoors in winter, the less the difference encountered as we step outdoors and therefore the less we stimulate the heat producing mechanism of our bodies.

The following quotation is from "Living with the Weather" by Prof. C. A. Mills, Director of Experimental Medicine at Cincinnati University.

"The basic difference behind the varying temperature needs for comfort in people are due to differences in actual metabolic level. There is no point in differing over this matter of comfort temperatures, for the individual cannot stimulate or smother his inner fires at will. What must be realized is that not all people need the same air temperature level."

"Attention should be paid to these individual differences. It is safe to say that no person should be compelled to work or stay where he feels chilly, since such a body reaction seems to dispose to infection in the nose and throat."

"There is, therefore, I believe, an urgent need for the development of conditioning methods, for both winter heating and summer cooling, whereby heat loss from the body can be properly controlled *without regard to air temperatures or humidity.*"

"Suffice it is to say that one can be made quite comfortable at air and wall temperatures of 92-95 deg. F. by removal of the body's heat as radiant heat and likewise at low temperatures (30-50 deg. F.) comfort can be readily achieved by radiant heat introduction."

"Preliminary hints have been noted that barometric pressure changes may be equally as disturbing as the

changes in temperature. Within a few years we may be as much interested in pressure control inside our buildings as we are now interested in temperature."

The foregoing considerations explain the rapidly increasing use of Radiant Heating and Cooling in the U.S.A. and to a lesser extent in Canada, notwithstanding the fact that they were first developed in modern times in England about 50 years ago.

The Romans used radiant heating in their great public baths over two thousand years ago.

Its use in European hospitals has proved that the movement of air—and, consequently, dust—is less, with resulting decrease of cross infection.

A further great advantage of radiant heating is that it acts to offset the cooling effect of windows, particularly large ones, especially when a curtain of radiant heat is directed from the ceiling down to the floor.

Mr. G. Lorne Wiggs, Consulting Engineer, Montreal, to whom we are indebted for data regarding some of the installations he has designed and carried out, assures us that the results obtained here in Canada confirm the expectations based on installations in other countries where the climatic conditions are just as severe as with us.

The following extract from a letter from Mr. R. Ruedy, Technical Information Service, National Research Council, Ottawa, dated October 16th, 1947, answers a question frequently asked re buried piping in Radiant Heating installations and is also significant in connection with other hospital problems:—

"Since replying to your letter of October 6, 1947, an article by E. Wirth on the operating experience with panel heating applied to ceilings, accumulated during the past ten years, has come to hand (Schweizerische Bauzeitung 65: 211-216, April 19, 1947).

According to this report, 170 installations representing a total tube length of close to 450 miles were installed in Switzerland from 1937 to 1947. The number of buildings may be grouped as follows:

Hospitals, institutions	34
Offices, schools, museums, precision tool workshops	85
Residences	51

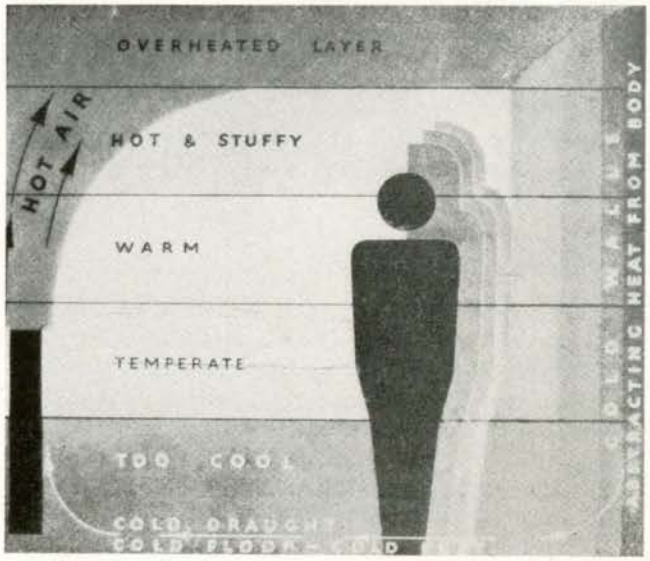
No leaks have occurred in any of the buildings.

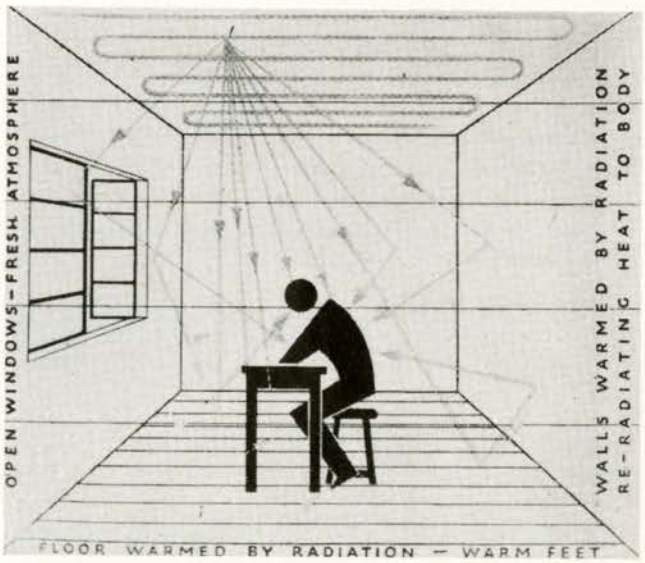
The following passage in the article, freely translated, refers to hospitals.

"Probably the most reliable observations in this respect are those that doctors have made on their own comfort and those of the patients in rooms heated by ceiling panels. The results are quite positive, because they come from institutions in which the older parts are heated with radiators and the new building with ceiling panels so that direct comparisons are possible. The doctors are of the opinion that panel heating gives a sanitary and natural room climate, while in the rooms with radiator heating the temperature is frequently higher and oppressive. One opinion concludes with the wish that all hospitals would soon be in a position to benefit by the new form of heating. Some reports mention additional details such as the rapid recovery of patients suffering from asthma in rooms heated by panels. These hygienic advantages were to a great extent responsible for the installation of panels in residences."

The saving in fuel is given as up to 15%.

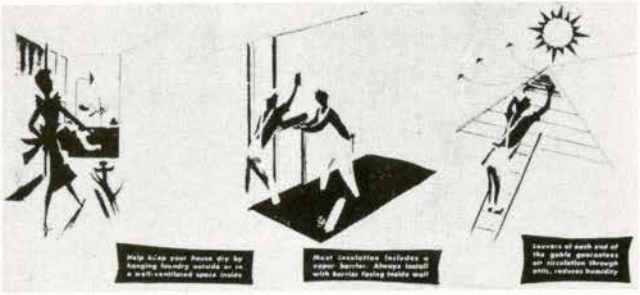
As regards the use of the panels for cooling on hot summer days, the article states that these occasions are relatively infrequent, but that excellent results have





RADIANT HEATING

Diagrammatic illustration of the difference between convection heating for comfort only and radiant heating for comfort and health.



IS YOUR HOUSE ALL WET

Insulation in building construction should not be used without a careful study of the probable effects of condensation in the structure.

been obtained by forcing cool water through the panels in the rooms having southern exposure. A temperature 5°F. below that in the shade out of doors is secured in this manner.

It is hoped that the author will supply additional information as regards the heating and cooling of hospitals for there are no other occasions in which the same number of hospital buildings can be studied within a relatively small area. The periodical mentioned probably can be consulted at the University of Toronto."

Electrically Heated Panels

The use of electrically heated panels in ceilings has been proved both practical and economical in England and the United States. Presumably the development of electrical power for heating in Ontario at least will be retarded until supply catches up with demand, but the possibilities of reducing the amount of power required for heating buildings, as indicated in this page, should not be overlooked when studying what might be done.

Problems Arising Out of Changing Trends In Construction

The economies in construction and maintenance indicated as possible and in many cases already in effect, have been due to changed methods of building. Rising costs and the shortage of mechanics skilled in ordinary practice are having an even greater effect in concentrating attention on prefabrication and different types and combinations of materials.

These changes have already created problems for which solutions have yet to be found. Other indicated developments will produce more as yet unknown difficulties.

It is, therefore, imperative that we study them with the particular needs of this country always uppermost in our minds.

Our climatic, social and economic conditions demand solutions suited to our conditions absolutely regardless of what may be popular elsewhere under entirely different combinations of circumstances.

Condensation

One of the most serious results from increasing the resistance to heat flow through walls, roofs and floors is the possibility of condensation in these structures due to the materials near the outside surfaces dropping in temperature below the dew point of the vapour that tends to find its way from the inside of the enclosure to the outside.

This condensation can do serious damage to the structure and when the possibility of ice formation is added the destruction that can ensure is greater.

Examples of ice forming on the back of brick veneer on the outside of hollow tile wall construction that had two inches of insulation at its inside surface have been noted.

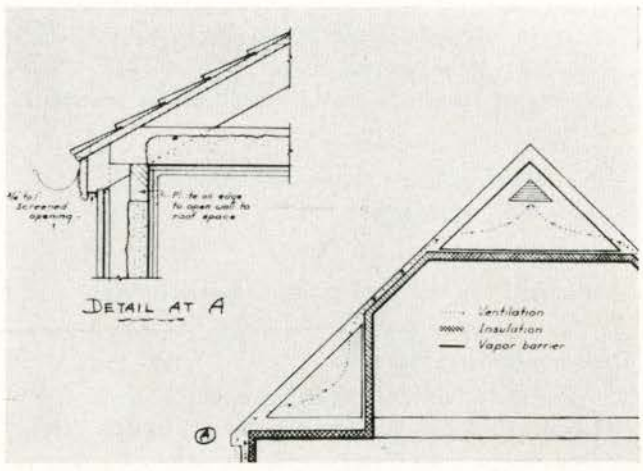
Hoar frost nearly 1½ inches thick on the underside of roof boards in an attic that had thick insulation on the ceiling below the attic was found to be due to the passing of vapour from below round the apertures in the ceiling left around plumbing vent pipes.

There are many reasons why the vapour problem now is more serious than ever before, for example:—the provision of insulation, weather stripping, caulking material in cracks and crevices, humidifiers indoors, more frequent laundering and bathing, cooking and heating with unvented fuel burning equipment, potted plants, more occupants per cubic foot of volume, etc. etc.

Two articles from the Pennsylvania State College, Engineering Experiment Station provide valuable technical data for which we are indebted.

A. Technical Paper No. 27 "Heat and Moisture Transfer in All-Metal Houses" by F. G. Hechler, E. R. Queer and E. R. McLaughlin.

B. "Is your House All Wet" by E. R. Queer and E. R. McLaughlin.



VENTING INSULATED CONSTRUCTION TO PREVENT CONDENSATION

Venting space between insulation and the exterior of wall construction up to and out at the wall top or into the roof space and thence outdoors through louvred vents in the attic to prevent condensation in the walls and roof spaces.

It is desirable to point out that the outdoor temperatures used in some of the tests referred to in these papers were not as low as we experience quite frequently and, therefore, the bad results to which they refer will be aggravated under our conditions.

The problem of venting an air space near the outside of a metal clad building is not too difficult if the air space can be open to the roof in a low building from which the moisture can be exhausted either by louvred vents or fan.

In a building of several storeys of skeleton steel construction, the difficulty of providing continuous venting increases. Metal to metal contact through the wall, roof and floor construction or inadequate isolation of metal members needs far more careful study than it appears to have had, judging by examples of structures we have noted in recent literature and advertising.

In the "Is Your House All Wet?" paper, we note the following:—"A very effective barrier to the flow of vapour is several coats of high-gloss oil paint on plaster, a finish coat of low-gloss paint or wallpaper may then be used over the high-gloss paint serving at a barrier."

If this treatment is given to plaster finished with a lime putty coat which has not been given time to re-carbonate the result will be disasterous. (See previous reference to this problem.)

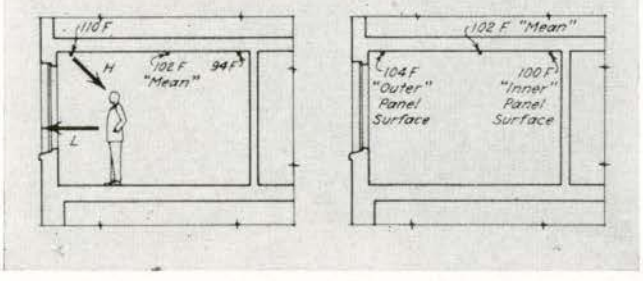
Expansion and Contraction Due To Sun Heat

Metal framed structures are subject to considerable movement due to the difference between day and night temperatures, especially during the months of March and October.

Inadequate insulation protection on the outside of structural steel, be it of large or small members, leads to serious cracking of walls, partitions, floors etc.

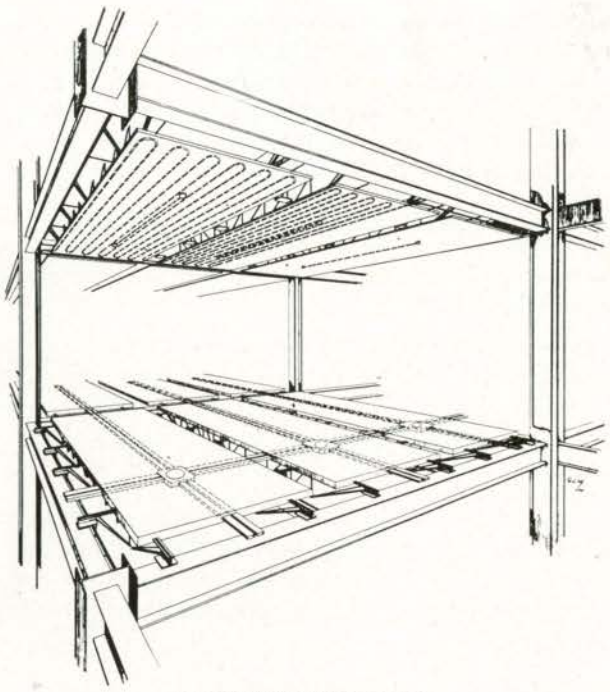
Not nearly enough attention to this factor has been given by Canadian Architects and Engineers.

It is desirable to increase the panel surface temperature near glass and outside wall; this results in more even warming up of the room. The sketch at the left shows how the excessive body heat loss by radiation to cold glass surfaces (*L*) is compensated for by additional heat input (*H*) from the warm panel section



RADIANT HEATING AT CEILING OFFSETTING HEAT LOSSES FROM BODY AT LARGE PICTURE WINDOWS

Body heat loss to large glass surfaces can be off-set by a radiant heat curtain from the ceiling downwards, when special provision is made in the heating coil layout to take care of this problem.



PREFABRICATED FLOOR SLAB

Prefabricated floor panels of two-way bar joist construction in which, before erection on the steel, radiant heating ceiling coils, wiring and supplementary electrical services, sprinkler piping, and plumbing, were all assembled.

Courtesy, G. Lorne Wiggs, Montreal

Prefabricated floor panels, combined with radiant heating, plumbing, wiring, sprinkler piping and channels for telephone and other services.

The illustration showing prefabricated panels of two-way bar joist construction on which all of the above listed services were mounted in Montreal and then shipped 60 miles to the job and there erected on a structural steel framework, is an interesting example of what can be done when an owner decides where and what services are wanted sufficiently far in advance of construction to permit study and careful planning and cooperation between Architects, Engineers and contractors.

Windows

With an indoor-temperature of 70 deg. F. and zero outdoors the inside surface of a single glazed window will be 17.3 deg. F., with double glazing 49 deg. F. and with triple glazing 56.9 deg. F. These figures are based on co-efficients of transmission of 1.13, 0.45 and 0.281 respectively.

As even the best of these co-efficients is 3½ times, and the worst is 14 times, greater than many well insulated walls we have used, it is evident that the body heat loss by radiation to large glass surfaces, presents a very serious problem.

The only solution appears to be the provision of a curtain of warm air passing over the inside surface of the glass. Where picture windows are low down close

to the floor the difficulty is increased and in such a situation the most satisfactory results can be obtained by concentrating a sufficient amount of radiant heating coil in the ceiling so located as to increase the radiation downwards at this point and decrease it at the room area further removed from the window.

This problem is of particular concern in Hospital work where the patients are all more or less in a weakened condition and, as a rule, more lightly clad than under normal conditions.

For them exposure to near-by large glass areas at the temperatures given above may seriously hinder their recovery.

The question of light glare also needs consideration in hospital work.

This problem of radiating body heat to a surface colder than a block of ice is aggravated when metal sashes and frames are used. We then get direct metal to metal contact which adds to the difficulty of preventing condensation.

Noise Transmission and Absorption

The tendency to reduce the dead load of construction increases the difficulties of preventing noise transmission from one part of a building to another. Vibration problems multiply and necessitate sound stopping and sound absorption provisions which were never needed in old types of buildings where the sheer mass of the structure and the lack of hard sound reflecting surfaces gave results that can only be got under modern conditions at greatly increased cost.

Effects of Frost Action

One result of stopping heat flow through walls is to increase the danger of frost action spalling the face of brick work, when bricks with too high a water absorption factor are used.

Construction in which no insulation was used has stood for years without signs of disintegration. Bricks of the same porosity used in insulated walls are revealing indications of frost action on their surface for the same reasons given previously as the cause of vapour transmission through the walls, coupled with the fact that the temperature drop through the wall permits more frequent periods of ice formation.

The provision of open balconies that are very rarely used simply invites trouble from frost action on the exposed masonry surfaces.

Effects of Vibration on Building Construction and Surface Finishes

Vibration due to heavier trucking loads on streets, the operation of pounding equipment not only in buildings but also at considerable distance from buildings, and other factors of this nature, are the cause of considerable cracking and crazing of masonry, concrete, plaster, tile, marble and other unyielding materials.

The extent of this damage is not realized as it should be and, as a result, undeserved blame is put on architects, contractors, engineers and manufacturers for poor construction materials and workmanship.

The crazing of Canadian made wall tile that has stood up satisfactorily for many years can definitely be attributed to the vibration caused by the operation of an emergency power generating unit during the recent stoppages in hydro-electric power service. This is only one of many examples of damage due to vibration studied by the writer.

Conclusion

While only a few aspects of the newer construction and planning tendencies have been dealt with, sufficient evidence has been cited to show that copying work done outside Canada can lead to many practical difficulties. It has one greater disadvantage in that it stultifies Canadian creative impulse. Evidence of this fact can be seen in much of the work produced in recent years. In this respect older work had even more defects because of copying architectural styles regardless of their fitness, but, in putting emphasis on functionalism let us take care that, although the paths we follow may be straight and narrow, they may not be in the right direction.

BUILDING RESEARCH IN CANADA

By **ROBERT F. LEGGET**, *Director, Division of Building Research, National Research Council, Ottawa*

An Address at the Forty-First Annual Assembly of the Royal Architectural Institute of Canada, February 24th, 1948

FOR four decades the work and activities of the Royal Architectural Institute of Canada have reflected the corresponding development of the industrial and economic life of this country. Those forty years have seen the Dominion change from one of the minor industrialized nations to the third most important trading country in the world. The associated changes in the fabric of the country are well known; the architectural profession has played a leading part in this remarkable development. While there may be some question as to whether there has yet been developed a Canadian style of architecture, it cannot be questioned that there are in the Dominion many fine and noble buildings, which stand in testimony to the widespread achievements of your profession.

The proceedings of your annual meetings have shown clearly the changing trends in architectural thinking. Today, buildings have ceased to be the simple structures which they were but relatively few years ago, having become in many aspects unusually complex in response to the steadily increasing demands of those who build and who use them. Accordingly, it is perhaps fitting that the subject of building research should enter into the proceedings of this, your forty-first annual meeting. The present is a time when increasing attention is being given to the proper application of the scientific method; it is no surprise to find the same attitude being displayed towards building and even towards design. Your meetings have occasionally been held in Ottawa, but it is especially fitting that this meeting should be held in the capital city, where are located the headquarters of the National Research Council, for it is to report to you on the recent activity of the Council in setting up a new Division of Building Research that I appear before you at this seminar.

I feel that it is almost necessary to take the unusual course of sounding a personal note at the outset of this talk with you, for it is my pleasure to be no stranger in your company, even though I am a member of a sister profession. My presence here today may be regarded as yet further evidence of the singularly cordial relations which exist generally in the Dominion between the professions of architecture and engineering. My last appearance before you was to present a report on architectural training in Canada, which I had been asked to prepare by your architectural training committee (R.A.I.C., 1943). I look back with keenest pleasure to a very happy association with your Institute when carrying out that assignment. It may be merely a coincidence that I appear today to speak with you about research. It is, however, to be noted that this association of education and research is also reflected in the activities not only of the Royal Institute of British Architects but also of the American Institute of Architects, in ways which I propose to mention a little later. It is at least fitting that thoughts of building research should be associated with thinking about architectural education, since the two must advance hand in hand.

As a further preliminary note, may I set at rest the doubts of those who think that I have come here to be critical of existing building methods and techniques. Nothing could be further from the truth. I have already indicated my appreciation of architectural work carried out throughout this Dominion. I would assure you that all my comments regarding building research are to be constructive, bearing on the work of the future rather than criticising any work of the past. It will, I think, be generally admitted that due to the increasing complexities of building requirements and functions, the time has come when the association of the idea of research with building has ceased to be unusual and become rather a necessity. The aim of the new Division of Building Research of the National Research Council will be to assist in the solution of some of the problems associated with these complexities of building which still lie ahead for your profession.

The new Division is a part of the National Research Council of Canada. It may therefore be useful to say something about the work of the Council at the outset since this is not always as well known as it should be. The Council has its origin in a report made during the war of 1914-18, which was concerned with the mobilization of the scientific resources of the British Commonwealth. Canada followed the recommendations of this report in 1916 by appointing an Honorary Advisory Council for Scientific and Industrial Research, this being still the official title of the National Research Council. For some years the Council was just a Council, as its name applies, but in 1927 the decision was taken to set up laboratories to perform work which the Council saw to be necessary in a national sense. These laboratories soon expanded and in 1932 there was opened the large

building on Sussex Street in Ottawa which is now so well known. This building soon ceased to be adequate for the needs of the great research organization fostered by the Council and in 1938 the first steps were taken towards the development of what are now known as the Montreal Road Laboratories. These laboratories, located on a fine site five miles from the center of Ottawa, now consist of sixteen buildings, housing principally the Division of Mechanical Engineering. It is in them that the new Division of Building Research has started its work.

From a small beginning in 1917 the Council's research organization had developed to a total of about 300 in 1939. Today the Council has on its staff, inclusive of the Chalk River Project, a total of about 2,500 personnel. The active research work of the Council is organized under the Divisions of Chemistry, Physics, Applied Biology, Mechanical Engineering, Radio and Electrical Engineering, with a Division of Medical Research which is a co-ordinating medium for national work in this field, and a Division of Information Services which is described by its name. In addition, Canada's Atomic Energy Project is now administered under the National Research Council, with a Vice-President resident at Chalk River. The Council will shortly open a Prairie Regional Laboratory in Saskatoon and consideration is being given to a similar Regional Laboratory in the Maritimes.

The Council's interest in building research is of long standing. As early as 1932 the first of a number of committees concerned with various aspects of construction was formed. This committee led eventually to the setting up, jointly with the Department of Finance, of an administrative committee, which prepared the National Building Code. In the work of the Divisions of Chemistry and Physics many investigations have been made relating to details of techniques of construction, in particular with reference to heating and insulation, as well as many studies of paints and protective coatings. Before the war thought had already been given to extending these activities but the incidence of war necessarily postponed further development. A meeting was held in Ottawa, however, in September 1945, at which the whole subject of building research was carefully reviewed. Action following this meeting was delayed pending the decision of the Dominion Government with regard to national housing activities. Soon after the formation of the Central Mortgage and Housing Corporation in December 1945, the Council finally decided to extend its coverage of applied research in the major fields of industrial activity in Canada by the setting up of a new Division of Building Research. The actual work of the Division may be said to have started on the 1st August 1947.

In taking this step the Council was aware of corresponding developments in other countries, the most notable of which is the building research work which has been done in Great Britain. The British Building Research Station was started in 1921 as a result of the difficulties being experienced with housing in Great Britain after the first world war. It was a pioneer in its field and its work has provided and still provides a challenging example to all building research stations which have been set up since its inception. Its work was described in your own *Journal* as recently as January 1947, in an interesting paper by an architect to whose work I shall refer later (Allen, 1947a). More recently a considerable impetus to building research in Great Britain has been given by the work initiated through the Office of the Chief Scientific Advisor to the newly created Ministry of Works. This organization has had as many as 600 investigators engaged on intensive study of the many problems associated with post-war building in Great Britain. House construction is naturally the principal object of the Ministry's research programme, but study is also being made of more general building problems.

In Australia the need for similar activity in the building field has been recognized by the setting up of two organizations for building research, both in association with recent housing needs. The Commonwealth Experimental Building Station is located at Sydney and operates as a separate unit under the Department of Works and Housing. It is concerned with building methods and techniques and works in association with a Building Materials Section of the Commonwealth Council for Scientific and Industrial Research located in Melbourne. These organizations both started their work in 1944. In South Africa there has been formed a National Building Research Institute having its origin in an investigation initiated in 1942. A similar organization is being considered in New Zealand.

We are fortunate in having already forged close links with all the organizations mentioned. It has been my good fortune to pay several visits to the British Building Research Station, in 1946 and 1947, to see also the corresponding Road Research Laboratory and some of the research activity of the British Ministry of Works. The Directors of both Australian building research organizations have visited us in Ottawa, and the Director of the South African Institute will be visiting us later this year. No words of mine can express adequately the cordiality and helpfulness of the staffs of these sister organizations towards our start in this field of mutual interest. The Directors of the British Stations and Sir Reginald Stradling, in particular, have made available to us the benefit of their long experience most willingly. Somewhat naturally, they look to us for developments in connection with cold weather conditions! One of my Australian friends was in Ottawa last August—he, alone of those mentioned, now realizes fully the truly remarkable potentialities of Canada's climate!

Not only in the British Commonwealth is this attention to building research to be found. The Scandinavian

countries have taken active steps in the same direction, Sweden having a particularly notable building research organization. In this its example has been followed as recently as this year by Denmark, while in Holland and in France there are corresponding building research institutes.

The remarkable programmes of industry-sponsored research into many specialized features of the building field which have been and are being carried out in the United States will be well known. What may not be so well known is the recent setting up of a Building Research Advisory Board under the auspices of the National Research Council of the United States. It is intended that this Board shall correspond generally with the Highway Research Board, which now has a splendid record of almost thirty years leadership in its field. The Building Research Advisory Board is at present being organized and it is expected that its first meeting will be held in the near future.

The National Research Council of Canada is therefore in good company in having set up a new Division to give attention to the many pressing questions in the building field with the solution of which research may be able to assist. It is more than usually significant that most of the building research organizations in other countries (with the exception of those in Great Britain) have been started only within the last few years. With so much building under way, and so much more in prospect all over the world, it is well that scientific research should be called upon to assist in meeting building problems. Nowhere is this more true than in North America. And it may not be too presumptious to suggest that in this, as in other comparable matters, Canada's favourable position as a link between the United States, the United Kingdom and the other Dominions places us at once in a position of great responsibility and of unusual opportunity.

You will be specially interested in the part which architects have taken and are taking in these several developments of building research activity. In Great Britain architects sit as regular members of the Advisory Boards to both the Building Research Station and the work of the Office of the Chief Scientific Advisor to the Ministry of Works. The interest of the Royal Institute of British Architects (with which your Institute has such close relations) is shown by the institution of a Building Science Board as an integral part of its organization. This Board conducts studies and arranges for technical meetings and for special technical papers which are presented to your sister Society. It is of significance that the first report of this Board dealt with the question of architectural education in Great Britain. Although this report may not have received unanimous support from the members of your profession in Great Britain, it was widely acclaimed as an important document and shows clearly the interrelation between educational advance and the philosophy of building research. Even though you may not be familiar with the existence of the Building Science Board, you will all know well of the important scientific papers on various aspects of building research in Great Britain which have appeared in the Journal of the R.I.B.A. It is of some interest to note that exactly two hours before the delivery of this paper, a lecture on "The influence of technical research on design and methods of building" was given by M. Hartland Thomas to the R.I.B.A. in London. A similar situation exists in relation to the building research organizations in other European countries. In Denmark, for example, architects have taken a prominent part in the organization of the Danish Building Research Institute.

The same interest of the architectural profession in building research is shown by recent developments in the United States of America. You will be familiar with the recent starting of a new publication *(The Bulletin)* by the American Institute of Architects in association with the setting up of their Department of Education and Research – the two ideas again intimately associated (A.I.A., 1947). American architects have played a leading part in the negotiations which are still proceeding with regard to the organization of the Building Research Advisory Board of the National Research Council of the United States. One of these architects is Professor William Schiek, who is Coordinator of the Small Homes Council of the University of Illinois, to which I pay tribute as one of the most significant housing research activities on this continent known to me. An architect is directing a similar activity at Louisiana State University. Finally, your kindness in inviting me here to speak with you this afternoon is evidence enough of Canadian interest in the possibilities which the application of research to building problems appears to hold.

Against the background provided by this brief historical review you will perhaps be able to appreciate the better the action recently taken by our own National Research Council in setting up the new Division of Building Research. Your next question will naturally be with regard to the work which we have in view. Let me attempt to sketch very briefly the principal directions in which we hope to advance.

The National Building Code has already been mentioned. Many of you will know it as a splendid guide to the preparation of municipal ordinances regarding building. Its preparation involved a great deal of work on the part of many members of the R.A.I.C., including probably some who are present today. It has been widely acclaimed in other countries and has been described as probably the best general building code in existence. Such a code, however, can never be a finished document. It must continually be kept under revision in order to be in accord with changes in practice and advances in technique. It is accordingly planned to have the National Building Code administered in the future under the new Division of Building Research.

This will be a major task and a continuing task, since it is intended to keep the Code up to date and in conformity with the new building practice which is found to be satisfactory for Canadian conditions. The work will be continued through the medium of committees (upon which we hope architects will sit), assisted by a technical staff when suitable men can be found for this special work. An indication of the future plans is the suggestion that future editions of the Code may be published in loose leaf form in order that individual sections may be issued as they are revised, for general convenience. Correspondingly, it is intended to assemble the most complete collection possible of local building codes from all Canadian municipalities so that these may be available for reference and may eventually be cross indexed. This latter work will be a part of the efforts which will be made in assisting all responsible agencies in Canada to achieve as much uniformity in their building regulations as is possible.

This building code work, if it is to be properly done, necessitates the availability of complete and up-to-date information regarding materials, techniques and methods in the building industry. For this reason, and for others yet to be mentioned, one of the major tasks of the new Division will be the assembling in Ottawa (in conjunction with the N.R.C. Library) of the most complete collection of printed information on building practice that it is possible to bring together. It will be a matter of years before even existing information can thus be assembled but the task will have high priority in view of its general usefulness. The information thus assembled will always be available for use by those concerned with the industry, this being another reason for its inclusion in the initial programme of the Division. Eventually, therefore, we hope to be able to answer at least some of your technical enquiries. The Division will naturally work in close association with the existing Technical Information Service of the Council, which some of you may know already in view of the work of its regional offices, located in leading cities across the Dominion.

Since the field to be covered by the new Division is so wide, enquiries must of necessity form a very definite part of its procedure in the organization of its research programme. It would not be difficult to draw up immediately a list of many hundreds of problems in the building field which could usefully be investigated as research projects. In the selection of those which should receive immediate attention, the character of the enquiries received by the Division will prove a most useful guide. This has been the experience of other building research organizations and will show why we shall always rank highly the handling of technical enquiries. A final reason for this emphasis on the building up of an information center is the need for a complete study of all the work that has been done elsewhere on any problem which is being tackled before active research work upon it is started in Canada. This is an essential procedure with all scientific research work but it will be of special importance to us in view of the many problems already in view and of our limited facilities and man-power.

You will have noted that the name of the new Division is the "Division of Building Research" and not the "Division of Housing Research." The Division is starting its work on a very long term basis with the ultimate objective of serving the whole field of building. At the present time, however, problems of residential construction are of such a critical character that housing problems must naturally be given every priority, even in the very limited work which the Division is already able to do. In all housing matters the Division will always work very closely with the Central Mortgage and Housing Corporation, which it is to serve as a research wing on all the technical aspects of house and residential construction. There has already been formed a very happy agreement as to the method of this joint operation in the housing field. The Division will be concerned with investigation into special technical problems, the provision of technical information and with all questions concerned with building codes and regulations. All other aspects of housing practice, from the national point of view, are the responsibility of the Corporation. In association with the Corporation the Division looks forward to carrying out research work on actual housing projects in Canada of an "operational" character. Correspondingly, joint study will be made of new materials and new processes when these are seen to be of any possible practical value to the solution of the vital housing problem. It is hardly necessary to point out to such an audience as this that there is no "short-cut" to even the technical part of the housing problem. But for the record, and since there are possibly some who think that since the Division of Building Research has been set up the solution to the low-cost housing problem will be available in a few weeks, may I observe that our work can have but little, if any, effect upon current housing practice for some time yet to come. Research is of necessity a long-term proposition; in no field is this more certain than in building work.

Let me emphasize as strongly as I can the importance with which we view all possible work on housing research. At the same time may I emphasize equally strongly that research work in this field cannot quickly be effective. Many of you will have heard glib talk (probably with some misgiving) about the possibility of "building houses in just the same way as automobiles." There are many reasons why this cannot be so of which I need mention only one. The automobile happens to have four wheels whereas a house does not, and until someone can suggest how the installation of sewer and water pipes and the necessary excavation of soil can be mass produced in a factory such talk of "automobile-housing" is visionary. Much advance can probably be

made by prefabricating housing components and even house structures but in Canada we must remember that improvements in construction methods on the site are equally necessary and may be equally effective. But, as many authorities have pointed out, improvement in technique is but one of the several factors which together can lead to reductions in the overall cost of housing; nowhere is this more true than in Canada. Probably no one has stated this more clearly than Catherine Bauer in her notable publications, including her book "Modern Housing." Some of you may recall that in that volume of several hundred pages the distinguished authoress devotes only a few to questions of construction technique, a fact which I leave to speak for itself. Housing research can help, however, and it will be our continuous effort to make a real contribution to this field.

Since building is a matter which must always be considered in relation to local conditions, climatic and geological, the work of the Division is being planned from its inception with this fact in view. We hope before long to be conducting actual operations on a regional basis from centers in the Maritimes, in the Prairie Provinces, in British Columbia, and the North West Territories, and naturally in the central provinces of Ontario and Quebec. In all these regions which have such distinct characteristics we shall hope to work with provincial and local authorities, particularly with the universities and their schools of architecture.

I have probably said enough to show the general trend in which we hope to direct our work. It may be useful if I just list a few of the matters to which we have already given some attention, either directly or in association with others—studies of local foundations, the economics of wall design in relation to insulation and vapour penetration, time and motion study of house construction, the economics of winter construction, masonry deterioration and methods of outside painting. These are but some of the matters still under review but they will indicate to you the type of technical problem which we hope to study in detail.

What has been said about the work in view will show you at least three things. In the first place, the work of the Division will not be carried out merely in the cloistered atmosphere of the laboratory but in close association with building construction. You may recall my plea for an appreciation of construction experience in architectural education. In the work we have in view I hope to "practice what I have preached" in relation to all our research work. In the second place, you will note that our activities must necessarily cover a very wide field. We therefore look forward to cooperating as closely as possible with all existing research organizations in this country and with corresponding building research organizations in other countries. The promises which we have received from all the other agencies with which we have been in touch with regard to cooperative endeavours have constituted one of the greatest possible encouragements at the outset of our work. I hesitate to mention any by name but perhaps I might refer appreciatively to the Forest Products Laboratory, to the Division of the Bureau of Mines, to the Geological Survey and to the Dominion Bureau of Statistics, here in Ottawa, and to the Dominion Meteorological Service in Toronto, since many of you will know their work. You may be sure that we shall in no way encroach upon the fields of these and similar splendid existing organizations but rather seek to work with them towards a common goal.

The third and last point upon which I would comment is that many might think a large number of the problems with which we may deal have already been solved on the basis of experience and that experienced architects already have opinions of their own with regard to the solutions. I do not question this point of view but merely observe that the time seems to have come when the words of the great Lord Kelvin appear to be particularly applicable to the complex problems of modern building. On a famous occasion he said that "one measurement is worth more than a thousand opinions." We hope to make a small contribution towards measuring some of the things upon which most of you have opinions. But we hope that in this measuring process we may continually have the benefit of your judgement, your considered opinions, and your wide experience. There must be, for example, many buildings in this Dominion which contain experimental features from which much useful information could be derived. We hope that in the course of time members of your profession will be good enough to help us to discover these buildings and to record the information which they can give so usefully.

Some may think that building research should be confined to the attention of architects! This is a matter upon which I naturally speak with unusual diffidence but I would venture to submit with very great respect just two comments. In the first place, and as I have said before in the pages of your *Journal*, I suggest that it is impossible to draw a dividing line between where architecture begins and where engineering ends in modern building work (Legget, 1945). In the second place, and in keeping with my expressed views on this subject, the professional members on the staff of the new Division will never be referred to officially as either architects or engineers (so long as I am privileged to have anything to do with the use of such names) but will always be called *"Research Officers"* of different grades.

I make this last comment with much feeling since it is my keen desire to have architects playing a prominent role in the work which lies ahead of the Division. It is of more than passing interest to know that two of the senior architects on the staff of the British Building Research Station received their architectural training in Canada. Both incidentally are sons of professors of

physics at Canadian universities and they are now engaged upon work which is described as architectural physics. Mr. William Allen (who described the work of the British Station in your *Journal* last year) has carried out much notable work in the special field of lighting in relation to buildings and has recently made a most notable contribution to the actual planning of buildings in relation to light orientation to which I would respectfully draw your attention as an outstanding example of the unusual contributions which architects can make to building research in view of their special training (Allen, 1947b). His colleague, Mr. Richard Eve, is similarly engaged upon important heating studies. We hope to be privileged to see such work as this done by architects in the new Division as part of the great job which lies ahead. We can only do this if we have the sympathetic interest of Canadian Architects— in whose hands rests the application of so much of the work which we shall do. When we have progressed far enough to justify your confidence, we hope that we may have also the active support of the Royal Architectural Institute of Canada in our work. Finally, since the value of our work will depend almost completely upon the staff that we are able to attract, it is my hope that you may be able to assist us in recruiting suitable men for this work from the junior members of your profession. It is for this reason that we look forward so keenly to working closely with all the Schools of Architecture in this country and correspondingly to serving them to the very best of our ability as our work advances. Inevitably, I have again mentioned education in relation to research but this perhaps is a fitting note upon which to bring our consideration to a close.

Engineers are usually expected to define the terms they use at the outset of their statements. Today, I am reversing this practice. We have been talking about research—what do we mean by that all-too-popular word? There are innumerable definitions available. There are those who, quite seriously, regard research as taking useless information out of books which are never used to put it into new books which never will be read. An architectural journal, which shall be nameless, defines research as the systematic collection of useful information—a concept as vague as it is vast. Naturally, I can not presume to define research in words of my own, nor can I with propriety draw upon the writings of engineers or of architects for this purpose. Let me rather conclude by using words of a member of another profession, to which we are all beholden. I refer to a great figure in the field of medicine, the man who was private physician to King James the First of England. You will know him better as William Harvey, the discoverer of the circulation of the blood. A true research worker, some of his words are going to be a continuing guide to the new Division as it starts on its way; these words—

"It were disgraceful, with this most spacious and admirable realm of nature before us, and where the reward ever exceeds the promise, did we take the reports of others upon trust, and go on coining crude problems out of these, and on them hanging knotty and captious and petty disputations. Nature is herself to be addressed; the paths she shows us are to be boldly trodden; for thus, and whilst we consult our proper senses, from inferior advancing to superior levels, shall we penetrate at length into the heart of her mystery . . . Truly in such pursuit it is sweet not merely to toil, but even to grow weary, when the pains of discovering are amply compensated by the pleasures of discovery."

REFERENCES

A.I.A., 1947: "The Architect looks at Research." *Bulletin of the A.I.A.*, Vol. 1, pp. 21-25, March 1947.

Allen, William: "The Building Research Station." *Journal R.A.I.C.*, Vol. 24, pp. 24-26, 32, January 1947.

Allen, W. and Crompton, D.: "A Form of Control of Building Development in terms of Day Lighting," *Journal R.I.B.A.*, Vol. 54, pp. 491-499, August 1947.

Legget, R. F.: "The Future of Architect-Engineer Relations." *Journal R.A.I.C.*, Vol. 22, pp. 113-116, 133, June 1945.

R.A.I.C., 1943: "The Thirty Sixth Annual Meeting of the Royal Architectural Institute of Canada." *Journal R.A.I.C.*, Vol. 19, pp. 31-40, March, 1943.

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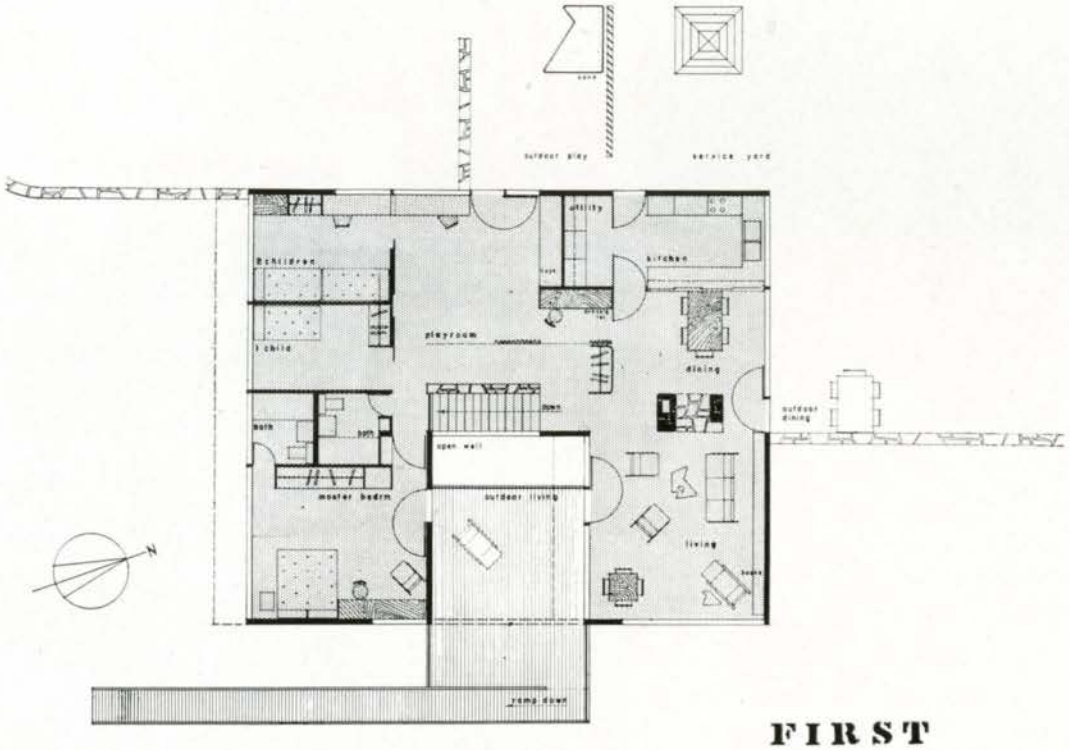
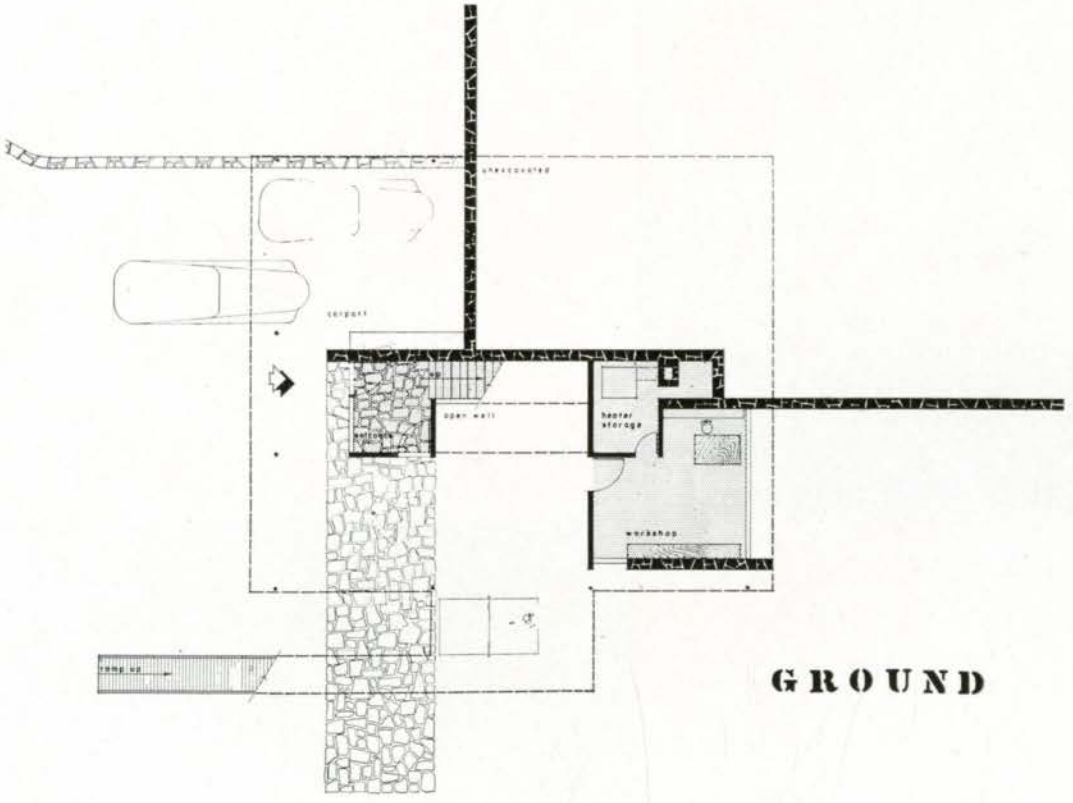
HOUSE IN FOXBOROUGH MASSACHUSETTS

HARRY SEIDLER
ARCHITECT

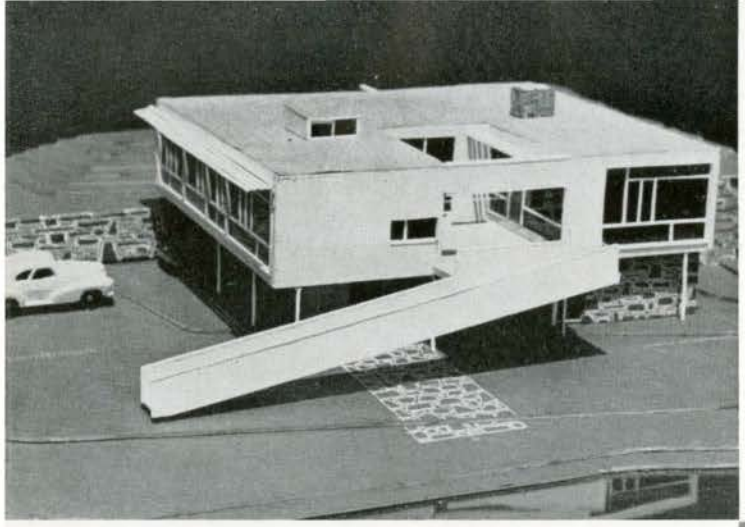
R. D. THOMPSON
ASSOCIATE

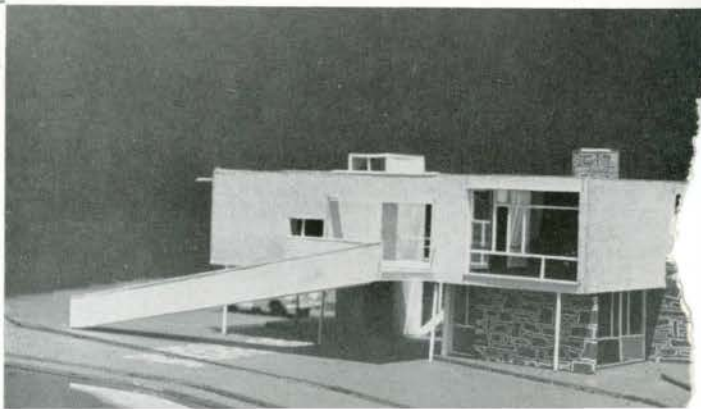


FIRST



GROUND





A house for a family with 3 young children, located at a wooded hill sloping East toward a lake and South toward marshland.

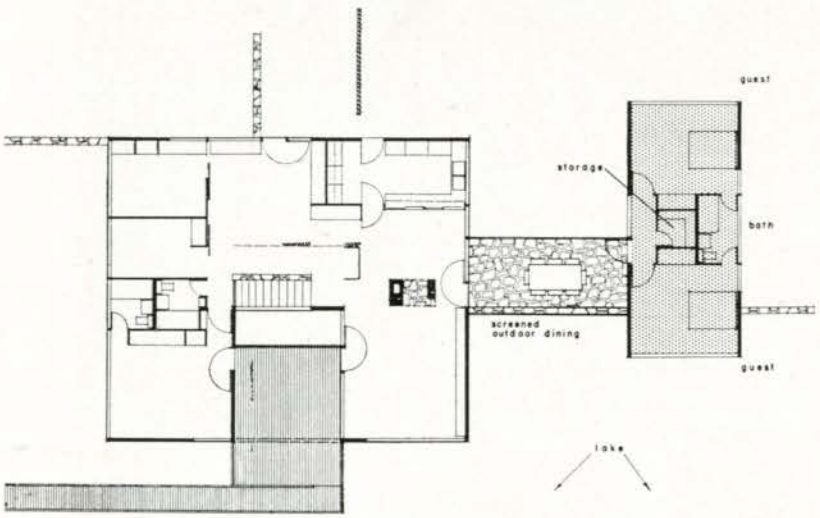
The essential character of a one storey house is maintained except for partial elevation to prevent dampness in the living areas, to gain better view of the lake and to increase exposure to summer breezes.

A flexible space is provided for all members of the family; for the children, by including their bedrooms with the playroom and for the adults by the possible combination of the playroom with the living area for entertaining. Separation of the outdoor areas on various sides of the house provides for outdoor play, easily supervised from the kitchen and removed from the waterfront. The hollow center of the house forms a windscreened adult outdoor living area in full view of the lake.

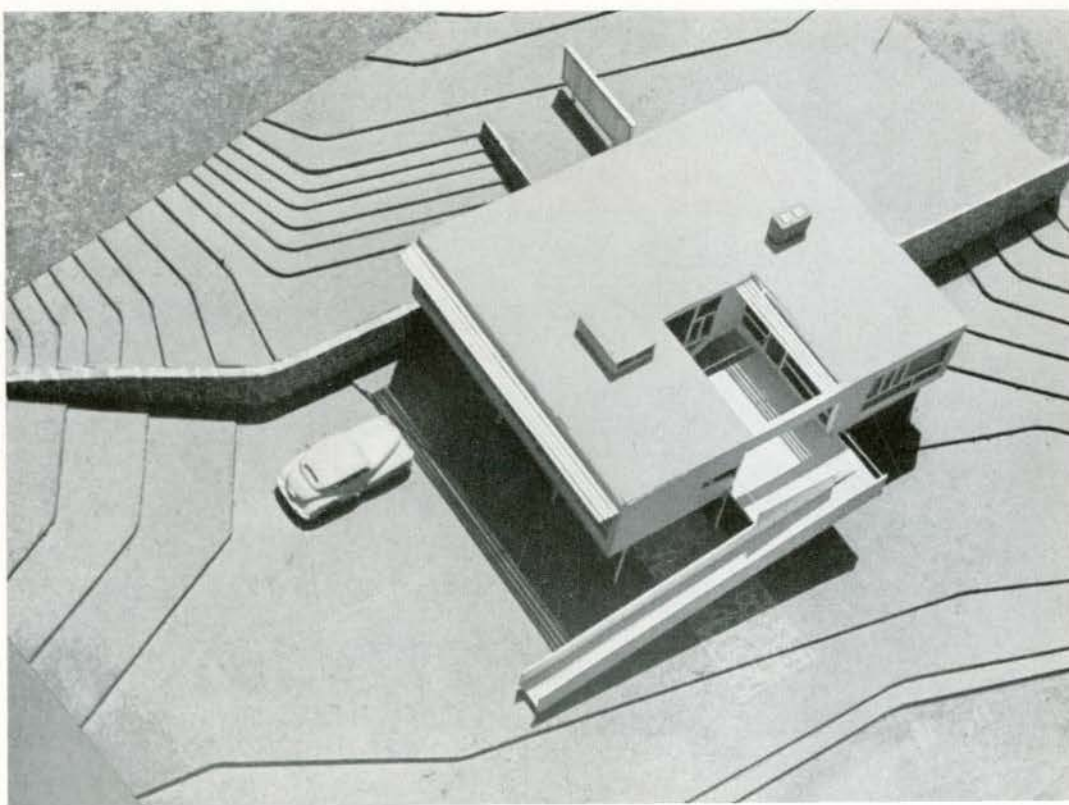
A future addition, cantilevered out toward the lake, will accommodate completely private quarters for weekend guests and a screened and covered outdoor dining area.

Aesthetically the building is a simple rectangular mass, lightened by a dissolved center and partial elevation from grade. The horizontal penetration of the mass is completed by a two storey open wall piercing the core of the building vertically.

The rigid angularity of the whole composition is emphasized by the contrast of the strong incline of the ramp leading to the lake.



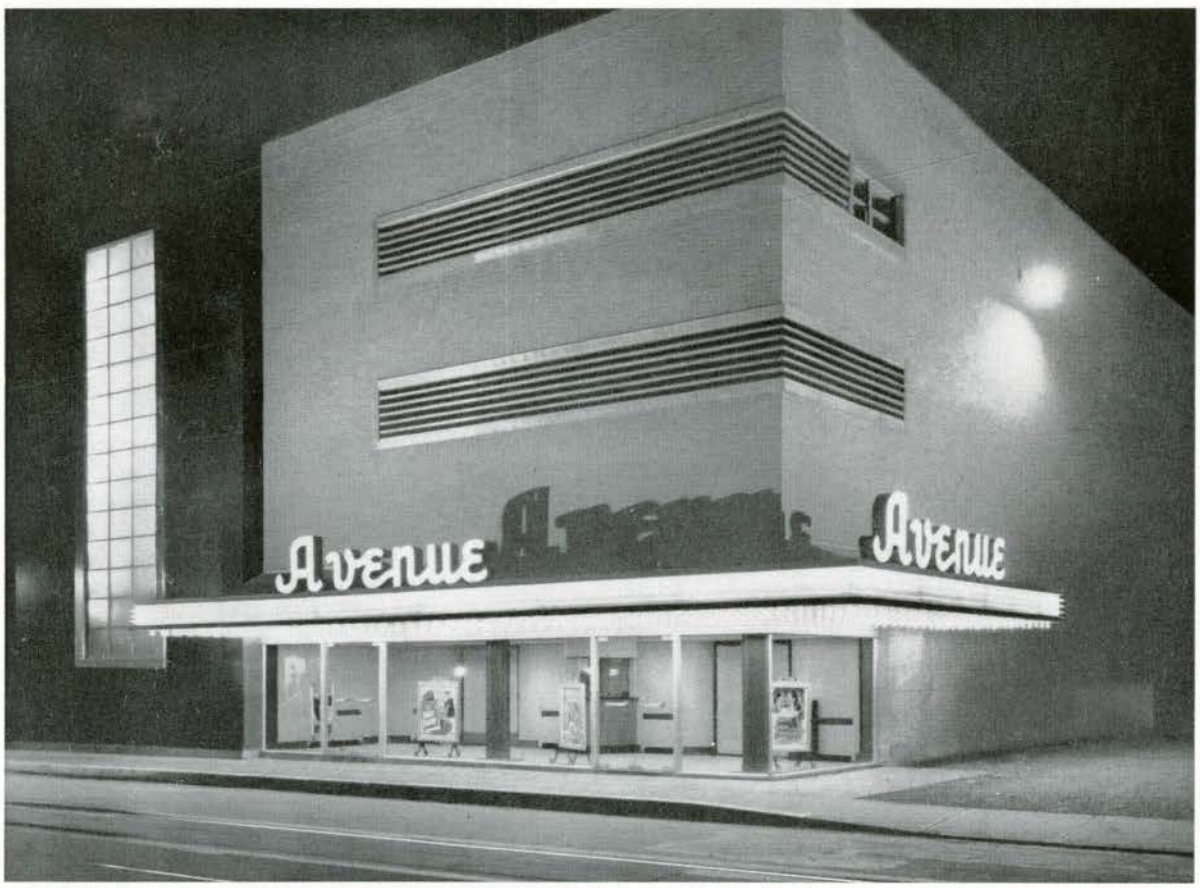
FUTURE GUEST WING



AVENUE THEATRE, MONTREAL, QUEBEC

LUKE, LITTLE AND MACE, ARCHITECTS

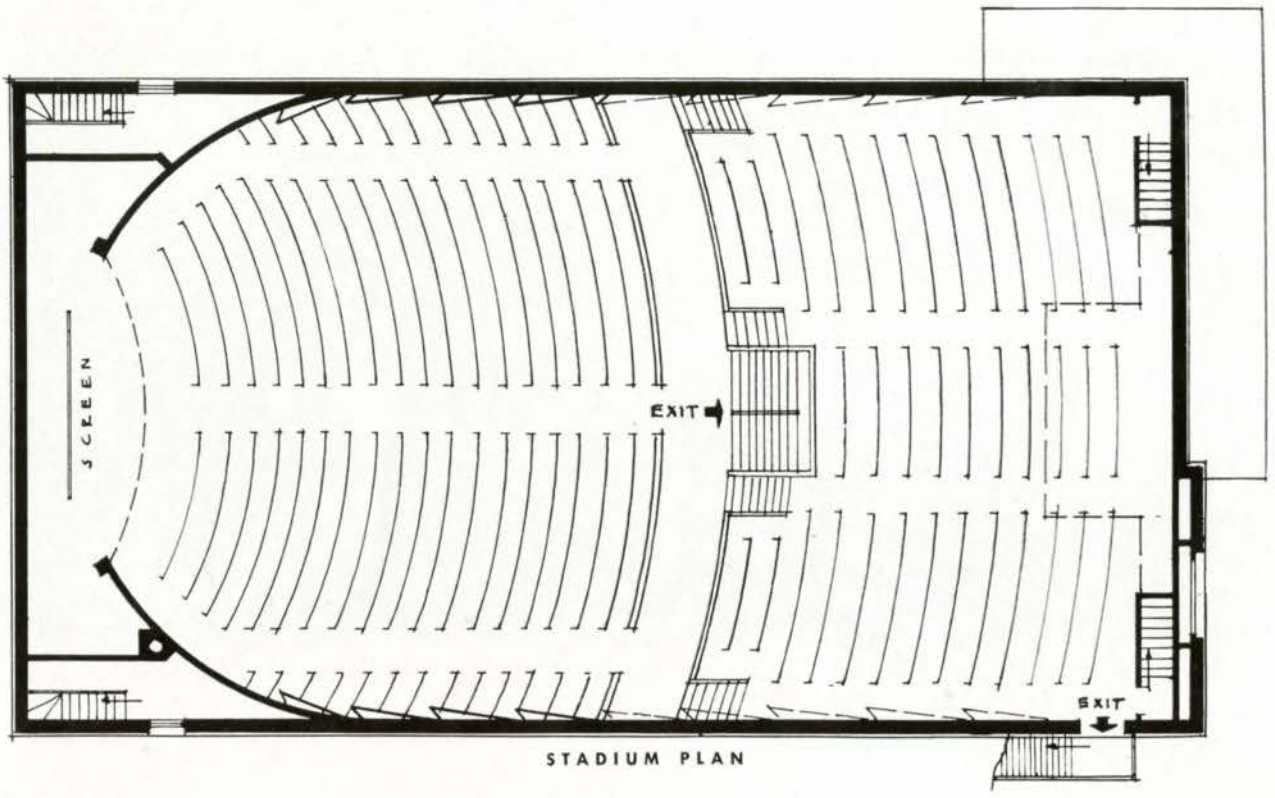
STAGE



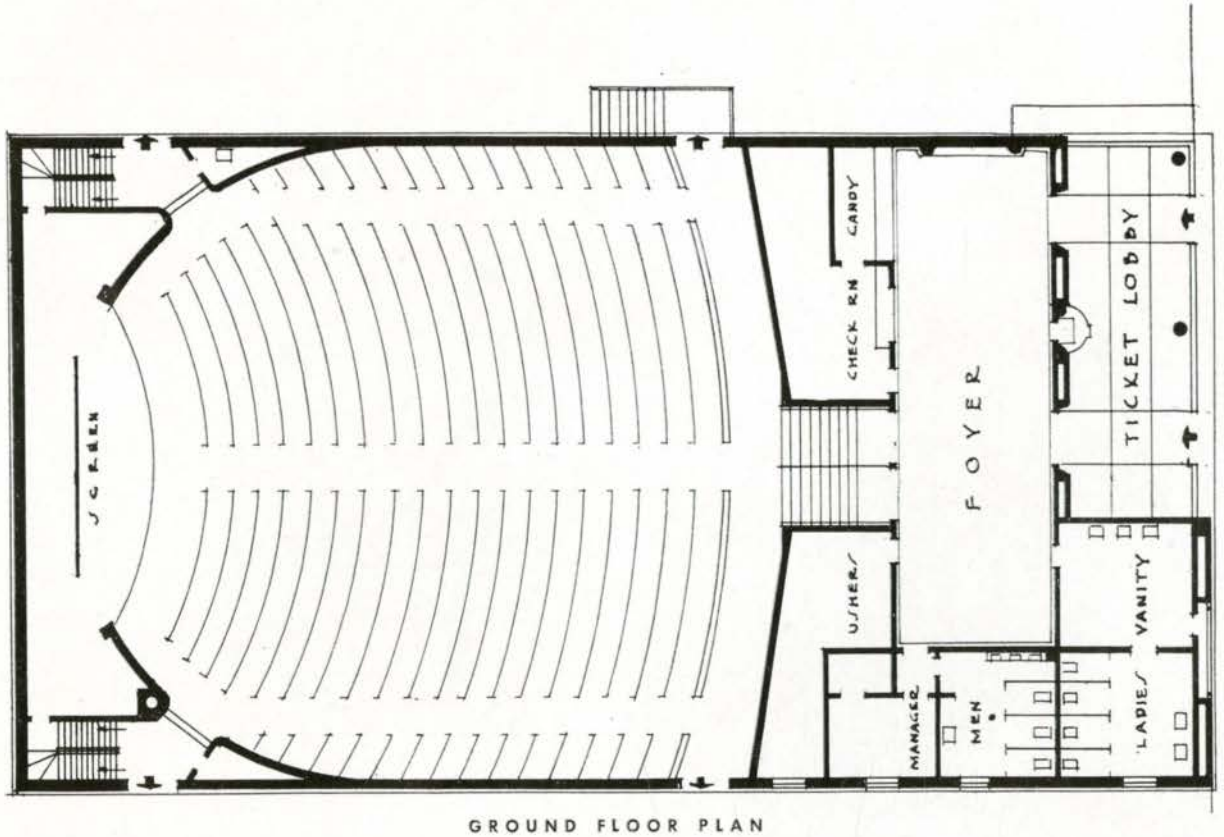
This building, completed July 1947, is a stadium type cinema situated in a better class residential district. Of reinforced concrete construction, it embodies three new features, a visual front without the usual display frames and program lettering, wave break interior treatment for acoustics and push-back seating.

The ceiling of the lobby has been sound deadend by the use of flock applied directly to the plaster.

LOBBY



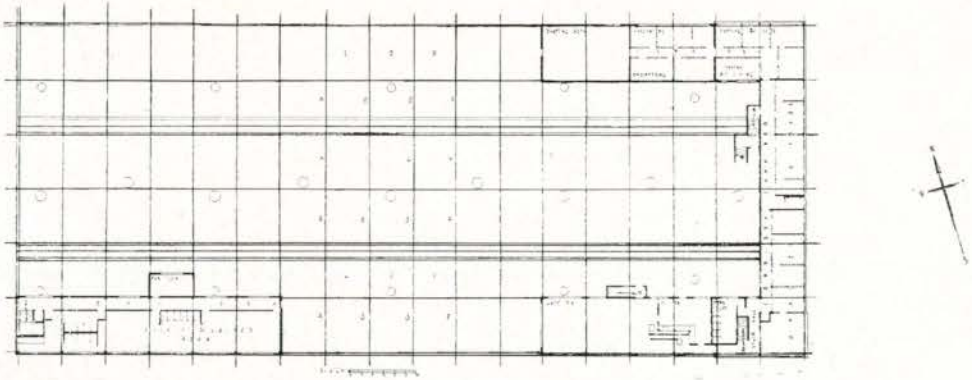
STADIUM PLAN



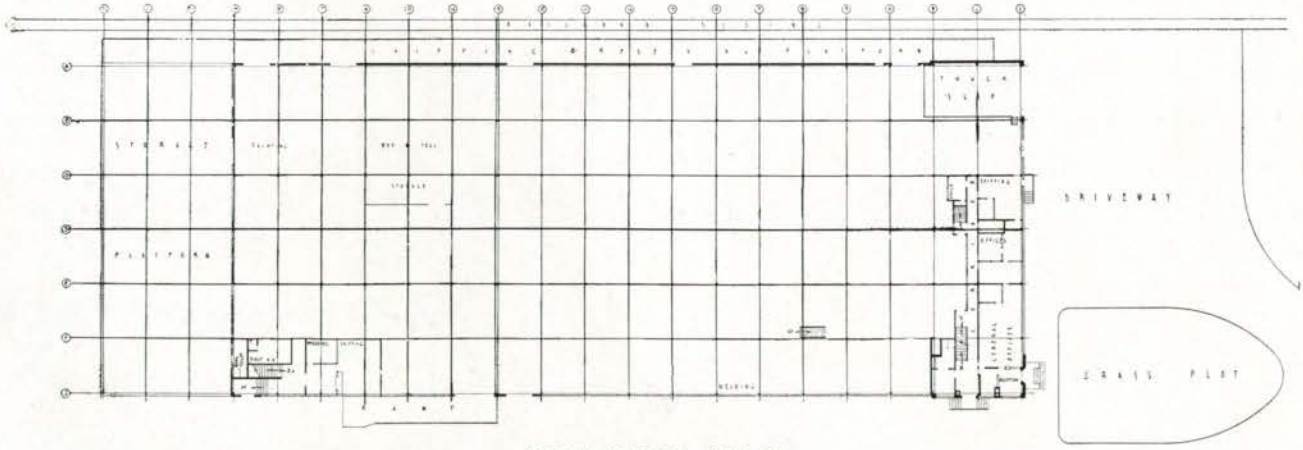
GROUND FLOOR PLAN

H. H. ROBERTSON CO. LIMITED — THOMAS IRWIN & SON LIMITED, HAMILTON, ONTARIO

PRACK AND PRACK, ARCHITECTS



SECOND FLOOR PLAN



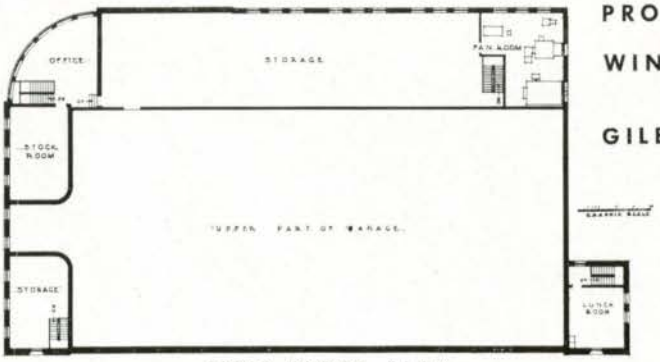
FIRST FLOOR PLAN

HEAVY
MANUFACTURING
AISLE

AERIAL VIEW

PROVINCIAL GARAGE
WINNIPEG, MANITOBA

GILBERT PARFITT, ARCHITECT



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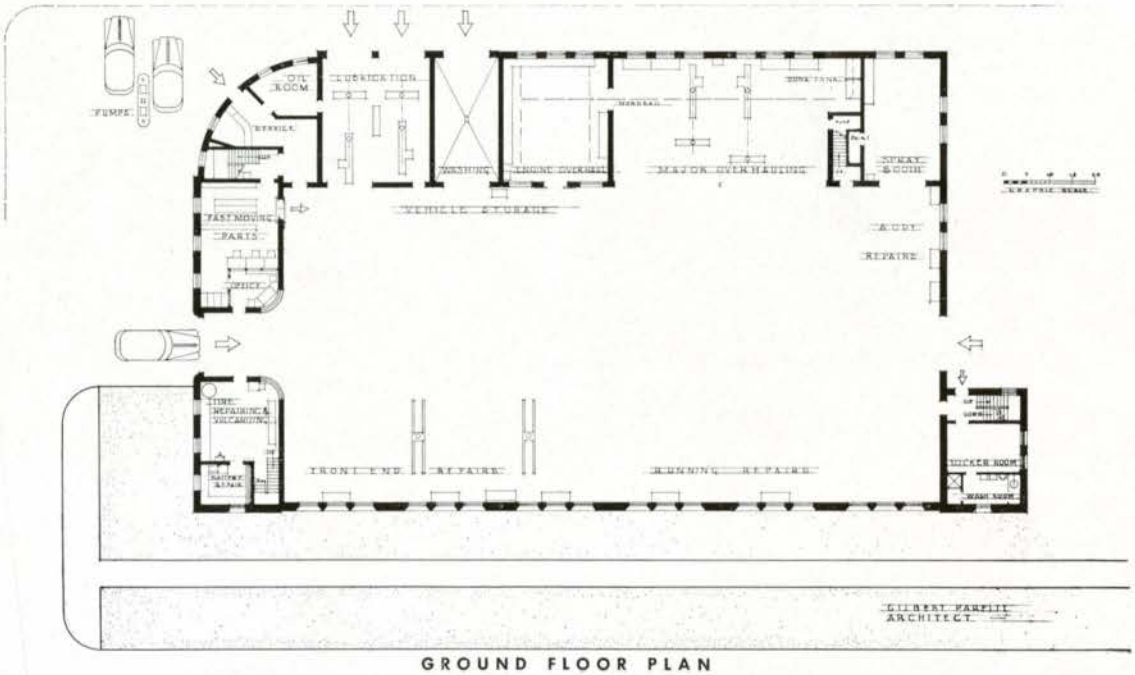
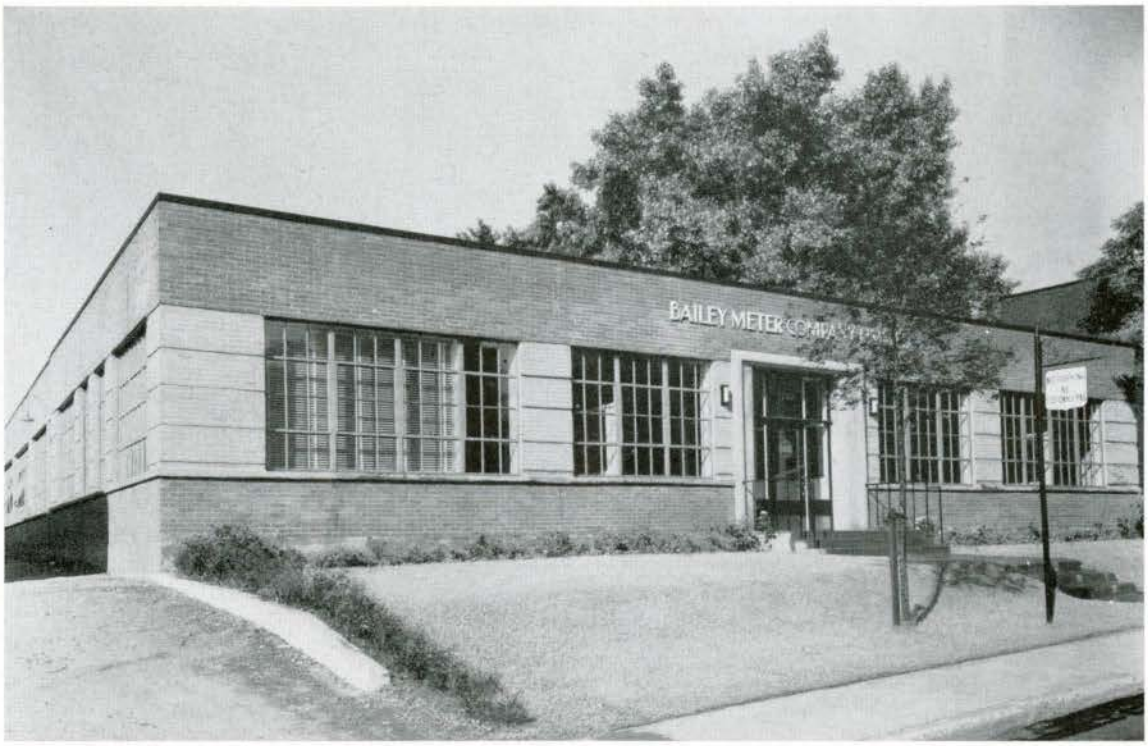


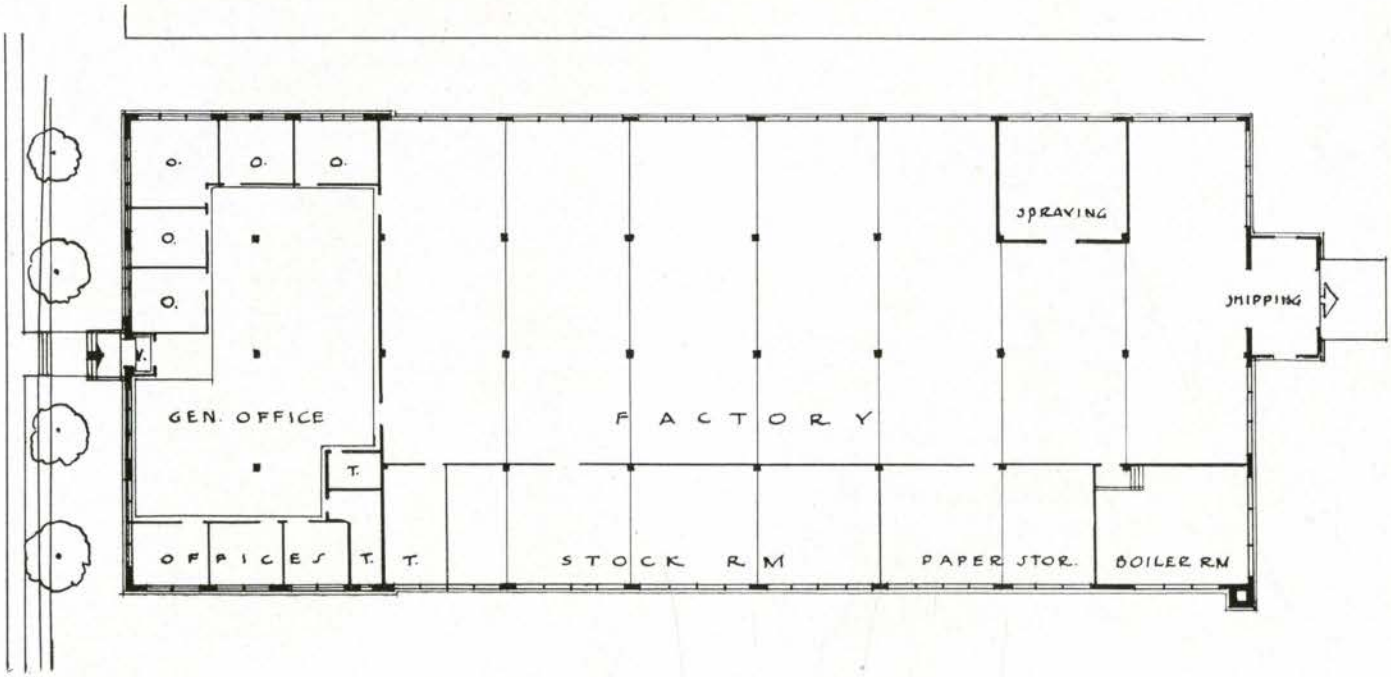
GROUND FLOOR PLAN



BAILEY METER COMPANY LIMITED, WESTMOUNT, QUEBEC

LUKE, LITTLE AND MACE, ARCHITECTS

This reinforced concrete building is a typical of many small manufacturing buildings in Canada. The office at the front of the building is in constant touch with the assembling activities in the manufacturing area. Shipping and receiving is carried out at the rear.



A COUNTRY CLUB IN NEW HAMPSHIRE

By JAMES E. SECORD

The following is a First Special Thesis Problem submitted in 1947 by Mr. Secord for a Masters Degree in Landscape Architecture at the Graduate School of Design, Harvard University.

FOREWORD

The purpose of this report, is to describe and illustrate the various site planning and Landscape problems involved in designing this Country Club, and to explain the Landscape Architect's solution to the problem. Sketches are used where possible, to illustrate the ideas as conceived by the Landscape Architect, and are introduced here in an attempt to get away from the all too frequent *"magic word picture method"* which in the end, may prove a false illusion and, a disappointment to the average client.

This book is designed for the purpose of a more intimate study of the problem, and it is felt it might be passed among club members freely. It could even be taken home, where the family might browse through it at leisure. Ordinary plans are bulky, awkward things, and even at best are incomprehensible to the ordinary man on the street.

THE PROBLEM

A brief description follows of the factors as laid down by the student in his "Statement of the Problem," which was submitted to the Chairman of the Department of Landscape Architecture, Graduate School of Design, Harvard University 6th, January, 1947.

A newly formed Country Club of fifty members (All young business men of Boston and vicinity) have purchased some Forty or Fifty acres of land on a small lake near Franconia, New Hampshire. It is their intention to develop a Club, which would be principally a week-end Club that would be open all year round. Because of its proximity to a fine 18 hole golf course, and being in the heart of the ski country the activities within the Club will not be elaborate but of a more intimate nature, however, a Stable for ten to fifteen horses will be required, a boat house for punts, canoes and sail boats and a Beach House.

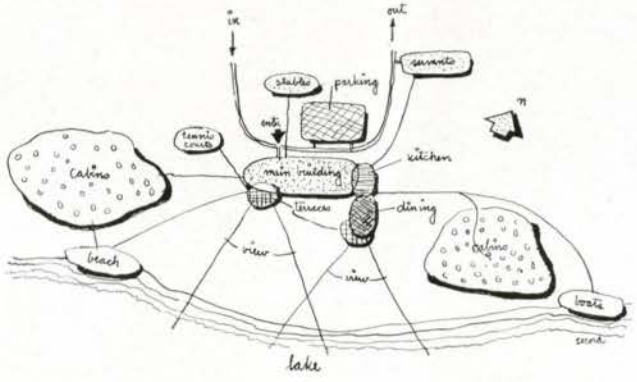
Fairly extravagant Terraces off of the main Club House are requested so that in the more pleasant months of the Summer, outdoor dining, and lounging, can be undertaken on "the grand scale."

Cabins for thirty families are requested, as well as fifty rooms in the main building, the rooms it is felt would only be used to capacity on Skiing week-ends. Three Tennis Courts and six Squash Courts are to be provided. Living quarters for twenty servants, as well as storage space for power mowers, storm windows etc. Parking space for seventy-five cars.

The view to the South over the Lake is a particularly fine one, and the club members feel every means must be taken to fully exploit this feature. The preservation of the White Pine—White Oak character which exists, is requested.

General

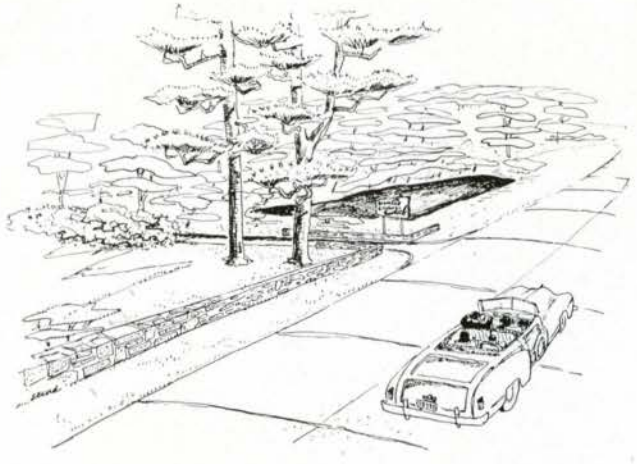
The Landscape Architect and the Architect have made several joint visits to the property, so that the actual siting of the various buildings is one of compromise *e.g.*:—the Architect felt that the main building could be nearer the lake, but, as the Landscape Architect pointed out, this involves many grading problems in order to facilitate ease of approach, and a reasonable physical relationship with other buildings and activities.



A diagram of the mechanics involved as agreed upon by the Architect, and Landscape Architect, is outlined graphically above.

Main Entrance

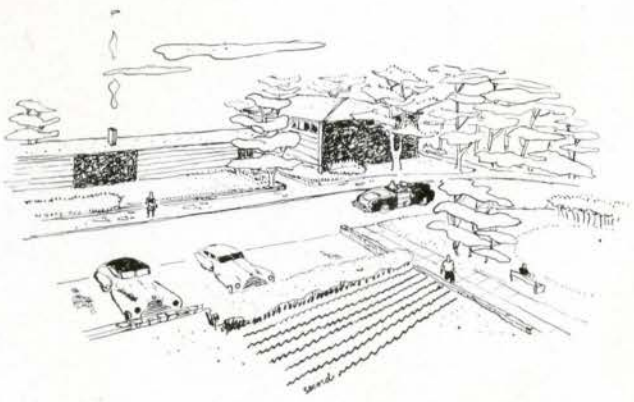
A small duck pond backed by birch and mountain laurel, serves as a marker for the main entrance, low stone walls also help to define the opening. Two sizable White Pine, together with rhododendron flanking the main drive, produce the main planting effects.



The drive curves throughout its length, having easy grades (not exceeding 4.5%). It is 18 feet in width, and surfaced with bituminous paving.

Traffic Circulation

Although a right hand approach to the main building is desirable and in this case possible, the advantages gained by the left hand approach seem to outweigh the advantages of the former. An approach up the natural swale over easy grades, the view over the lake at the top, and the ease of service to both kitchen and servants quarters seem sufficient to dictate its position. The servants quarters are sufficiently screened so that the main building is the dominant one on approach.



Perpendicular parking is straight forward and ample to accommodate up to 90 cars. The Round-about is two way to facilitate an easy drop—park—pick-up sequence.

Club House Entrance

Because of the change in grade from the turn-around to the lounge terrace level, the main entrance is on the upper level of the two story lounge, connected inside by broad shallow steps. A low stone wall backed by a barberry hedge, and a bed of annuals serve to punctuate the walk to the main door. A coloured canvas canopy may be added later, should overhead protection be desired.

A practice Putting Green in the end of the turn-about is convenient to the entrance, and parking lot, its shape also lends itself to the circular roadway which encloses it.

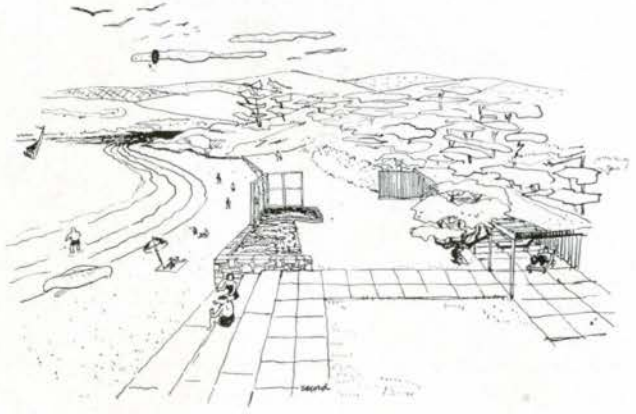
Club House and Terraces

The Club house and Terraces are of sufficient height above the lake to catch Summer breezes. A natural rock outcropping figures to a large degree in the outdoor design areas of the main building. The outdoor lounge terrace "grows" out of this outcropping while it is "clutched" by a stone retaining wall, which in turn evolves from the rock below. Because the main sitting Terrace faces South, awnings protect a good deal of it from the hot Summer sun. Pines have also been spared on the Terrace to add additional shade and psychological coolness.

The view from the main terrace is "vast" and "deep." The Dining terrace is separated by a difference in elevation from the main terrace and commands a Westerly view of the lake. Other than potted plants on the terrace, no attempt was made to provide flower beds, as the Landscape Architect felt, the view, the Pines, and terrace treatment were in their simplicity, quite enough to command the situation.

Beach Development

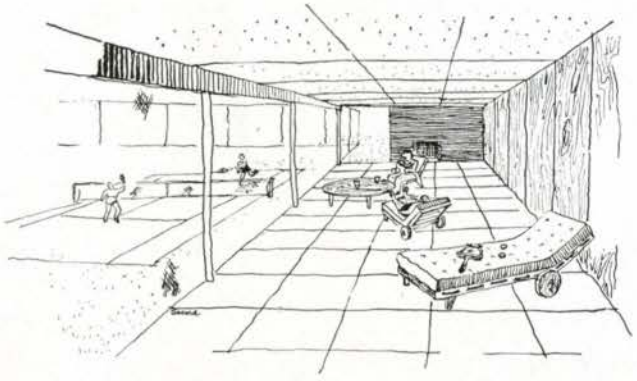
As expressed by the club committee, the beach was to be rather highly developed, with provisions for more than just bathing. The Landscape Architect tried to incorporate three main features in this beach design: (a) A sand area. (b) A grass area. (c) A paved secluded area with shelter, and possibly some flower beds.



These three features evolve around the locker room and bar. A two-foot retaining wall separates the sand from the grass area, while they are connected with broad steps of exceptional width designed to accommodate "sprawlers."

Tennis Courts

In order not to disturb the existing grade the Tennis Courts were placed on the only level spot on the property, they are oriented North-South and are accessible through a small shelter just off the West end of the turn-around.



Although the location of the Tennis Courts does not particularly relate to the other sports, its proximity to the showers in the main building seems to be the important relationship, and one that is maintained here.

Cabins

The Cabins are of two family type, provided to "sleep" families over Summer week-ends. All meals are served in the main dining hall thus no cooking facilities (other than a hot plate) are provided in the Cabins. Two bedrooms, a living room, a bath and a screened porch are included in the plan.

The Cabins are grouped in two densely wooded areas of Pine and Oak, both areas command a view to the

lake, while they are connected by path with the main building. Rhododendrons have been planted throughout the areas, to act as partial screens.

Boat House

Is located about as far to the East of the main club house, as the beach is located West, (about 200 yards) a sizable dock with five berths to accommodate sail boats, extends some 75 feet out into the lake.

No provision has been made for harbouring of speed boats as the lake is considered too small, to allow the operation of high powered boats, and even the use of out-board motors should be restricted, thus making it safer for sailing, canoeing, and swimming.

Skeet Range

The Skeet Range is located in a small bay on the eastern edge of the property. The clay birds will fall over the lake, red flags will be displayed on the rock outcroppings on either side of the range, to warn boatmen that the range is in use, because of the distance involved there is no real danger, even if anyone should disregard these warnings.

A trail sufficiently wide to accommodate a station-wagon, will be cleared and graded, to provide a means of servicing the range, and as a means of access.

Plant Materials

Very little new plant material has been added, only in the way of shrubs. The White Pine and large White Oaks have been maintained wherever possible. Rhododendron is used on either side of the entrance drive, and as a screen in various places. Grey and paper birch are used here and there to add lightness.

Red and Yellow Dogwood, and Japanese Yew are used for winter colour. A system of bridle paths encircle the property and link up with the main trail that follows the highway East and West.

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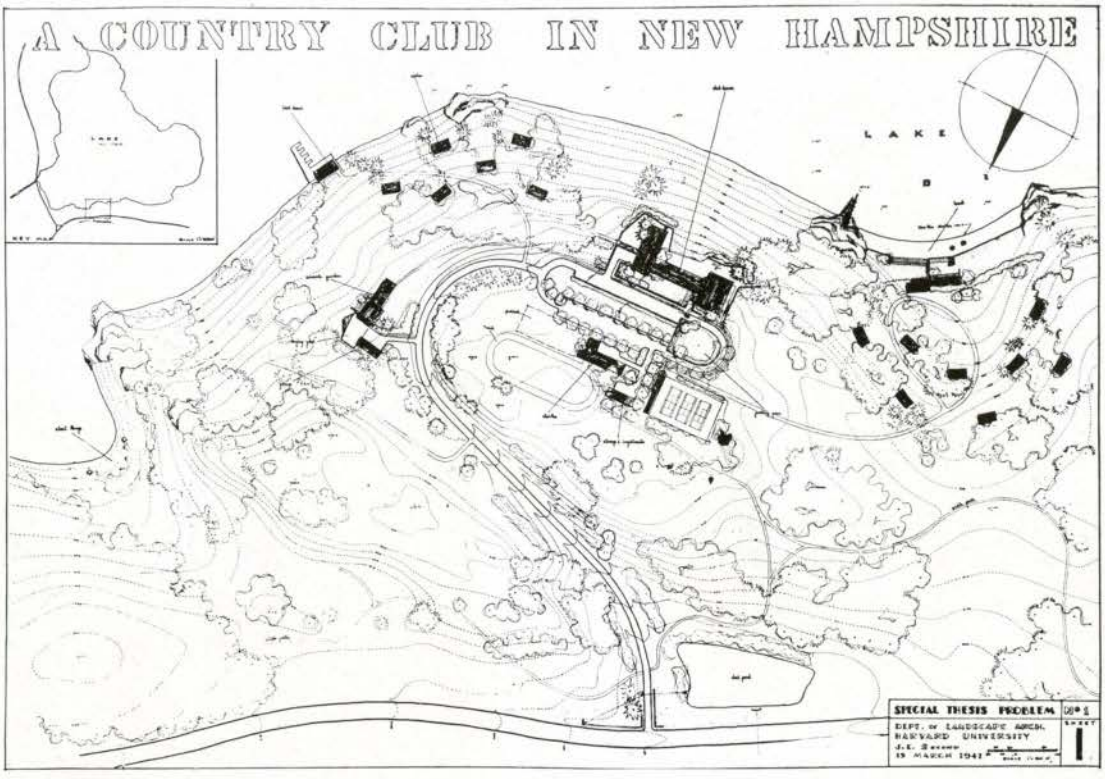
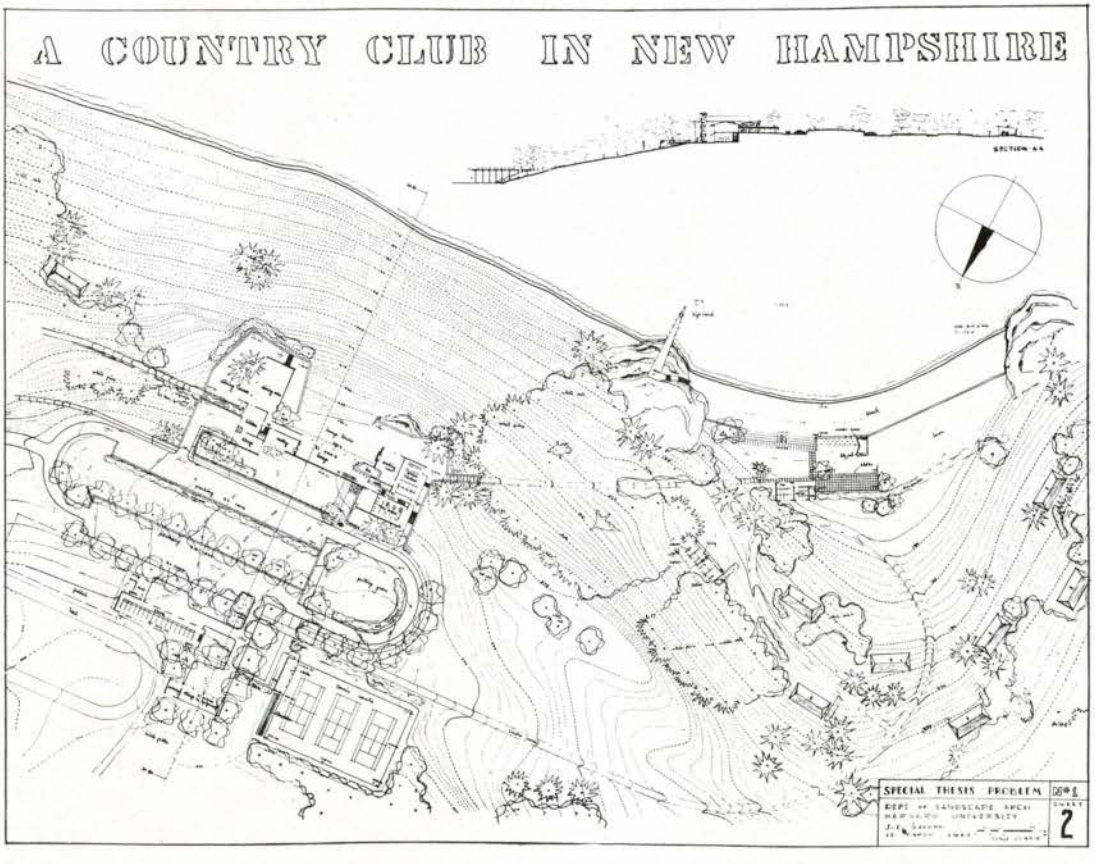
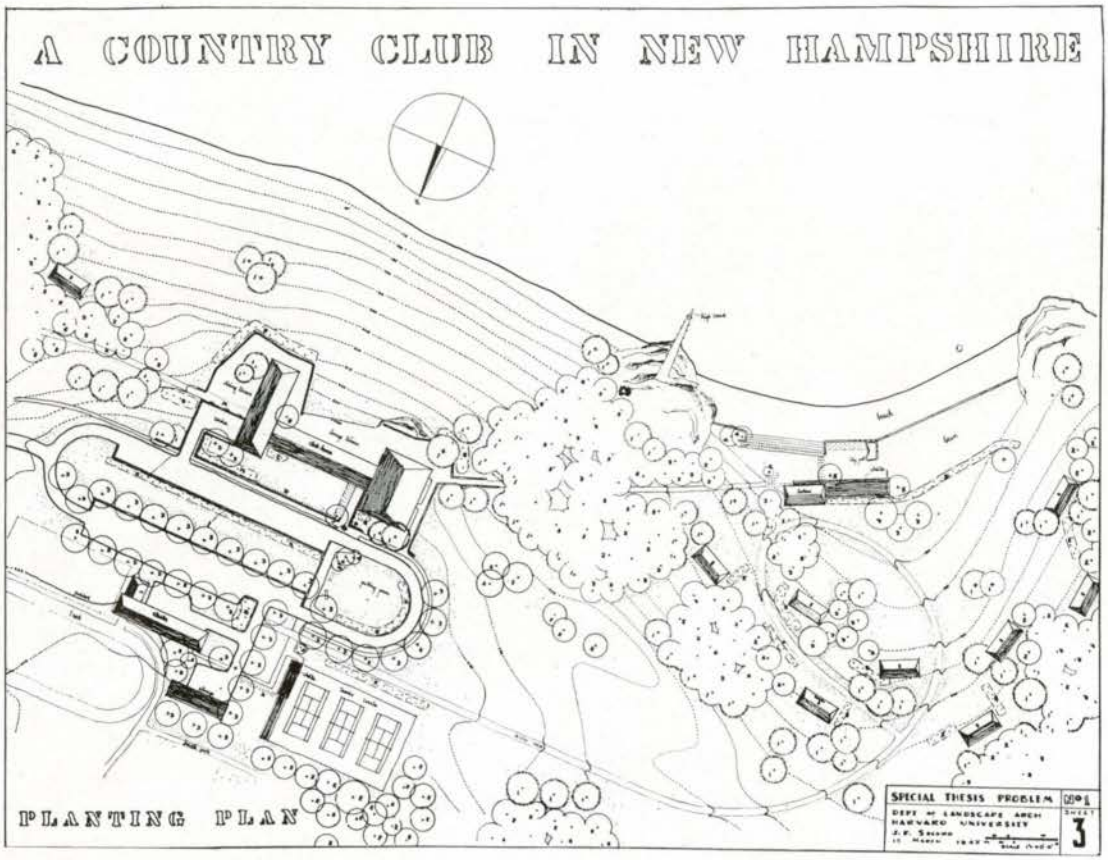
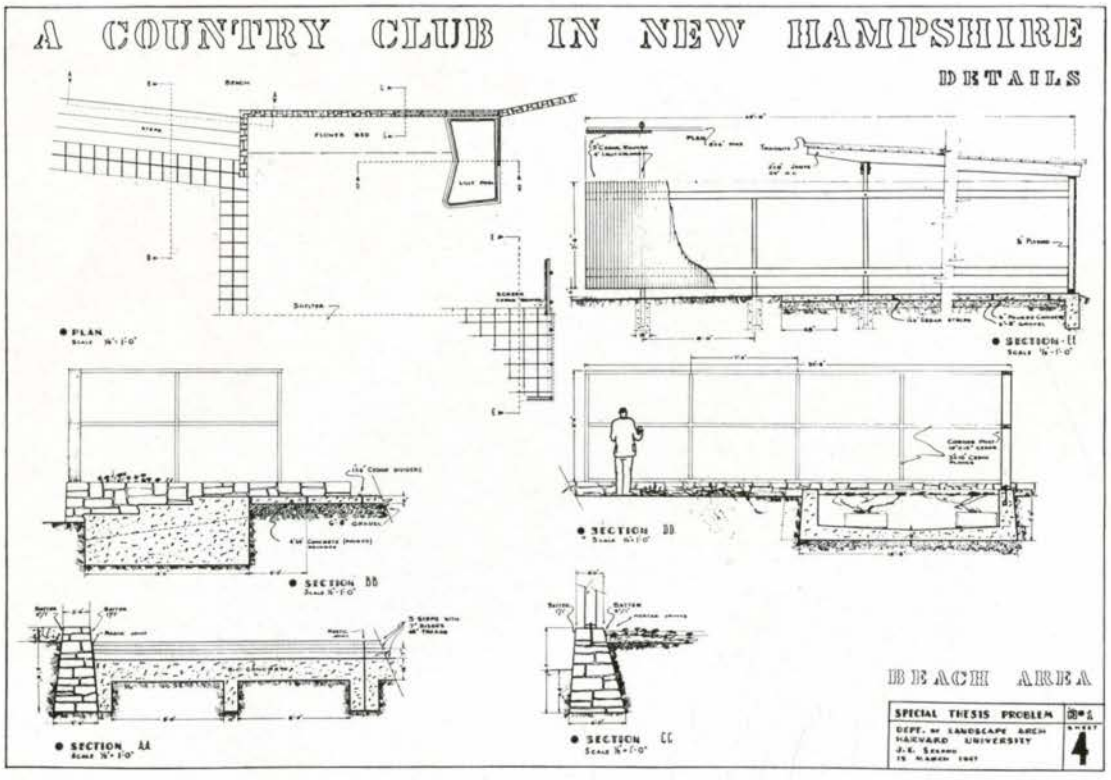

A COUNTRY CLUB IN NEW HAMPSHIRE
LAKE
SPECIAL THESIS PROBLEM
DEPT. OF LANDSCAPE ARCH.
HARVARD UNIVERSITY
19 MARCH 1941
SHEET
1


A COUNTRY CLUB IN NEW HAMPSHIRE
SECTION A-A
SPECIAL THESIS PROBLEM
SHEET
2


A COUNTRY CLUB IN NEW HAMPSHIRE
PLANTING PLAN
SPECIAL THESIS PROBLEM
DEPT. OF LANDSCAPE ARCH
HARVARD UNIVERSITY
3


A COUNTRY CLUB IN NEW HAMPSHIRE
DETAILS
PLAN
SECTION AA
SECTION BB
SECTION CC
SECTION DD
SECTION EE
BEACH AREA
SPECIAL THESIS PROBLEM
DEPT. OF LANDSCAPE ARCH
HARVARD UNIVERSITY
4

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ALBERT JAMES HAZELGROVE

A notice in the *Journal* announcing the elevation of the Honorary Treasurer to the position of President of the Royal Architectural Institute of Canada usually calls for something in the nature of a panegyric on the editorial page. That has been our ancient custom, which from now on we shall discontinue. It it were true of his predecessors in office that such a practice was unnecessary, it is equally true of Mr. Hazelgrove. His position in the architectural hierarchy is too secure to require a eulogy, he is too close a friend of his contemporaries in the profession for his virtues to require enumeration, and he has a devastating wit, both in speech and in print, that he would put to maximum use if anything written here were not factual and to the point.

It is unfortunate that this notice does not appear in the students' issue of the *Journal*, because Mr. Hazelgrove, more than any other practising architect in Canada, sets an example of service to the profession, which the young architect might study and endeavour to follow. His professional life seems to have been divided almost equally between, on the one hand, the affairs of the Ontario Association of Architects, the Registration Board, the College of Fellows, the Royal Architectural Institute of Canada, and, on the other, his practice. For our new president, the practice of architecture is inextricably linked with service to the profession – indeed practice and service are, for him, synonymous terms.

We remember the late Sir Charles Reilly saying that, before he took a new member on his staff, he interviewed the candidate's wife. He felt that he was employing a team (even if one of them was, for the most part, unseen), and that the success of the one was dependent to a large extent on the co-operation of the other. No one could carry out her duties with more grace than has Mrs. Hazelgrove as wife of the President of the O.A.A., or likely will as wife of the President of the R.A.I.C. These, however, are high points in the life of her husband. Over the years, how often has she been the wife of the chairman of a committee absent on duties that will raise the standard of plumbing throughout the dominion, or the annual fees of members of the O.A.A. These are the necessary, but humdrum, affairs that put the acid test on Sir Charles Reilly's theory. So well has Mrs. Hazelgrove stood that test that it is hard to write of her husband's achievements without mentioning her as part of them.

Presidencies and official honours mean little to a man as modest as Bert Hazelgrove. For him, we would guess, there are but two honours that have lasting value – to be a citizen of Ottawa, and to have the respect and affection of his fellow architects. The former is a statistical fact, and we can assure him of the truth and sincerity of the latter.

Editor

NEWS FROM THE INSTITUTE

OLYMPIC ARTS COMPETITION

Some time ago, all the members were advised of the Art Competition which is being held in conjunction with the Olympic Games in London in the summer of this year, and were sent the Programme and regulations governing the exhibition. At that time, the Institute appointed judges to handle the preliminary Canadian judging of entries in the Architecture Division, and to select the works to represent Canada in the final contests in London.

The Board of Judges has now reported to the Institute concerning the results of their preliminary judging of entries. Two projects have been selected to be sent to London to represent Canada in the Architecture Section of the Art Competition and Exhibition of the XIV Olympiad. These are the entry of the firm of Marani and Morris of Toronto - the Grandstand at the Canadian National Exhibition; and the entry of the firm of Kaplan and Sprachman of Toronto - a Golf and Country Club. The Institute wishes to extend their sincere congratulations to these two firms, and to offer their best wishes for every success in the forthcoming Competition.

1949 ANNUAL ASSEMBLY

The unprecedented success of the Annual Assembly this year has been the subject of discussion by the Executive Committee of the Institute, and it was decided that arrangements for next year's Assembly should be got under way as soon as possible. Inquiries are being made as to the possibility of holding the Forty-second Annual Assembly of the Institute at the General Brock Hotel, Niagara Falls, towards the end of February, 1949.

ALBERTA

The R.A.I.C. is understood to be enquiring into the question of the requirements that are set out in the various provinces for admission to their architectural associations. It is right to ensure that adequate standards of knowledge be demanded in all the provinces. It is probably necessary and desirable that there be local variations. The present standards appear to be at least fairly similar in all provinces. It will be well too that all should not only be equivalent but also that all should be the best and of the most suitable kind that can be devised and reasonably demanded.

Where students of accepted architectural schools are concerned it is usual that graduates be admitted to the association after having served for a stated period in the office of an architect who is himself a member of the R.A.I.C. These candidates have passed not simply a set examination but a long series of examinations and they have also had systematic training in a number of subjects involving draughting and other methods of study.

It seems clear that one set examination in which seven or eight subjects have to be covered in a few days cannot, of itself, be a satisfactory test of a candidate's knowledge and abilities. This is particularly the case in such subjects as Historical Architecture and Design. Short test examinations are somewhat more applicable to subjects which involve merely the knowledge of facts and the application of calculations. For this reason it would be advisable to introduce more of the nature of thesis and other "testimonies of study" into the examinational system.

The subject of facilities for study is at the present time under considerable strain. Universities and technical schools are crowded and there are many young men whose circumstances prohibit their making use of even these inflated facilities. With such, home study becomes the sole resource. For this purpose it happens that there is a great dearth of books. I had occasion recently to recommend for purchase by the public library a dozen standard and not highly expensive books on historical architecture.

It was found that every one of these twelve books is out of print. This scarcity probably does not apply to engineering handbooks. Publishers catalogues of these arrive daily and they are probably in good supply. I am afraid that some will say that this is all that is really essential; that a knowledge of historical architecture is a secondary matter. The special aim of this letter is to represent that the knowledge of historical architecture is no secondary matter but one of first rate importance. Of all the subjects set down for examination this is the only one that has a cultural influence. The rest are factual and material. Men who have no personal culture may, no doubt, be of great practical service and may earn large fees. But they have not the breadth of view and the wide human sympathies to which all professional men ought to aspire and without which they can hold no enduring respect in the minds of their fellows. Medical students begin their courses with cultural studies. It is a complaint in the engineering departments of our universities that many of their graduates lack the fundamental elements of culture. Architectural students have, I understand, so far escaped this censure. What is there in their courses besides this study of historical architecture to supply the defect? I have moved a good deal amongst students of architecture and of engineering and I have the feeling that these live in the here and now and those have all time and the wide world ever in their consciousness. Not less but more of cultural study is the need of our day. Stu-

dents either of engineering or of architecture would be well advised to take a degree in Arts before taking up their specialty. What the R.A.I.C. may be able to effect in improving the standards of the architectural profession I do not know but I hope that they will not neglect cultural standards.

Cecil S. Burgess

MANITOBA

At the March council meeting of the Manitoba Association of Architects the thought was voiced by the president, Mr. Moody, and acclaimed by council members, that this year the monthly provincial letters should come from the hand of not one but all councillors in turn. It was felt that this would not only lighten the task for one particular individual, but that it would give an opportunity to bring variety and different opinions to the column. Needless to say, I was delegated to start the series.

An inaugural meeting was held this past month by the Arts Council of Manitoba; an organization being formed by seven chartered societies in Manitoba which are directly connected with the Arts. Mr. R. Patton was elected chairman of the council and Mrs. S. Newton, secretary-treasurer. Affiliation with the Canadian Arts Council is being applied for and it is felt that closer cooperation and mutual aid and understanding will be created between the member organizations involved. The member organizations are: The Manitoba Drama League, Canadian Authors Association (Manitoba Branch), The Federation of Canadian Artists (Manitoba region), The Manitoba Society of Artists, The Winnipeg Ballet Club, The Civic Music League and The Manitoba Association of Architects.

The Winnipeg City Council, after considerable debate, has voted to have Winnipeg's "Metropolitan Plan" continued at least until this year's end and will reach a definite conclusion as to its future by the end of September. That there should have been any real doubt as to the value of this organization is hard to understand. The excellent work done by the Metropolitan Planning Committee and the Winnipeg Town Planning Commission since active work started some three years ago, cannot perhaps be immediately seen, and certain members of the city council apparently find it difficult to understand the real importance of the work being done. A greatly expanded public relations program must be put into action in the next few months which will strike home, not only to our "far-sighted" city fathers, but also to the general public as a whole. This is essential to ensure the continuance of our planning body.

Official authorization has been received from the University board of governors by Manitoba's Department of Architecture, to make some rather radical changes to the present courses. The present four year Bachelor of Architecture course is to be extended to five years with senior matriculation as the entrance prerequisite. The three year Interior Decoration course will be extended to a four year "Interior Design" degree course with junior matriculation as the entrance prerequisite. The new changes will go into effect in the fall term of this year. Veterans, however, will be allowed to enter into the old four or three year course if they choose to do so.

The Planning Research Center of the University of Manitoba has completed material for two booklets which will be published within the next month. One will be on "Community Centers" (rural non-electrified)—a planning guide which explains the basic approach to Community Center planning and gives some suggestions on construction. The other will be on "Rural Housing"—a series of ten house plans and alternates with sketch perspectives. These booklets will be distributed by the Departments of Agriculture of Alberta and Manitoba, the Department of Reconstruction and Rehabilitation of Saskatchewan and by Central Housing and Mortgage Corporation any branch. The Planning Research Center, under the direction of Professor J. A. Russell is under the sponsorship of the Prairie Rural Housing Committee which in turn is sponsored by the governments of Alberta, Saskatchewan and Manitoba and the Central Housing and Mortgage Corporation.

Ernest J. Smith

THE SCHOOL OF ARCHITECTURE

THE UNIVERSITY OF MANITOBA

ANNOUNCES

the following changes in the courses in Architecture and Interior Design, effective for the season 1948-1949

Department of Architecture

Architecture will become a five-year course, leading to the degree of Bachelor of Architecture.

The entrance requirement will be Senior Matriculation (Arts I or Grade XII, Manitoba, or equivalent).
Students who have completed the former Pre-Architecture course prior to September, 1948, may enter the first year of the old or new course.

Veteran students entering in September, 1948, with Senior Matriculation may enter the first year of the old or new course.

All others must present Senior Matriculation credit and enter the first year of the new course.
During the session 1948-1949, the first year of the new course and all four years of the old course will be offered.

Department of Interior Design

Interior Decoration will become a four-year course to be known as Interior Design and leading to the degree of Bachelor of Interior Design.
The entrance requirements will be Junior Matriculation (Grade XI, Manitoba, or equivalent), with an average of at least 60%.

During the session 1948-1949, the first year of the new course and the second and third years of the old course will be offered. In addition, a special fourth year will be offered to enable holders of the Diploma in Interior Decoration, who so desire, to obtain their degrees.

ONTARIO

The President and Council,
Ontario Association of Architects,
Toronto, Ontario.

Gentlemen,

As a Delegate from the Ontario Association of Architects to the 41st Annual Assembly of the Royal Architectural Institute of Canada, held in Ottawa on February the 23rd, 24th and 25th, it is with particular pleasure that I report to Council and offer the following observations.

It would appear that we have had this year one of the largest registrations in the history of the Institute. The attendance of architects from the Maritimes and from the West Coast together with many members from all of the other Provinces helped in no small way to make this Assembly the success that it was. The various meetings were all well attended and a keen interest was shown in the operation and affairs of the Institute.

The President and the Executive Committee presented most favorable reports on all activities during the past year, and the retiring President is deserving of our highest commendation for his work during the past two years. Perhaps the brightest star was the report of the Editorial Board of the Journal. Great credit is due the Editor, the Publisher, and the Chairman and members of the Board for a work well done, and many favorable comments were heard of the high standard that has been achieved in the production of the Journal. The financial statement was a 'honey' and the Institute has every reason to be proud of this accomplishment. Plans already made for 1948 augur well for another successful year.

Some question was raised as to holding the Assembly at the beginning of the week rather than at the end, as in the past. It was explained that facilities and accommodation at the Chateau, with the House in Session, more or less dictated the policy adopted this year.

The three seminars were very well attended and proved of considerable interest to the members. It was the general feeling of the meeting that this feature should be carried forward into future Assemblies.

The visit to the National Capital Planning Service and to the National Film Board Offices to view the progress that has been made on the National War Memorial project was most interesting, and M. Jacques Greber was a genial host to the members in describing the developments to-date.

Following the pleasant time spent at the Officer's Mess, Lansdowne Park, on the Tuesday evening, several of the younger members were enquiring as to the traditions attending The Andrew Cobb Memorial Dinner. I do think that an explanation should be given so that those who never knew or heard of the late Andy. Cobb, hailing from Halifax with his musical cigar box violin, might be informed of his loyalty to the Institute, and of his many fine qualities as an architect and the respect in which he was held by his colleagues.

The writer would be remiss if some reference was not made to the efforts of the Ottawa Chapter in entertaining the members throughout the period of their sojourn in the Capital. We are grateful for their kindness and hospitality.

In our new President, A. J. Hazelgrove, F.R.A.I.C., who is so well known to the Ontario members of the Institute, and who has contributed greatly of his talents in the advancement of the profession, and of his personal charm, we have a capable 'Master for the Ship' during the coming year. It is assured that under his wise counsel and guidance, the Institute will flourish and grow in stature.

It was the writer's privilege to once again extend to the Institute, on behalf of the Members of the Hamilton Chapter, O.A.A., a cordial invitation to hold the next Annual Assembly at Niagara Falls, and we sincerely trust the Executive Committee may find this invitation acceptable.

Respectfully submitted,
W. Bruce Riddell

CONTRIBUTORS TO THIS ISSUE

James Govan

At present Chairman, Toronto Chapter, Ontario Association of Architects, and a member of Committee on Designing, Constructing and Equipping of Public Hospitals in Ontario—a Committee appointed by the Lieutenant-Governor in Council.

Architectural apprenticeship in Scotland and training in Glasgow School of Art.

Came to John M. Lyle's office in 1907 and appointed architect to Provincial Secretary's Department in 1912 to plan and design Whitby Mental Hospital and other work in Public Institutions under that Department.

Engaged in research studies 1925 to 1929, when partnership Govan and Ferguson formed, now enlarged to Govan, Ferguson, Lindsay, Kaminker, Maw, Langley and Keenleyside.

Has acted as consultant on Hospital and Institutional developments for:--State of New York and New York City Hospital Commission. State of New Mexico. Welfare Department, City of Cleveland, Ohio. National Committee on Prisons and Prison Labour, New York. Mr. C. F. Neergaard and Associates, New York.

Material in paper "Newer Construction Methods and Materials" developed from data given on slides at meeting of Royal Canadian Institute, Toronto, Feb-

ruary 14th, 1948. Also author of numerous papers requested by Architectural, Engineering, Medical and Surgical Societies and other Technical organizations in the U.S.A. and Canada.

Robert F. Legget

Director, Division of Building Research, National Research Council. Graduate, in Civil Engineering, of the University of Liverpool. Came to Canada in 1929, after experience in Westminster and Scotland. Worked on heavy construction until 1936. On the staff of Queen's University, 1936-1938. On the staff of the University of Toronto, 1938-1947, latterly as Associate Professor of Civil Engineering. Author of technical papers and of "Geology and Engineering."

James E. Secord

Writer of the special thesis problem "A Country Club in New Hampshire," was born in St. Catharines. After matriculation there, he proceeded to the Ontario Agricultural College at Guelph where he obtained the degree of B.S.A. in Landscape Architecture, 1939.

From there he went to the Graduate School of Design at Harvard University in the pursuit of a Master's degree in Landscape Architecture. While there he did some work with Mr. Daniel Kiley, M.L.A., of Washington, D.C., and also enjoyed a summer at Black Mountain College, N.C., through a scholarship in architecture.

His studies were interrupted in the Fall of 1941 when he joined the Engineers of the Canadian Army. During his army service he spent three years overseas as a staff officer in camouflage work.

In November, 1945, he was discharged and returned to Harvard to complete his studies. It was during this period that the thesis problem was written. Having obtained his M.L.A. degree, he returned to Canada, and is at present associated with W. A. Salter, M.R.A.I.C., at St. Catharines.

BOOK REVIEW

STRESS ANALYSIS AND DESIGN OF ELEMENTARY STRUCTURES

By James H. Cissel
2nd edition, John Wiley and Sons, Inc., New York, N.Y.
Chapman & Hall, Limited, London, England. Price $5.00

A text-book written primarily for those studying structural engineering as a minor subject, it deals in a comprehensive and competent manner with statically indeterminate as well as elementary structures.

Work in timber, reinforced concrete and structural steel does not differ appreciably from that found in many other books while the new chapter on light gauge steel structures has not appeared before on this continent in a structural engineering text.

Inclusion of exercise problems enhances the usefulness of the book.

C. F. Morrison

DATA BOOK FOR CIVIL ENGINEERS, FIELD PRACTICE

By Elwyn E. Seelye
John Wiley and Sons, Inc., New York, N.Y.,
Chapman & Hall, Limited, London, England. Price $4.50

A compilation of field practice including data on:— surveying, mapping, construction stakeouts, grading, fill consolidation, soil classification, load tests on soil, pile driving, timber grading, paving, the design and control of concrete mixtures.

Most of this material would be of no particular interest to most architects.

C. F. Morrison

THEORY OF LIMIT DESIGN

By J. A. van den Broek
John Wiley and Sons Inc., New York, N.Y.
Chapman & Hall, Limited, London, England. Price $3.50

This treatise considers the strength criterion of a structure to be "safe deformation" rather than "safe stress." In many instances the two criteria would give the same answer while in others, particularly statically indeterminate arrangements the difference is significant.

Since this concept of the performance of structures is not considered in most specifications it would be of interest to most architects only in an academic way.

C. F. Morrison

NOTICE

After considerable research and testing, the Canadian Institute of Steel Construction has sponsored a method of designing structural steel beams supporting reinforced concrete floor and roof slabs in which the concrete slabs are considered as a structural part of the combined section.

In order to facilitate design by this principle, the Institute has recently published a book giving the structural properties of various rolled beams in combination with concrete slabs of different thicknesses and concrete grades.

Examples of various design problems are worked out in the book showing the savings in the weight of steel which can be expected. These savings range from 8% to 26% depending on the conditions. In some cases, there is the added advantage of a reduction in depth.

At this time, when supplies of structural steel are limited, engineers will see the wisdom of making each ton of steel do the maximum possible amount of work. Composite design is a very effective and simple method to achieve this end.

The new handbook is available to designers upon application to the Canadian Institute of Steel Construction, 124 Bloor Street West, Toronto.

Facts by Pilkington about Glass
FOR ARCHITECTURAL STUDENTS

NO. 18 — GLASCON* (CONTINUED)

INSTALLING GLASCON IN BULKHEADS

Glascon is ideally suited for bulkheads in remodeling of storefronts, theatres and office buildings where the existing old bulkhead may be removed, because it offers many distinct advantages over other materials for bulkhead work.

ADVANTAGES OF GLASCON BULKHEADS

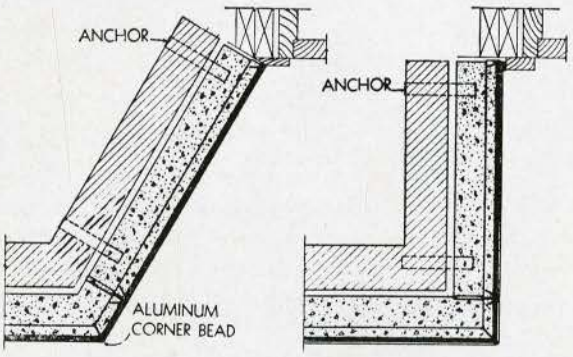
1. The solid construction of Glascon greatly increases the strength of the glass and offers durability like other solid masonry materials.

2. Glascon has a colorful, sparkling surface for which glass is unequaled and a surface which is easily kept clean.

3. Glascon bulkhead construction offers ease of installation of store-front metal settings. Installation is completed by fastening directly to Glascon.

4. Ventilator grilles and receptacles for flush type hose bibs (furnished by others) can be cased into Glascon bulkheads.

5. Either 4″ or 8″ Glascon may be used in bulkhead construction. Where 4″ Glascon is used it is necessary to back it up with either 4 or 8 inches of other masonry. Eight-inch bulkheads are usually free standing (not backed up). The concrete back of Glascon may be cast to provide for show window joists at no extra cost. U-anchors are used in Glascon bulkheads to anchor into masonry backing or to provide running bond.



4″ GLASCON

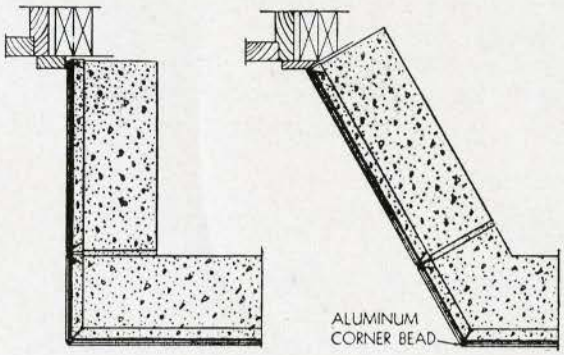
Extruded aluminum corner beads are furnished for angles from 90° to 140°. Mitered or polished round corners are not practical.

* *Registered Trade Name of* VITROLITE LIMITED. *Manufactured in Canada under Canadian Patent No. 372705.*

"Glascon" is the name by which the Libby-Owens-Ford product "Glastone" is known in Canada.

6. Glascon can be set at any angle required. Extruded aluminum corner beads are furnished for angles from 90° to 140°.

N.B.—It is suggested that the first 6″ of bulkhead above Grade be of Concrete or recessed Construction.

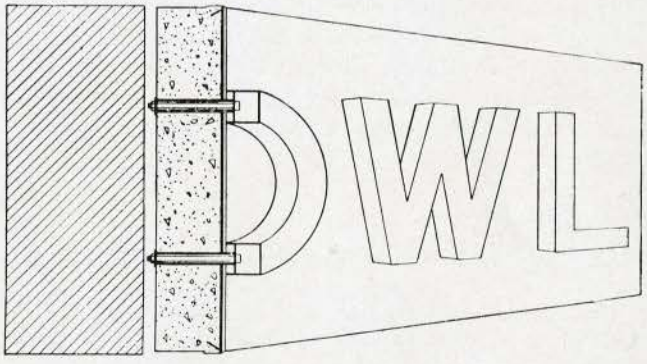


8″ GLASCON

ATTACHMENT OF SIGNS TO GLASCON

Signs on Glascon buildings are often large, often heavy in keeping with the solid massive scale of Glascon. Hollow metal, sheet metal or solid metal letters may be used. Arrangements can be made to properly fasten these signs to the Glascon either prior to the setting of it or after it has been erected and in place.

Laminated "VITROLITE" letters, monograms, trademarks, etc., may also be used on Glascon. Laminated letters are cut from 11/32″, 7/16″ or 3/4″ thick "VITROLITE" and are securely anchored and cemented to the Glascon.



Our Technical Department is always available for consultation regarding the properties and uses of Glass in architecture.

Reprints of this series will be supplied by request.—Write to our Head Office.