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The Canadian Architect and Builder

VOL. XVII.—NO. 195. MARCH, 1904.

ILLUSTRATIONS ON SHEETS.

Bank of Montreal, Sydney, C. B.—A. T. Taylor, F.R.I.B.A., Architect.
House in Glen Road, Toronto.—Chadwick & Beckett, Architects.
Fire Station, Quebec.—Staveley & Staveley, Architects.
Miscellaneous Sketches.

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Entrance, Woburn Cottage Hospital, for the Duke of Bedford.—H. P. Adams, Architect.
"The Gothic Room."—House in South Kensington.

ILLUSTRATIONS IN TEXT.

Portrait of the President of the Toronto Builders' Exchange.
Portrait of the 1st Vice-President, London Builders' Exchange.
Group Photograph, Toronto Builders' Exchange Annual Dinner.
Fidelity & Bond Building, Baltimore.
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Uniform Building Laws.

The International Society of State and Municipal Building Commissioners was recently organized in the city of Washington. One of the purposes of the Association is to secure a greater degree of uniformity in building regulations. The object is praiseworthy, and one that we hope to see achieved. The combined experience of a large number of cities in relation to the most satisfactory methods of constructing buildings, to ensure safety and reduce the fire risk should be embodied in a standard set of regulations that should govern the construction of important city buildings in the future.

Vancouver Warned.

A letter appears in the Vancouver papers over the signature of Mr. Henry Lye, a well known fire insurance adjuster, protesting against the proposed erection in the heart of the city of a wooden building of immense size, which must prove a source of danger to the more substantially built structures surrounding it. In 1886 Vancouver was laid in ruins by fire. Is a period of only seventeen years sufficient to efface the memory of such a catastrophe and destroy the lessons it should teach? While the adoption of the severest restrictions in force for the prevention of fire in metropolitan centres might be calculated to hinder the development of young cities like Vancouver, building in such cities ought nevertheless to be subject to reasonable restrictions. This especially applies to the business district, in order that none but buildings of substantial construction and appearance may be put up, and that the appearance of the principal thoroughfares may be pleasing and impressive and a barrier placed in the way of the spread of fire. A city of the size and importance of Vancouver ought to have build-restrictions of some kind, and any kind should be sufficient to prevent the erection of a fire trap in the centre of the business district.

The Water Supply of Toronto.

The property owners of Toronto have shown wisdom by voting in favor of the by-law submitted for their approval on the 23rd inst. to authorize the expenditure of a million dollars for improving the public water supply. The city has entirely outgrown the present system and from the standpoint of health as well as of fire protection, demands that the capacity of both pumping and distributing systems be largely extended. During the present winter the city was brought almost face to face with a water famine, and much destruction of property must have resulted if a serious fire had occurred during the time when there was but little pressure on the mains. There are some things a city may do without, but an abundant supply of pure water is an absolute necessity

and ought to be provided regardless of cost. A great mistake was made when a year or two ago the charge to consumers for water was cut in half. In consequence of this cut the revenues of the water department have since fallen short of the expenditures by more than $75,000 per year. This deficit has to be made up by the property owners, who were therefore not as favorably disposed to vote the money now required for improvements as they would have been had the department remained on a self-sustaining basis. In view of the urgency of the case, however, it is gratifying to note that a broad view of the question was taken, and the authorities put in position to carry out the improvements.

The Building Outlook.

It is perhaps too early to speak with certainty regarding building enterprises likely to be undertaken during the season now opening. The information at hand, however, would indicate that taking into consideration all sections of the country, a fairly brisk season is in prospect. So far as can be learned it would appear that the numerous and serious labor difficulties which were a marked feature of last season and which reduced so materially the income of both contractors and workmen, are not likely to be repeated this year. Agreements have already been reached in some trades and it is to be hoped that soon after the first of April, all possible causes for disagreement will have been adjusted and removed out the way. In New York the plan has been introduced of dating wages agreements from the first of January instead of as heretofore from the first of May. A sufficient number of unions have already given their assent to the change of date to insure the success of the movement. The change is a most desirable one and must work to the advantage of all whose interests are in any way dependent on the prosperity of the building industry. The builders and building workmen of Canada should lose no time in adopting similar action, thereby getting rid of the uncertainty which in the past has usually prevailed at the opening of every building season. This uncertainty and the recollection of last year's experience may have something to do with the fact that so far contractors in Toronto have been asked to do but little tendering.

The tightness of the money market may to some extent have a retarding influence upon building this year, but speaking generally, the prospects point to a fairly active season in Toronto. In Hamilton a repition of last year's activity seems certain, the leading architects' offices being crowded with work much earlier in the year than usual. The erection of the immense new factories of the Deering and Westinghouse Companies giving employment to thousands of skilled workmen, has created a large and immediate demand for moderate cost dwellings. Throughout western Ontario much building is said to be also in prospect. In Winnipeg and the West as well as in the Maritime Provinces all indications point to a record year for builders.

In the United States lower prices are expected to prevail. Mr. J. Knox Taylor, Supervising Architect, is quoted as saying that during the past few months there has been a drop in tenders amounting to upwards of 20 per cent. and he looks for still lower figures. He further states that there is now keen competition for government work, while a year or so ago bids were comparatively few. In Canada prices for labor and materials are likely to correspond closely with those of last year. While the output of lumber will be considerably reduced, the slackening of demand from Great Britain and also from the United States, due to the disturbance to trade caused by the approaching Presidential election, will likely prove an effective offset to any advance in prices.

The Baltimore Fire.

Since the recent great fire Baltimore has been crowded with visitors, principally architects, contractors and experts. The architects have been looking for information, and many of them for commissions. The contractors are on the look-out for contracts, while the building experts, including many city architects and building inspectors, have visited the scene with the object of observing the effects of the conflagration upon the various kinds of building materials and methods of construction. One fact stands out prominently as the result of this fire, namely, that steel buildings when properly protected by fire-proof materials, such as porous cotta and reinforced concrete are able to withstand a severe fire. But for the fact that several steel structures stood in the way and blocked the progress of the fire, the public buildings and a large section of the residential district of Baltimore would have been destroyed. This fire has further emphasized the necessity of protecting by means of iron shutters, wired glass, or other equally effective methods, the windows of large buildings in the business centres of cities.

The Mayor of Baltimore has appointed a committee of citizens to advise concerning the reconstruction and improvement of the burned district. The existing building by-laws of the city will be carefully revised and remodelled before any new buildings are allowed to be erected. It is proposed that all new buildings over 100 feet in height shall be fire-proof throughout; that stores and warehouses more than two storeys high be equipped with fire-proof shutters on all windows not opening on a principal thoroughfare; that all outside walls shall be build of stone, brick, iron, or other non-combustible material, and that the roof sheathing shall not extend across front, rear, side, end or division walls. It is proposed to establish a municipal experimental testing department for the investigation of materials by the department and by builders and contractors.

BANK OF MONTREAL, SYDNEY, C.B.

The position of this building, illustrated in the present number, is in the centre portion of the town. It is built of freestone from the "Wallace" quarry in New Brunswick. The interior is cruciform, with piers carrying arches supporting the central dome, and is very spacious, lofty and light. The finishings and fittings are in oak, with old brass railings. The floors are marble mosaic in ornamental patterns. The general contractor was Mr. Reid, of Windsor, N.S., and the contractors for fittings were The Rhodes Curry Co., of Amherst, N.S., who all did their work very well. Mr. Andrew T. Taylor, F.R.I.B.A., of Montreal, was the architect, and Mr. Hopson, of Sydney, superintended the construction.

MEDITATIONS IN A CHURCH

A good old church always sets the eye to work measuring possibilities of application to modern conditions. The church I have been seeing for the last month is not at first sight at all suggestive of conditions in Canada. It is in the middle of a little nest of halls, two half timbered and one of Queen Anne brick; which all, beautiful in the first place, are made doubly so by being reflected in a series of fish ponds round which they are grouped. These buildings were the successive residences of the head of the family which built the church. They did not do it all at once, as is evident not only from the appearance of the stone but from the structure of the church. The portion marked off by corner buttresses was built first; it most likely had a small chancel proceeding from the east side, of less width than the body, but it had neither the present chancel nor the present tower which are both built of a redder stone than that of the body and are obviously additions to it. This evidence of piecemeal work may be encouraging for church builders who build for posterity; but, in addition to the fact that we are posterity and build for ourselves, it is not so very encouraging in view of the fact that, as completed, the ratio of seating accommodation to cost is such that it would cost a congregation somewhere between 800 and 1000 dollars a head to reproduce it in Canada. Nevertheless there is no repressing the suggestiveness of the plan—a single rectangle. It is both more spacious, more handsome, and more economical than any other form, when it is properly treated and of an area within reasonable limits, and both scale and treatment are so right at Gawsworth that, after admiring it on many occasions, I have thought it desirable to get it down on paper and here is the result:

The old body 40'.0" x 29'.0" continues to be the body of the church. The chancel, though of the same width, and nearly as long, 33'·8", was built only for honour and glory, partly of God and partly of the family of the Fyttons. Here, nearer heaven by one step than the common people, they used to sit, and here are their tombs, with an inscription on one which proclaims them "Fit on's to wear a heavenly diadem." The Fytton sare gone now. The last trace of them disappeared in marriage with Lord Mohun and it was for her inheritance, this very Gawsworth, that Lord Mohun fought with Duke Hamilton, as recorded by Thackeray in Esmond. Their tombs and their sixteen quarterings in painted marble remain, and make one wish that this kind of feature (fig. 2) could be repeated in Canada. Nothing seems to sanctify a church so much as these relics of vanity; at least when there are recumbent figures upon them, (good recumbent figures,) to make one feel the presence of the dead among the living. And when, as in this case, the monuments remain in all their dignity while the family is gone forever, it becomes a case of sermons in stones, of building better than the builders knew; for the monuments which were ordained to perpetuate family honour point also to its evanescence. There is evidently something to be said for monuments, but most, I think, for life sized figures; recumbent figures, I should say; in marble; in painted marble.

The great thing, however, is to get the church built.

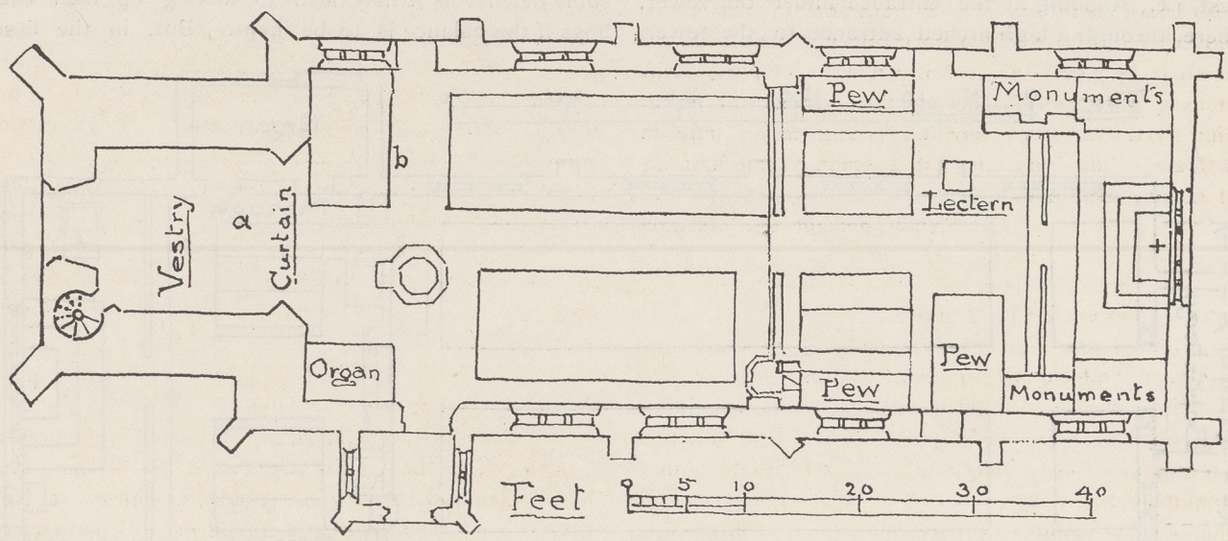


FIG. 1.—PLAN OF GAWSWORTH CHURCH.

FIG. 2.—MONUMENTS TO FYTTONS.

The plan in fig. 3 is a study of its possibility. As far as the general proportion goes, an internal view of the existing church is most satisfactory from the extreme west, i.e., standing at the entrance under the tower, where, through a high arched entrance to the tower, the whole length of the roof is to be seen. A suggestion of the view is given in fig. 4 from a photo taken from the point marked **a**, under the tower. The camera is not as inclusive as the eye and it was not possible to get in either the same extent of roof that is seen by the eye or, what is the great beauty of the view, the windows along the sides. The photograph was taken to serve as a sort of sectional view, showing the relation between the span and the height of the wall. This is exactly satisfactory in proportion to the length from west to east, and these dimensions—92′.0″ length, 29′.0″ width, and 23′.0″ wall height—would make a well proportioned single chamber church as laid down in fig. 3—which is like some aisled churches with the aisles omitted.

The side passages 2′2.″ and the centre 5′.0″ are quite enough ; the seats seem to want a few inches in length to make them take six persons of moderate size with ease. An exact width would be 30′.3″ and the other dimensions may be safely increased in proportion.

For hearing, the total length is not too great for the familiar words spoken from the altar, where the speaker has also the advantage of having a wall close behind him. The greatest distance for ease in speaking from the pulpit would be, as far as one can judge by the eye in the church, the distance from the east wall to b, on the passage from the north side door. This distance may then be transferred to the new plan as the distance of the chancel screen from the west end. The length thus left for the chancel is about right and the width, allowing for return passages for communicants, is no more than is necessary for good arrangement on the pulpit side, for the reading desk should range with the men rather than with the boys. The lectern may repeat the pulpit on the other side and there will thus be a mask to both hind seats and a similar motive in plan at the ends of the screen.

The three seat arrangement of the choir requires some defence as it may lead to mixing up men and boys if the balance is to be kept. But, in the first

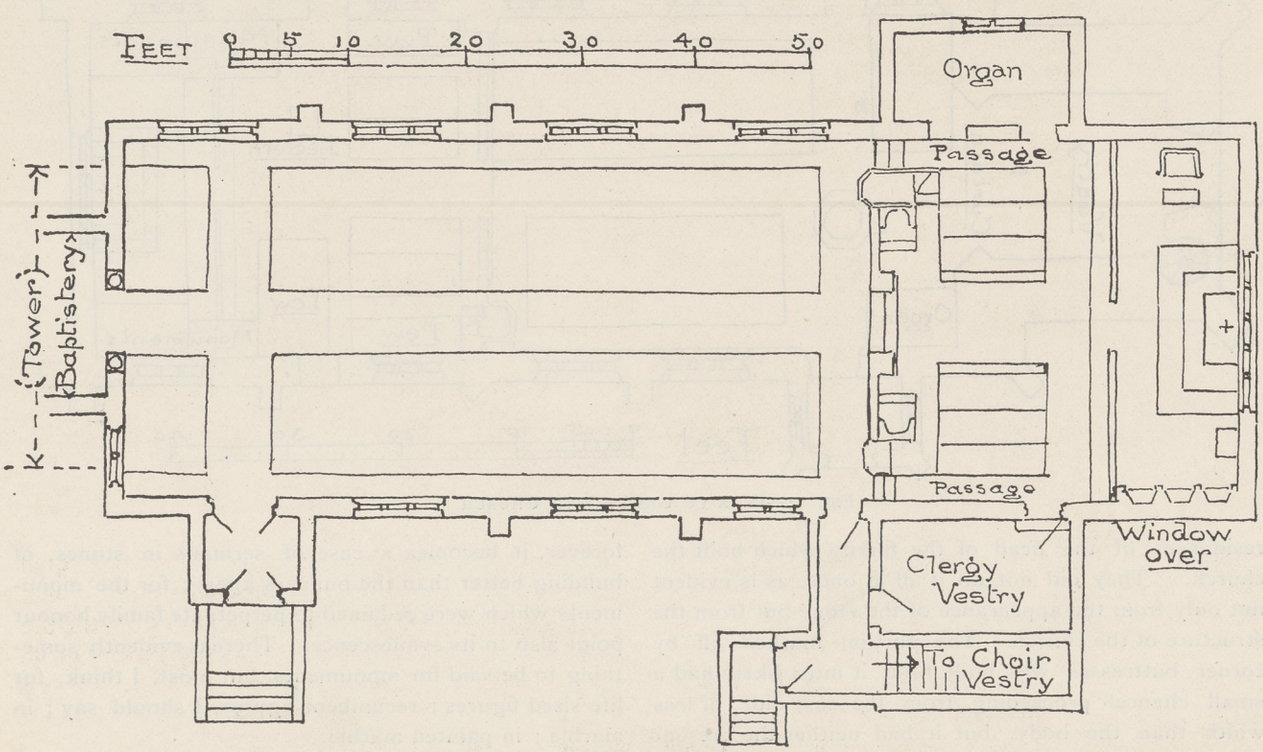


FIG. 3. SKETCH FOR DERIVED CHURCH.

place, alto boys are usually too tall for the boys' row and had better sit with the men; and secondly, the back seats are not likely to be filled except on festivals. The two front seats on each side, which would mean 10 men and 14 boys, would be enough for ordinary use.

The three seat arrangement is otherwise an advantage in reducing the depth of the chancel. It will permit the allowance of due spaciousness at the east end.

There ought to be no suspicion of narrowness in front of the communion rail or within it, and abundant room must be left for this.

The depth thus given to the choir is one bay of the roof; and the walls of the organ chamber and vestry take the place of buttresses. To make the vestry gable not wider than a bay, the church can be entered under a long slope masked by a gabled porch.

Here then is a church seating 250 and, if one can rust study from a model different enough to make some guessing necessary, both convenient and economical; that is to say, as far as the latter point is concerned, the walling is simple and dignity may depend merely on roof and windows. Apart from proportion in the latter, which costs nothing, deep reveals seem necessary; and these are the natural result of the hollow walls which are the churchwarden's friend and the coal dealer's enemy. As for the roof, it is not impossible to give a roof architectural character without great cost, but we are not so confident as formerly that this can be done merely by displaying its architectural essence. The real truth is that an acceptable open timber roof is acceptable only from its superfluity. The gothic revivalists who displayed scientific trussing have left roofs that are anything but acceptable. The safest bottom idea to have is continuity of surface. Vaulted roofs and such perpendicular roofs as that of Grawsworth are one in this respect, and indeed an open roof with trusses four times as many as is necessary or four times as heavy as is necessary is not far removed from the same feeling. If pitched rather than flat, crossed by heavy construction members and recessed or double recessed, its continuity is still the leading idea if the nature of the transverse supports is not entirely revealed and the attention directed to them. I would then try this as a way—a way for which wood and plaster would suffice—to accomplish for this church a roof that would be both dignified and economical.

FIG. 4.—VIEW LOOKING EAST.

W. A. LANGTON.

A GRAPHICAL SOLUTION OF THE FINK ROOF TRUSS.

By PROF. C. H. WRIGHT, of the School of Practical Science, Toronto.

Let the annexed daigram Fig 1, represent a Fink roof truss supporting the loads AB, BC, CD, DE, etc., and let the reaction of the left wall be MA. Consider first the forces acting on the point ABLM. There are two

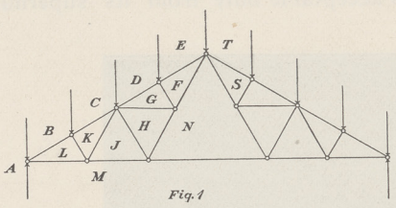


Fig. 1

known forces MA and AB and two unknown, BL and ML, exerted by the members BL & ML on the point as in Fig. 2.

From any point M, Fig. 3, draw the lines MA and AB to represent the wall reaction MA and the load AB.

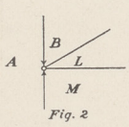


Fig. 2

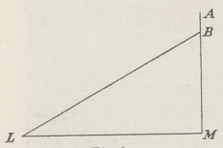


Fig. 3

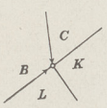


Fig. 4

Through B and M draw the lines BL and ML parallel to the directions of the forces BL and ML.

Let these lines intersect in L. Then MABLM is the vector diagram for the point, and the lengths of BL and LM represent the magnitudes of the forces BL and LM acting on the point—the force BL being a push and LM a pull, hence the member BL is in compression and LM in tension.

Proceeding to the point BCKL the known forces acting are LB and BC, and the unknown CK and KL as in Fig. 4.

From any point L Fig. 5, draw the line LB parallel to the force LB and from it cut off the length LB to re-

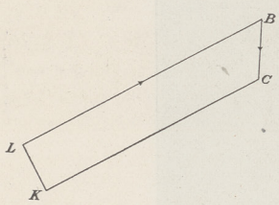


Fig. 5

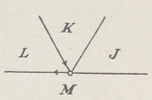


Fig. 6

present the magnitude of the force and from B draw BC to represent the force BC.

Through C draw CK parallel to the force CK and through L draw LK parallel to the force LK intersecting CK in the point K.

Then LBCKL is the vector diagram for the point and CKand KL represent the forces CK and KL. These are both pushes on the point, and therefore the members CK and KL are both in compression.

Considering the forces acting on the point JKLM there are two known forces ML and LK and two unknown KJ and JM as in Fig. 6.

The vector diagram being MLKJM fig. 7, where KJ and JM represent the forces KJ and JM. As they are both pulls on the point the members KJ-JM are in tension.

Now examine the conditions existing at the point DEFG. There is one known force DE and three unknown, viz.— EF, FG and GD as indicated in fig. 8.

Two of these forces DG and EF act in the same direction and will have a resultant acting in this same direction. For these two forces substitute their

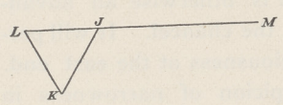


Fig. 7

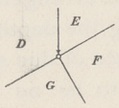


Fig. 8

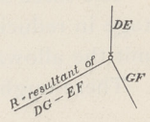


Fig. 9

resultant and the forces acting on the point are DE, GF and the resultant of DG and EF or R, fig. 9.

Draw the vector diagram (fig. 10) for these three forces and the lines DE, GF and R will represent the force DE, GF and R, and as GF is a push on the point the member GF is in compression.

At the point FGHN there are four forces acting, one of

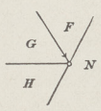


Fig. 11

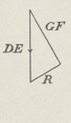


Fig. 10

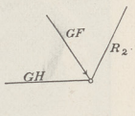


Fig. 12

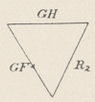


Fig. 13

which FG is known and the other FN, HN and HG are unknown and act as in fig. 11.

Of the unknown forces FN and NH act in the same direction and will have a resultant acting in that direction. Substituting this resultant for the two forces

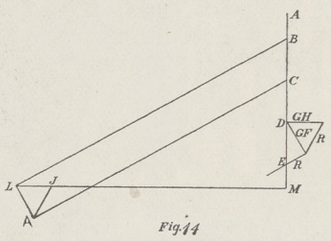


Fig. 14

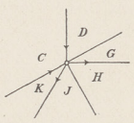


Fig. 15

and the set of forces becomes GF, GH and R2 (Resultant of FN and NH) fig. 12.

Draw the vector diagram GF, and GH and R2, fig. 13,

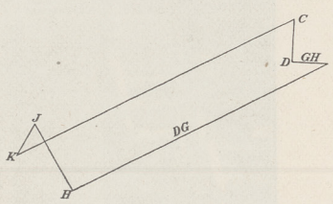


Fig. 16

and the length of the line GH gives the magnitude of the tension in the member GH.

Combine these four vector diagrams in one (fig 14

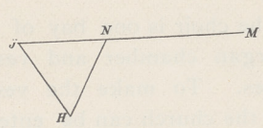


Fig. 17

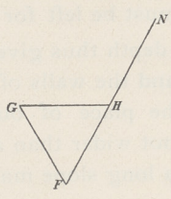


Fig. 18

The annexed diagram Fig. 15 represents the condition existing at the point CDGHJK. There are two unknown forces DG and HJ. Draw the vector diagram

J, K, C, D, GH, DG, H, J, fig. 16, and the length of DG and HJ will give the magnitude ot the unknown forces.

The vector diagrams for the points MJHN, NHGFV,

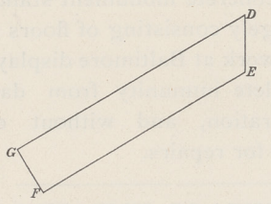


Fig. 19

and DEFG are given in figs. 17, 18 and 19 respectively.

Adding these four vector diagrams completes the combined diagram as in fig. 20.

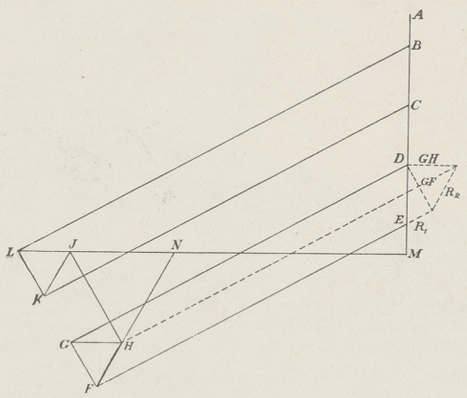


Fig. 20

Suppose the loads AB, BC, CD, DE and ET are unequal, that their total is equal to the load on the

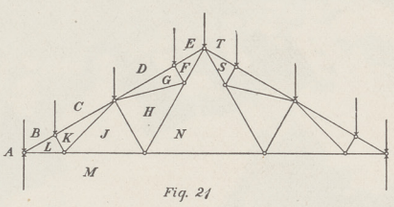


Fig. 21

right hand principal and that the lengths of the members BL, CK, DG, and EF are unequal as in fig. 21.

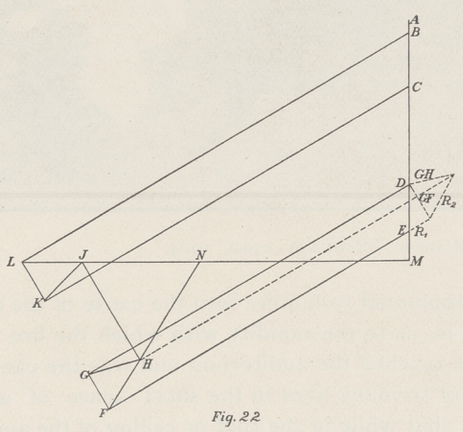


Fig. 22

Proceed as in the above problem and construct the vector diagram fig. 22.

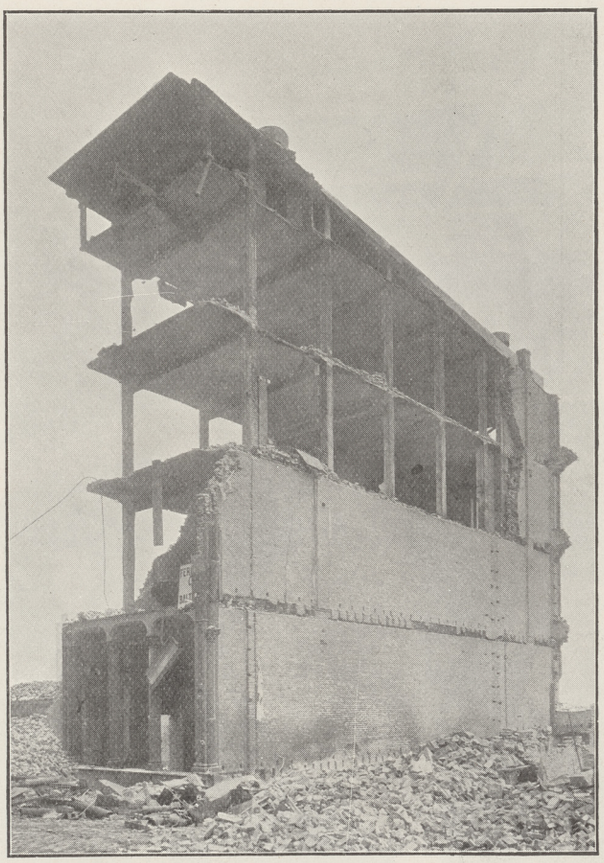
The work of excavating the Roman remains at Silchester, in Hampshire, (England), has been productive of valuable results. A number of tesselated floors have been unearthed, while a magnificent section of mosaic pavement, with a figure representing a dolphin, in a remarkable state of preservation, and over 1,000 pots and vessels, of varying sizes and shapes, have been brought to light.

SOME COMMENTS ON THE BALTIMORE FIRE.

By a Visitor to the Scene.

Huge heaps of debris, entire streets of them, and amidst this desolate vista of broken brick or stone an occasional steel-frame structure, standing sentinel-like, over the scene of the disaster. Such is the scene left by Baltimore's recent fire and giving to Engineer and Architect the injunction. "look here upon this picture and on this." The brick rubbish is all that remains of the acres of non-fireproof buildings.

One good service was done by the wholesale conflagration in supplying owners and designers with the strongest sort of proof that modern fire-resisting practice was based on true theory. The fire-proofed building, about which many professed scepticism, has fully vindicated itself.



The Fidelity & Bond Building, Baltimore.

The intensity of the heat at Baltimore is indicated by the thoroughness with which everything combustible was licked up—hardwood flooring, door and window trim, and interior fittings. While this was the case, the efforts to protect the structural steel framing are seen to have been mainly successful, and most of the steel work is as good as ever and the walls only need superficial repairs.

The buildings with concrete fire-proofing, without exception, have passed through the fiery ordeal showing a wonderful state of preservation, under the most severe conditions.

A striking case is that of the Commercial & Farmers' National Bank, where the upper floors of the building were of mill construction and the floor over the bank was the only one fireproofed. It was a concrete floor and all the debris of falling walls, safes, etc., landed on it, but according to "Iron Age" it was absolute-

ly uninjured, while all above, including the roof, was completely ruined. Another building, the National Bank of Commerce, had all the wood-work burned out of it, but the concrete floors are absolutely intact. The writer saw a large safe being moved across the concrete floor. The banking house of Alex. Brown & Sons is another example, with floors and roof included, of expanded metal and concrete fireproofing. The military cordon and debris strewn street alone prevented this institution from opening for business the morning after the fire.

A most remarkable example of the fireproofing qualities of concrete is exhibited in a four storey structure now known as the "Concrete Building", the concrete is intact and as good as when first installed. The buildings on all sides of it were levelled to the ground and the brick walls of the building itself crumbled and fell away. The cast iron front failed also, and to-day this concrete monument stands, a paradox of a building largely consisting of floors without walls.

The concrete work at Baltimore displays an unbroken record of complete immunity from damage by the general conflagration, and without exception will not cost a dollar for repairs.

THE CHICAGO THEATRE FIRE.

On this subject Mr. Chas. Baillairge, Architect, of Quebec, writes:—"I see by the report of the Commis-

ANNUAL BANQUET OF THE TORONTO BUILDERS' EXCHANGE, FEBRUARY 23RD, 1904.

which prior to the fire was the office of the U.S. Fidelity & Bond Co. We publish a view of this building showing its unique appearance. It is built of steel-reinforced concrete floors, roof, beams, and columns. In erecting the building, party walls belonging to adjoining buildings were used instead of building new walls, and in order to carry the floors pilasters of concrete re-inforced with steel rods were built up against the walls, and on these were carried the beams, also of concrete and steel rods. The beams are about 22 feet long, spaced about 10 feet apart. The floor slab is of reinforced cinder concrete, about 5" thick. There is no structural steel in the building, so that there can be no warping of heavy metal framework. Although the brick walls and iron front succumbed, as well as everything combustible,

sioners appointed to inquire into the cause of the disaster, that is, as to the rapidity with which the fire from the stage reached the auditorium and was the cause of the loss of so many lives in the short space of a few minutes, that while in the roof or ceiling of the auditorium there was an open ventilator, a skylight which on the roof over the stage end of the building should have been open, was on the contrary hermetically closed.

"Now, say the Commissioners, all the smoke and heated gases, which, had this skylight been open, would have passed out direct through opening, had to seek issue by the ventilator over the auditorium, thus creating a current of air which prevented the lowering of the incombustible curtain which, with the wall separating the auditorium from the stage, was intended to

cut off all communication between the two in case of fire.

This current of smoke and heated gases, which, had the stage ventilator been open, would have passed out directly through that issue, being prevented from so doing, rushed through the proscenium arch or opening with such rapidity and force that it pressed the curtain so tightly against the groove or sides in which the curtain was intended to work, that it could not be got down lower than within 14 ft. of the stage floor.

Thus the fumes and gases asphyxiated the audience and in a very few minutes; those in the galleries or upper tiers being, of course, the first victims of the disaster.

The Commissioners insist forcibly and are right in doing so, that the stage sky-light or ventilator should have been open during the performance, and that had it been opened and the gases enabled to escape in that direction, there would have been no such a current of air towards the auditorium as to prevent the lowering of the fire-proof curtain, and probably no loss of life at all on the auditorium side of the cut-fire wall between the auditorium and the stage end portions of the building, would have occurred.

This should be noted and immediately acted on by the managers of our Quebec so called Auditorium, though it is only the audience side of the structure that can be properly so called.

A ventilator over the stage can easily be made of proper dimensions and at trifling expense, which while allowing the fumes and heated gases to pass out, would exclude rain and snow, etc.

True, there are the so called emergency doors—five of

MR. R. G. KIRBY,
President Toronto Bui'ders' Exchange.

them on the eastern and four on the western side of the building, with iron staircases leading from them to ground level; but in such a climate as this, the landings of these outer stair-ways might, in the case of a heavy fall of snow, become impeded during a single sitting or representation and the outward opening of the emergency doors be thus prevented.

There should be a lad at each door with strict orders not to leave his post during the performance; for at the Paris Charity Bazaar fire, there were seven emergency doors, but no one having been stationed at them to open them, when the explosion of the acetylene apparatus of the cinematograph occurred, the audience from the far ends of the bazaar building (300 ft. in length) had to travel 150 ft. to reach the central door by which they had entered, not being aware of the existence of the emergency doors.

Had these doors been opened in time all would have escaped, with scorched heads and shoulders, no doubt from the falling draperies but with their lives at any rate, and three months would have repaired all such sores and singings as were caused by the burning hangings falling from above.

MR. GEO. C. YOUNG,
1st Vice-President London Builders' Exchange.

The only really safe theatre of more than one story in height, as at the Somner Park, Montreal, which is open all around and allows of immediate escape on all sides, may be said to be at Antwerp, Bruxelle, erected according to the system proposed by the undersigned in 1884 and exhibited in Paris in 1900. In this theatre there are five tiers of inside galleries one over the other, with corresponding iron balconies surrounding the auditorium end of the building on the outside. To each tier of superposed boxes or galleries there are 25 doors—125 in all—opening onto the outer balconies, with iron staircases descending from the one to the other to ground level. But even with all these precautions, the stage ventilator recommended by the Chicago Commissioners and the keeping of it open during each performance, would be none too much of a safe-guard against the possibility of the stage fireproof curtain being out of order.

When the undersigned built the Quebec Academy of Music in 1854, he had designed to have an iron cut-fire curtain (asbestos being then unknown) and the iron covered on the auditorium side with mirror in vertical strips of some 3 ft. in width, with silver-edged bars between them to keep the glass in position; but funds were lacking to carry out the scheme, and though the mirror was imported for the purpose, the rigid iron curtain was never made.

CHAS. BAILLAIRGE, Architect.

QUEBEC, March 18, 1904.

PUBLICATIONS.

One of the latest additions to the rapidly growing literature on the use of cement for constructional purposes is a book of 200 pages, entitled "The Architects' and Engineers' Hand Book of Re-Inforced Concrete Constructions," by L. J. Mensch, C.E., published by Wm. Seavert, Chicago, price $2.00. It treats of the use of concrete for a great variety of purposes, giving results of tests and illustrations showing important works which have been carried out in this material.

PHOTOGRAPHY FOR ARCHITECTS.*

By Francis R. Taylor.

Photography should not be considered as antagonistic to sketching. It has a utility in the education of the architect by producing an accurate delineation of old buildings unattainable by a sketch. It must not be forgotten that however valuable a sketch or measured drawing may be to the individual student who prepared it, there is the personal error to bear in mind when this method of delineation is applied for general study.

Photographs in conjunction with measured drawings undoubtedly form the best means for architectural study and research. It may be mentioned that in the Architectural Association Sketch-Book there are examples of measured drawings together with a photograph of the work. This method of illustration might be employed with advantage to a much larger extent. Whenever any old building of interest is to be pulled down to make way for modern improvements, or for other reasons, a set of measured drawings with a series of photographs form the best record of the old work.

Another use of photography as a means of illustration occurs in classes of instruction for architects when lantern slides are available ; these enable all present to see, whereas diagrams and plates on the walls are only visible from certain parts of the room.

Lantern slides for architectural lectures should be made with a view to suitability of purpose. Photographs of buildings, both externally and internally, would be useful to illustrate the grouping and general effect, and then should follow photographs of towers and spires, of piers and arches, of caps and bases, of doors and windows, of vaulting, etc., to illustrate the treatment of the parts, and, lastly, of mouldings and ornament.

In illustrating constructive subjects the same principles shou'd be adhered to—explanatory lantern slides to illustrate the manufacture and uses of the various materials, and then slides showing the different methods of construction.

The use of telephotography in the study of architecture is one which should receive careful consideration. In many instances parts of a building well worth studying are inaccessible for measuring ; in these cases an ordinary photograph gives a general idea of the composition and a telephotograph the details.

REPRODUCTION OF DRAWINGS.

The utility of photography in the practice of architecture might receive far more attention than it does. In many instances the only use to which photography is put in architectural practice is in the reproduction of drawings by the ferro-gallic process. In this process the reproduced drawings are either on a thin paper or a paper similar to Whatman's, and a black or brown line is obtained on a white ground. The advantage of the process is that the reproduced copies can be colored similarly to an original drawing. A great saving of time is effected, because from one complete set of tracings any number of reproductions can be obtained. If the reproductions are to be kept for a considerable time as in the case of copies for the authorities, care must be taken in the selection of the paper owing to its tendency to fall to pieces after a time. For this reason the authorities will only accept photographic reproductions on linen. The makers of the paper might consider the best means of surmounting this difficulty. It may be mentioned here that some of the papers shrink slightly in the process of obtaining the reproduction ; this emphasizes the necessity for fully dimensioning all drawings.

The ferro-prussiate process with a white line on a blue ground is sometimes used, but as colouring is then out of the question it is not so suitable for general architectural work. Its use is limited to drawings where colouring is not essential, as, for instance, in details of steel construction.

Besides this special application, the use of photography in architectural practice is generally limited to what may be termed the legal phase of our profession, although a wider application would be a distinct gain. No one will deny that photographs of buildings about to be pulled down are valuable records, and in ancient light, easement, party structure and such like cases would always be useful on one side or the other.

If the building happens to be one of considerable architectural interest, then the value of the record cannot be overrated.

Photographs of a building at its various stages of erection, with the dates and in some instances the time noted thereon, would be a valuable record of this class of work, and, in addition, would be very serviceable in the valuation of certificates. Engineers often adopt this method, with the best results, and there is no reason why architects should not do so.

Photographs of the finished building should in all cases be obtained, and a comparison made by showing the photograph side by side with the perspective drawing. Photographs should be taken by oneself.

It is impossible for a professional photographer to know exactly what is wanted unless he happens to have made a thorough study of architecture, and we know that in the majority of cases he has simply a mere smattering of the requirements.

It might, of course, be urged that the professional photographer could do the work under our guidance, but it will be found that this method is expensive, and is, in reality, only applicable in those instances where selection of subject is not required to any great extent.

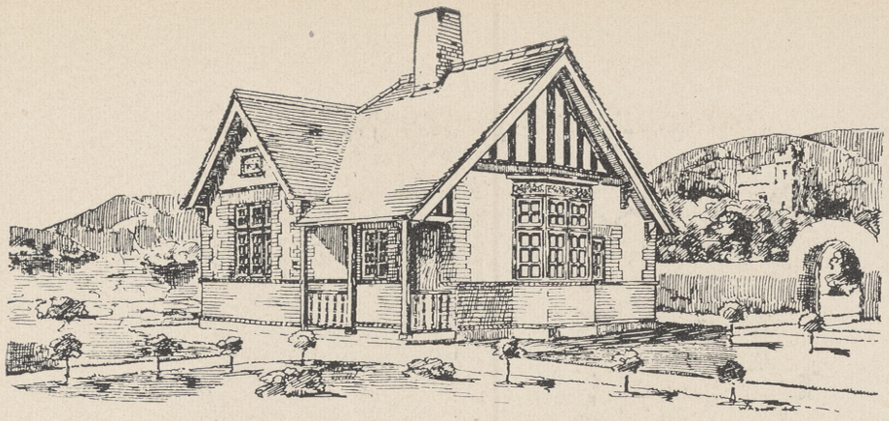
The architect who decides to use photography as an aid in his study and practice should understand certain of the technicalities. The questions which present themselves are :—What is the best camera for architectural work? What lenses should be used? What photographic plates and papers should be employed?

Before anything can be done, the size of the camera must be decided upon. The ordinary sizes are: 4¼ in. by 3¼ in. (quarter-plate); 6½ in. by 4¾ in. (half-plate); 8½ in. by 6½ in., (whole plate); 10 in. by 8in.; and 12 in. by 10 in.

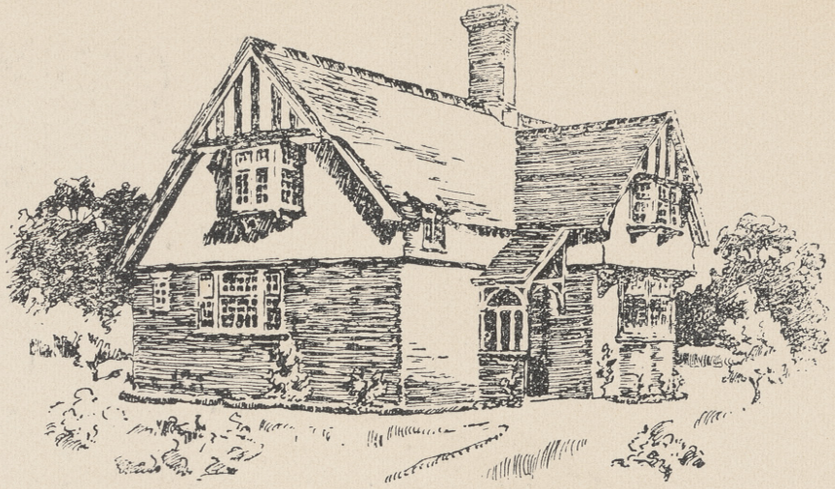
It is generally agreed that the larger sizes are the best for architectural work. But the larger the size the more expensive it will be. Besides this, the weight of the camera is a serious matter, especially as in the majority of cases the work would be done at a distance from home. For these reasons it may be conceded that the half-plate is the most serviceable. When lantern-slide work is contemplated, the quarter-plate is generally selected, as that is the most suitable size for the purpose.

If a good lens is employed, the quarter-plate size

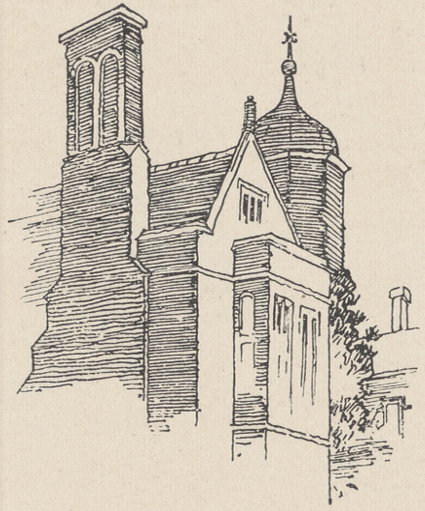
*Summary of paper presented before the Architectural Association in London.



GATE LODGE AT BEAUPARC, CO. MEATH, IRELAND. ANTHONY SCOTT & SON, ARCHITECTS.



ELEVATION FOR A VILLA, FT. FRONTAGE, TO BE BUILT IN STONE AND CONCRETE OR BRICK.



AT KENTWELL, ENG.

FRENCH BAY WINDOW INTERIOR.

A FARM HOUSE, STANTON, ENG.

MISCELLANEOUS SKETCHES.

ENTRANCE TO WOBURN COTTAGE HOSPITAL, FOR THE DUKE OF BEDFORD.
H. P. ADAMS, ARCHITECT.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
MARCH, 1904

"The Gothic Room."—House in South Kensington, Eng.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
MAROH, 1904

BANK OF MONTREAL, SYDNEY, C.B.
A. T. TAYLOR, F.R.I.B.A., ARCHITECT.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
MARCH, 1904

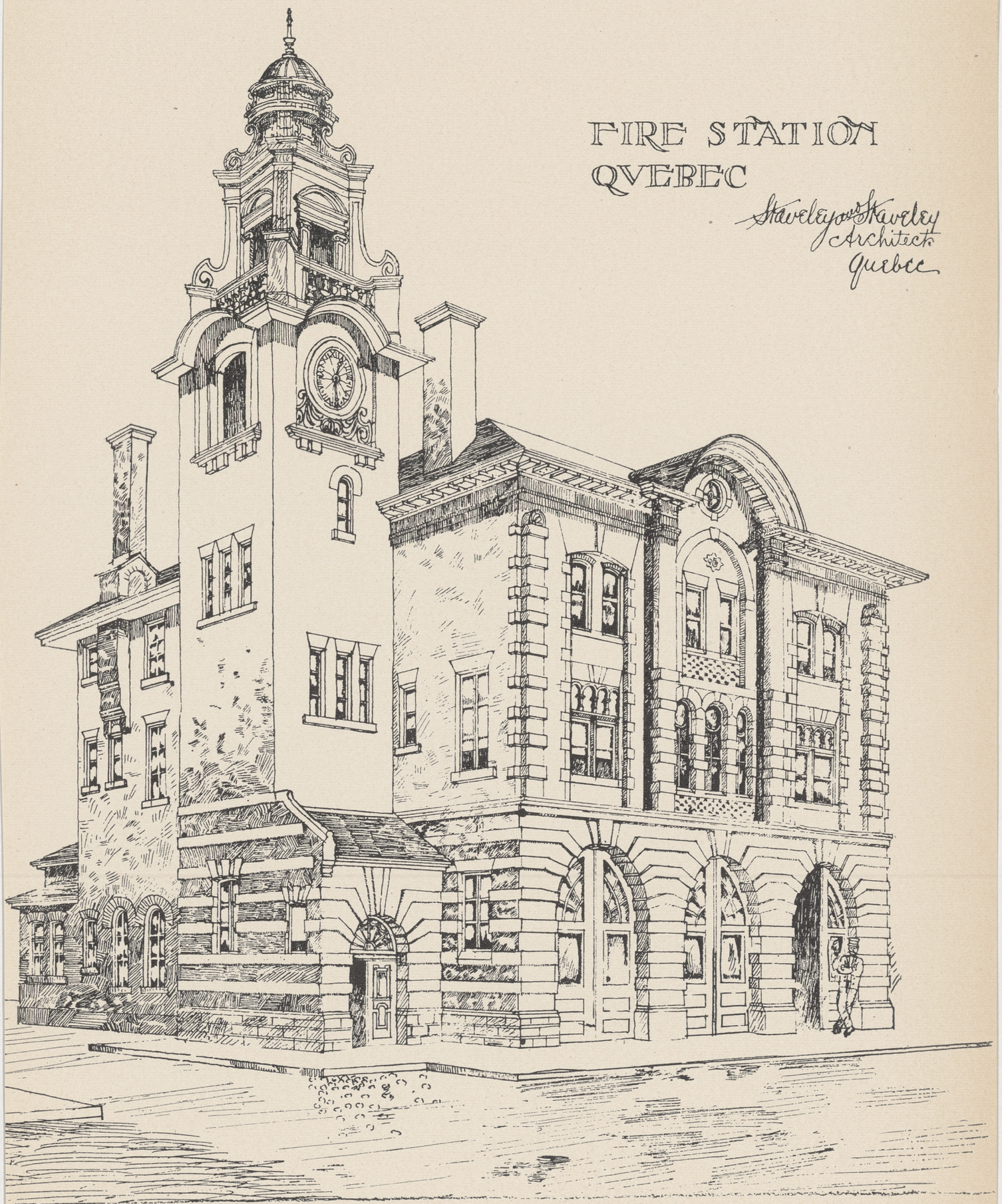
HOUSE IN GLEN ROAD, TORONTO.

CHADWICK & BECKETT, ARCHITECTS.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
MARCH, 1904

FIRE STATION QUEBEC

Staveley & Staveley
Architects
Quebec



SUPPLEMENT TO
IAN ARCHITECT AND BUILDER
MARCH, 1904

might be used for all work, as the photographs can be enlarged satisfactorily.

A camera for architectural work should have considerable rise and fall at the front, a good swing-back, long extension for long-focus and telephoto lenses, parallel or only slightly conical bellows (which prevent the cutting-off of the edges of the photograph when a short-focus lens is used), and at least three or, better, six double dark slides.

As to lenses, it is best to have a set of different foci and of a good make. They should be of rectilinear type.

For average work the rapid rectilinear of about 7in. focus is most serviceable on a half-plate. Long-focus lenses are useful in detail work, and wide-angle lenses are essential in confined positions.

The telephoto lens is a most valuable acquisition in the equipment. Some of the best examples of detail work are at too great a distance from the position available to give a photograph of a satisfactory size, but a telephoto lens enables one to obtain it to a larger scale with the same extension of camera. As this lens is not of a fixed focal length, the scale of the photograph can be altered at will, which is often useful.

Ordinary plates of a good make are the best for architectural work, especially for interiors, although in dark interiors where very long exposures are requisite rapid plates may be used with advantage. Isochromatic plates are useful when the lighting of the interior is yellow. In interiors where the light from windows, etc., would be likely to cause halation it is necessary to use backed plates.

The development of the negative requires care on the part of the operator, but this question cannot be discussed now. It may be mentioned, however, that the architect-photographer should do his own development.

The chief printing processes are silver printing-out, platinotype, carbon and bromide ; the decision as to which should be used depends upon circumstances.

A silver printing-out process, such as the well-known P.O.P. of various makes, produces excellent results, but if permanent photographs are required, platinotype or carbon processes should be used. For enlargements, bromide papers are most satisfactory.

DISCUSSION.

Mr. Arnold Mitchell said a level should always be used on a camera. Mr. George Scamell advised the placing of a scale on the building, so that it might be reproduced in the photograph ; he recommended a paper scale published by the Society of Antiquaries, price 6d. He always used a whole-plate camera himself. A pendulum level should be fixed on the back to enable the vertical lines to be accurately obtained. A camera for architecural work should have its lens fixed at the top of the front, not in the centre, as in nine cases out of ten this would avoid the front being raised. An ordinary stigmatic lens of three foci saved carrying several lenses. He had largely used Wellington Ward's stipping films, which saved much in weight and had practically no halation. "Ortol" was as good a developer as "pyro" and it did not stain the fingers. Starch paste should only be used for mounting. He thought it better to over-expose rather than under-expose. Mr. Hugh Stannus described a mirror reflector he had made for photographing ceilings, etc. ; this consisted of a piece of mechanically-planed glass carefully silvered, and was placed at an angle of 45 degrees with the camera.

ECCLESIASTICAL ART IN IRELAND.

It is plainly evident from the address he recently delivered at a meeting of the Maynooth College Union that the Rev. J. O'Donovan, of Loughrea, not only holds strong and sound views on ecclesiastical art, but he knows how to express himself strongly. The talk of a revivial of industries in Ireland led him to urge a revivial of Irish art in church decoration. He "went for" modern stained glass, sculpture, and painting as seen in the Church of Ireland. Stained glass, he remarked, is one of the most familiar forms of decoration in our churches. There is scarcely a church in Ireland that has not one or more stained glass windows. In some of the large churches the cost of those windows runs up £3,000 or £4,000. It may seem a rather sweeping statement to make, but it is a statement upheld by every expert authority on art, that generally—indeed, in almost all cases—this glass is, from an art standpoint, beneath contempt. It is as a rule gaudy in colour, badly drawn, vulgar in design, and where perspective is attempted, false in perspective. It is, moreover, bad glass. There are many varieties of glass known by the very indefinite name of stained glass. There is pot-metal, which alone was used in the best period of stained glass. In this glass the colour runs through and through the texture of the glass, the colour and the glass being fused together in the pot. Then there is enamelled glass, in which the colour is enamelled on the glass in soft pigment. When stained glass manufacturers advertise they always profess to supply a window, as the advertisement puts it, "best pot metal antique." When the window is put up it is not unfrequently very poor enamelled stuff.

There is, he went on, a craze for pictured windows, large and elaborate subjects that tell stories. This is a complete misunderstanding of the limitations of stained glass. In the thirteenth century, when the finest glass was produced, there were no elaborate pictures ; the effects were produced by careful leading and a most delicate choice of differently coloured glass. If figures were necessary they were outlined in leads, the feature and other details being worked in with the smallest possible use of brown pigment. The artist craftsmen of these times knew exactly what could be done in glass and what could not. They knew that the first quality of a window is to give light, and next if it is to be coloured its function is to give coloured light of the finest kind. For that reason the thirteenth-century artists always aimed at colour and translucency. Now the modern windows sin in almost every instance against this primary law. The function of the modern window seems to be to shut out light, or where it is let in to pass it through thick dirty brown or other paint with which the glass is thickly plastered. Take some good glass of the best period and compare it with the modern. The best examples are to be seen at Chartres Cathedral outside Paris. There are also a few fine examples which somehow escaped the vandalism of Puritanism in some of the English cathedrals—in York Minister, in the east window, in Salisbury, Lincoln, Westminster, and others. These windows, when the sunlight passes through them, are like mosaics of different coloured jewels, they never look gaudy because of the extreme purity of their tones. Sunlight through a modern window is robbed of all its beauty,

and strikes the eye as a dirty drab. Apart from quality and colour, the modern stained glass window is bad and vulgar in design. The human figures are certainly not of any race that inhabits this earth in any know period of history. But even given correct drawing, the effects of light and shade are always wrong ; they are impossible with light always falling on the picture from behind.

Another important branch of church decoration, continued the reverend critic, is sculpture. To judge by the Irish churches it is a lost art. Here again the foreigner holds the field. Go into our churches and you will find that the more pretentious of the statues come from Italy and Munich. If you venture to say you don't like the work the good priest looks you all over with a smile of superior pity, and reduces you to your proper level by the clinching remark, "Why, this statue was made at Carrara." Of course there are marble quarries at Carrara and stone-cutters of very great technical skill, but art, with an idea behind it, especially on religious art—no ! Take a statue of St. Joseph, admitting that it is modelled correctly, which it very often is not, does it convey any religious idea to the mind ? Only for the label it might just as well have stood for Marcus Aurelius or any other character that you like to think of. Church painting is at just as low an ebb. All our church-painting, with such few exceptions as are hardly worth noticing, comes from abroad. Rome, Germany, Belgium, France, are the principal markets. We may dispiss this branch of church art in a few words. The paintings are either attempts at religious art not above the level of daubs, or fairly good pictures—not religion. For some time past the country has been flooded by good and bad copies, generally made in Germany, of paintings entitled Madonnas, Magdalens, &c. The originals were painted by men who had no religious belief and are frankly naturalistic in treatment. Yet those pictures, often the grossest portrayal of human passion, are hung up in convents and other religious buildings, even in churches, to inspire the reverence and devotion of the faithful. There are other branches of church decoration—brass,gold and silver work and woodwork generally made in Birmingham or in Belgium.

We have first an immense consumption of decorative work that shows no sign of decreasing. We have most of this produced aboard, and done almost as badly—considered artistically—as one could possibly conceive. This work, if it could be done in Ireland, would be an immense industrial gain, and would provide work for thousands of hands. But it has behind it far higher possibilities. It may make Ireland a great centre of art production. Ireland once was remarkable for its art products. "The barbarians by the Western Sea" knew the exquisite art of enamelling on various metal when it was unknown to the Greeks and Romans. The country that produced the Tara brooch and the cross of Cong and the Ardagh chalice had surely a highly-developed art sense. In architecture our fathers did work of wonderful beauty. The Romanesque ornament at Cong, at Dysart O'Dea, the whole design of that imperishable memorial to Irish genius on the Rock of Cashel—Cormac's chapel—indicate what Irish art might have come to had it not been arrested by foreign influence. The revival, if there is to be a revival, will rest with the Church, which has at all times been the centre of art production.

LOMBARDIC COLUMNS.

Among the characteristic peculiarities of the Lombardic style, the following may be enumerated as the most obvious and the most general : Columns with cylindrical shafts, and varying greatly in their proportions, some being of the average height of the Roman Orders, others extremely short, either in proportion to their diameter or their capitals, or else excedingly tall, and when attached to walls elongated into a mere rod, or vertical convex moulding, surmounted by a capital. Instances of fancifully shaped or decorated shafts are by no means unfrequent, some being zigzaged horizontally, or polygonal in plan, or embossed with sculpture, or either twisted or cut into spiral grooves or mouldings. Equal diversity—not to call it extravagance—prevails in the capitals, which, as far as general mass and outline go, bear some analogy to the Corinthian. If, however, some capitals are much decorated, others are nearly plain, and these are frequently in the form of an inverted cone, but in such manner as to present four flat sides or faces which again are occasionally more or less ornamented. In bases there is much less variety, they being for the most part only a series of mouldings in rude imitation of the common attic base. But one very great singularity in this style connected with columns is that of placing them upon the backs of couchant animals or other figures, which serve as pedestals to them. Whimsical as it appears to us, it may very probably have originated, not altogether in caprice, but have been occasioned by employing materials and fragments taken from ruined edifices, where columns, being found too short for their intended situation, were raised or stilted up by being set on other fragments for which purpose remains of sculpture may have been adopted, either because they chanced to be at hand or because considered more ornamtental and as adding richness to the column itself. Upon the same supposition we may easily account for the great variety of columns and capitals in the same building, namely, that they were ornaments collected at random from the remains of other structures, and that the irregularities thus occasioned in the first instance grew by degrees to be a matter of taste, and was adopted as a matter of choice. Columns of the kind just specified were, however, by no means very usual, and are chiefly to be met with in those forming porches or decorating the chief entrance to a church, as in that of St. Ciriaco at Ancona, and in San Zeno at Verona. Although not invariably so, columns are to be understood as accompaniments to arches which spring from them, and arches applied in different ways are very predominant features of the style. Besides giving the form to doorways and windows, they were employed for decorating the faces of walls in very nearly the same manner as in the kindred Norman style.—The Architect.

Mr. Hebert, the well-known French Canadian sculptor, has been commissioned to prepare a statue to the late Joseph Howe to be erected in Parliament House Square, Halifax, on the 100th anniversary of Howe's birth in December next.

The members of the O. A. A. and others who had the pleasure of meeting Professor Nobbs of McGill University, on the occasion of the recent O. A. A. Convention in Toronto, will regret to learn that, immediately following his return to Montreal, he was compelled to enter the hospital and undergo an operation. It is gratifying to learn, however, that he is now on the way to convalescence.

Of the half million dollars expended in sculptural decoration for the St. Louis Exposition, women have secured a considerable part. Six are included in the distinguished corollary of artists selected to embellish the buildings. In the Art Palace the work of feminine painters compares favorably with that of men. In rug weaving, working in metal, book binding and decorative work, woman has made great progress.

PLUMBING PRACTICE UP-TO-DATE.*

By Lewis Le Grow, Toronto.

The plumber has always stood for one who works in lead; the name stands for the same to-day, but it has advanced to a position where it not only represents one who works in lead but also one who is responsible for the health of the community more than any other, and as it has been stated that there is nothing new under the sun, plumbing as we find it to-day is a contradiction of that statement.

It is not long since that plumbing was looked upon as the least important part of a house. It was considered quite up-to-date to have a 4-inch tile drain, extending from sewer on street to the most convenient point and then to run branches to different houses without respect to what basements it went through. or how complicated it might be constructed. Once an obstruction occurred in the main drain all properties dependent on it suffered in consequence. To-day every house must have its own drain carried outside of foundation walls.

Light soil pipe was universally used to bath room, then extended with galvanized iron through roof with slip joints. Every fixture in the bath room would be connected into heel or closet bend and it often connected to soil pipe with a putty or rust joint. Then for the finishing of the job, Pan, Hopper or Demerest closet was considered quite a luxury, but on no condition was any part of it to be exposed that might allow the free circulation of pure air, which in the opinion of many was not so important as that everything boxed in and painted so that microbes and other parasites might be the better increase.

With the advance of practical and technical education, laws have been adopted to compel people to appreciate good plumbing. Our improvements have affected all fixtures and condition of work, the most important being our system of backventing and syphon jet closet.

We will briefly notice the most important article of plumbing construction, namely, traps. A great many have been placed on the market, but from experience I find that traps with internal partitions are most dangerous. A flaw may exist in this partition above the water line and allow gas to enter the house. When we consider that it is not the depth of seal that offers the most resistence to syphonage, but the amount of water and that it is the depth of seal and not the amount of water that offers the greatest resistance to sewer gas, it is very important that the trap should be well made and work on the centrifugal principle with a back vent to relieve the trap from the pressure of sewer gas. The main trap in the sewer in my opinion should not be tolerated; it prevents the ventilating of sewer through the main stack and it also acts as an impediment to the flow of sewerage.

House drains should carry waste out of the house—not much nor little, but all—and do it promptly; when that which is intended for the street sewer is started on its journey it should be afforded a means of reaching its destination at once and without interruption, not a particle of filth should be allowed to cling to the sides of waste pipes nor be held in solution in some trap until it begins to decompose and give off its dangerous gases.

Kitchens of hotels and restanrants should have a grease trap situated in an open place and easy to clean out; all back vents on bath traps should rise perpendicular through the floor and not be bent so low on the trap as would allow any particles of waste matter to accumulate around its opening and stop the free ingress of air. When this occurs there is danger of syphoning. Where vents from traps connect with wrought iron pipes square elbows should not be used, angle fittings are the only perfect connection. Water closets such as the Richelieu and improved Sanitary should not be used on sanitary work owing to the vent being made a part of the trap and crockery is not a safe thing to connect with lead; the vent being rigid, any settling of the floor or movement of the fixtures is likely to break off the vent horn. And to prevent any settlement of soil pipe, it should rest on a foundation of brick or stone properly built by a mason. There are too many stacks of soil pipe connected with the tile drain allowed to rest on a bed of sand supported only with iron hangers. We have all had experiences of a very unpleasant nature from hear frost accumulating at top of 4-inch soil pipe above roof, stopping the ventilation of fixtures and causing syphonage, allowing sewer gas to saturate the room in a short time. All soil pipe passing through the roof should be increased to 5-inch from underside of same.

Another point of very great importance to the health of the people is the proper construction of a cess pool. It should be so placed that the liquid from it into the surrounding soil may not affect the water supply or leak into the cellar of the house.

(Continued on page 55.)

*Paper read before the Toronto Master Plumbers' Association.

—THE—

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Contributions of value to the persons in whose interest this journal is published are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

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NOTES.

The specification of the new naval barracks at Chatham, Eng. stated that the floors were to be caulked, and the contractor, entered into a sub-contract for the work. The space between the boarding was said in the contract to be ⅜ inch. Owing to the shrinkage of the timber this space was increased, and the sub-contractors claimed to have expended 137l. on the additional glue and oakum that was required. The defendants admitted the shrinkage, but maintained that it occurred after the caulking. The jury gave a verdict in favor of plaintiffs, with 118l. damages.

When properly built of brick or stone with loose joints, with drain tiles to distribute the water, leaving behind the solid matter which should be removed when necessary, we will find the sanitary arrangeme s equal to our city sewerage system.

The improvements of water closets have been remarkable, thanks to our manufacturers and the healthy competition amongst us to introduce to our customers the very best appliances. The syphon water closet takes first place to date. The energy of the flush is exerted without loss under atmospheric pressure ; it produces complete syphonage. In the washout closet before the trap is reached much of the energy is wasted. Water closets constructed in basements should be arranged with a due regard to the effects of the sun, for there is no disinfectant so sure as sunlight and ventilation. Local vents should always be connected directly with the closet bowl to be of the most practical benefit, and where it connects with the chimney it should run into a piece of iron pipe as galvanized iron in time will become rusted.

A great source of trouble in our homes which we fail to be conscious of is the refrigerator. Into it is placed the important things of life and it is surprising how little attention is paid to the proper disposal of the waste water. It should be conducted into an open pan or sink, placed some distance from the end of the waste pipe, with a good air space. This fixture properly trapped and ventilated and supplied with faucet would remove a great source of unpleasantness.

House drainage at the present time consists of two parts, soil and waste pipe above ground and tile drains under ground.

For each part there are different tradesmen, the plumber taking care of work above ground, the drainmen that below ground. The connection of soil pipe with the system of drainage belongs to the plumber, and he is responsible for the same. This connection has to be made with cement, and the most important of all, for it is covered up and not likely to be seen again until trouble occurs in the drainage. If then it is admitted that iron pipe free from all defects is necessary above ground, is it not of more importance that the same soil pipe should continue uninterrupted to a point outside of the foundation walls.

In this city materials out of which house drains have been constructed have remained the same while other improvements were being made, and it is time that we should take the initiative and have our drainage system placed in a proper position and constructed of material that the first cost will be the only one, and that the interest of men engaged in the manufacture of pipe must take second place to the health of the people. The ordinary tile drains must be discarded since they cannot be secured against breaking and defective joints. Perfect joints and not mere increasers must be used between sections of drains and soil pipes inside of any building. The removal of main traps and the purification of sewer gas that is the most poisonous, namely, sulphurated hydrogen and sulphide of ammonium.

It is not extravagant to talk about a perfect system of drainage since lasting material can be used. There is no more reason why there should be perishable material used and defective joints made in house drains than in the pipes which convey the gas. The latter are air tight aud gas tight; so should the former be. House drains should be recognized as a part of a house, not as something that will be covered up and not of so much importance. The supervision and the construction of house drainage should be put under the direction of the responsible and practical plumber, and not as at present, any man who can do it the cheapest.

It appears very simple to those who take no further thought of it that the essential element in plumbing is the ventilation of the sewers, but conditions and details of actions require to be studied, taking into consideration the disregard many people have for the plumbing fraternity, and it will be necessary for us to use scientific knowledge and practical experience to improve the sanitary comforts for all conditions. A united co-operation between the medical, architectural and engineering societies, lead on by our own professional plumbing and heating engineers, might bring the day when we will fully realize that an Omnipotent Providence has placed on us a responsibility of educating the indifferent to an understanding that the highest material things in life are cleanly surroundings and a pure system of ventilation.

THE IROQUOIS THEATRE FIRE.

The coroner's jury, after an investigation lasting nearly three weeks, placed the responsibility for this holocaust upon the shoulders of eight city officials and theatre attaches. The mayor of the city, the manager of the theatre, a fire marshall, a building commissioner and a building inspector are included in the list. The causes of the fire are stated as follows :

By the grand drapery coming in contact with an electric flood or arc light situated on an iron platform on the right hand of stage facing the auditorium.

The city laws were not complied with relating to the building ordinances regulating fire alarm boxes, fire apparatus, damper or flues on and over the stage and fly galleries.

We also find a distinct violation of the ordinance governing fireproofing of scenery and all woodwork on or about the stage.

The asbestos curtain was totally destroyed,and was wholly inadequate considering the highly inflammable nature of all stage fittings, and owing to the fact that the same was hung on wooden buttons.

The building ordinances were violated by inclosing aisles on each side of lower boxes and in not having any fire apparatus, dampers or signs designating exits on orchestra floor.

The building ordinances were violated in that section regulating fire apparatus and signs designating exits on dress circle.

The building ordinances were violated in that section regulating fire apparatus and signs designating exits on balcony.

Generally the building is constructed of the best material and is well planned, with the exception of the top balcony, which was built too steep, and therefore difficult for people to get out of, especially in case of an emergency. We also note a serious defect in the wide stairs in the extreme top east entrance leading to the ladies' lavatory and gallery promenade, the same being misleading, many people mistaking this for a regular exit, and going as far as they could, were confronted with a locked door which led to a private stairway, preventing many from escaping and causing the loss of fifty to sixty lives.

It is to be hoped that the officials of Canadian cities will feel their responsibility and not wait for the verdict of a coroner's jury. What is being done to remedy the defects in theatres and other public buildings in Toronto and elsewhere discovered as the result of visits of inspection made immediately following the disaster in Chicago ? The newspapers of Toronto, which remained mum in the face of the statements published in this journal regarding the unsafe condition of one of the Toronto theatres, were forced by the Chicago horror to make a show of defending the public safety, but for weeks past they have not published a line on the subject. The Theatre and Music Halls Committee of the London County Council recommends that all places of amusement should compulsorily be placed in telephonic communication with the fire brigade; not only should this be done, but members of the fire brigade and police force should be detailed to attend every performance. The buildings should be mude as nearly fire-proof as possible and so planned as to afford ready egress from all parts of the interior. In addition to all this, some carefully thought out method of preventing a panic should be adopted.

What is called a heat-proof putty is made by mixing burnt lime with linseed oil and boiling down to the usual consistency of putty, and allowing the plastic mass to spread out in a thin layer to dry in a place where it is not reached by the sun. It can be warmed over a lamp or otherwise for use, and on cooling is hard again.

A VISIT TO THE CANADA FOUNDRY COMPANY'S WORKS.

A luncheon was recently tendered at the King Edward Hotel, by Mr. Frederic Nicholls, general manager, on behalf of the Canada Foundry Co., to some two hundred gentlemen prominently identified with the business interests of Toronto. Arrangements had been made to afford these gentlemen the opportunity of inspecting the company's extensive works at Davenport, and special cars were in waiting for the purpose. Unfortunately, however, as the start was about to be made a severe blizzard set in, and it was decided to postpone the visit until a future date, of which due notice will be given.

NEW IDEA IN HOT WATER DISTRIBUTION.

Oscar F. Peterson, of Des Moines, has secured a patent on systems of hot water distribution designed to keep the hot water hot while circulating in the mains, without expensive main construction. He places the hot water pipes in common clay tiling, through which, surrounding the hot water pipes, he forces hot air, which keeps the water in the pipes at the highest possible temperature. It is said that with a 40-horse power engine to pump the water and a 6-horse power engine to run the fan with which the hot air is forced through the tube, the plant can be operated advantageously and at a minimum cost. The air which is used is heated by the waste heat which otherwise would go out the smokestack. The use of the hot air is elementary in reducing cost of production, in two ways : It keeps the hot water hot, thus reducing the fuel required to keep it at 250 degrees, and it does away with the expensive asbestos and wooden log main construction. Where the water pipes in the ordinary system radiate and lose much heat throughout their length, in the Peterson device it is claimed that it is the hot air which radiates and loses heat instead of the hot water. Mr. Peterson says that he has tried the device in a mile of mains and it worked satisfactorily. On account of the economy of the scheme the heat can be furnished at a much lower price than the heat of other plants, it is claimed.

PERSONAL.

On March 16th Mr. Stewart Percival McMordie, of the firm of Barry & McMordie, Niagara Falls Ont., was married to Miss Edith Mabel Stephens.

Mr. William Graham, a once prominent contractor, died at his house in Galt, Ont., on March 16th, at the advanced age of 86. He was a second cousin of Thomas Carlyle.

Messrs. Robert McCallum, City Architect of Toronto, and A. Chausse, Building Inspector of Montreal, attended the recent convention of the National Building Commissioners and Inspectors' Association at Washington, and were elected vice-presidents of that organization.

BUSINESS NOTES.

The attention of architects and contractors is directed to the card of the Hagersville Quarry appearing for the first time this month in our Stone Dealers' Directory.

The Cement, Stone and Building Co., Toronto, has been incorporated with a capital of $50,000, to manufacture building materials, builders' supplies, etc. The provisional directors include W. D. McVey, H. H. Thompson and Robt. Taggart, Toronto.

The Manitoba Builders' Supply Co., Winnipeg, Man , has been incorporated with a capital of $450,000, to manufacture builders' and contractors' supplies, etc. The provisional directors include Wm. J. Hodgins, Robt. Watson and H. J. Macdonald, Winnipeg.

The Montreal Silicate Brick Co., Limited, chartered in the summer of 1902, with an authorized capital of $100,000, to take over the brickyard and plant of C. Sheppard & Sons, and engage in making bricks by a new patent process, have themselves applied for an order in liquidation.

The Canadian Coral Marble Co., Limited, of Toronto, whose advertisement appears in this number, have issued a handsome brochure explaining the various uses to which their materials are adapted in building construction, such as flooring, panneling, tiling, etc. A number of excellent reproductions of photographs are given showing the materials in situ in the King Edward Hotel, City Hall, and other prominent buildings in Toronto.

NOTES.

The following are the officers elect of the Ottawa Master Plumbers Association for the ensuing year: President, Gil Julien; 1st Vice-President, D. O'Connor; 2nd Vice-President, A. Langelier; Treasurer, Wm. Northwood; Secretary, T. Blyth; Sanitary Committee, J. Livock, J. R. McLennan, J. McKinley, Mr. Martel, Mr. Normand; Auditors, C. Watt, H. A. Knox; Tyler, P. I. Bois.

The electric wiring of the Tooting Bec asylum for aged imbeciles in London, England, is carried through brass conduits which are made to act as the return conductor as well as a protecting channel. One insulated conductor is run within each tube (or two where the three-wire system is employed) and the tubes are 5/16 to 7/16 inch in diameter. The conduits are, of course, grounded to prevent shocks.

There is reported to be a movement of foot among the owners of lumber yards and wood working factories in Vancouver to sell through one central office at agreed prices and apportion the sales among the different firms. As a result the builders are anticipating an all round advance in prices of lumber and wood finishings. They threaten to import their materials from Puget Sound if the combine should squeeze them too hard.

The following gentlemen have been elected as officers of the Montreal Master Painters' Association : President, C. T. Charlebois; First Vice-President, W. P. Scott; Second Vice-President, T. A. Gauthier; Joint Recording Secretaries, L. Z. Mathieu, Chris. Sonne; Corresponding Secretary, S. N. Arcand; Treasurer, A. Girard; Executive Committee, Wm. Young, convenor; R. E. Jones, P. Houle, Wm. T. Castle ; Arbitration Committee, the President, W. P. Scott, John Murphy, W. T. Castle, J. N. Arcand.

The effect of low temperature on iron has recently been investigated by Professor Dewar and Mr. Hadfield, using a bar containing 99.89 per cent. of iron, which is practically pure. Tests at ordinary temperatures showed a tensile strength of 21 tons and an elongation of 25 per cent. in 2 inches. At a temperature of — 180 degrees Cent. the tensile strength was increased to 54 tons, but the elongation was nil. The part of the bar that had been subjected to extremely low temperature bent double cold after it had returned to the normal temperature.

NOTES.

The revival in England of glass painting, which at one period threatened to become a lost art, has, during the past forty years, made such progressive strides as to mark a new epoch in the art work of Great Britain.

"Look here!" cried the victim, "you said that house was just a stone's throw from the station." "Well?" enquired the real estate agent. "Well, the distance is half a mile at least." "Is that all? Time and again I've seen a blast in a quarry that would throw stones upwards of a mile."—Philadelphia Press.

"Fire Marks" of fire insurance companies are conspicuous objects in London houses and recall the old days when only such buildings as were so distinguished from those not so "adorned" were entitled to the services of the firemen in case of a fire. These badges consist of embossed leaden plates, which originally were colored gilt, and bore on them the distinctive sign of some particular insurance office, often with the number of the policy added. Some are very curious, and are being carefully preserved by the London county council to form part of the contents of a future municipal museum. Quite a number have recently been taken off from the walls of some old houses that have just been removed in the clearance made for the new thoroughfare from Holborn to the Strand.

A short time since, the side wall in a large building in a western city bulged so far out of line that the authorities intervened and a total collapse of the structure was looked for. The difficulty was remedied by connecting the two opposite walls across the building at short intervals by two-inch rods with nuts and heavy washers on the ends. Alternate rods were heated and the expansion taken up by turning in the nuts. Then, as the wall was drawn in by the contraction of the iron on cooling, the remaining bolts were heated, and in their turn tightened, and the process repeated until a bulge of some eight or ten inches was effectually counteracted. This process is an excellent one when it is carried out intelligently. But we remember one occasion on which the same system was tried, but the strain on the rods was so great that, though they expanded with the heat, they were simply pulled out again under the contraction, and it was the rods instead of the brickwork which gave way.

FURNISHINGS OF THE BRITISH BUILDING AT THE WORLD'S FAIR.

The finishings and furnishings of the interior of the British Building at the World's Fair are in keeping with the grandeur of the royal rooms they represent. The Banqueting Hall is a reproduction of the Orangery at Kensington Palace. The ceiling is enriched with the Royal Arms and festooned mouldings of fruit and flowers. The furniture of this room comprises faithful reproductions of historical examples of the Queen Anne period. The old Console tables were part of the collection at Mertham House. The chairs are reproduced from the originals in the possession of the Earl of Westmoreland. The brass chandeliers are based upon fine old examples. Next to the Banqueting Hall is a fine suite of rooms designed in the English styles.

The Elizabethan Room has an ornamental ceiling which is copied from the breakfast room in that historical mansion, Holland House, Kensington, in the decoration of which the best artists of the day were employed, and whose many famous occupiers included the Earl of Holland, William Penn, and Vandyke, the celebrated artist. The chimney piece, paneling and plaster frieze are taken from Bromley Palace. The furniture is of the same period, the small cabinet being a copy of one dated 1621, formerly belonging to Archbishop Sharpe and now in the possession of Sir William Sterling Maxwell, Bart. The old armour was formerly in the collection of the late Earl of Egmont, Cowdray, Sussex.

The Georgian Room, with white enriched paneling and mahogany doors, is a fine specimen of English work reproduced from an old house at Epsom, Surrey.

The Adams Room, with its enriched plaster ceiling, frieze and doorways, is taken from examples designed by the celebrated architects, Robert and James Adams, in the latter part of the eighteenth century.

The large room (Queen Anne) is designed in the style of Sir Christopher Wren, the details being taken from Hampton Court Palace, and Belton House, where Grinling Gibbons executed some of his best wood carving under Sir Christopher's direction. The furniture is from old examples. The original chair came from the collection of Viscount Hilton, at Mersthm House. The settee was prepared for Queen Anne's reception at Forde Abbey. The cabinet is an old one, procured from an ancient county family who have handed it down for generations.

The Ontario Wind and Tornado Mutual Insurance Company will apply to the Ontario Government for incorporation to carry on the business of insurance against loss or damage to property caused by storms, wind and tornadoes.