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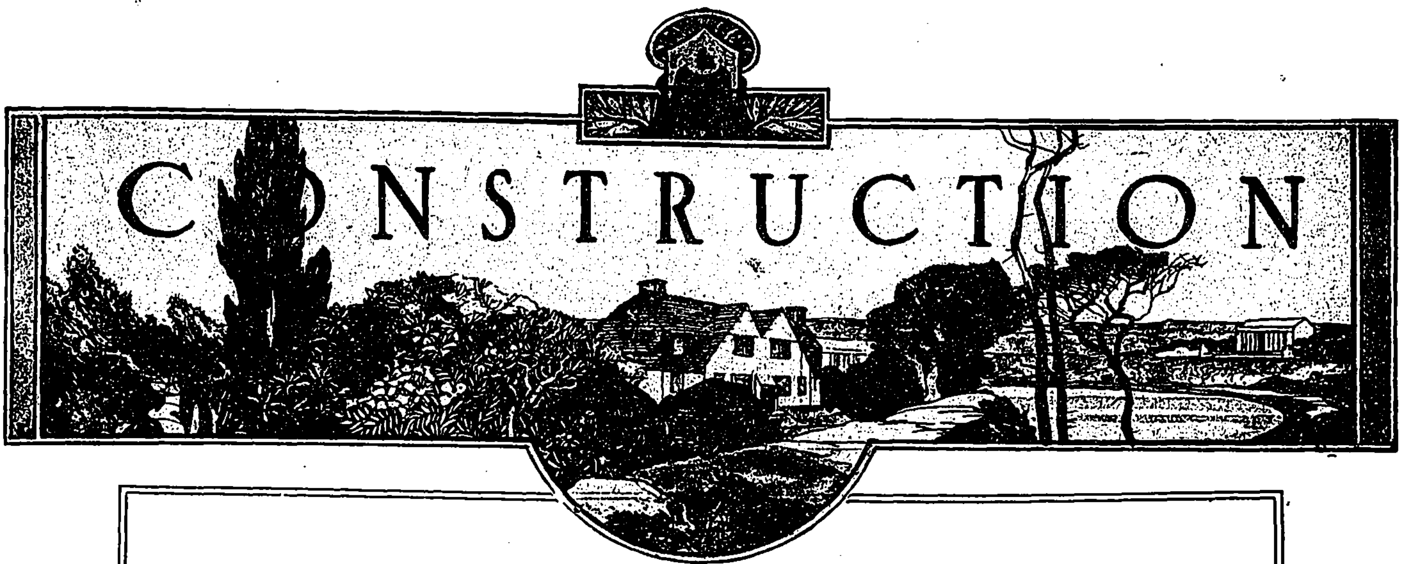

August, 1918 Volume XI, No. 8

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Full Page Illustrations

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES
MONTREAL NEW YORK

GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

PRACK & PERRINE, ARCHITECTS.

Canadian Westinghouse Office Building

INDUSTRIAL office buildings are assuming a character of considerable architectural importance. To-day the progressive manufacturer not only recognizes the advantage of a separate building for administrative purposes, but find it a matter of genuine business expediency. This incidentally vastly increases the architect's opportunities by widening the field for specialized work. The Canadian Westinghouse Company has just completed a noteworthy building of this type in connection with its large plant at Hamilton, Ont. It is a five-storey structure, 200 by 50 feet, especially planned to house their executive and office staff and involves a well-arranged system of offices and departments. In addition to the various offices the building also contains a good-sized auditorium, which is intended to be used for salesmen meetings and staff lecture work.

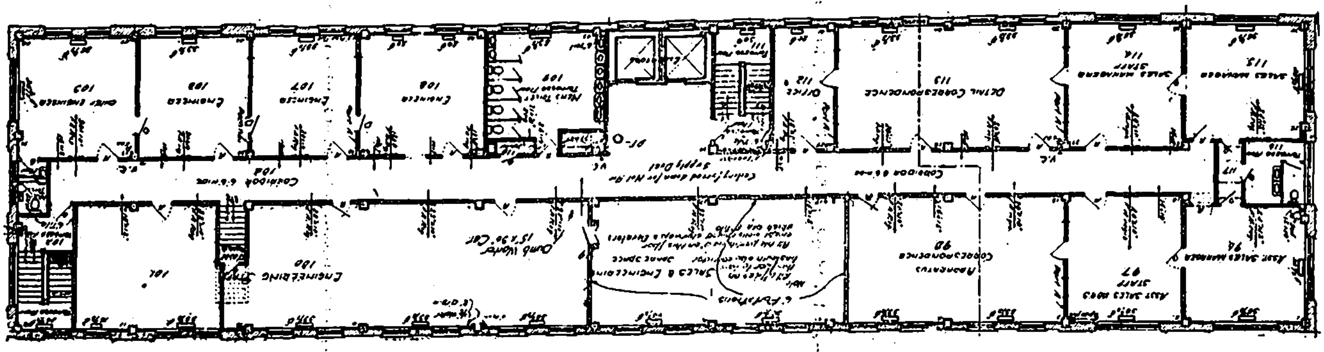
The building itself is constructed of reinforced concrete with hollow tile floors, and has a flat ceiling throughout. The offices are arranged on either side of a central corridor, and have a clear span of approximately 18 feet from the side of the corridor to the outside wall. The corridor itself is approximately 7 ft. 6 in. wide. This leaves the interior entirely without any exposed columns or ceiling obstructions. Besides the building is exposed on all four sides with the result that all offices have outside light.

All the main offices are finished with quarter-inch cork carpet over the concrete floors, including the large draughting room on the fifth floor. The executive offices, reception room and dining room, have mosaic floors with a marble cove. In the reception room, which is of spacious dimensions and has an enquiry desk or counter, the walls have a panelled marble dado, plastered above and finished with an enriched ceiling.

Ornamental plaster work is also used quite extensively in the auditorium, which is quite elaborate in its decorative character. This room, which is situated at the rear of the main floor, can be entered either from within or through a separate outside entrance, and seating accommodation is provided for over three hundred. The auditorium is approximately 50 feet square, the structural trusses spanning the full fifty feet, the second floor columns resting on top of the structural girders, thereby not interfering with the column spacing throughout the rest of the building.

Specially selected quarter-cut oak is used generally for the interior trim of the principle rooms. The President's and Vice-president's rooms have panelled walls and decorative plaster ceilings. In the President's room is a fireplace designed in character with the architectural treatment of the room. The dadoes of all corridors, stair wells and toilet rooms, as well as those of the executive offices and special

ENTRANCE HALL.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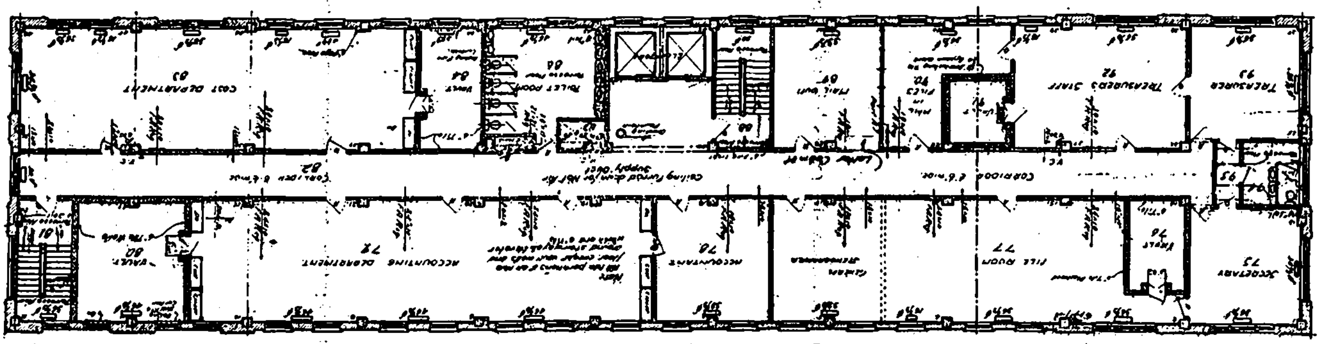
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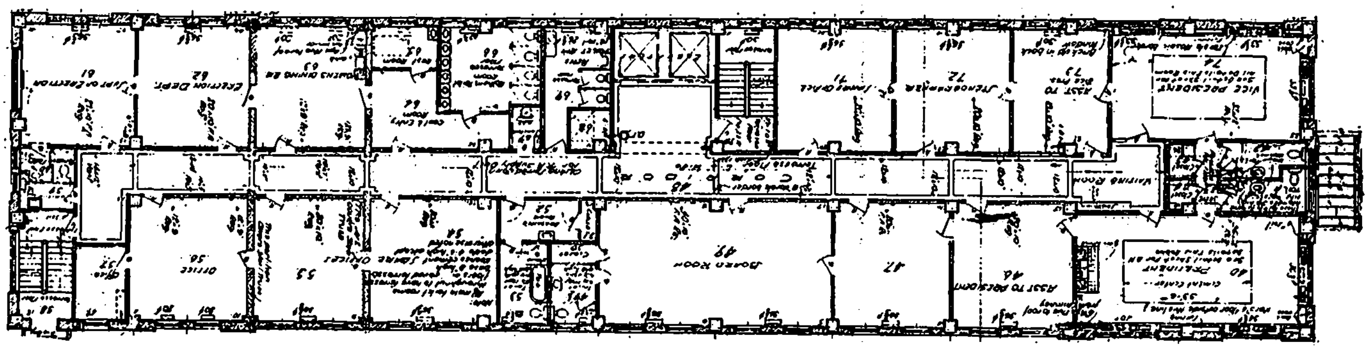
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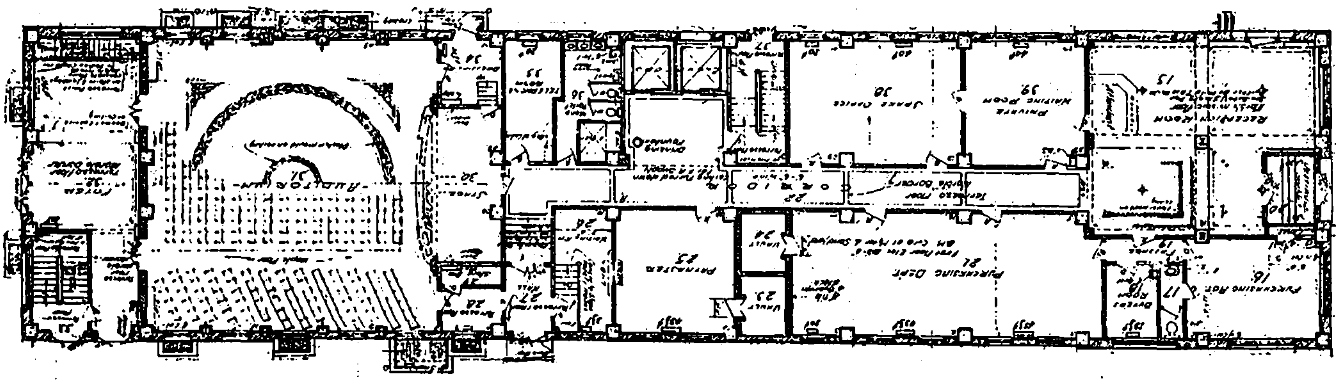
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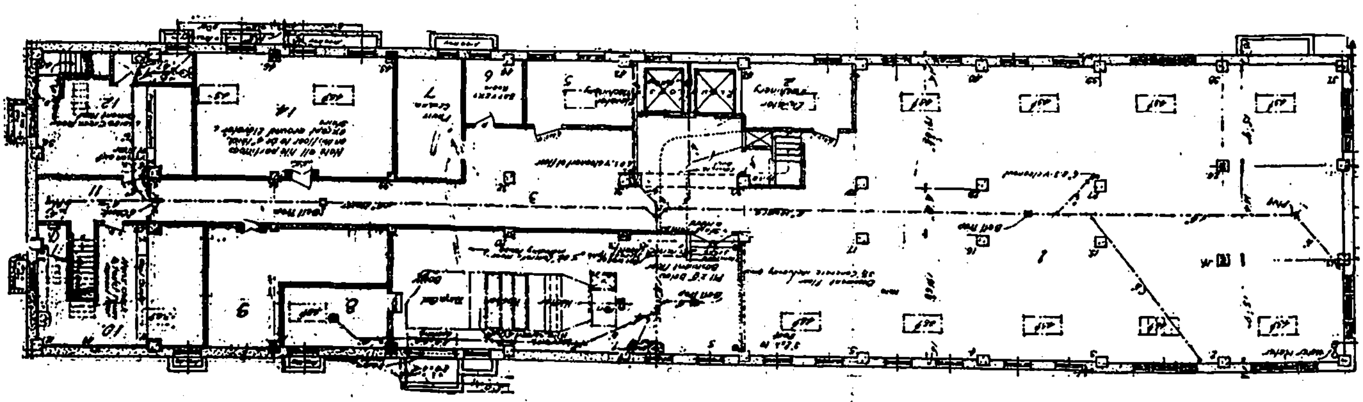
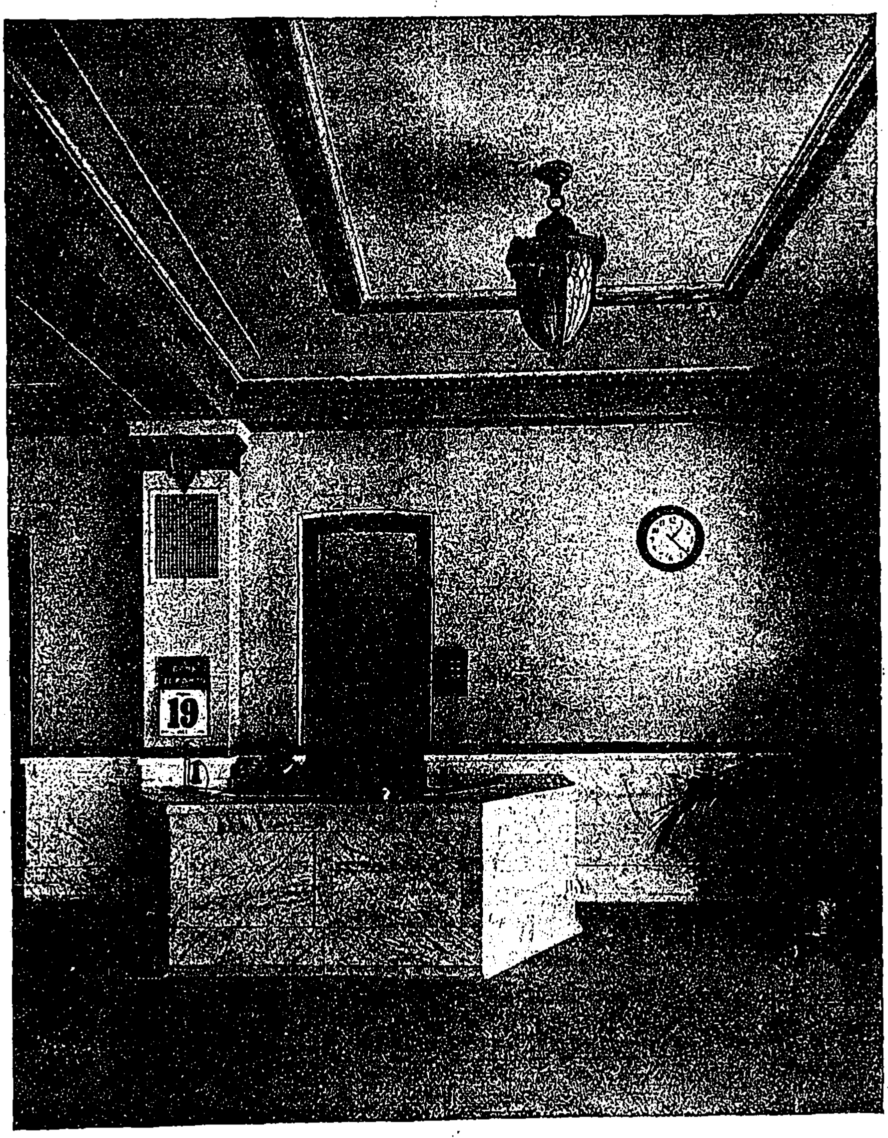

BASEMENT.

GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

LOWER FACADE. GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

rooms, are covered with canvas and painted. All executive offices, including the rooms of the heads of the departments, have private toilet facilities.

As manufacturers of general electrical appliances, it is natural to expect that the electrical and service installation would be modern and complete. Semi-direct lighting is employed in most of the general offices, and total indirect in the draughting room. An autophone system connects the President's room with all general and executive offices. This is supplemented by a buzzer installation connecting executive with communicating departments. All inter-works telephones and outside telephones are controlled by the main switchboard on the ground floor. There is also a master clock in the telephone operators' room with a system of auxiliary clocks in all corridors and executive offices. All buzzer system wires are so arranged that they are completely hidden beneath the main chair rail, which is in sections and can easily be removed so that



RECEPTION ROOM.

AUDITORIUM, GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

additional buzzers may be installed or re-arranged at any time. All wires for the other systems are arranged in the same way and located in the base, which is also sectional. In addition the kitchen on the fifth floor located between the executive and general dining rooms, is fully equipped with electrical stoves, heaters, cookers, and other modern appliances.

The heating and ventilating of the building also represents an up-to-date installation. Two-thirds of the heating is direct with wall radiators, and one-third direct, coming from heater coils and fans located in the basement. In the summer time this equipment is reversed so that the air is chilled and rendered cool by sprays of water and then pumped through the building, coming in at the ceiling, the exhaust leaving through vents in the bottom of all corridor doors and returning by way of stair wells to ducts in the basement, where the air is re-washed and again used.

How to Become An Architect

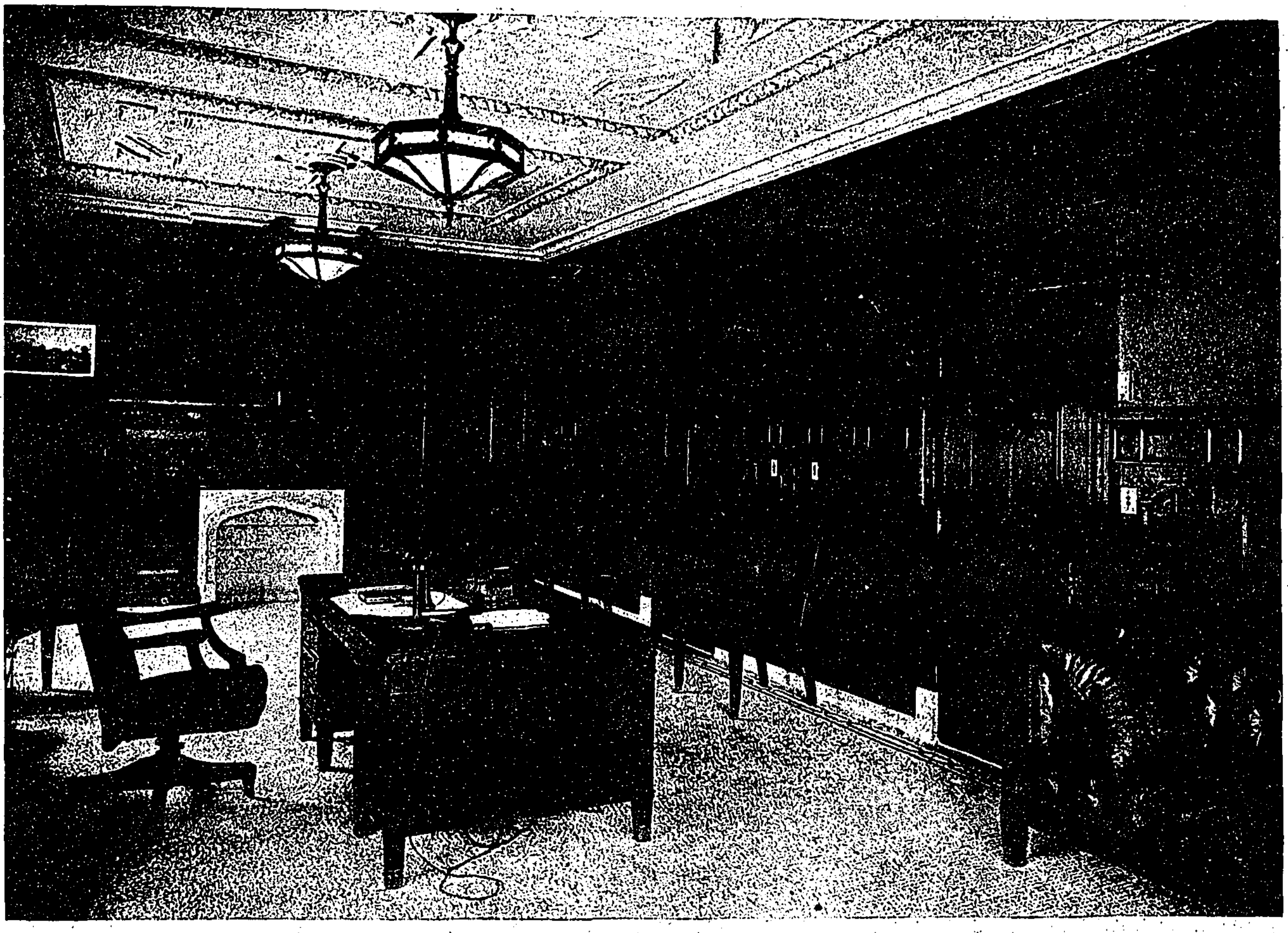
By a Man Who Has Been One.

The architect is, unlike the poet, made and not born. He is entirely the creature of circumstances—let him mould them if he can.

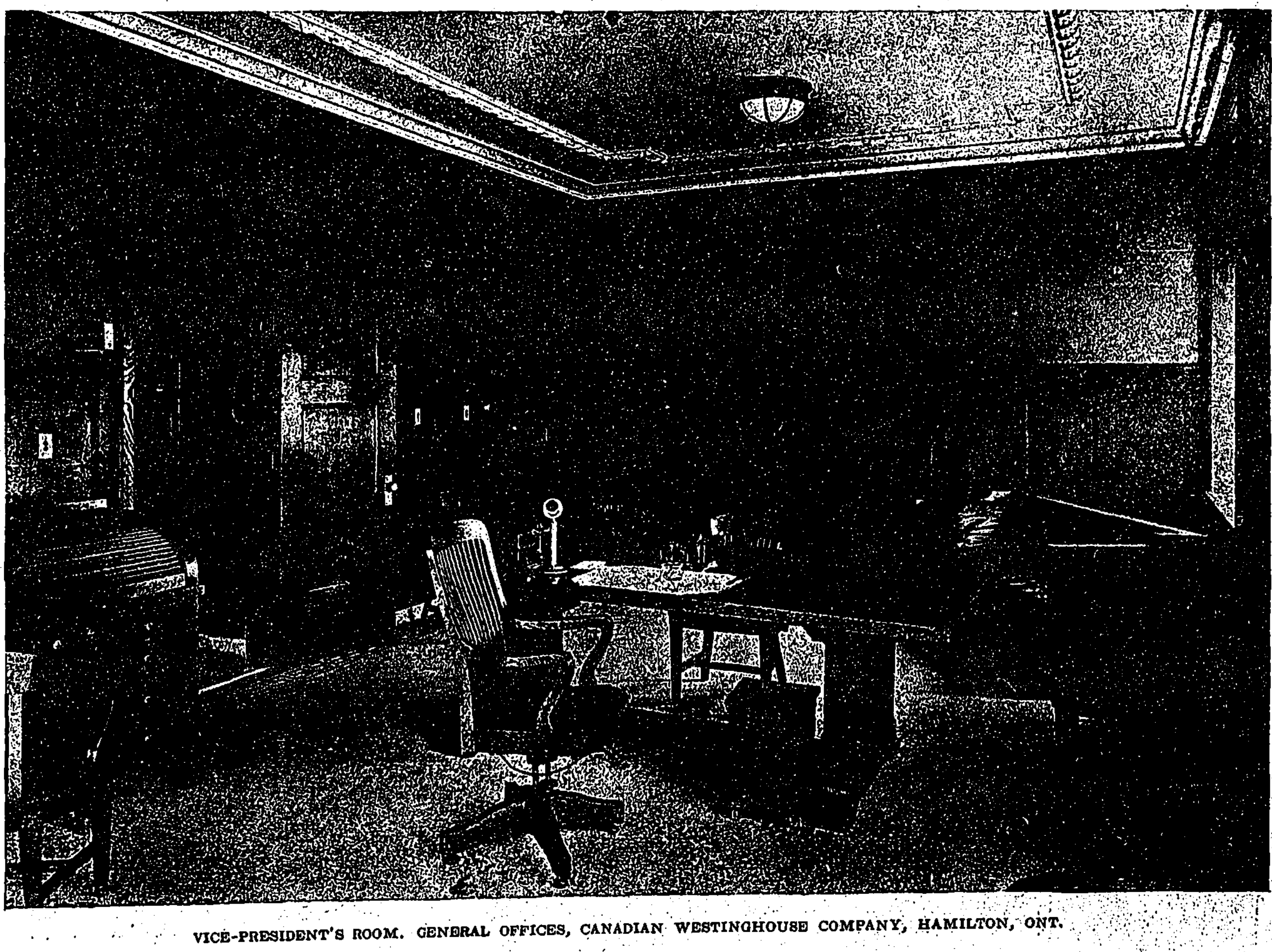
When the articles are signed and the premium paid and the youth fairly launched in an architect's office, he will find himself started on a long, long road, as long as that to Tipperary, which he has to traverse before he can claim to have become an architect himself. For his encouragement the following notes are written. And as example is always better than precept, I may have to quote many incidents in my own career, trusting to anonymity to hide my personality, or I may draw upon the published lives of other architects to point the moral and adorn the tale.

A youth of the age for "leaving school" who is not proceeding to one of the Universities should be old enough to select the profession for which circumstances or inclination have best fitted him; or by that age his parents or guardians, or at least his tutors, should know something of the bent of his mind and have some pretty clear idea of the life-work for which he is most suited.

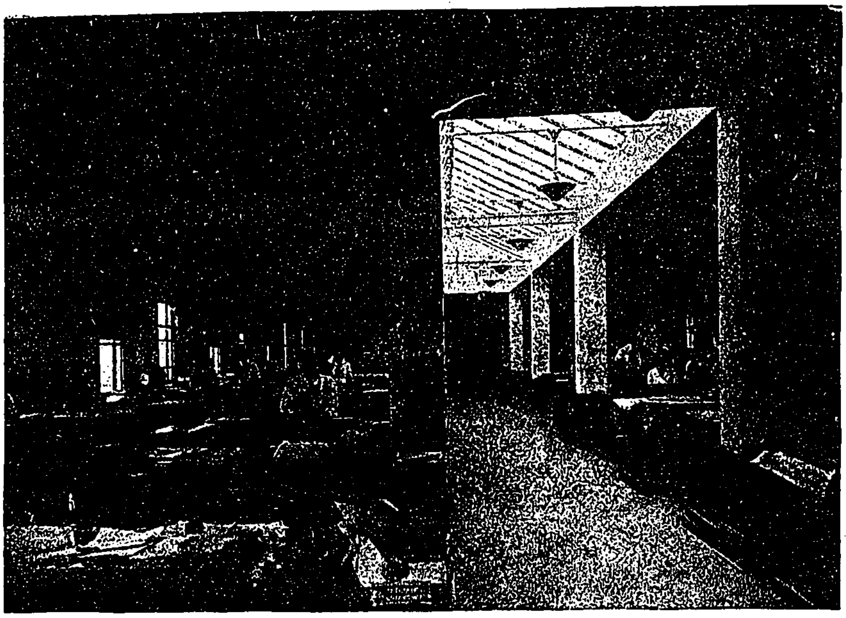
Sometimes a youth has been brought up with artistic surroundings and that atmosphere of refinement in taste which in itself is half an education; or he may have been the son of, say, a butterman, but ambitious and with strong predilections, coming he knows not how, to an architect's profession. His circumstances form no barrier to his success, heavily though he may be handicapped by them; but he should be certain of his taste and know something of the difficulties which must attend his efforts, since it is



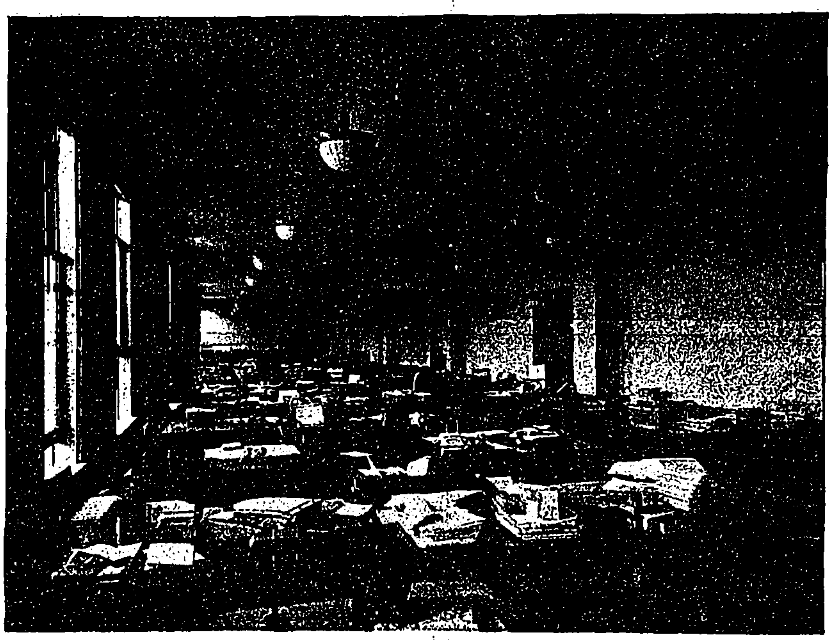
PRESIDENT'S ROOM. GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.



VICE-PRESIDENT'S ROOM. GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.



DRAUGHTING ROOM.



ACCOUNTING DEPARTMENT.

MECHANICAL EQUIPMENT.

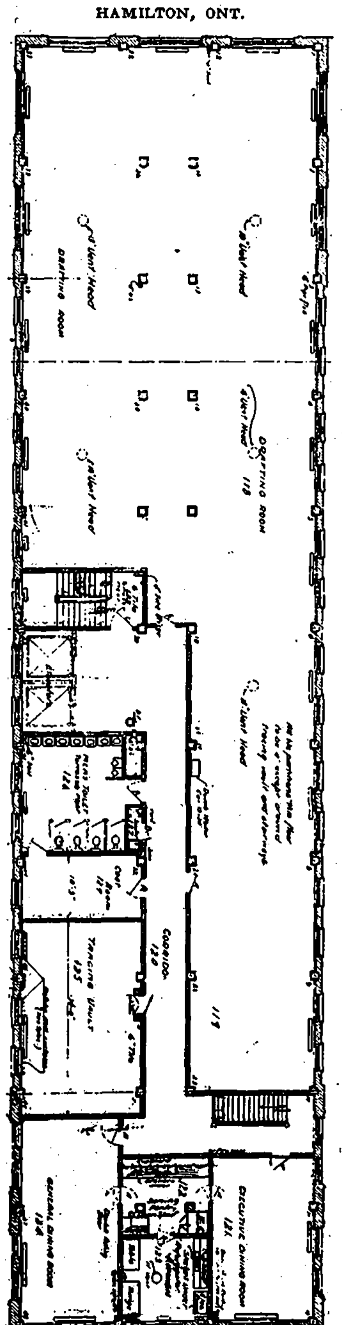
better to be, at the end of his career, a successful butterman than a struggling architect.

On two separate occasions I met in Rome a man who showed considerable and informed interest in a certain phase of artistic life and work, although his conversation betrayed but little culture; and I afterwards discovered that he was a successful trader, the owner of many retail shops in London and the Provinces, who devoted every year a considerable sum of money to assisting young art students to study mediæval and renaissance work in Italy. His natural tastes might have led him to become an artist with dubious outlooks; his success as a trader did not kill his regard for art, but enabled him to assist many others to achieve their ambitions.

The fact that a boy was "fond of his pencil" has induced many a parent to place his son in an architect's office only to discover when too late that the taste was ephemeral, to vanish before the tee-square and the set-square. Moreover, the most perfect of artists or even draughtsmen are not necessarily fitted for our business-like profession. The experience of J. B. Waring, than whom there was no better illustrator of architecture and the decorative arts, himself remarkable for his taste in color, as given in his published life, is very much to the point. "After this," he writes, referring to his failure in a competition, "I determined to try no more. I had done my best, had fitted myself by diligent and prolonged study of my profession for producing works of art which might have done credit to myself and my employers. I had always acted upon the maxim of La Bruyere, 'Nous devons travailler a nous rendre tres dignes de quelque emploi; le reste ne nous regarde point; c'est l'affaire des autres.' But it was a mistake; in this age of competition, unless artists are of known and approved merit, they are obliged to seek for business like other people; the public will not apply to anyone unless he has a name; and in architecture, especially where it is impossible for a man to show what he is capable of, not to seek employment is to court neglect.''

DINING ROOM, GENERAL OFFICES. CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

As with solicitors who have already established a family business, their sons, if of average capacity, may after death "keep on the business still,'' so with architects, whose connection is even more personal, who have got one together, public or private, their sons and their sons' sons, as we know by many examples during the last century, may carry on the same practice to higher and more successful achievements.



FITFH FLOOR.

Not infrequently some accidental circumstance may implant the initial desire of a youth to become an architect, and the favorable conditions in which he is placed bring it to fruition. The idea first came to me almost as a vision when, during a school holiday, I saw the chapter-house doorway of Southwell Minister; and the atmosphere was supplied by the tales of a grandfather, who had also been an architect, and who left behind many books, casts, and instruments, some of which I to this day use, but unfortunately no practice to which I could succeed.

The decision having been definitely arrived at that the youth is to be made an architect, the first thing to consider is how he is to achieve his purpose. Once there was only the straight gate of apprenticeship by which to enter the professional path, but now climbing over the wall is not only permitted but encouraged, and official and recognized ladders may now be used to surmount such an old-fashioned difficulty.

The benefits of proper apprenticeship are manifold. With the driving force of a premium paid and the direct control of a legal master come more steadfastness in the pursuit of knowledge; the benefit of another's example and experience in practice and professional duties; assistance and guidance as difficulties of all sorts arise; an outlook gained on general procedure only to be obtained by having the run of a working office; the early association with men who have already gone through the probationary stages and are perhaps in practice, more or less, on their own account; and, beyond all, an early appreciation of that esprit de corps which is essential to all professional success.

The disadvantages of "climbing over the wall'' as a short cut are as numerous, if much less tangible. Take the case of the pupil educated for the profession in "the schools''; and there are numerous important institutions in London and the Provinces undertaking to teach their students, in a few courses, drawing from the round, geometrical drawing and perspective, and the elements of architectural design and construction sufficiently to pass, at least, the intermediate examination of the Institute and be on the high road for its associateship. But the acquirement of all these things implies close attention to the classes, lectures, etc., a difficult thing to ensure where there is no compelling authority to secure the student's continuous attention. In the schools the pupil has to have his knowledge pumped into him; in the office he inhales it with his breath or absorbs through the pores of his skin. And when all is said and done, I venture to say that an architect's office boy of twelve months' standing and average ability has acquired more practical insight into professional work than many a prize student turned out by the schools.

An office boy is frequently called upon in times of stress to help on the tracings, and by that means learns a great deal about planning, construction, and design, and, above all, to be very exact in his work. Nothing has a greater educational value in the teaching of design and style than carefully tracing published drawings of fine buildings, and nothing makes the eye more sensitive in drawing and perspective or trains it with equal exactitude. . . . . . I am perfectly sure that a student who has carefully traced an architectural drawing has a greater and more accurate appreciation of the work it displays than it is possible for anyone to acquire who, with the drawing propped up in front of him or perhaps covered with a sheet of talc, attempts in such a manner to copy it. The eye has to be taught to see the things before the hand can draw them; and tracing leaves nothing to chance.

When I was a pupil my master had occasionally to lecture on architecture and required diagrams for the purpose; and I was told off to make tracings for the purpose from books he had selected at the Institute library, often of a character not ordinarily brought before a student's notice. The amount of knowledge I thus acquired in working for him I quite appreciated, and continued tracing on my own account; I thus worked on Cotman's etchings in Normandy, and while tracing his drawings incidentally learnt something of pen-and-ink work as well.

Any talent that a boy may show in his drawing should be by all means encouraged; but the drawing usually taught at an ordinary school is generally so much time wasted. Drawing is one of those requirements of modern life that seems natural to everybody now, and, though latent in most, will come almost at call in case of necessity. If he has not attempted to draw before, he will soon find that he must when he starts in an architect's office, and his sketches and drawings will be made with decreasing difficulty as his own tastes or requirements suggest. In my own case, except for a few lessons in water-color from John Varley, I had no direct teaching; but my master was a remarkably good sketcher, and he turned me out, almost weekly, to do some sketching—at Westminster Abbey generally—*and criticised the result,* and he always insisted on seeing the work of my annual tour, notes as well as drawings, even when I was "out of my time."—The Architect and Contract Reporter.

Death of Well-known Contractor

The death of Henry George Love, which occurred at his home, 92 Gloucester Street, on August 18th, removes a personality prominent in the building circles of Toronto for many years. Mr. Love came to Canada from England in 1843 at the age of twenty-nine, and organized the firm of Brown & Love, retiring from same only a few years ago. Among a few of the larger business houses built by this firm are the Bank of Commerce, Western Assurance Company's building, the old Dominion Bank, Victoria College, and the Canada Life Building. The deceased was a member of the Queen City Bowling and Curling Club and will be remembered for his generosity in both charitable and patriotic work. His passing away will be the cause of genuine bereavement among many friends and acquaintances.

To Regain Ontario Trade

It is announced that the British Columbia Government will reopen its lumber office in Toronto, which was closed about a year ago owing to conditions brought on by the war. This decision, it is stated, is due to a serious decline in the business connection maintained at that time. Since then Pacific Coast lumber interests have not been properly represented in the Ontario field, with the result, it is claimed, that the American firms have been getting the bulk of the trade. The object is to again regain this market by having the architects and others in the Province of Ontario specify and use British Columbia lumber in preference to Georgia pine and other American woods for building purposes.

Resigns Office of City Architect

Mr. Alcide Chausse has resigned as City Architect and Superintendent of Buildings of the city of Montreal, and has resumed private practice at 367 Beaver Hall Square, that city. Mr. Chausse has for a number of years capably filled the post he has just left in addition to actively looking after the interests of the R.A.I.C., of which he is honorary secretary. He requests building material manufacturers and supply firm to send catalogues and price lists to the above address.

Lieut. George McSweeney Killed

Word has been received of the death of Lieut. George McSweeney, who was recently killed while flying in England, where he was attached to the Royal Air Service. The news comes as a distinct shock to his many friends, and especially to the members of the Toronto Builders' Exchange, of which he held the secretaryship at the time of his enlistment. He was not only regarded as a capable and highly efficient official by his fellow-associates in the Exchange, but enjoyed a wide popularity generally among a host of personal acquaintances. Lieut. McSweeney left for overseas early this year, and was honored with a presentation on the part of the Exchange prior to his departure.

Is Wood Suitable for Mill Buildings?

By W. Kynoch, B.Sc.F., F.E., and R. J. Blair, B.A., Forest Products Laboratories of Canada.

THE Forest Products Laboratories have frequently had occasion to draw attention to the serious financial losses resulting from the ravages of so-called dry rot in mill or factory buildings of wooden construction. Numerous cases in which this trouble has occurred in Canadian buildings have been carefully investigated, and one of these, which has been under observation for upwards of a year, affords a typical example of a deplorable state of affairs which could have been entirely avoided had those concerned in the erection of the building been guided by the necessary knowledge of the technology of timber and the mechanism of the decay of wood.

From the point of view of the owners of the building the facts are as follows: Five years ago a large factory building was constructed with heavy timber columns and beams and laminated floors of 2-inch x 6-inch planks overlaid by ⅞-inch hardwood. The timber was partially seasoned only when installed. The operations carried on in the building are such that the relative humidity in the interior is usually high. Serious decay was first noted about three years after the erection of the factory, and since that time has apparently become steadily worse. The tearing out of practically the whole of the timber construction has now become imperative, and such is the prejudice against wood as a structural material which has been created in the minds of the owners that they have decided to replace entirely with reinforced concrete at an estimated expenditure of $100,000.

From a technical standpoint some additional important facts present themselves. The decay of wood is due to the action upon it of low forms of plants known as wood-destroying fungi and bacteria. For practical purposes the bacteria may be ignored. The germs of decay are no more inherent in timber than tobacco is inherent in a tobacco pipe; infection must come from outside, and sound wood becomes infected in two ways, namely, by contact with either tissue or spores of a wood-destroying fungus under suitable conditions of temperature, moisture and air supply. It should be noted that this is not merely an interesting theory. It is a hard fact, proved beyond dispute by extensive research and thousands of carefully conducted tests, and we can now induce decay in timber at will in the laboratory. A number of kinds of fungi which can be definitely identified are responsible for the destruction of timber in buildings. In the particular case under discussion the range of temperature and relative humidity of the air in the factory were such as to provide exceedingly favorable conditions for the growth of several of the most destructive kinds. In addition the unseasoned state of the timber facilitated decay because it was not even necessary for the wood to absorb water from the humid air before reaching the moisture content permitting the action of the destructive agent—the moisture was there already. Lastly, a large quantity of the timber used was of the character shown in Fig. 1—that is to say, of rapid growth and low density. Different pieces of wood, even of the same species, differ in their ability to resist attack. Fig. 2 shows timber of slower growth and higher density and possessing much greater resistance to wood-destroying fungi. What occurred, therefore, was that timber of low resistance in a condition to invite decay (*i.e.*, unseasoned) was placed in a building in which the operations to be carried on gave rise to very favorable conditions for the growth of several extremely destructive kinds of fungi. It is, therefore, obvious that it could have been predicted that in all human probability decay of the timber would occur.

Such instances, and they are numerous, raise two important points for the consideration of the lumber trade. Firstly, they bring wood into serious disrepute as a structural material and indirectly advertise other materials; the net result being loss of business to the lumber dealer. Secondly, they do not simply happen without warning like an earthquake nor are they due to some mysterious and unknown cause. The cause is known and the trouble can be prevented by proper procedure. Wood initially sound will last for an indefinite period so far as decay is concerned if any one of the factors essential to the growth of fungi is lacking or can be effectively controlled. The moisture factor is especially important. If the required amount of moisture is present in the wood the fungi can grow in it. If it can be kept thoroughly air-dry their growth is absolutely prevented. It is, of course, rarely practicable under ordinary conditions to control the moisture content of the wood, the humidity of the air, temperature or air supply. The food supply of the fungus, however, that is the wood itself, can readily be controlled in that by efficient impregnation with a suitable preservative it can be made chemically impossible for the fungus to act upon it. In the particular mill with which we are now concerned the conditions were so exacting that the timber should without doubt have received efficient preservative treatment.

The selection of the preservative to be used for the treatmentof timber for a mill or factory building should depend on the circumstances of the particular case. A material which has been

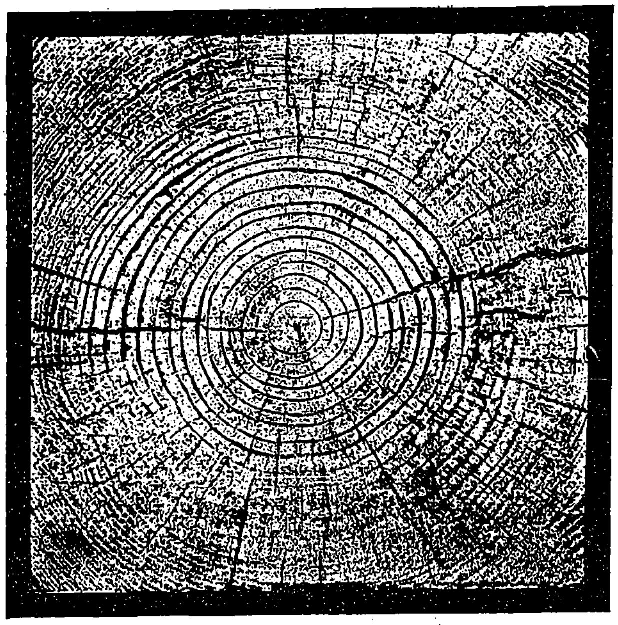


FIG. 1.

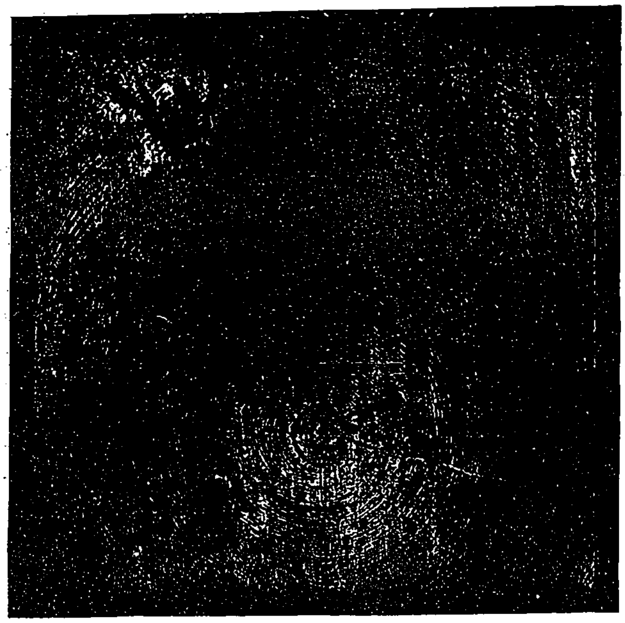


FIG. 2.

employed in several cases in Canada and the United States, known to the Laboratories, is mercuric chloride (corrosive sublimate). This preservative has been in commercial use to a rather limited extent for many years for the treatment of timber for various purposes both in Europe and on this continent and has given excellent results.

Before the war several concerns of which the writers have knowledge treated timber with mercuric chloride for use in their own mill buildings at a cost of about $3.00 per thousand feet B.M. The price of the preservative has since advanced so greatly, however, that it might in some cases prove prohibitive at the present time. Other less costly preservatives which might be used are zinc chloride and sodium fluoride. The Laboratories would be glad to furnish, on request, further particulars regarding the use of these materials for the treatment of timber for mill buildings. Timber to be treated with preservatives should always be thoroughly air-dry. Treating green or very wet wood is time and money wasted, as little or no penetration of the preservative can be secured. In the case of large structural timbers, which frequently take years to become seasoned, the outer inch at least should be reasonably dry before treatment.

In mill or factory buildings or parts of the same, where the operations carried on create very favorable conditions for the growth of fungi, the use of untreated timber, especially timber of low density, or timber containing much sapwood, is inviting disaster. If the timber be efficiently treated, however, there is no objection to the presence of a considerable proportion of sound sapwood or to the use of sound second quality or low density wood, provided that where necessary due allowance be made for the lower strength of the lighter material. The added cost of treatment could, therefore in some cases be partially offset by using less costly timber.

It must not be inferred that treatment of timber for mill construction is always necessary. It is only requisite where the conditions are especially exacting. In other cases the use of timber of the proper quality and the observance of certain precautions will give reasonable assurance of immunity from decay. The following precautions, some of which would require modification in individual cases, have been mentioned by the Laboratories on previous occasions but will bear repetition here.

(1) Only dense material of the more durable species should be used and the proportion of sapwood allowed should be small.

(2) The timber should be carefully inspected as to soundness, density and proportion of heartwood and material not up to specifications should be rejected.

(3) Planking should be thoroughly seasoned in all cases. In large timbers the outer inch at least should be reasonably dry.

(4) Timber delivered on the work should be piled out of contact with the soil and with any unsound wood.

(5) All reasonable and practicable precautions should be taken to keep the wood as dry as possible before and during construction.

(6) Laminated floors should not be built while the wood is wet. If this is unavoidable it is advisable to proceed as follows: As soon as the building is completed and the heating plant installed, close all doors and windows, raise the temperature inside the building to, say, 120 degrees Fahrenheit, or as near this as possible and maintain this condition for several days. If this can be done before building paper, pitch or

hardwood flooring is applied over the laminated flooring so much the better. (In the case of storage or other buildings not provided with heating plants it is suggested that some temporary means of heating might be used. Where this is not feasible it would be safer to build with treated timber.)

(7) Wood should not be covered with plaster or other materials or painted until at least two years after the building has been occupied.

(8) Construction at joints, where beams enter walls, etc., should be such as to permit of ample ventilation.

(9) Special care should be taken in the construction of roofs when untreated timber is used. It is necessary to have the interior roof planking thoroughly insulated, so as to prevent condensation of moisture on it in winter.

(10) An examination of the planking and timbers should be made periodically, say, half yearly, during the first three or four years after the completion of the building.

That timber frequently becomes infected in the lumber yard, and that trouble from decay in mill buildings often arises from the installation of such infected timber is beyond question. Where infection occurs in the lumber yard it is usually due to the existence of conditions which foster the growth of fungi, such as the following:

1. Location of yard in a damp, low-lying situation, or neglecting to provide proper drainage.

2. Allowing decaying waste wood to accumulate in the yard and to form centres for the distribution of infection.

3. Using partially decayed foundation timbers for lumber piles, whereby disease is transmitted to sound lumber piled on same. (Foundation timbers should preferably be thoroughly impregnated with creosote oil.)

4. Piling lumber too near the ground, thus retarding circulation of air where it is most needed, and keeping timber in the lower part of the piles in a favorable condition for infection.

5. Using diseased spacers in lumber piles.

6. Permitting diseased timber to remain as part of permanent structures in the yard.

Timber possesses several important advantages over other materials for interior construction in mill or factory buildings. For example, the initial cost is appreciably lower, alterations and extensions can be more easily and cheaply effected, construction can be completed in a shorter time, and conditions are frequently more conducive to health, and therefore to efficient work on the part of employees. Lower insurance rates can be secured for a sprinklered building of the standard mill construction type than so-called fireproof buildings not protected by sprinklers. The only serious objection to the use of timber for this purpose is its tendency to decay, and as we have endeavored to show, the cause of the disease is known, and preventive measures are neither difficult nor costly.

The Courage of France

When the biggest war in the world's history was launched by the German military machine, to quote the "Improvement Bulletin," France had embarked upon the preliminaries of one of the greatest engineering feats ever attempted.

On the shores of the Mediterranean is the busy city of Marseilles. It lies near the mouth of the Rhone River, a great inland waterway. In order to dock at Marseilles river barges making the Rhone trip were compelled to venture out into the open Mediterranean, always a dangerous feat for river craft of light draft.

The French had, as far back as Napoleon's day, planned to connect, at some period, the outlet of the Rhone with parallel canals, running to Marseilles. The great engineering obstacle to this plan lay in the ring of hills which fringe the city of Marseilles.

Shortly before the war began, French engineers planned to construct not only the canal, including a canal tunnel through the hills, but an elaborate system of breakwaters, and the dredging of a basin for shipping protection at Marseilles.

The city of Marseilles did not permit the stress of war to interfere with this project. Marseilles kept on with the work. The canal tunnel is one of the most remarkable in the world. It is not only seven miles long, but it is the widest tunnel in the world. As the war advanced and the call for man-power increased, Marseilles found it necessary to employ German prisoners upon the work.

It is a startling commentary upon the German viewpoint that the prisoners so employed accepted the situation with equanimity, remarking that it was well to finish the work, because it would be all ready for Germany when she came to seize it and make it efficient.

The tunnel has been driven and is ready. The channel will not be dug until after the war.

The remarkable fact, however, is that a nation, so torn and desolated as France, could, in her hour of supreme effort, find time and enterprise to continue this great engineering work. If France, seeing the necessity of such work, could carry it through, how much more important is it that this country, with its great available resources, should continue necessary public construction during the period of the war?

Reasons for Failures of Heating Systems*

By J. D. Hoffman.

THE time has come for a campaign of education for more satisfactory heating and ventilation in the homes of our country. Buildings of larger proportions have been carefully worked out, because of their importance as public utilities, have been treated with such respect by both architect and engineer as to insure fairly satisfactory service. The home of the private citizen of moderate means, on the contrary, still suffers grievously, and the need for such agitation is apparent. The society should do this and some means should be found through which to educate the public to demand and see that they get more satisfactory heat in their homes.

POOR BUILDING CONSTRUCTION.

The recent coal situation has served the purpose of calling to the attention of heating and ventilating engineers that in the future the economic problems of the home must necessarily become more vital factors. Heretofore they have pacifically endeavored to fit their heating and ventilating systems into ill-conceived and poorly constructed houses, and have trusted to their ability as engineers to overcome the handicap imposed upon the systems by architects or constructors who knew little and cared less about the requirements of home comfort. The heating and ventilating engineers this past winter have shown their willingness to do anything in their power to tide over the acute stages of panic and suffering due to the fuel shortage. They have unceasingly counseled "fewer fires" and "more economic firing," because under the conditions this was all that could be done. Then, nothing counted as much as direct coal saving, but now that the stress of severe winter has passed, we may ask ourselves: What and how may the heating and ventilating engineers do to assist in laying the foundation of a more effective economy in the years just ahead?

I have especially in mind some of those conditions (principally residential) that not only work against economic heating, but absolutely prevent it in a large number of cases. Some of these conditions are due to the mistakes of the architect with knowledge aforethought or otherwise, some of them to those of the heating man (or hardware man) who installs the system, and some to those of the householder who practising false economy is not willing to pay the price of good work.

CAMPAIGN NEEDED FOR BETTER BUILT HOUSES.

We need to urge a campaign for better built houses—houses that are made to *live in*, and not merely to rent or to *sell*. It is a sad commentary on our domiciles, but it is a fact that the average residence is a satisfactory habitation for only nine months in the year. It has been stated that 75 per cent. of the residences built in 1912 cost each $5,000 or less. This ratio, if correct, has probably not changed much in the interim. From what I know of the methods of construction of the average residences of this class, I am safe in venturing that 75 per cent. of this number are not satisfactorily heated. Further, I am willing to venture that 75 per cent. of the number not giving satisfaction are failing, not so much from the lack of gray matter on the part of the heating man, as from unsatisfactory house design and construction.

In most of the ordinary balloon-framed houses the sheathing is very inferior in grade and loosely butted at the edges, when there should be solid boards and lap joints. Some of the houses have no building paper or its equivalent, some have one course of the building paper, and a few have two, but very few courses are laid with care to serve as an insulation. Two courses of paper in face contact are, it should be stated, inferior to one course with the sheathing, and one course woven in and out over the studding; or, to one course with the sheathing and one course on the inside of the studding, with strippings under the laths to bring the plaster free from the paper surface. Again, suppose the wall is well protected against inleakage, but the upper and lower ends of the spaces between the studs are open; in this case there is free connection of air upwards between the inner and outer layers of the wall and the heat that should be kept within the room is dissipated to this air current and lost to the attic, and the conditions are worse than the open wall in that the heat is lost and there is no corresponding physical benefit from inleakage.

TYPICAL CASES OF POOR BUNGALOW CONSTRUCTION.

One of the worst types of construction, and one I have frequently met with, is the bungalow type second floor outer wall, which offsets within the plane of the first floor outer wall. Irrespective of the type and quality of main wall construction (balloon-frame, brick or stone), the second floor wall is studded down from a ceiling level near the roof line, lathed and plastered on the inside of the studs and on the ceiling; and the outside of the studs and joists left open to the cold spaces under the roof. In two, otherwise well-designed and properly-heated stone bungalows called to my attention recently, where the heating systems were pronounced

*Paper recently presented before the American Society of Heating and Ventilating Engineers, at Buffalo, N.Y.

failures, the heat lost through the second floor walls and ceilings to the cold spaces underneath the roof was so great that a cold draft of air down the open stair was sufficient to make the first floor uncomfortably cold. A careful inspection of the heating systems showed them sufficient in capacity to supply similar buildings with ordinarily well constructed walls, and excessive in capacity for the heavy stone outside walls those houses had.

Everything seemed to be satisfactory, but as a last resort I asked to see the attic construction. Here we found that the exterior walls and ceiling of the second floor had only one ordinary lath and plaster thickness separating the rooms from the attic spaces. The outside temperatures at the time were near zero, and the temperature in the attic spaces showed that the heat was going through these plaster partitions like water through a sieve. My advice in each case was to surface the outside of the studs and joists with heavy building paper or tight boards, or better, with both. I have mentioned these two cases because they show how a splendid construction may be set at naught by inexcusable carelessness in some hidden detail of construction. These houses that on the face of things were overheated, were as a matter of fact only partially heated, and through no fault of the heating man excepting that he should have insisted upon knowing what kind of construction would be used in these various walls. Most cases of poor house construction that come to the attention of the heating and ventilating engineer differ, however, from the ones mentioned, in that the failures are due to *general house debility,* and it is more difficult to say which bad feature has the greatest effect to produce failure of the heating system.

POOR PRACTICE TO CARRY PIPES THROUGH ATTIC.

It frequently happens that in order to conceal the piping the heating engineer frequently crosses the wall and carries his pipes through the attic spaces. The practice improves the appearance of the room somewhat (and some householders insist upon it), but it is opposed to economy. In one striking example of how not to do it, a new vapor system was installed in a stone bungalow last summer with all the second floor returns and some of the mains traversing these attic spaces. The result was a freeze-up in every radiator on the windward side, alternating, of course, as the wind shifted so as to give every room some of the same experiences, and during one week of the extreme weather last winter every second floor radiator was out of commission. No insulation was put on the pipes, and I doubt if they could have been successfully insulated against the zero temperatures which were indicated by the thermometer near the pipes. Vapor system returns are especially susceptible to freezing conditions.

OVERHANGING ROOMS SHOULD HAVE WELL-INSULATED FLOORS.

Another feature of house design that is frequently fatal to the plans of the heating engineer is the overhanging room with only one thickness of $\frac{7}{8}$-inch flooring on the room and light ceiling over the porch. This always gives a cold floor that is not only uncomfortable to the occupants, but eliminates heating possibilities on cold days. These remarks do not apply, of course, to sleeping porches with no heat. If an overhanging room is desired, be sure to provide for a well-insulated floor.

LOOSE CONSTRUCTION AROUND WINDOWS.

One feature of house construction that reflects against the builder rather than the architect is the loose construction around the windows. The owner wishes free moving sash, and the workmen give him everything he could desire in this regard. But how about the person who is expected to inhabit the room on a zero day when the wind is blowing a twenty-mile velocity? I have caught snow in my hand at a distance of two feet from a tightly-locked window, in a house supposed to have better than ordinary construction. What can the society do to better such conditions? Window strips, metal weather strips, and storm windows may be urged. Storm windows, top hung, give satisfactory insulation during the cold days, and at the same time provide ventilating possibilities on moderate days. An average nine-room house can be supplied with good storm windows, west, north and east, for an expenditure of from $75 to $100, and the coal saving will pay for the first cost in two years' time. Such storm windows are no hindrance to open-window ventilation when desired.

OUTSIDE CHIMNEYS NOT GOOD DRAFT PRODUCERS.

Next, let us look at the chimney. Several points in common practice among architects tend toward inefficiency. The outside chimney, in spite of its possibilities toward exterior ornamentation, is not a good draft producer, because of the chilling effect of the outside air. Where a chimney is required in an outside wall it should be not less than two bricks thick (eight inches) on each side of the flue at the thinnest part, increasing to at least twelve inches on the lowest part. This is improved if the chimney wall is double with an air space between the walls. Such an air space may be closed in with an occasional layer of header bricks from the outside wall nearly touching the thinner wall. These header bricks cut off air circulation, and in addition steady the inner wall. They must not bind the walls together, since the lineal expansion of the two shafts are not equal. The chimney is improved occasionally by an ornamental wall of cobble stones laid up on the outside of the chimney proper. All chimneys should have an inner lining of hard burned tiles, well cemented at the joints and embedded with the inner brick surfaces.

Let me add a word of caution in regard to the inside chimney: *Under no consideration should the house construction be rigidly fixed to the chimney.* This is too frequently done. The expansion and contraction of the chimney causes movement of the floors, thus cracking the walls and ruining the fits of the doors, casings, etc.

SPACE RESTRICTIONS IN WARM-AIR FURNACE HEATING.

So far I have been pleading for better *exterior construction,* since this is the most vital. The points touched upon do not by any manner of means exhaust that part of the subject, but now notice what the heating man encounters in the *interior construction,* with indirect heating, or, say, *furnace heating.* (Steam and hot water direct heating may, of course, be fitted to almost any building, no matter what the interior construction may be. Of the unsatisfactory furnace systems, I wager that seventy-five per cent. fail because the architect and constructor have restricted the heating man to such a degree that the heat lines of his system are too small to carry the heat necessary to supply the loss through the outside walls and windows. If this statement is even only approximately true, then it would seem that our society has neglected the the furnace heating business. Any one of the necessities of the home that is so vital to so many of our people should be more carefully guarded.

To note some of these limitations, taking them in the order of first importance, the *wall stack* is, in my opinion, the chief offender. In houses of this classification ($5,000 or less), the interior walls are built of 4-inch studding, set 16 inches on centres. This gives, allowing for shrinkage of the studs, approximately 3¾ by 14¼ inches maximum cross section of opening through which the vertical air ducts (stacks) are run. Since stacks fit loosely in this space and are supposed to be insulated from the woodwork of the wall by one or two layers of asbestos paper, single walled stacks will be about 3⅝ by 14 inches, and double walled stacks (two stacks fastened symmetrically with each other with a thin air space between), 3¼ by 13⅝ inches. All such stacks are of tin or light galvanized iron, and as such cause very little friction in the movement of air through them, but they fail because they are *too thin* or because they have *too many right-angled turns.* The maximum wall stack has, say, 45 square inches net cross sectional area. This will supply a 10 by 12-foot centrally located room having small exposure, but is not sufficient for large rooms, or for heavily exposed rooms.

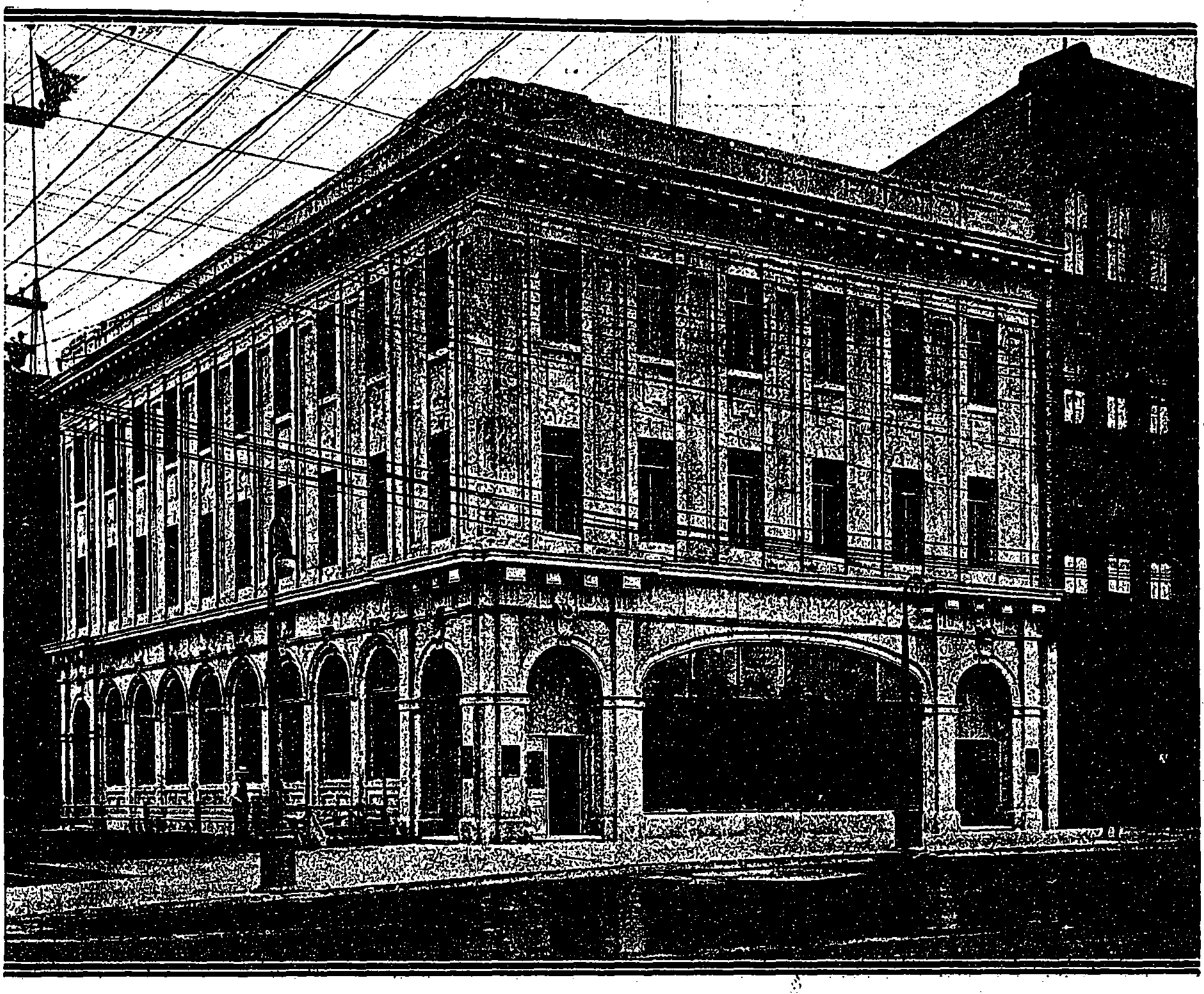
Can't we conceive of some new styles of first floor designs that will permit square, or nearly square, air shafts instead of the elongated rectangle whose effective cross area approaches zero?

Another point, chargeable principally to the owner, is the low basement ceiling that reduces the pitch of the leaders to a minimum. If the average householder realized the importance of extra pitch to the pipes in the basement he would let loose enough additional capital to guarantee a ceiling height of 8 feet instead of 6 feet, as is so often found.

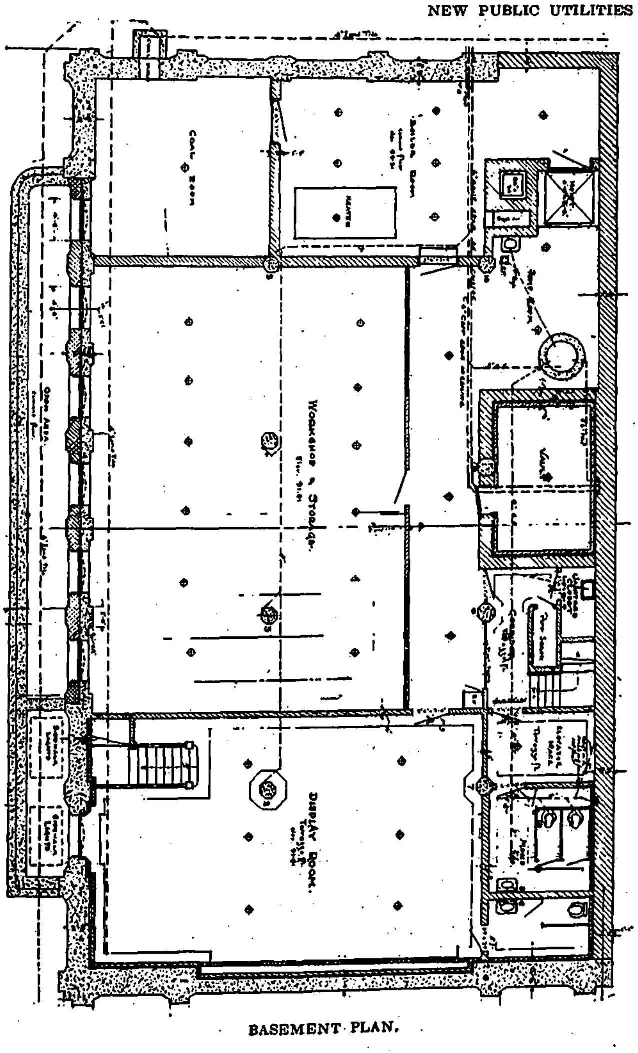
Another point, tabooed by the average furnace man as unnecessary, is the return metal duct. No furnace plant should be installed that has any part of its air lines formed by merely tinning along the edges of the studs and joists. This is against the laws of the convection of air, and is an offence against the sanitation of the building. The almost universal custom among furnace men is to take air from off the floor of the room, together with dust and all, and carry it back to the basement through a duct that has one side of very rough plaster, two ends of rough studs and one side of tin. In many cases this is continued to the furnace between rough joists on two sides, a fairly loose floor above and tin beneath. After a while the collection of dust and micro-organisms that deposit on these rough surfaces would fill a cemetery if turned loose *en masse* on the neighborhood. Why not add a few dollars to the building and make a smooth duct system with hand holes at intervals to permit cleaning once each year by swabs or fans, as the case may require? Not only will the house be more sanitary, but the heating system will come nearer giving satisfaction, because the laws of friction have been considered intelligently. Teach the householders what to expect and most of them follow your advice.

The conditions governing the pitch of the pipes, aggravating as they may be, are to a greater or less degree within the control of the heating man. Friction, on the other hand, is a worse enemy to overcome, because the conditions controlling it are bound up with the house wall construction, and this is usually fixed by the architect before the problem is put up to the heating man. I have no desire to shift the burden of responsibility. The mediocre heating man, especially the furnace man who knows enough to buy a furnace at the cheapest price but does not know enough to install it correctly, is a detriment to the heating profession, but in many cases he is more sinned against than a sinner. He is the victim of a type of construction that even the best at times stumble over.

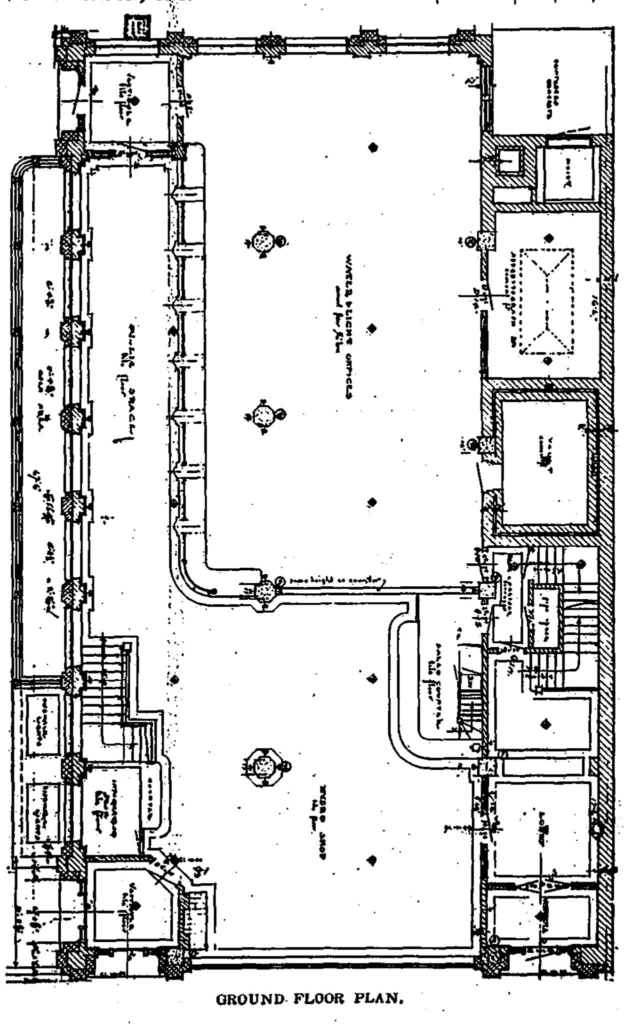
(*Concluded on page* 260.)



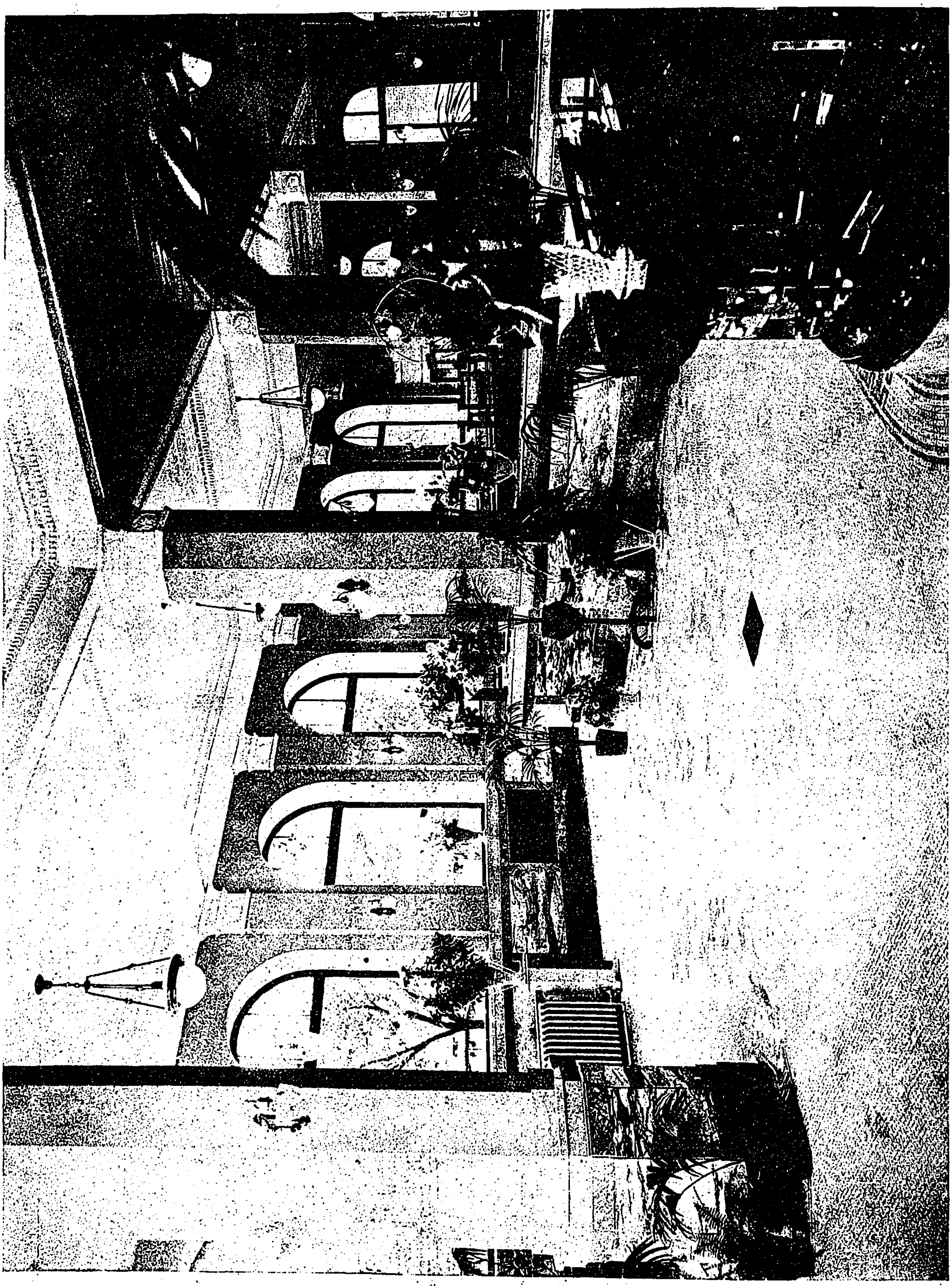
NEW PUBLIC UTILITIES BUILDING, LONDON, ONT.



BASEMENT PLAN.



GROUND FLOOR PLAN.



GENERAL BUSINESS OFFICES AND DISPLAY ROOM. PUBLIC UTILITIES BUILDING, LONDON, ONT.

GENERAL OFFICE AND DISPLAY ROOM, PUBLIC UTILITIES BUILDING, LONDON, ONT., ILLUMINATED AT NIGHT

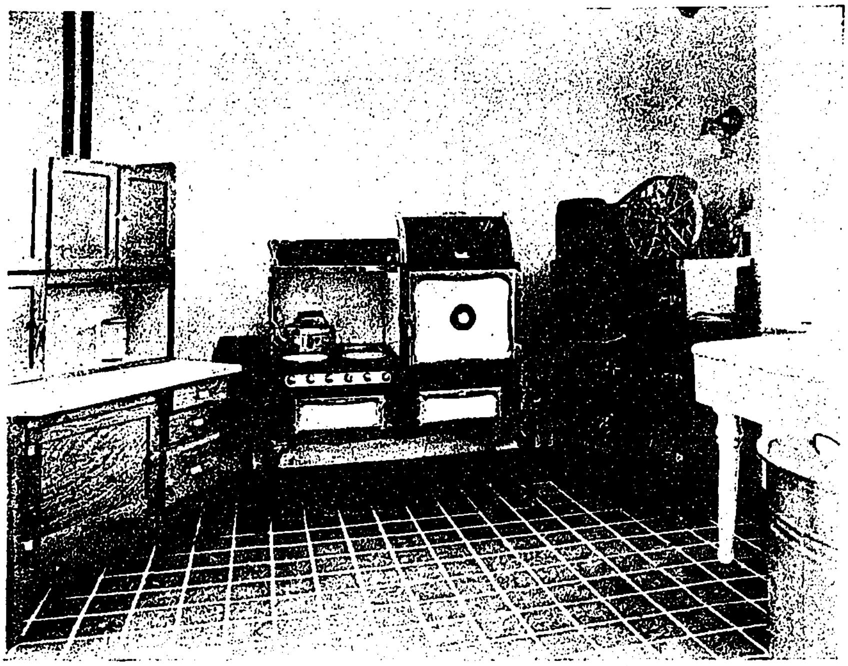
Public Utilities Building, London, Ont.

THE new Public Utilities Building, which was recently officially opened at London, Ont., by Premier Hearst, is under the direct management of the Public Utilities Commission, which has administration over the civic departments of water, light, fuel and parks. Accommodation is provided for the clerical and working staff of the various departments, in addition to attractive sales and demonstrating rooms for the merchandising of electrical goods and appliances to the consumers direct. The purpose of the structure is rather unique among municipal buildings, in that it seggregates the several utility departments from general civic politics by placing them under well organized and limited control.

With a view to permanency and fire protection the building is built of reinforced concrete flat slab construction, with "T" beams used in conjunction with the floor slabs. The exterior, which is in semi-classic design, is of Indiana limestone, the stone work being backed with common white brick. The interior partitions are of gypsum blocks, and the vault walls throughout are of common brick backed on the inside with hollow tile, to secure an air space. The rough stairs throughout the building are also of reinforced concrete, the finishing treads and risers both terrazzo and marble, being put in place after the erection and securely bonded to them. In designing the structure due provision was made to add another storey should this be required. For this reason the fourth floor slab was laid and the roof built on top of this, so that at any time the commission should decide to build another storey, work can be gone on with without disturbing any of the occupants of the building. The top portion of the coping and cornice is also so arranged to be removable in case a fourth storey is added.

From the street the main office and showroom presents a decidedly attractive appearance. Entrance is through tiled vestibules into a spacious interior, richly finished in marble. The dado is composed of Laurentian base, rail and stile with Italian pavanazzo panels, the apron and cap of the dado being in Vermont marble, Mullen gray. This latter material is also used for the door and sidelight trim, while the counter for the water and light offices carries out the general treatment of the surrounding walls. The top of the counter, however, is partly wood, to enable clerks to use the counter for their ordinary duties. In the public space a mosaic floor is used, while above the dado the walls are stucco with pilaster caps and a simple ceiling enrichment.

Marble is also extensively used in the lobby leading to the upper offices and the basement,



DEMONSTRATION KITCHEN. PUBLIC UTILITIES BUILDING, LONDON, ONT.

board room linotile is used over the rough concrete floor. Both of these rooms are richly finished in British Honduras mahogany, which is used for both the wall and ceiling panels. The doors of these rooms, which are of steel, have been grained to resemble the woodwork as closely as possible. The dining-room, which is the only other room in which wood trim is used, is panelled in oak, and has a buffet built in the end wall. Elsewhere in the building the metal trim, consisting of hollow steel doors, base, chair and picture moulding, is finished in Circassian walnut.

which is floored in pink Tennessee. Here the walls to the height of the top of the doors and the stairs leading to the basement display room are finished in Napoleon gray, with Napoleon gray treads and risers and an ornamental iron balustrade. The terrazzo treads and risers were built in forms on the job, and polished before being placed in position, thus securing the best possible result. The basement display room and the second and third floors are floored with terrazzo, with the exception of the dining-room, board room and general manager's office. The dining-room is floored in quarter-cut oak, in keeping with the surrounding trim. In the general manager's office and

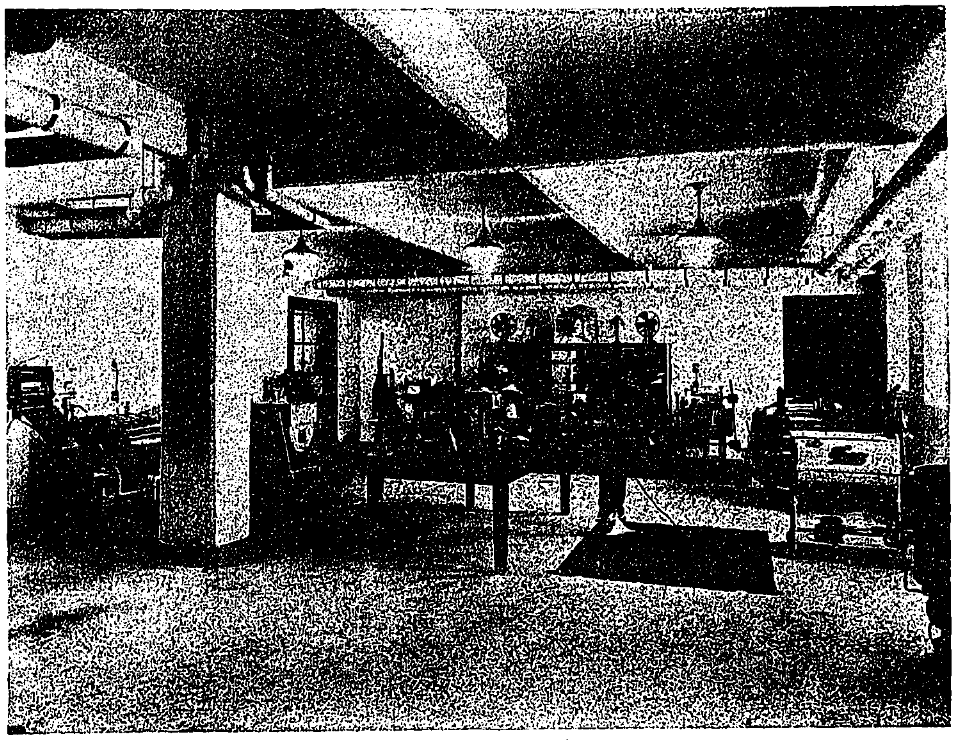
The structure is equipped throughout with steel casement windows. These are fitted with bronze hardware, in keeping with the general interior hardware, which is also in bronze. The main showroom on the ground floor, as will be seen from the photograph, on account of its large size, has extremely good advertising value. The transom part of the show window, also the transom heads for the large casements on the ground floor, are glazed in prism glass, the remainder of the exterior glass being plain plate.

MECHANICAL EQUIPMENT.

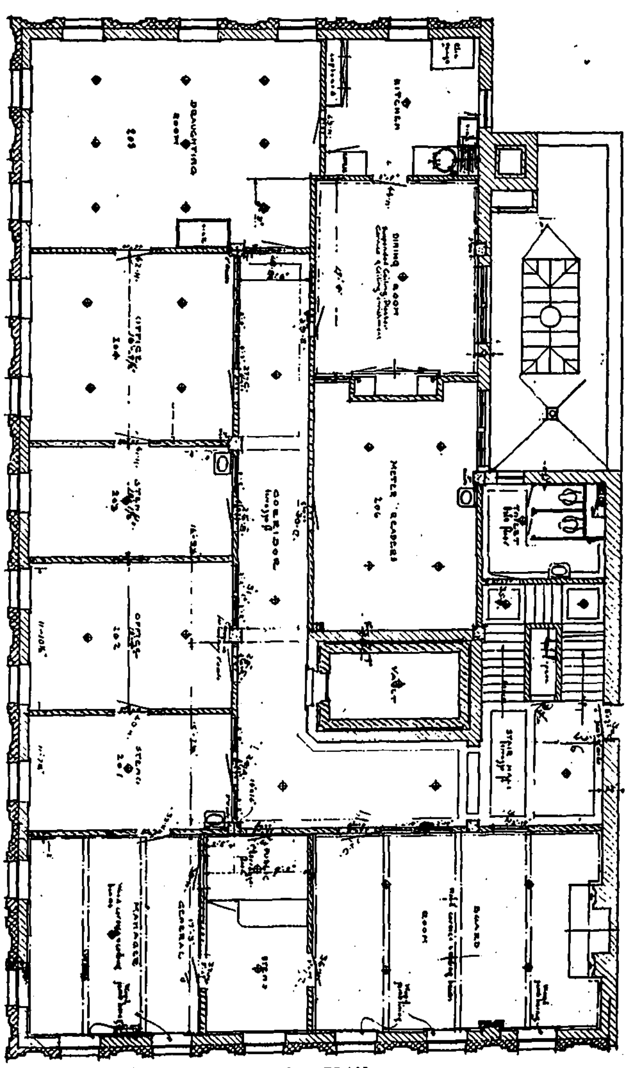
The mechanical equipment of the building represents a very complete installation. The toilet rooms and basement display room have been equipped with a mechanical ventilating system of an exhaust type. The demonstrating kitchen is equipped with a separate ventilating hood, composed of a porthole fan mounted in the exterior wall.

DINING ROOM. PUBLIC UTILITIES BUILDING, LONDON, ONT.

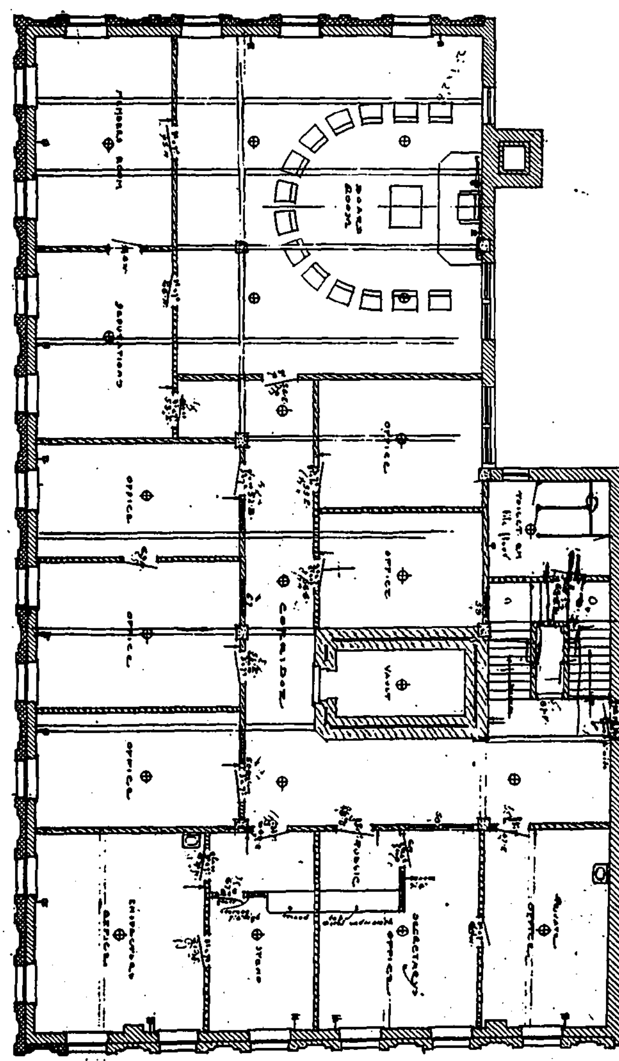
The lighting has been designed to secure the maximum of efficiency. The fixtures, with the exception of the board room, general manager's office and toilet rooms, are finished in bronze. The fixtures in the general manager's office and board room are finished in oxidized silver, and in the toilet rooms nickel-plated finish has been used in keeping with the rest of the equipment. The lighting for the main show window is a decided innovation, lamps being concealed behind prism glass in the soffit of the arch around the window. In order to secure ventilation for the large number of lamps thus enclosed, vent outlets have been provided in the soffit of the ceiling beam immediately above. This type of lighting has proven very satisfactory, and much favorable comment has been made upon its neat appearance and general efficiency. In the basement display room, which, by the way, is entirely artificially lighted, another new system of lighting has been used, in the form of lamps placed behind a false wall directed against a wall painted a sky blue immediately behind the false wall, and are placed so as to reflect the light back through the windows in the false wall, thus making an indirect lighting through ground glass, which, it is claimed, is the nearest approach to daylight possible. By referring to the photos of the basement display room, it will be seen that the distribution of light is perfect, there being practically no shadows. On the ground floor bracket lights have been mounted on the columns and pilasters, adding very much to the artistic beauty of the room.



BASEMENT DISPLAY ROOM. PUBLIC UTILITIES BUILDING, LONDON, ONT.



SECOND FLOOR PLAN.



THIRD FLOOR PLAN.

The heating plant consists of a forced hot water system. Provision, however, has been made to operate the system by gravity in case of a breakdown. The radiators in the public space on the ground floor have been arranged behind the marble dado by the use of bronze grills, the space occupied by the radiators being entirely enclosed from the back, thus forcing the heat out through the grills. A small grill has been used at the bottom to give a forced circulation to the air surrounding the radiator. Provision has also been made in the piping to instal electric heating units at some future date, when the supply of Hydro power warrants the change.

The plumbing system throughout the building was designed and installed by the commission's own staff. The very latest type of plumbing fixtures have been used throughout. On the hot water system in connection with the plumbing system an electric heater has been used, thus making the hot water system entirely independent of the heating system. All lavatories have been fitted with the latest type of water closets, flushometer valves being used in place of the storage tanks.

The electric conduit system and the telephone piping were designed and installed by the Commission's own staff of wiremen, the piping being laid in the floors and walls and outlets provided in same during the construction of the building. The piping system is a most complete one, every office room in the building being provided with telephone and base outlets on all four sides. All of the electric wiring was carried out by the Commission's own staff, as well as the placing of the conduit piping. The telephone system was installed, with the exception of the conduit piping heretofore mentioned, by the telephone company's wiremen, each outlet being wired but only one outlet in each office being used, the advantage of having the extra outlets wired being their easy access in the case of rearrangement of the furniture being made. In this connection it might also be mentioned that the electric time system throughout the building was also installed by the Commission's own wiremen. The Commission's wiremen also installed a bell system throughout the general offices. In connection with the telephone system, it might be mentioned that the ground floor is equipped with an information office which also holds the telephone switchboard connected to some fifty telephones throughout the new building, the City Hall and all of the city sub-stations, an operator being placed in charge of the board.

The building was erected by the Commission's own labor. Contracts were let for several of the different staff and all work as far as possible carried out by day works, but were inspected by the Commission's staff from time to time. The estimated cost of the building is $115,000.

Canadian Industrial Reconstruction

It is announced by the press that the Canadian Industrial Reconstruction Association is planning a general Dominion-wide interchange of ideas and conventions next year. The Executive Council, it is said, have tentatively discussed arrangements for delegations to travel throughout Canada as a means of bringing the East and West into closer understanding on questions affecting the general welfare of the Dominion.

According to Sir John Willison, the president, the idea of encouraging the various Canadian interests to understand each other is one of the chief objects of the association. "That is how we can hope to successfully negotiate the trying post-bellum period," said he. The delegations that will visit different parts of the Dominion will consist of farmers, manufacturers, business men, financiers, etc. They will be restricted to no special interest or section of the Canadian business and industrial community.

Sir John Willison states that plans for various university fellowships are going ahead, and that when the coming academic year opens these will take definite shape.

Reasons for Heating Failures

(*Continued from page* 254.)

What we need is a type of building construction that looks toward comfort, utility and permanency.

AVERAGE HOME BUILDER SHOULD BE INFORMED OF STRUCTURAL REQUIREMENTS.

Is it not possible to develop a campaign of education in such a way that the average man who may be contemplating building himself a little home may become more informed on these vital points that are so necessary in co-ordinating the heating and ventilating features with the building construction, and in that way develop an independent thinker who will not be wholly at the mercy of the unscrupulous promoter or the uninformed individual who frequently poses as an architect or engineer? Such a movement to be effective must be supported by some organization of men whose interest in the best things under discussion cannot be questioned. The press of the country is always ready to assist in anything that stands for the public good so long as it is convinced that the movement is *bona fide* and under competent supervision. May the time soon come when we will build our houses to serve as homes, and not as private cantonments.

What Constitutes Unprofessional Practice in Architecture?

In the following article republished from our well known contemporary the "American Architect," the writer has courageously tackled what he evidently regards as certain ethical misconceptions in reference to the practice of architecture. It is to say the least a thorough analysis of an important and time-worn subject, and while many may not be in accord with the writer as to certain phases of his opinion, the general viewpoint is one which even here in Canada will be found of interest and not entirely without concurrence and support in the sentiment expressed.—Editor.

DURING a time of stress two psychological conditions manifest themselves, seemingly very opposite but really almost identical. The one is a loosening of restraint, a throwing off of conventions and an increase in the intensity of competition; the other is an exaltation of ideals, a seeking for new standards and a greater intensity of emotionalism. The architectural profession is just now experiencing both of these moods. We are certainly in times of stress; we certainly are filled with emotions which tend to raise our ideals, and we certainly are throwing over some of the restraints which in the past have made us one of the most straight-laced professions, ranking in that respect only after that of medicine. Now, restraints, ethics, codes of practice are such necessary things and contribute, when properly devised and applied, so much to the enjoyment of the practice of a particular profession that we cannot afford to throw over any code which has a real value. We cannot afford to blunt the keen edge of our ideals; and it is, therefore, fitting that while we are going through the melting pot, while we are trying so many lines and losing so much that we once thought fundamental, we should consider very carefully in what our code of ethics should consist and what is to be the standard of professional conduct in the light of the revolutionary episode of the war.

A code of ethics is simply a statement of the conditions under which a man can follow his calling with fairness to his competitors and with justice to his clients, his employees and his associates. So far the question of ethics seems very simple, and it is really only a constant application of the Golden Rule, but unfortunately the element of business is a very prominent one in architectural practice, and it is right there that the line begins to waver. The American Institute of Architects for the last fifty years has been formulating codes of ethics and trying to define professionalism, but always the point of view has been backward, applying to the future only the tried and proven experiences of the past, and experiences which have been interpreted by the members of the profession who have been successful and have won their full share of opportunity. I often wonder what our code would be like if it had been drawn up in every case by men under twenty-five, if it were based not upon the practice of the past alone, but upon the hopes of the future, as judged with the restraining point of view of the Golden Rule. It has not required the upheaval of the present war to make our past codes of ethics seem strange and illogical to at least some of the young men who are coming out of the architectural schools and are eager to take their place in the profession, but are met right at the very start with restrictions that they do not always understand, and for that matter, which very few of us clearly comprehend.

The fundamental essential of the practice of architecture is to get a job, and to get a job one must have friends or acquaintances, or business connections who are willing to take a chance on an untried quantity, if the architect is just beginning; or at any rate, a certain amount of uncertainty is involved even when the older and more experienced architects get their chance, and right there the difficulties begin. We tell the young man he must not seek out a possible client and offer professional services, and yet in most cases how will an unknown man otherwise get a job? We tell him he must not let his talents be known, and yet if he cannot sound his own praises how can he expect anyone else to? We tell him he must sedulously keep his personality in the background, suppressing his name, suppressing his connection with the work, and yet architecture of all professions is one of personality, and if we tell him to suppress the vital part thereof how is he going to find his chances? We tell the young man that his best programme is to do every piece of work that comes to him just as well as his abilities will allow, to give the most rigid attention to details; in fact, to carry out all of the conditions of most efficient service and that then the rewards will come if he has the ability, and yet on the other hand we all of us know of architects who give their very life blood to the profession, who do creative work of the highest rank without fair reward, and there are scores of young men in all our cities who are able, sufficiently experienced, and certainly honest and well meaning, but whose average income from architecture is a mere pittance.

Again, we tell a young architect he must be a business man, must run his profession as a business, and yet we tell him he must not make good in the very fundamental of all business transactions, namely, responsibility; that since he is only an adviser he must never be responsible for results; that since he is a professional man in a calling which requires a great deal of business management, he must not stand behind any of his statements financially, must not guarantee anything; that his motto to his clients can be only "caveat emptor." Again we impress it upon the young man that his profession is a creative one, that his work over the drawing board is purely objective, that the building is the thing and not the drawing, and yet we absolutely prohibit him from taking any part in the actual building. Architects often refer to the structures they have built. This is an unconscious derogation of a part of the code of ethics. Architects do that really far more than the profession sometimes admits, but theoretically the young man may have no affiliation or connection of any sort with the building, and may take no contracts from anyone to do anything.

Again, and this is a point which is held most tenaciously by most of the older architects who have arrived, the young man starting out must not enter any competition unless it has received an official sanction from a body of men who may have had absolutely no connection with that particular problem. He must make no attempt to show on paper what he is good for unless such an attempt is so surrounded by restrictions that he has slight chance to show his ideas, and he must, perforce, if he is to be professional, stand back and see men of less ability, fewer scruples, but far more freedom of action, sail right by him and take the job out from under his nose.

So, therefore, it is, or has been at least, unprofessional to solicit work, to advertise, to guarantee a contract, to accept a contract for carrying out work or to enter an unauthorized competition, and the last item has been construed to mean that if a certain client wants the combined advice of two or more architects they cannot furnish it to him under any conditions, except it be that of a recognized competition approved by the institute, even though the client is perfectly ready to pay full professional fees for all the advice that is given him. We say our whole trade, our whole occupation is giving advice, and yet we prohibit ourselves from offering that advice freely even when paid for.

Now, these provisos are not the result of an attempt to suppress individuality or to deny access to the field on the part of the younger men, but they are rather the results of the code of ethics being a backward look instead of a forward prospect, and they represent the reactionary element of the profession rather than the alert, striving, active element which looks at results first rather than theories. The American Institute of Architects at its last meeting dodged the matter of advertisement and simply struck out the clause relating to it in the code of ethics. That body did not quite dare to accept the developing facts, and it was quite right in doing so, for we shall always have two codes of ethics, one the written code which will invariably lag behind actual practice, will invariably be archaic and harmful in many cases; and the other will be the unwritten code, the real constitution of the profession and the voicing of custom which has sprung up as result of real, practical experience.

Looked at in the light of what is done, and being really honest with ourselves, we can write a very distinct negative code of ethics.

1. It is not unprofessional to solicit work.

By no possible explanation, except on the ground of pure selfishness, can we deny to another the perfect right to go and ask for a job. It may be inexpedient at times to do so, the method of asking may defeat its own ends, and it may be far wiser to adopt the indirect method and have our friends do the asking for us, but no matter how it is done it is asking just the same, and there is absolutely no wrong to anyone or to the profession in presenting one's case, one's experience and one's ability in the most judicious light so long as the Golden Rule is observed and the presentation is made in absolute fairness and truth.

2. It is not unprofessional to advertise.

This again is a matter of expediency and method. The profession has hid its light under a bushel for so long that it has come to feel a comfortable glow under the suppressed light of the candle and think that means moral victory. It is really nothing of the sort. We are simply sticking our heads in the sand like an ostrich and refusing to let other people even dream we are on earth. With a natural result they take us at our own estimate and pass us by. There is a right and a wrong way to advertise, and no code can say which is which, but that an architect should condemn himself to voluntary oblivion is at least a needless limitation.

3. It is not unprofessional to guarantee results.

If an architect has not the courage of his own convictions and can prove it, he has no place in this busy, practical world. If he is a mere dreamer, changing his mind as easily as he changes his drawings and cannot maintain his promises to his clients, he is a bad and faithless business man, and I would that every architect were held to the same degree of accountability which exists in France, where for ten years after the completion of a building the architect is liable for damages if anything wrong happens, and where not infrequently an architect financially guarantees the results of his work. No individual could possibly be harmed by accepting responsibility and faced the consequences.

4. It is not unprofessional for an architect to assume the capacity of a master builder.

If an architect is not a builder, pray what on earth is he? If he who creates in his mind is to be debarred from creating in fact, we then go back on all the principles of the world previous to the Renaissance. The architect is preeminently the one to carry out his own ideas and give them just the right shape. We admit it in our practice by our close supervision and by our wrestling with contractors who have no interest except a financial one, but just because the profession has tried to put itself apart and assumed a cloistered attitude we try to believe that we are taking high professional ground when we refuse to carry our directing to its logical conclusion, and, by declining to give the final personal touch which will make the building just right, we stamp ourselves as poor business men, as unfaithful servants and as inconsistent artists.

5. It is not unprofessional to compete.

As to the expediency of competitions at all, that is a very different question, but with every young man there comes hundreds of cases where he is eager and anxious to show what he can do, and suppose he does take part in a competition which has not received the sanction of the institute, wherein is he wronging anyone on earth if he is honestly trying to show what he can do? I do not say he might not be very unfair in his methods, but certainly we have had plenty of cases of unfairness and rank injustice perpetrated by competitors in competitions which have been approved by the institute. No code of ethics would of itself change human nature, but we to-day do compete in lines that the institute looks at askance, we do offer our services provided the conditions of employment are satisfactory, and to say that we should not unless we are acting under strict union rules is simply making it easier for the untrained, ignorant practitioner to impose on the public while we stand aside and refuse to give our best to the community.

There is a positive element of professional practice which must not be ignored. It is unprofessional to take a job away from another architect. Everyone agrees to that, always has and always will, but this is simply the Golden Rule put in practice, and needs to be neither defined nor explained. The line between fairness and unfairness in our dealings with our neighbor cannot be laid down by mere words. Sometimes an architect will unconsciously take work away from another man by doing his own work better and thereby unknowingly influencing a client, but that is not his fault. In the great majority of cases we know perfectly well when we are acting fair in the matter of infringing upon someone else's territory, and I believe if rigid distinctions were obliterated from a code and the matter were left to individual honor we would have no more trouble than we have now and might have a great deal less, while each architect would be freer to take what comes to him in a perfectly fair, honourable way and would not be liable to vituperation and charges of unprofessionalism by a disappointed fellow practitioner who did not get the job.

Now why is it not possible to formulate a positive code of ethics something like this?

1. Do unto others as you would have them do unto you.

2. Be a self-respecting gentleman in every act of life.

3. Be a conscientious, faithful business man in all your dealings with clients, builders and associates.

4. Give everybody a square deal.

What more is there to say? The architect who conscientiously carries out the four foregoing can solicit work, advertise, guarantee his contracts, act as a builder, finance an operation if he has the means and ability, roll up his sleeves and go into competition of any sort, sell his services for cash or its equivalent just because he likes the job and yet be self-respecting, professional and square with the world and all about him. Is it not about time that we admitted that is just what we are doing now, that these four comprise the duty of man toward man, and these duties are no more specialized in the case of architecture than they are in any other calling, and that professionalism after all is fundamentally the golden rule and a square deal?

Dissolution of Partnership

After a partnership covering a number of years, Mr. Alfred Chapman and Major R. B. McGiffin, of the well-known architectural firm of Chapman & McGiffin, Toronto, until recently located at 95 King Street East, have mutually decided to segregate their interests. Mr. Chapman will practice hereafter under his own name, and has moved his office and draughting rooms to the new building recently completed for the Harbor Commissioners on the water front between Bay and York Streets. Major McGiffin is at present devoting his time to military work, and will find it necessary in all likelihood to continue in that capacity until sometime after the conclusion of the war.

Economy in the Design of Concrete Buildings

Paper presented by C. W. Mayers, before American Concrete Institute

UPON the designing engineer of concrete buildings rests the big responsibility of conservation of building materials. The mere fact that concrete is composed of cement, sand and stone, of which there seems to be an excellent supply, does not in any way relieve the designer of concrete construction of the obligation of careful study of the work in hand in order that no excess of material be used. Most errors made in concrete design are not easily recognized even by experienced estimators of building construction. For instance, hidden away inside a column there may be reinforcing steel which should be elsewhere doing work at less expense to its owner, as would have been the case had the designing engineer given proper thought to the design of this column. A large percentage of the floor space occupied by columns might be storage space for the same reason. The beams may contain an excess of steel reinforcement simply because it was less trouble to call for straight top rods to take care of negative bending than it was to determine where and how bends could have been made in order to have used the least amount of reinforcements in the design. Flat slabs may have a number of individual rods over the top of each column head, where a few more bottom rods should have been bent up to take care of this negative bending. And yet this entire building may have been designed in accordance with the recognized standards of concrete design. These errors are not errors in computations, but are errors of careless design, and the result is dire waste of material.

ECONOMY IN DESIGN OFTEN OVERLOOKED.

In most cities, building plans are O.K.'d by responsible engineers authorized by the city to pass upon these plans before the work is allowed to proceed. Errors in computation are usually detected in this process, but who ever heard of one of these authorized engineers returning a set of plans with suggestions for a more economical design? The design either "gets by" or comes back for correction on account of errors in computation, etc.

Hence, if the designing engineer does not study economy in the design of his work, he may be reasonably sure it will get very little such study from anyone. Designs prepared without this special study are sure to show a waste of building material, and the building is no better, and serves no better purpose, because of this extra expense.

Recognized standards are observed by most designers of concrete buildings as regards stresses and strains, factors of safety, etc., but unfortunately no rules, tables or data are at hand which will solve the problem of maximum economy in the choice of the various methods of concrete construction which may be used. Each building presents new problems. It is a case of careful study in an intelligent way, and the designer must do this work well if he would "do his bit" and at the same time keep or build up his reputation.

Is there any position more humiliating to the designing engineer of a contemplated structure than to have a bidder who is estimating the cost of this work submit to the prospective owners a more economical design based on the same fibre stresses as were used in the original layout? This is not an uncommon event, and uncomfortable complications always arise.

INSUFFICIENT ATTENTION TO COSTS.

A general survey of conditions and inspection of the possible methods of construction usually constitute the first thought given to a new problem of structural design. By this inspection a process of elimination is set up, and finally the engineer considers only a few schemes which could be well employed to give the owner a structure suitable for his purposes. The next step usually consists of viewing the several schemes from every angle in order to study their individual merits. Each layout possesses different advantages, some of more value than others, but each one would answer the purpose very well. For instance, a beam and girder type of floor construction may offer advantages in the way of hanging shafting if the building is to be used for certain types of manufacturing. Column spacing would perhaps work out to better advantage in one scheme than in another. Thus the discussion continues, with here and there a remark about the probable cost of this and that. A decision is usually made in favor of the scheme offering the most advantages, even though they are trivial. The plans are drawn up on this basis, and the work proceeds. The detailed design is finished with about the same attention to costs as have been given to the selection of the type of construction used. Generally, the owner of the completed building is satisfied, being ignorant of the fact that he could have had just as good a building for less money.

The average concrete designer makes no claim to being an estimator. In fact, he does not think it is necessary to be an estimator even of the materials with which he works. It is a fact that a large majority of men employed in the design of concrete buildings have hardly any idea of the cost of the work they are laying out, and what is more, they do not know how to find this out for themselves. Surely, if an engineer designed a structural steel girder, he could tell with reasonable accuracy what it would cost by computing the weight and getting the market price of the structural steel and the labor cost of erection. Estimating the cost of concrete work is a little more complex, but each step is very similar, and the process is the same.

DESIGNER SHOULD CALCULATE COSTS.

A designer of concrete structures should think continually of costs, but in order to think intelligently of the cost of his work, he must know how to calculate approximately the cost of his design. In no other way is he able to determine which one of his studies will serve his purpose at the least expense.

It should be borne in mind that, in making designs for comparative costs, it is not necessary to work to as great a degree of accuracy as for the finished plans. Rough designs, accompanied by rough sketches, will furnish enough information for his study. In case the comparative costs of two schemes should work out the same, a more careful design might become necessary. A little practice on the part of the designer will soon reveal to him to what degree of accuracy he must work in order to get satisfactory results.

The process of estimating these various designs for comparative cost purposes is not nearly as difficult as may be supposed. Concrete is measured by the cubic foot or cubic yard; forms by the surface measurement in square feet, and reinforcement by the pound or ton. After the quantities have been calculated for the various designs, unit prices are fixed and the total cost of the member estimated. It is usually here that the engineer throws up his hands. In fact, it is very likely that he knows but little about the prices of this class of material and labor, and in his rush of work he has not kept in touch with the fluctuations, and feels he does not have time to inform himself properly on this subject. Again, it should be understood that it is not necessary to fix absolutely accurate unit costs to these quantities in order to obtain reasonably accurate cost comparisons. As long as the same unit costs are used for similar types of work in the various designs, the comparative costs will be surprisingly accurate. In fact, some of the unit costs may be in error 25 per cent. or 30 per cent., and yet the resulting costs will show unquestionably which type of construction should be used. For example, the quantities for two designs, (a) and (b), for an interior column are given here, and these quantities are priced for current normal conditions, under "Estimate A," and another estimate for the same quantities, with the unit prices grossly in error, is shown in "Estimate B."

It will be seen that, although the comparative total costs of the schemes (a) and (b) are entirely different in the two estimates, the resulting comparative costs in both "Estimate A" and "Estimate B" show conclusively the design (b) is the cheaper column to build. It will also be noticed that the percentage of cost saved by using design (b) is about the same in both estimates. However, the alert engineer will soon become as interested in having his unit costs in accordance with current prices of material and labor as he is in having his design correct.

DESIGN CALLING FOR LEAST MATERIAL NOT ALWAYS CHEAPEST.

Contrary to the opinion of most engineers, the concrete building design calling for the least amount of material is not always the cheapest

Estimate A.	
(Scheme a.)	
Conc. (1 : 1½ : 3), 52 cu. ftfl at 36½c.	$18.98
Forms, rd. steel	15.00
Reinfct. (vert.), 514 lb. at 5c.	25.70
Spirals, 264 lb. at 5½c.	14.52
Lost fl. space, 7/10 sq. ft. at $2.75	1.92
Total	$76.12
(Scheme b.)	
Conc. (1 : 1 : 2), 52 cu. ft. at 43c.	$22.36
Forms, rd. steel	15.00
Reinfct., 245 lb. at 5c.	12.25
Spirals, 264 lb. at 5½c.	14.52
Lost fl. space, 7/10 sq. ft. at $2.75	1.92
Total	$66.05
Estimate B.	
(Scheme a.)	
Conc. (1 : 1½ 3), 52 cu. ft. at 27 c.	$14.04
Forms, rd. steel	19.00
Reinfct. 514 lb. at 3¾c.	19.28
Spirals, 264 lb. at 4c.	10.56
Lost fl. space, 7/10 sq. ft. at $3.50	2.45
Total	$65.33
(Scheme b.)	
Conc. (1 : 1 : 2), 52 cu. ft. at 32c.	$16.64
Forms, rd. steel	19.00
Reinfct., 245 lb. at 3¾c.	9.19
Spirals, 264 lb. at 4c.	10.56
Lost fl. space, 7/10 sq. ft. at $3.50	2.45
Total	$57.84

building to erect, as such a building may call for much more labor. Form work is a big factor in the cost of concrete buildings, and this phase of the operation must be given careful consideration in order to simplify the construction of the form work as much as possible. Study must be made also to determine whether the complexity of forms in a comparatively light design would not make the final cost of the building in excess of a building designed of simpler yet heavier construction. Concrete floors designed on the flat slab method sometimes have considerably more material in them and yet work out cheaper than a beam and girder type designed for the same conditions. Placing reinforcement costs more per ton and forms more per square foot in a beam and girder construction than the same operations in a flat slab construction. In laying out floors of the beam and girder type, the addition or omission of one beam per bay may influence the cost of the design a great deal. Changes in column spacings will also have the same effect. It is only by making the design of a typical floor bay of the various schemes considered and getting the quantities and costs of these schemes that it will be possible to tell definitely which method should be used. Many times concrete columns should be composed of a richer mix of concrete and have less reinforcement. In a building of several stories it is necessary to devote considerable study to the design of columns in order to locate the point where the mixes should change, where spirally reinforced columns should be introduced, and also to consider carefully the loss or gain of floor space occupied by columns. It will be necessary to make several sketch designs and calculate the cost of each. Thousands of dollars may be wasted by improper column design, and still the error is one which would not readily attract attention. There is a certain type of design for every part of the construction which will show maximum economy, and it is up to the designing engineer to calculate the costs of his various designs and determine for himself which one should be used.

OBTAINING UNIT PRICES.

Up to this point this article has emphasized, principally, the necessity of making several preliminary designs of the various members of a concrete building and calculating the cost of each design before the final layout is begun. Not much light has been shed upon the method of obtaining unit prices to fix to the quantities of material and labor. Unit prices are subject to wide fluctuations. Markets, labor, location of the work in question, speed of the operations, etc., and many other items enter into the making of these costs. However, as stated before, these unit prices need not of necessity be extremely accurate, and the designing engineer need not feel that he cannot price closely enough to obtain fairly accurate results.

A list of approximate unit prices have been tabulated here, which may be used to calculate the comparative costs of the principal members in a concrete building. Judicious use of these unit costs will enable the designer to incorporate in his design the most economical methods and at the same time develop a keener eye for economical construction.

Concrete per cu. yd. (1 : 2 : 4 mix),		
Cement, 1 2/3 bbls. at $2 per bbl. at the job		$3.33
Sand, ½ cu. yd. at $1.50 per cu. yd. at the job		.75
Crushed stone, 1 3/10 tons at $2 per ton at the job		2.60
Plant, cost		per. cu. yd.
Freight charges	$0.05	
Rental of mixer, etc.	.35	
Purchases	.45	
Labor	.40	
		1.25
Labor of mixing and placing		1.25
Total cost per cu. yd.		$9.18
Total cost per cu. ft.		.34

Concrete mixed in the proportion of 1:1½:3 will require about one-third of a barrel more cement per cubic yard. This will add about 67 cents to the cost of one yard of concrete in place, making the unit price about $9.85 per cubic yard, or 36½ cents per cubic foot. If a 1:1:2 mix of concrete is used, the cement will be increased about 1 2/10 bbl. over and above that used in a 1:2:4 mix. At $2 per bbl., this would make the cost of 1:1:2 mix concrete about $11.58 per cu. yd., or 43 cents per cu. ft. In large plain concrete footings it is sometimes advisable to use a concrete mixed in the proportion of 1:2½:5. Concrete mixed in this proportion requires about 3/10 of a barrel less cement than 1:2:4 mix. Figuring cement at $2 per bbl., concrete mixed in the proportion of 1:2½:5 works out at approximately 32 cents per cu. ft. in place.

"PLANT" THE MOST UNCERTAIN ITEM.

In making estimates for the cost of concrete in place, the most uncertain element entering into this cost is the item of "plant." The cost of "plant and tools" varies greatly with different building superintendents, and depends largely upon the foresight of the persons responsible for the layout of the job operations. The number and location of the mixers, towers and runs used on the job, layout and extent of storage space for aggregate, source and expense of power, etc., distance over which concrete machinery has to be transported, good or bad mechanical conditions of rented machinery, rental rates of machinery, replacement of missing shovels and other tools, and many other variable expenses go to make up this cost. The size and shape of the building, as well as the speed of the operations, play an important part in this cost. The "plant" cost for a job containing 6,000 cu. yd. of concrete need not necessarily be one-fifth more than a job containing 5,000 cu. yd. of concrete. The "plant" will, of course, cost more for the job containing 6,000 cu. yd. of concrete, but since the cost of erecting and dismantling the "plant" work for both jobs may be the same, the extra cost of "plant" for the larger job will be principally extra depreciation or rental, fuel, power, wear and tear, and loss of tools. However, "plant" expense enters into all concrete costs, and must be included in the unit price of concrete if we would get a reasonably accurate idea of the ultimate cost of the work. At the present high cost of all building materials and labor, "plant" costs cannot be safely assumed to be less than $1 per cu. yd. and will very seldom run as high as $2 per cu. yd. of concrete. Owing to this wide variation in the cost of "plant," it is necessary in estimating concrete to strike an average cost which, while not accurate, will cover the usual "plant" work, and give a unit cost for concrete in which all items of material and labor have been considered. It is with this in view that a "plant" cost of $1.25 per cu. yd. has been used in making up the unit cost of concrete in place, as given in the above tabulation.

AMOUNT OF AGGREGATE CONSIDERED EQUAL FOR VARIOUS MIXES.

In calculating the amount of materials necessary to make 1 cu. yd. of concrete, it will be noticed that the only change made in the quantities for the various mixes has been in the amount of cement used. It has been assumed that a cubic yard of 1:1:2 concrete will require the same quantity of sand and crushed stone as a cubic yard of 1:2:4 concrete. Theoretically this is not true, but in general practice there is some waste of material, and it has been found that the small differences of aggregate used in the various mixes of concrete in a building are negligible. A very large part of the concrete in a building is a 1:2:4 concrete; therefore, the aggregate quantities of 1:2:4 mix are generally used for all concrete work, and the cement alone is changed for various mixes. It will also be noted that the quantity of cement, sand and stone used here is somewhat in excess of the amount usually given in the tables published in various text-books. It must be borne in mind that the waste of materials on the job must be absorbed, and the quantities in tables compiled by laboratory tests must be somewhat increased. It is actually necessary to estimate on about 1 2/3 bbl. of cement to make 1 cu. yd. of 1:2:4 concrete on a job where the usual construction methods are employed, and in other mixes of concrete the cement should be proportionately increased.

The prices of concrete work as tabulated here are about 30 per cent. in excess of pre-war prices and 50 per cent. more than the prices of 1913. These costs, based on the present high cost of material and labor, should be adjusted from time to time as necessary.

The cost of steel reinforcement is extremely erratic in its fluctuation, but at present it may be assumed at $90 per ton, exclusive of the labor of bending and placing. It will cost from $6 to $15 per ton to cut, bend and place this reinforcement, $100 per ton, or 5 cents per lb., being a unit price which may be used to give reasonably close cost ratios. Reinforcement requiring much bending and made up of small bars should be figured about ½ cent per lb. higher than steel requiring only a small amount of bending. Spiral reinforcement for columns should be figured at an extra cost of about ½ cent per lb. over and above plain bars. In estimating the weight of spiral reinforcement, it should be remembered that about 7 per cent. should be added to the weight of the spirals for welding laps.

FORM COSTS.

Forms for round columns are usually made from sheet metal, and in flat slab construction it usually works out cheaper to use round interior columns formed with this material. However, the cost of forming an interior column 26 in. in diameter for flat slab construction is about the same as forming a column 20 in. in diameter designed for the same purpose. This being the case, it is not necessary to consider the difference in the cost of forms due to different diameters of round interior columns. It may be well remembered that it costs somewhat less to build an interior column having a head by using a steel form than it does to form the column of wood, as the cost of forming the head in wood is no small part of the column cost. The list of unit prices given here covers the cost of labor and material for form work for the principal operations in a concrete building, but are

Type of Construction.	Sq. Ft. Cost. (Surface Measurement.)
Forms for flat slabs, including drop panels.	$0.09
Slab, beam and girder construction, slabs to span not less than 9 ft.	.12
Slab, beam and girder construction, slabs to span not less than 7 ft.	.13
Slab, beam and girder construction, slabs to span not less tran 5 ft.	.14
Column forms	.15
Floor beams and girders, not including slabs	.16
Wall beams	.14
Partitions and wall forms	.15
Footing and foundation forms	.15
Round steel column forms, including heads, each	15.00

tabulated for use in making comparative estimates only. It must be borne in mind that these unit prices are for the use of the engineer in weeding out the more expensive designs, and are not to be used for making actual estimates of buildings without regard to conditions and what not. While these costs might be more or less useful in arriving at the total cost of a concrete building, it should be remembered that they are only approximate units to be used for the purpose outlined herein.

Now that the methods of arriving at the comparative costs of the various types of concrete construction have been outlined, it is believed the designer will be able to work more intelligently regarding the cost his work involves. Typical dimensioned sketch cross-sections of the building from the roof slab to the footings, should be made, and the work of estimating done from these sketches. In this way the extra column lengths required to obtain the same clear story heights will enter into the estimate. This is quite a factor in comparing flat slab with beam and girder designs. Estimates made from these cross-sections for a length of building

(*Concluded on page* 272.)

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CONTRIBUTIONS.—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

WESTON WRIGLEY, Business Manager

FRED. T. HOLLIDAY, Advertising Representative

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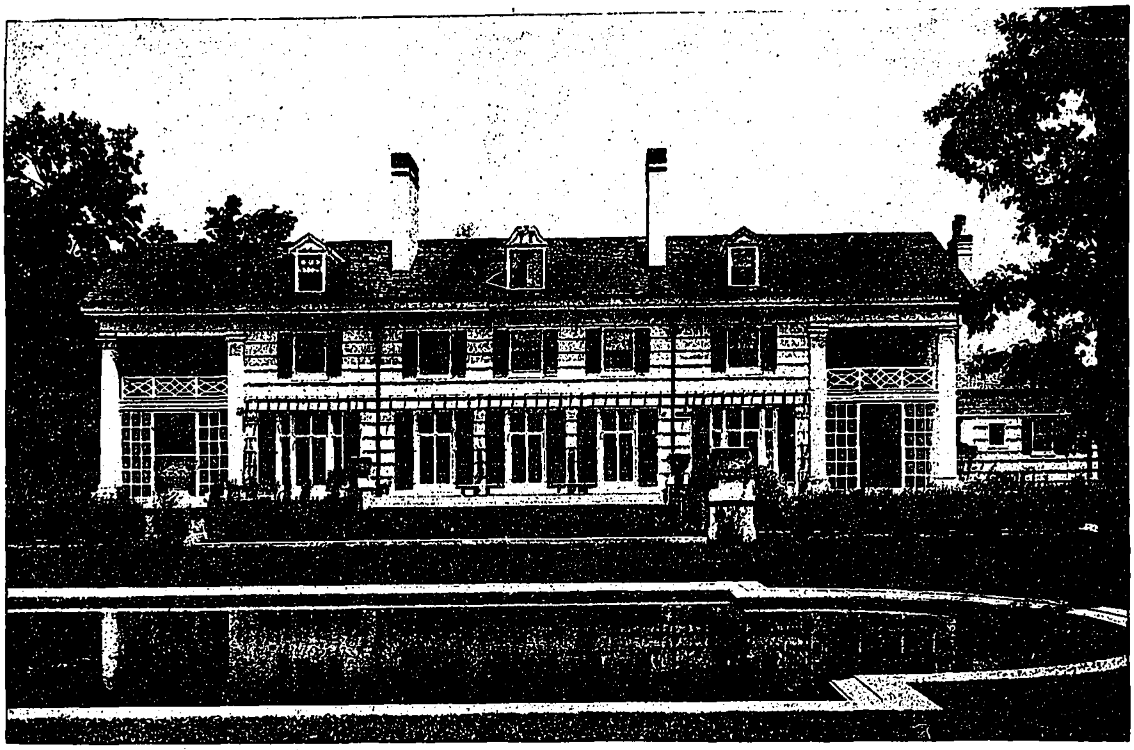
The Housing Situation

The wide newspaper publicity and sustained interest in the housing situation indicates the importance of the problem with which the Ontario Government and the Toronto authorities are now attempting to deal. The committees appointed both by the government and the City Council are now seeking information with a view to learning more or less accurately the extent of the house shortage which really exists. In the meantime numerous proposals are being brought forth suggesting various possible remedies. These range all the way from the single tax theory down to questions involving the removal of restrictions, cheaper lands, loans and guarantees, transportation, and the utilization of vacant city-owned property.

While all these suggestions will be of value to the authorities in their endeavor to arrive at some satisfactory solution, their chief importance lies in the fact that they show that housing is a many-sided problem which must be worked out on a careful and intelligent plan. In fact, those who have given the subject close attention claim that the only proper solution lies in the adoption of a comprehensive town planning scheme. It is pointed out that this conforms to the more advanced views in England and European countries which have had the benefit of greater experience in undertakings of this kind, and does not imply an immediate programme of general reconstruction, but rather the gradual development of housing according to a definite preconceived general plan.

Just what will be done or the manner in which it will be done, however, still remains to be seen. The committee will undoubtedly base their survey on the data now being gathered before deciding on any course of action. The unfortunate part of the whole thing is the apparent apathy of the architects in the matter. Of the various suggestions which have come forth not one has emanated from the ranks of the architectural profession, and it would seem that a grand opportunity is thus to be let go simmering. Possessed of advantages which their special training gives them, and imbued with the spirit necessary to the success of such an enterprise, the members of the profession could render a most necessary and excellent service, and their co-operation should be of the greatest value in assisting the committees to determine the best course to adopt.

The government fund available for the purpose amounts to the sum of two million dollars. This is to be loaned to municipalities with the proviso that the local authorities provide an additional twenty-five per cent. to the sum borrowed. Allowing for structures which could be built at a minimum of twenty-five hundred dollars each, this will only provide for one thousand houses altogether. In Toronto alone there are at present over two thousand condemned houses, and according to the Medical Health Officer there are at least five thousand additional houses which are tenanted by from two to in some cases five and six families. Considering this, the present proposal will be decidedly limited in scope and will be undertaken with a view to giving immediate relief. However, this is no reason why it should not be considered and carried out in relation to a permanent future scheme. It would certainly be gratifying to see the architects agitate toward this end, and be more satisfying still to know that their services and ability were being recognized and utilized in reference to such an important undertaking.



MODERN COLONIAL TREATMENT.

NOTEWORTHY IN SITUATION AND CHARACTER.

INTERESTING EXAMPLE OF MODERN HOUSES BUILT OF WHITE PINE.

This is a photograph of a cross-section cut from a Barrett Specification Roof.

Made in Canada

Above photo shows why we dare *Guarantee* Barrett Specification Roofs for 20 Years—

ABOVE is a photograph of a cross-section cut from a Barrett Specification Roof.

Note its great thickness.

Note the five alternating layers of Specification Pitch and Felt Waterproofing.

Note the heavy wearing-surface of Slag bound with Pitch.

No other type of roofing approaches a Barrett Specification Roof in the amount of protective waterproofing material used in its construction.

The weight of this waterproofing material is about 250 lbs. to 100 sq. ft., compared with 175 to 100 lbs. used in other types of roofs.

The wonder is *not* that we dare guarantee such a roof for twenty years, but that some people still buy light-weight, poorly constructed roofs and expect them to give long and satisfactory service.

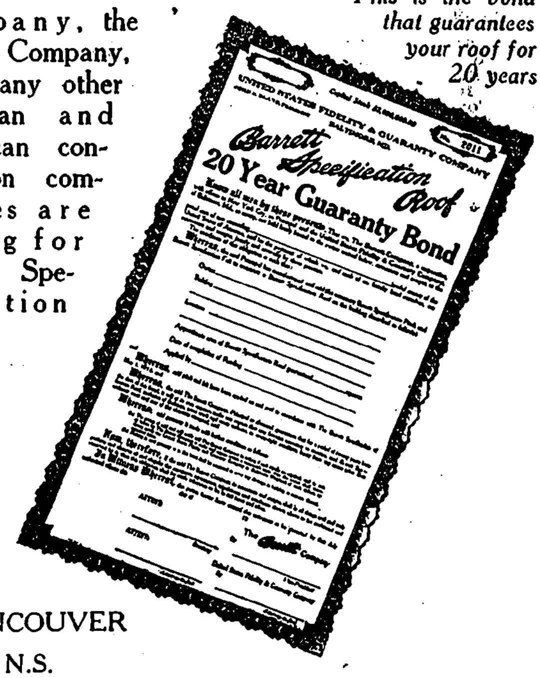
Lowest Cost per Year of Service

The buyer naturally asks, "Do such roofs cost more than others?" Our answer is, "*No, they do not.*"

The experience of many years has proved that Barrett Specification Roofs *cost less per year of service* than any other kind. It is because they give such long service at such low cost that this type of roofing now covers most of the permanent struatures of the country.

It is because of these facts that leading architects, engineers, and roofing contractors everywhere are co-operating with us in the better roofs movement and why large construction companies like the Turner Construction Company, the Fuller Construction Company, the Austin Company, and many other Canadian and American construction companies are strong for Barrett Specification Roofs.

This is the bond that guarantees your roof for 20 years



A copy of The Barrett 20-Year Specification, with roofing diagrams, sent free on request.

The Barrett Company
LIMITED

MONTREAL TORONTO WINNIPEG VANCOUVER
ST. JOHN, N.B. HALIFAX, N.S. SYDNEY, N.S.

Economy in Concrete Design

(*Continued from page* 267.)

equal to one bay only, is the usual practice. In this way the cost per lineal foot of building, as well as the cost per square foot of floor space, may be calculated. Comparisons of costs made in this manner are genuine proofs to the designer that he is giving the design proper study for economy, and will result in a conservation of building materials, save good dollars for the owner, and establish for the engineer the reputation of being a designer of economical concrete buildings.

CONTRACTORS and SUB-CONTRACTORS

As Supplied by the Architects of Buildings Featured in This Issue.

GENERAL OFFICES, CANADIAN WESTINGHOUSE COMPANY, HAMILTON, ONT.

Brick, Milton Pressed Company.
Boilers, Goldie & McCulloch Company.
Casement Windows, Patterson, Tilley & Company.
Casement Windows, Williams Pivot Sash Company.
Clocks, Stromberg-Carlson Telephone Manufacturing Company.
Concrete, Pigott-Healy Construction Company.
Electrical wiring, Harry Alexander.
Electric fixtures, McDonald & Willson.
Electric fixtures, Jefferson Glass Company.
Electric fixtures, Cassidy & Company.
Electric wiring and apparatus, Detroit Fuse Company.
Elevators, Otis-Fensom Company.
Fire extinguishers, Dunlop Tire & Rubber Goods Company.
Floors (cork), T. Eaton Company.
Floors (Terrazzo), Italian Mosaic & Marble Company.
Furniture, Doten-Duntin Desk Company.
Hardware, Belleville Hardware Company.
General contractors, Pigott-Healy Construction Company.
Heat regulating system, Darling Brothers.
Grilles, Tuttle & Bailey.
Interior fittings, Burton & Baldwin Manufacturing Company.
Hollow tile, National Fireproofing Company.
Interior fittings, Hancock & Company.
Interior fittings, Hamilton Mirror Plate Glass Company.
Interior decorating, Thornton-Smith Company.
Metal files and cabinets, Office Specialty Company.
Marble, Hoidge Marble Company.
Ornamental plaster, W. J. Hynes, Limited.
Painting, Fred G. Roberts & Company.
Plastering, Hannaford Brothers.
Plumbing, Adam Clark.
Plumbing fixtures, Cluff Brothers.
Plumbing fixtures, Standard Sanitary Company.
Radiators, Adam Clark.
Roofing, F. W. Bird & Son.
Reinforcing steel, Burlington Steel Company.
Sheet metal, Thos. Irwin.
Stone, Ritchie & Son.
Structural steel, Hamilton Bridge Works.
Structural steel, McGregor & McIntyre.
Switchboards, H. Krautz.
Vacuum cleaning system, Spencer Turbine Vacuum Cleaner Company.
Vaults, Goldie & McCulloch Company.
Ventilating system, Canadian Sirocco Company.

PUBLIC UTILITIES BUILDING, LONDON, ONT.

Boilers, Gurney Foundry Company.
Brick, Interprovincial Brick Company.
Bronze and steel doors, McFarlane-Douglas Company.
Concrete engineers, Mouchel & Partners. (Hennebique System).
Concrete work, John Putherbough.
Electric fixtures, McDonald & Willson.
Hoists, Herbert Morris Crane & Hoist Company.
Fire doors, McFarlane-Douglas Company.
Fire extinguishers, Fyr Fyter Company.
Flooring, Armstrong Cork and Insulation Company.
Flooring (Linotile) Armstrong Cork & Insulation Company.
Flooring (Terrazzo) Italian Mosaic & Marble Company.
Flooring (Marble Ashlar) Hoidge Marble Company.
Furniture, J. B. Hay.
Furniture, A. A. Langford.
Glass, Hobbs Manufacturing Company.
Hardware, Yale & Towne Company.
Hardware jobber, Purdon Hardware Company.
Interior fittings, London Art Woodwork Company.
Interior fittings, McCracken Showcase Company.
Inter-phone system, Bell Telephone Company.
Marble, Hoidge Marble Company.
Marble, Vermont Marble Company.
Ornamental iron, Dennis Wire & Iron Works Company.
Paints (waterproof), Patterson Manufacturing Company.
Plumbing fixtures, Mott Company.
Plaster work, George S. Gould.
Pumps, Canadian Fairbanks-Morse Company.
Reinforcing steel, Baines & Peckover.
Radiators, Gurney Foundry Company.
Roofing, Barrett Manufacturing Company.
Stone, A. & E. Hobbs.
Steel vault fitting, Steel Equipment Company.
Tile, Italian Mosaic & Marble Company.
Vault doors, Goldie & McCulloch Company.
Vault doors, J. & J. Taylor, Limited.
Ventilating fans, Canadian Sirocco Company.
Ventilating ducts, Stevely & Son.

THE STROMBERG AUTOMATIC ELECTRIC TIME SYSTEMS

War conditions have demonstrated and emphasized more than ever before the necessity of "Being Prepared," and the element of time is a big factor, in that preparation, as time waits for no man.

In this issue are shown cuts and a description of the modern office building of the Canadian Westinghouse Company. This concern has installed Stromberg Automatic Electric Time Systems. The advantages of this system enable the owner to check, account for, and balance the intangible commodity time with as great a degree of accuracy as the balancing of a set of books. This system in other words is the Accountant of Time.

The Master Clock, which insures perfect synchronization of time throughout their entire plant is entirely automatic in operation—self winding and electrically operated. One Master Clock controls any desired number of secondary clocks and time devices.

The Cost-Keeping Recorders print time in hours and decimal fractions of an hour, or in hours and minutes, as preferred, and automatically locate cards.

The Secondary Clocks indicate time in various places throughout the organization and contain no clock mechanism or delicate parts, being electrically operated.

Employees In-and-out Time Recorders furnish an exact, non-tamperable record of time of arrival and departure of each employee. The number of employees these machines care for is limitless.

The equipment also includes a Program Instrument for automatically blowing whistles, ringing bells, etc., at specified periods for work signals. Also an Office Time Stamp, for stamping time and date of receipt of letters, telegrams and documents of all kinds. The use of this machine definitely locates responsibility. The devices are electrically operated. Their motive power comes from electro magnets. There is no wear in an electro magnet. Consequently the apparatus is not subject to any fluctuation. It performs its work day in and day out with as great a degree of accuracy as the day it was first installed.

The various recorders installed throughout the plant are all controlled by the Master Clock, which is placed in one of the executive offices. The time on any instrument cannot vary a fraction of a second. All instruments at all times register exactly the same time as the Master Clock.

Clock mechanism, springs and weights do not enter into the motive power of any Stromberg Device. Electro-magnets furnish the motive power. The system was installed by Signals Systems Ltd., Toronto, who are the representatives for Canada of the Stromberg Electric Co., of Chicago, makers of the equipment.