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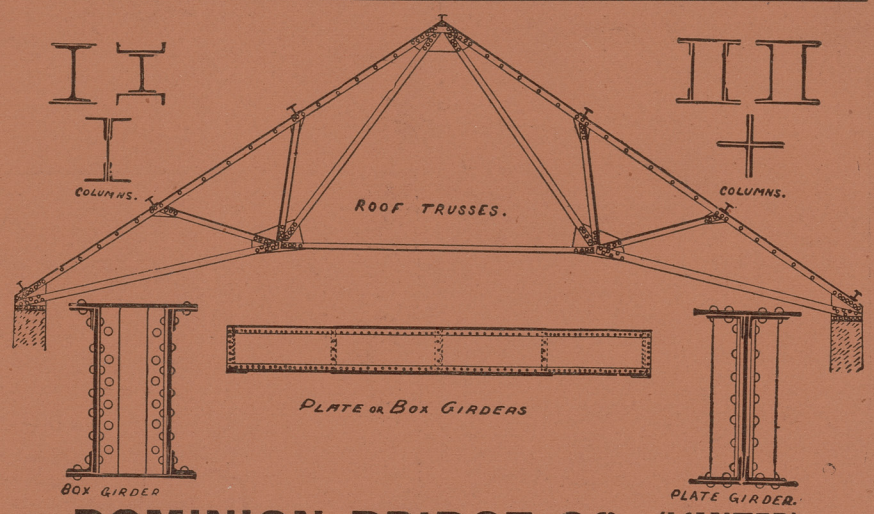
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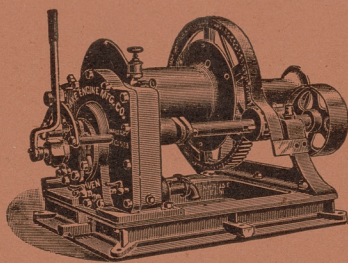


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The properties of slate and its adaptability to the uses of mankind are said to have been accidentally discovered in warlike times in Wales when the material, so abundant in that country, was used in the construction of earthworks and fortifications. This, of course, was long antecedent to its discovery and use in the United States. Now, however, slate to the value of nearly one million dollars per year is exported from the United States to Great Britain. This trade began in 1876, and strange to say, at that time, Welsh slates were still being exported to New York, Boston and Philadelphia.

WE commend to the consideration of the leaders of the labor organizations, the following opinions regarding the rights of capital and labor as expressed by Mr. P. M. Arthur, President of the Brotherhood of Locomotive Engineers: "I differ from many labor leaders as to the methods to be pursued in bringing about the best results. I say organized labor is the hope and salvation of the workingmen. The great stumbling block that has injured us in so many ways is the so-called labor organization which attempts to dictate. It cannot see two sides to any question. We should give and take. The interests of capital and labor, I say, are identical, and the only way these matters can be settled is by a fair honest method—Christianity, I might say. We must do unto others as we would have them do unto us. We must recognize the fact that we are all entitled to certain considerations. What is capital? You work, accumulate money and get into business. Must you be condemned for that? I say no. That is capital. It is only when it becomes tyrannical that we resist it."

Another Building Collapse.

THE London City Hall disaster came near being repeated at Owen Sound last month. The floor of the police court was densely packed with persons witnessing the progress of a trial, when suddenly there was heard a loud cracking noise. Following this the floor began to settle, and the frightened crowd made a rush for the doors. The concentrated pressure having been thus relieved, the settlement ceased, and all escaped injury. The floor dropped a distance of two feet at the

rear of the hall, and but for the prompt dispersion of the superincumbent weight, would undoubtedly have fallen to the ground floor, a distance of 14 feet, carrying with it to injury and death a large number of persons. There was a red-hot stove in the room, which must have added to the horror of the catastrophe. The floor is said to have been entirely supported by the outer walls of the building. To avoid the recurrence, in public buildings at least, of accidents of this nature, the municipal authorities would do well to appoint a competent architect to inspect and report upon the safety of such buildings. In order that human lives shall not in the future be sacrificed as the result of improperly constructed buildings, the Ontario government should follow the example of the legislatures of Quebec and Illinois, by enacting that no person shall be permitted to call himself an architect without having passed a qualifying examination to demonstrate that he possesses the requisite knowledge to enable him to adapt the strength of his structures to the purpose for which they are to be used.

A SUGGESTION. A successful departure has recently been made by the Cincinnati Chapter of the American Institute of Architects, which might perhaps with advantage be copied by the Toronto Chapter of Architects. When papers are read by members or non-members, invitations are extended to those interested in the subject to be present and participate in the general discussion. Since this has been done the meetings have been very successful. At a recent meeting the discussion was so interesting and instructive that a special session was called to complete it and to give parties concerned time for further preparation.

THE VICTORIA SQUARE PROJECT. It is subject of sincere regret to all interested in the beauty and healthfulness of the city that the assessment commissioner of Toronto has seen fit to report adversely upon the proposal that the city should acquire the property opposite the new municipal buildings for the purposes of a public square. The commissioner in his report considers the financial aspect of the question at considerable length, and concludes that the city's proportion of the cost would be unwarrantably large. The report recommends that if the Council decide to acquire the property the plan which has thus far been under consideration should be abandoned and the scheme carried out as a local improvement, payments of principal and interest to extend over a period of not more than ten years. It is stated that special legislation would probably be necessary for this object. As to the financial drawbacks of the present scheme, we do not presume to speak with authority, but if it be deemed desirable that the project should be carried out as a local improvement, we see no reason why the payments should not extend over a much longer period than ten years. The improvement would be one of a permanent character, the cost of which should not be entirely borne by the present generation of ratepayers. We are decidedly opposed to the opinion expressed by the commissioner that "the small size of this property precludes it from being of much advantage as a public square." It would have a frontage of 248 feet on Queen and Richmond streets, and a depth of perhaps 200 feet. The cost, which is the chief obstacle in the way of the acquirement of this

property, which is almost entirely covered by buildings of trifling value, will certainly stand in the way of the city obtaining a large area for the purpose in the heart of the business district. It therefore comes to this that unless means can be devised for carrying out this project, we may as well become reconciled for all time to the inadequate view of the new municipal buildings at present obtainable and the absence of a spot in the business centre which would afford a resting and breathing place for citizens and visitors.

CANADA FIRST. THE false notion which has induced some Canadian institutions to engage the services of foreign in preference to Canadian architects, seems in turn to be displayed by some Canadian architects in the purchase of materials for their buildings. Some of the most important buildings recently erected in Canada are literally full of American materials, counterparts of which we believe might have been purchased from Canadian manufacturers without disadvantage as regards quality or price. We do not advocate the purchase of Canadian materials simply because they are Canadian. On the contrary where a distinct advantage in quality or price lies with the foreign material, it is perfectly justifiable for the architect to purchase abroad. Where the quality and price are about equal, preference should be given to native materials. By giving Canadian materials first consideration Canadian architects can substantially aid the development and prosperity of many important industries engaged in the production of articles used in building construction. If on the other hand they show preference for foreign materials, our manufacturers will be deprived of much trade to which they are entitled and of the incentive to achieve the highest degree of perfection of which their art is capable. Not only so, but our artisans will be deprived of employment. "Canada first" is a motto which should obtain in business as well as in politics.

EFFECT OF FIRE-PROOFING ON INSURANCE CHARGES. THE insurance authorities of New York appear to have come to a sudden recognition of the fact that buildings in the construction of which fire-proof materials are wisely employed, are an important factor in lessening fire losses, and should therefore be charged a preferential rate. In pursuance of this idea, the justice of which is self-evident, the companies are eagerly striving to secure risks on this class of buildings, and so keen is the rivalry existing between them that rates have to a large extent been demoralized. It may reasonably be expected that the example set by the insurance authorities of New York will be followed by those of other cities, and will prove a strong incentive to the use of fire-proof construction. In order that the fire loss and the cost of insurance may both be permanently lessened, however, owners, architects, manufacturers of materials and others interested should be careful to see that fire-proofing is properly done. It is not enough that the materials employed be themselves impervious to fire; they will be non-effective unless properly used. The Engineering News has recently published an article and illustrations showing the careless manner in which porous terra cotta has been placed in a so-called fire-proof building now under construction in Park Row, New York City, where, as it states, defects, such as broken skewbacks, broken flange tiles, misplaced keys,

etc., are chargeable to the use of injured material, and to the manner of handling the material, rather than to the nature of the arch material itself.

School Accommodation in Toronto.

THE result of a recent inspection of the present temporary school accommodation in Toronto, as embodied in a report to the government by the Secretary of the Provincial Board of Health, leaves no room to doubt the necessity for a considerable immediate expenditure on new buildings. The report shows that one-twentieth of the entire school population of the city is unprovided with permanent school accommodation. The temporary accommodation afforded in private houses, churches, stores, basements, play sheds, etc., is necessarily of a very defective character. Of the 30 schools inspected, 18 had less than 16 square feet of floor space per pupil, while in 23 there was less than the required 250 cubic feet of air space. Of the 30 classes inspected 12 were found to have no playground, other than the street. All but two buildings were without artificial ventilation. In no instance was the lighting found to be altogether satisfactory, and in 26 out of 30 class rooms it is described as being either "defective" or very "defective". Not a single room fulfilled what might be considered fairly reasonable requirements. In view of the serious injury to the health of the children which must result from the continuance of the present system, no false notions of economy should be allowed to stand in the way of adequate and proper school accommodation being at once provided. The failure of the Council to supply the necessary funds appears to be entirely inexcusable in face of the fact that the sum of \$7,000 per year now paid as rent for the miserable class of accommodation described above would more than pay the interest charges on the necessary new buildings.

THE ONTARIO SOCIETY OF ARTISTS' 26TH ANNUAL EXHIBITION.

THE 26th annual exhibition of the Ontario Society of Artists, which has just opened at the Art Galleries, cannot be said to be like all the rest. There is indeed a marked difference between it and the preceding exhibitions with which we have been acquainted. This may be due to the conditions which have governed the artists, the Royal Canadian Academy having held an exhibition here a little more than a month ago, and necessarily taking a greater portion of the work of the year, or it may be due to the growing desire of the artists to make smaller exhibitions and thus make them more select. However it is, the result is a decided improvement. One misses, perhaps, important canvasses having size enough to accent the walls, which we are pleased to see are hung for the most part in groups, that is, each artist's works together. This is as an exhibition should be, though it may be difficult to do it and preserve symmetry, which is of course desirable.

The quality of the work shown is of a very high average, although nothing comes prominently to the front in point of excellence. Perhaps it is better to have such an average than to have one or more isolated works so overtopping the others that the symmetry is spoiled. If one were wishing a wish within possibility and unconcerned as to whether any one artist came out better than another, caring only for pictures, would it not be that there should be even more uniform excellence so long as the variety was kept? From the

point of view of a high average the exhibit certainly must be counted a success.

In a hasty glance at the works around the room, taking them as the numbers run, we should say that the exhibit made by the president, Mr. Reid, is tonal in character. Mr. Challener has only two crisp water colors. Miss Carlyle's "Monday Morning" is a screamer, but is admirable in its directness. A small one is a contrast by quietness. Mr. Grier's two portraits show his knowledge and strength. Mr. Bell-Smith shows only marines, which is perhaps his forte. There are three excellent examples of Mr. Atkinson's work, and Mr. Knowles has never shown us better landscapes. The quiet grays of twilight attract Mr. Ahrens, and though the one shown is not quite satisfactory, it possesses sterling qualities. Miss Tully's old woman is a very satisfactory picture, not forcible technically, but on that account all the more fittingly treated. Mr. Kelly's water colors are handled with knowledge, and are not ambitious pictures. Mr. O'Brien makes a strong exhibit, and his well-known work always gives one a feeling of satisfaction; it is because there is a fitness of all the parts. The insistence of detail in Miss Spurr's English studies mars the general effect of her work more than usual. A group of roses by Mrs. Reid, a small portrait head by Mr. Sherwood, and Mr. Manly's fairly representative exhibit complete the first room.

In room 2 Mr. Forster's somewhat sentimental "Go Ye" is the first. Sheep by Mr. Kidd is muddy in color, but he redeems himself in the church interior. The tone of Mr. Coleman's water color could be more harmonious. Mr. Martin makes an excellent showing, and the pastel head by Miss Hagarty is one of the successes of the exhibition. Miss Hawley gives us an exhibition of clever handling in her roses, but the small head is more satisfactory. Mr. Gagen's, Mr. Blatchly's and Mr. Rolph's water color exhibits make an even and harmonious wall with Miss Muntz's strong oil head making a central accent. Mr. Staples figure at a window has a good deal of grace, and his attempts at light effects are very creditable. Mr. Matthews' "Weeds" is his best work. The fruit trees by Mr. Cutts remind one of a popular kind of chromo, but are painstaking and deserve some credit. Mr. Verner does not show his best work, and his "Buffaloes in a Blizzard" are too colorless.

Other exhibitors are Messrs. Hahn, Gordon, Revell, Brigden, Bruenech, Jefferies, Cox, Spiers, Hudspeth, Beatty, Miss Douglass, Miss Farncomb, Mrs. Johnston, Miss Martin, Miss Hillyard, Miss Wrinch, Mrs. Holmsted, Miss Windeat, and miniatures by Miss Hemming and Miss Drummond.

In room 3 are hung groups of architectural drawings, drawings for illustration and some admirable work by the Saturday Night Composition Club. In the architectural group are drawings by Messrs. Bond & Smith, of a memorial, Mount Royal cemetery; residence, Toronto; houses at Peterboro', for Sir Sanford Fleming; hospital, one story ward system; sketch for church Toronto—by W. A. Langton, of a house in Toronto, store in Berlin, house in Rosedale—by S. A. Heward, of the Vyne, Hampshire; Coutances cathedral, France; Amiens cathedral; Evreux cathedral; half-timbered house, Lisieux, France; old house, Chateauden, France—by E. B. Jarvis, of the McKinnon building, Toronto; and by F. S. Baker, of a proposed addition to British America building, Toronto, and a Competitive Design for Public School Building.

RECENT COMPETITIONS.

In view of the growing disposition on the part of municipal and other public bodies to institute competitions for plans for public buildings, without making adequate provision to decide the merits of the plans submitted, and the appeals recently made by correspondents in these columns to the Ontario Association of Architects, to put forth an effort to improve this condition of affairs, we present the following correspondence and data relating to three of the most recent and important of these competitions :

LONDON HOSPITAL COMPETITION.

In this case the principal point in the conditions, so far as members of the Ontario Association of Architects were concerned, was that it was promised that the assessor should be appointed by the Council of the Association. The Council were not, however, consulted about the matter, and when, some time after, the particulars of the competition were published, this condition came to the notice of the Registrar of the Association, and he wrote the following letter :

October 6th, 1897.

P. W. D. BRODERICK, ESQ.,

Sec. Victoria Diamond Jubilee Hospital Co., London, Ont.

DEAR SIR,—I have been given a copy of the conditions of competition for the new City Hospital of London, and find in them a clause providing for the appointment of one of the arbitrators by the Council of this Association.

I have not heard from you on the subject, but I think I may say that the Council of the Association would be glad to act in the matter if the conditions of competition do not fall below the standard of fairness to the profession agreed upon by the Association.

There is, however, a point in your conditions which will, I think, make it impossible for the Council to act. In the fourth clause from the end, you say that the successful architect may be compelled to accept for specifications and all necessary working drawings (which would include details) the sum of five hundred dollars, that is to say, less than one-fifth of the regular commission for that proportion of the work on a building costing the sum you propose to spend.

The Association have agreed that the only acceptable condition is, that the author of the design placed first should be appointed to carry out the work at the regular commission, provided that the experts decide that the work may be safely entrusted to him. If the experts should decide that it would not be safe to entrust the work to the author of the design placed first, there would be occasion for the introduction of another architect, and the rules of competition agreed upon by the Association provide that the building committee may insist upon the appointment of some architect, in whom they have confidence, to be associated as consulting architect with the author of the design. But the Association would not agree to the superintendence being otherwise than in the hands of the designer. This is not a question of remuneration only, but is considered an essential of the creditable execution of the design. It is difficult not to injure a design in execution if the superintendence is not in the hands of the designer, even if the superintendent is a designer also and of equal merit—which, under ordinary circumstances, is unlikely.

In view, therefore, of this clause in your conditions, though individual members of the Association are free to accept it if they choose, I think it will be impossible for the Council of the Association to act as your conditions advertise.

I am yours truly,

W. A. LANGTON, Registrar.

No reply to this was received, nor was there any publication by the Hospital Committee acknowledging any necessity for change in this condition. Subsequently, after the plans were received (having been sent in under the supposition that an assessor would be appointed as promised), the secretary of the committee wrote to the Registrar asking if the Council would act in the matter, to which the Registrar replied, confirming his previous letter. A correspondent, in a position to know, says with reference to this competition : "There was not, when the plans were asked for,

any probability of the money necessary to build being even subscribed. The full amount paid for these elaborate plans was \$350, divided amongst three of the competitors. As the building can never go on under the auspices of those who got up the competition, even the successful architect has not much for his labor."

The following are the names of those who took part in the competition : Curry & Baker, Toronto ; H. C. McBride, London ; Herbert Matthews, London ; Geo. Craddock, London ; A. R. Denison & Co., Toronto ; Herbert G. Paul, Toronto ; David Ogilvy, Montreal ; J. S. Russell, Stratford ; Strickland, Symonds & Rae, Toronto ; C. H. Acton Bond, Montreal.

ST. THOMAS COMPETITION.

The following are the conditions for this competition :

The City Hall Committee of the city of St. Thomas will receive competitive plans and specifications for the erection of a City Hall under the following conditions :

Plans and specifications to be in the hands of the chairman of the committee (Alderman Sanders) by Thursday April 14, 1898.

The building to be built on the lot on the corner of George and Talbot streets. Size of lot on Talbot street is 124 feet and on George street 110 feet. The lot is on the north side of the street. George street is on the west side of the lot and runs north and south.

The front entrance will be off Talbot street. A side entrance will be off George street to police offices and cells.

1. The size of the building on each floor to be from 6,700 to 7,000 square feet.

2. Plans to show each floor, roof and position of offices and rooms, the location of heating furnaces, pipes, radiators, lavatories, etc.

3. Heating to be by hot water.

4. Elevations to be given of each side of the building.

5. The specifications are to provide for a building complete, including heating, wiring for electric lighting, pipes for gas and plumbing. The whole cost not to exceed \$32,000.

6. The basement to be under the whole building, to contain 10 police cells, room for lodging tramps, room for policemen, spare vault room, coal and furnace room and to have at least 10 foot ceiling.

7. First and second floors to contain the following offices and rooms :

City Treasurer.—Office for public about 500 sq. ft. ; private office about 160 sq. ft. ; vault room about 50 sq. ft.

City Clerk.—Office for public about 400 sq. ft. ; private office about 160 sq. ft. ; vault room about 100 sq. ft. (vault room in clerk's office may be reduced by having another vault on the same floor if found more convenient.)

City Engineer.—Office for public about 250 sq. ft. ; private office about 160 sq. ft. ; vault room about 40 sq. ft.

Tax Collector.—Office for public about 400 sq. ft.

Assessor and Sanitary Inspector.—Office for public about 400 sq. ft.

Police court about 600 sq. ft.

Police magistrate's office about 200 sq. ft.

Chief of Police.—Office for public about 200 sq. ft. ; private office about 160 sq. ft.

Free Library.—Public room about 1,600 sq. ft., and two rooms of about 150 sq. ft. each.

Committee room, adjoining or near City Engineer's office, about 500 sq. ft.

Mayor's office about 200 sq. ft.

Two spare offices each about 200 sq. ft.

Auditorium to have seating capacity for about 450 people or may have gallery to seat about 100 and floor space to seat about 350.

Attic to be used as an art room.

To be lavatories in basement and on first floor and second floor with wash bowl in each office.

The specifications are to be full and complete for each trade sufficient for a proper estimate to be made of the building.

The committee offers for the first design and specification selected the sum of \$150 and for the second the sum of \$75.

The committee reserves the right to have the probable cost of the building certified to by a builder appointed by them before deciding on the merits of the plans.

Every architect submitting plans must agree in case his plans

are accepted by the council to furnish at the request of the council full plans and specifications and detail drawings necessary to enable the contractor to erect and complete the building, which are to become the property of the council on their paying the architect two per cent. of the \$32,000, less whatever sum he may be awarded by the council as a prize for his plan, and every architect submitting plans shall be considered as submitting the same subject to this condition, and in case of his failure to furnish such plans, specifications and detail drawings within one month from demand made by council he shall forfeit any prize to which he may have become entitled for his plan.

March 18th, 1898.

RICHARD SANDERS, ESQ.,

Chairman City Hall Committee, St. Thomas, Ont.

DEAR SIR,—I am instructed by the Council of the Ontario Association of Architects to send you the enclosed Conditions of Competition which have been adopted by the Association as a standard of fair conditions, and to respectfully advise you that the conditions of competition for the St. Thomas new City Hall, which have recently been received, are not such as to induce the best class of architects to enter the competition.

The requirement of complete specifications for each trade implies also drawings so complete that the time from March 14th, when the conditions were received, to April 14th, when the drawings must be sent in, is not sufficient to allow for making the work required to be bona fide as intended by your committee.

There is no provision made for judgment of the plans by a person of professional training and experience, and without such provision there is no certainty that the best plan will be known to be the best.

There is no provision made for secrecy as to the authorship of the plans, without which, even with the best intentions on the part of the promoters, there is no guarantee of a perfectly unbiased judgment of the merits of the plans.

The commission offered is not sufficient to make it worth while for an architect in good practice to do the work, even apart from the risks of a competition.

The Council of the Association will be glad to give you any assistance necessary to make a competition which will be acceptable to the better portion of the profession, and have instructed me to offer you their services and assure you that the interests of the public and that of the profession are one in a matter of this kind.

Public buildings ought to be convenient and attractive, but they can only be made so by putting their design into the hands of a good man. The same mass of materials becomes either a good building or a poor one according to the skill of the architect who plans it. For this reason, good work is worth its price. But more than this, want of skill always means waste of money, and to make your competition an inferior competition, involving the choice of an inferior architect, means not only a loss in the quality of the building erected, but an actual outlay which the saving effected by reducing the commission paid is not likely to cover. So that you are likely in the end to spend more money rather than less, to have certainly more trouble and, for it all, a worse building.

I remain, yours truly,

W. A. LANGTON, Registrar.

March 19th, 1898.

W. A. LANGTON, ESQ.,

Registrar O. A. A., Toronto, Ont.

DEAR SIR,—In answer to your favor of March 18th, re competition of city hall plans I beg to say that when the committee prepared the information to send to architects they did not know that your Association had any standard conditions of competition. I they had known that such was the case it is likely that they would have taken them into their serious consideration, but as a certain amount of the time has now elapsed, and as you say it is too short anyway, I do not see that anything can now be done to improve the matter.

There have been a large number of applications for the conditions, and as yet only two architects have raised any objections. As to the question of judgment of the plans that may be considered later on by the committee, and probably the advice of your Association may be asked for.

Yours truly,

RICHARD SANDERS, Chairman of Committee.

March 22nd, 1898.

RICHARD SANDERS, ESQ.,

Chairman New City Hall Committee, St. Thomas, Ont.

DEAR SIR,—In reply to your letter of March 19th, I regret that you find yourself unable to amend your conditions of competition.

It will give me pleasure to report to the Council of the Association

the good will shown in your letter and the suggestion that you may wish to ask their advice when it comes to the judgment of the plans, but regret that I can only inform you that it will be impossible for the Council to take part in the affairs of a competition which is not acceptable according to the standard fixed by the Association.

Yours truly,

W. A. LANGTON, Registrar.

The names of the following architects have recently been published in the daily press, as having submitted drawings in the competition: N. R. Darrach, two sets; J. Z. Long & Son, three sets; E. T. MacDonald, New York; A. W. Rush & Son, Grand Rapids, Mich.; Wilkinson & Stewart, Montreal; Radins, Garrett & Cellar, Detroit; Harry J. Powell, Stratford; Thos. Kennedy & Son, Barrie; Robt. Thom Brooks, Detroit; Geo. R. Harper, Toronto; Geo. Craddock, London.

It is announced that the council have accepted the plan submitted by Mr. Darrach, and that the second prize has been awarded to Messrs. J. Z. Long & Son.

STRATFORD COMPETITION.

The conditions drawn up by a joint committee, called the Market and Police Citizens' Committee, consist in the first place of a specification of space to be occupied, cost, accommodation and material. Then follow these conditions under a separate heading called "Terms of Competition."

Two sets of plans will be selected, one for the restoration of the old building and one for the erection of a new building.

If the architect furnishing such a plan and the Market Committee can agree upon the terms upon which the architect's work is to be done, he will be engaged to furnish along with such plans the necessary specifications and such details as will enable the different classes of tradesmen intelligently to tender for the work to be done.

In the event of failing to agree upon terms, the committee may discard for that reason the plan selected and take the one next most suitable or advertise for another.

Upon agreement between the committee and any such competitor, the plans and specifications aforesaid will be supplied and tenders got for the work, and plans with tenders be submitted to the ratepayers for their choice between the plan for restoration and that for new building at the time of voting for the by-law authorizing the issue of debentures for building or restoration.

If either plan is adopted by the ratepayers, the architect whose plan is so adopted will be retained as architect for the furnishing of further plans and detail drawings and superintendence of the work upon the terms agreed upon as aforesaid.

In such event, the architect whose plans have been so selected but rejected by the ratepayers will receive the sum of \$200. In the event of both plans being rejected by the ratepayers by the defeat of the by-law, the sum of \$300 will be equally divided between the architect whose plans have been submitted for the approval of the ratepayers aforesaid. (There is evidently here a typewriter's error.)

The following is the correspondence between the Registrar of the Ontario Association of Architects and the chairman of the Market and Police Committee:

May 5th, 1898.

GEORGE F. INGRAM, ESQ.,

Chairman Market and Police Committee, Stratford, Ont.

DEAR SIR,—I have been requested by a member of the Association to send you the enclosed Conditions of Competition, which have been adopted by this Association as a standard of such conditions, and to request that you read them with a view of amending, if it is not too late, your conditions of competition, so that in essentials they may not fall below this standard.

I trust you may not consider my intervention an impertinence, as I have no doubt you desire to make a competition which will secure a good design for your building, and in writing to you I represent a number of architects of the best standing, who would be glad to contribute plans if the competition can be made such as to ensure the selection of the best plan and fair treatment of the architect.

The conditions I enclose were drawn up so as to cover the most important competitions, and there are a number of clauses devoted to making a fair judgment easy by enforcing uniformity in the

manner of making the drawings. This part of the conditions, which might in any case be modified according to the size of the building proposed, would in this case have to be dispensed with altogether, as some competitors may already have drawings under way.

The two conditions to which I wish to direct your attention, and which I think are essential if the best men are to be induced to take part in the competition, are that which requires expert judgment of the plans and that which provides for fair payment of the successful competitor.

If I understand correctly the article entitled "Terms of Competition" in your conditions, the plans in this competition are to be judged by your committee. I do not know who else compose your committee, and know yourself only by name, so that I am sure you will accuse me of no disrespect in suggesting that there is no assurance in this arrangement that the best plan will be known to be the best.

I suppose I may assume that your committee is composed of practical business men, and as such, you are probably pretty well posted in the law as it applies to your affairs, far more so than you are with either the practice or the art of architecture; yet you would not think of taking any new and important step in business without consulting a solicitor about any legal question involved. Here, however, is an important step of another kind in which the same need is not recognized. Yet I think the position of the average business man with regard to judging the merits of a plan is fairly represented by a client of mine—a successful man of affairs who had also had previous experience in building—who, in employing me, showed me a plan which he had had made some time before, intending to build from it. "When I saw this" he said "I thought this is just the very thing we want, but after looking over it all winter I have come to the conclusion that it is not what we want at all."

In a competition of this kind, there is no time for the judges to supplement want of experience by long continued study and the only way to ensure that the best plan will be known to be the best is to employ an expert to judge the plans.

I am, of course, speaking from the point of view of the architect, who, before spending time and money in producing a good plan, wants some assurance that his plan will be known to be a good plan; but of course the interest of architects and of the municipality are one in this respect. You also want to have the best plan recognized and built and not to be in the position of finding out for the first time after the building is up that it is neither attractive nor convenient.

With reference to the second point of which I spoke, as essential to a competition acceptable to the best members of the profession, I do not think you will find any good architect willing to make plans first and afterwards debate with a committee what his fee is to be, with the understanding that the amount he will consent to take as commission is to be made a factor in the judgment of his plans.

I am sure it is unnecessary to point out to you that it is not good policy to cut down the remuneration for services below the point that a reputable architect will accept. The difference between the recognized commission and a reduced commission is a very small saving in an undertaking of this kind, but, if it keeps the better class of practitioners out of your competition it may be a source of serious expense, not only in the process of building, but afterwards in the form of an annual drain for running expenses, which would soon mount up to many times the saving in the architect's fee.

Yours truly,

W. A. LANGTON, Reg. O.A.A.

STRATFORD, May 9th, 1898.

W. A. LANGTON, Esq., Toronto.

DEAR SIR,—The City Hall Building Committee have considered your letter of the 5th inst., and do not feel free to make any changes in the conditions already agreed upon. We have already received from Toronto and other places applications for particulars, and are persuaded that there will be a large number of plans and specifications from reputable and experienced architects.

Yours, &c.,

G. F. INGRAM, Chairman M. & P. Com.

The Chairman of the Committee seems to be under the impression that every applicant for particulars relative to the competition will be a contributor of plans, but it remains to be seen what "reputable and experienced architects" will take part in the competition.

A REJOINDER.

To the Editor of the CANADIAN ARCHITECT AND BUILDER:

SIR,—Mr. Langton's very tolerant letter states clearly his grounds for faith in the O. A. A. and its programme. Mr. Langton believes (first) that the public can be best protected from building accidents by making compulsory a higher education for architects, and (second) that this higher education can be best secured by an enactment conferring on the Association powers of examination and proscription.

Still Mr. Langton admits the importance of municipal supervision and inspection of buildings, but considers this the "small end of the affair." Mr. Langton considers that in view of the fact that in 1895 the Building By-law Committee of the Association made certain recommendations to city and town councils in Ontario, the Association has done its duty in this direction, but Mr. Langton nevertheless thinks that good might come of my writing to the daily papers.

Mr. Langton, THE CANADIAN ARCHITECT AND BUILDER, and every one who has considered the matter, agree with me that the building accidents that have occurred in various parts of Ontario are but signs of the general insecurity that results from methods of building that are now permitted.

Granting for the sake of argument that all the advantages that can be claimed by the most ardent backer of the Association's programme would follow its sanction by law, this "higher education" of the architect, which Mr. Langton feels sure the proposed legislation would foster, could come—if it came at all—only after years of organized work.

Now, I submit that those dangers of which I have spoken, and the existence of which we all admit, demand the immediate application of rigid measures of inspection and regulation, measures that shall be prompt and positive in their action. To find precedent for this sort of legal restriction it is not necessary to go to Illinois or Quebec. Such control of building operations is sanctioned by almost universal custom. Cities far larger than any Canada can boast have long had their building departments, not all of which can be accounted failures. Toronto should have a Building Department worthy of the name. As Mr. Langton very truly says, this is the small end of the affair. It is the handle end.

According to Mr. Langton the "elevation of the profession of architecture" is the large end. "Elevation of the profession" is a somewhat vague term, but with it, in Mr. Langton's mind, the idea of an association that has power to bind and loose seems to be closely associated. Against the view that the carrying out of the Association's programme must make for better architectural design, there is, I think, much to be said.

Many of the younger men now practising architecture in Ontario have had their best training in England or the United States. It is significant that amongst them the Association finds few supporters. To what is this to be attributed? The reasons are no doubt various.

The Association believes that the profession is to be raised by an act of Parliament, or by use of the privileges to be conferred by that act. Some of the younger men have seen architecture practiced on a high plane without legal bolstering. The Association stands for the old-fashioned apprenticeship idea; some of the younger men have seen in its place a more enlightened system. The Association has been seeking government authorization for its examinations, and this authorization being withheld, it has been threatening their abandonment; some of the younger men have profited by the examinations of an architectural body that asks no government favors. The Association professes to believe that the safety of the public can be secured only by applying tests to the architect and placing those found wanting under certain disabilities; some of the younger men have seen the building operations of a metropolis regulated successfully by means of the inspection and revision of plans and specifications, and the public supervision of buildings. The Association stands for "protection"—protection to native talent—protection of the public against the awful corrupting art of the United States architect; some of the younger men believe that Canadians can care for themselves in the talent market of the world. Or, if they can't, then so much the worse for them! And some one or two of the younger men may even be heretical enough to think that a Toronto Board of Trade building here or there in Canada will not prove a very positive injury to public taste, or a very ill example to the Canadian student. In short, some of the younger men believe that competition is not without its use in the "elevation of the profession," if in that phrase is included the idea of the betterment of architectural design. Finally some of the younger men feel that such legislation as the Association has been seeking cannot be justified on any broad economic principles; that it breathes the spirit of the trade guilds of more than a century ago, and that the time for that sort of thing is gone by.

Much respect as the personal qualities of many of the influential members of the O. A. A. must command, I question if the young men in the profession can work up much enthusiasm for what seems to them like "old-fogeyism" in the Association's programme.

Yours truly,

ARTHUR E. WELLS.

COMPETITION FOR PLANS FOR ARTIZANS' DWELLINGS.

THE attention of Canadian architects is directed to the notice appearing in our advertisement pages of a competition for plans for artisans' dwellings, by the Massachusetts Mechanics' Association, Boston. A single prize of \$500 is offered for the plan which shall best meet the requirements. We regret that at the time of going to press the conditions and other details of the competition had not reached us. We are therefore unable to do more than call attention to the advertisement.

BY THE WAY.

DR. Manning had a strong sense of humor, and delighted in telling Irish stories, says the Westminster Gazette. One related to an Irish laborer, who was thus addressed by a passing Englishman: "What's that you're building, Paddy?" "Shure an it's a church, yer honner." "Is it a Protestant church?" "No, yer honner." "A Catholic church, then?" "Indade an' it is that same, yer honner." "I'm very sorry to hear it, Pat." "So's the divil, yer honner."

x x x

THE legal mind has been taught to depend largely on precedents in deciding upon any given course of action. This legal characteristic found its way into the practice of a Winnipeg architect recently. The architect had designed a house for a lawyer and was submitting the same for approval, when his client made objection to the manner in which the roof was curved on a corner tower. He pointed out that there wasn't another house in town with a similar roof, and without such a precedent he would not approve of this feature of the design. In deference to his wishes the architect was obliged to forego a feature on which he had felt disposed to pride himself, as being a departure from old and commonplace methods.

x x x

ARCHITECTS and householders in Hong Kong have two betes noir, viz., typhoons and white ants. To guard against the first of these many special forms of construction have to be resorted to, especially as regards roofs, the scantlings of the timbers employed being very heavy, and the covering, consisting of curved plain tiles with tile and mortar ridges, being laid double with a space between the layers. What are known as white ants constitute a most persistent scourge, and from their habit of eating away at the centre of a baulk of timber without revealing their presence on the surface, are a source of continual danger where wood beams are employed for constructional purposes.

x x x

A BRITISH Columbia correspondent requests me to sound a warning for the benefit of persons in Eastern Canada who may have gained the impression that employment at good wages is plentiful in that province. He says "We have a great many unemployed, as hundreds are flocking in here from all parts of the world, and this (Vancouver) being only a small town they soon fill up any vacancies. We are trying to raise our wages from 25 to 30 cents per hour, but I fear it is impossible, as we can get all the men we want at 25 cents. This morning before 9 o'clock we had 7 men asking for work, and when the boats get finished in about a month we shall have 300 more thrown on the market. There are several big jobs spoken of, but the owners are rather backward on account of the rise in lumber and the proposed rise in wages."

x x x

AMONG the odd trade advertisements displayed at the recent Stockholm exhibition, the Lilietolmens candle played a prominent part. The lower part, which was intended to represent an old Swedish candlestick, was in reality an enormous structure of bricks and mortar, in which was established a perfectly equipped candle factory, where employees worked six hours a day. The base of the candle-stick covered a space 40 feet square. The candle-stick itself was 47 feet high, while the candle—a real stearine specimen—was fully 80 feet;

its diameter was 8½ feet. The appearance of this extraordinary trade trophy was at once remarkable and imposing. The colossal candle stick was painted with an aluminum powder until it shone like well polished silver. At night too, an electric searchlight of 7,000 candle power cast its beams from the lofty summit of the wick over the whole of the exhibition grounds. The cost of the structure was about \$10,000.

UNSAFE BUILDING CONSTRUCTION.

A CORRESPONDENT writing to the ARCHITECT AND BUILDER from British Columbia anent the recent building disaster at London, Ont., alleges the existence of an unsatisfactory condition of affairs in the city of Vancouver. He states "The Board of Works, composed of one alderman from each of the five wards, has not had a practical man upon it since Alderman Franklin quit in 1894, and plans of buildings submitted to the board are passed at once with the formulae, 'subject to the approval of the the city engineer,' the consequence of which has been failure after failure. The Metropolitan Club building (corner Hastings and Homer streets), erected four or five years ago, has been recently repaired at a cost of over \$6,000. In this case two stories and gable 50 feet wide, of brick work, were carried on three brick piers and four wooden posts 5½ inches face and 16 to 18 inches deep. The posts were from 25 to 27 feet high on the Hastings street front, taking in both ground and entresol floors, above which the brickwork begins, carried on wooden bressummers. As a matter of course, and in a very short time the bressummers began to sag and the posts to buckle. The architect then discovered that times were becoming dull in Vancouver and left for Australia, and Mr. Parr (now Parr & Fee, architects) was called in just in time to prevent a general collapse and the whole Hastings and part of the Homer street front from falling right into the street. Mr. Parr enclosed the wooden posts with cast iron on three sides, substituted rolled steel beams for the wooden bressummers, strapped and bolted the brick work together, etc., etc.

Another nearly similar case is that of the Inns-of-Court building (corner of Hastings and Hamilton streets) by the same architect, now at the antipodes. In this instance the same construction has been followed, only, the roof being a flat one, there is no gable, and consequently less weight to be borne by the woodwork, so that it will stand out a while longer. The projecting octagonal tower on the north-east corner, however, had to be shored up, while the stone corbels were being strapped and bolted back and the brickwork of the tower itself tied back with a steel wire rope. After this had been satisfactorily accomplished the shoring was removed, and a moulded and soldered covering of zinc painted to represent stone now conceals the real corbels below, with the straps, etc., etc.

A very nice question, it appears to me, would be, how far the city which passes these plans could be held liable for damage done in case of failure. It is certain that the way in which Vancouver has hitherto escaped is little short of miraculous, all things considered—only it may not continue so—and if 'the safety of the people' be 'the highest law,' surely the man who does something to secure that end is deserving of some commendation. I might add a great deal more on a matter of so great importance, but think I have said enough for the present."

NOTE ON THE OBJECTS OF THE TORONTO GUILD OF CIVIC ART AND ON THE EXHIBITION OF PRINTS OF MURAL PAINTINGS.

By PROF. MAVOR.

THE Toronto Guild of Civic Art has been founded upon the model of similar associations in New York and elsewhere. Its two chief purposes are, first, to promote and encourage the production of works of art intended for the embellishment of the city or for its public buildings; and, second, to provide an organization for a discriminating selection of these.

Encouragement of art has come to assume considerable promi-



MR. B. E. WALKER,
President Toronto Guild of Civic Art.

nence among the functions of the modern municipality. Few cities, indeed, are without a memorial of some important figure or event in national or civic history which is also intended to be an object of interest from the point of view of art. The selection of these memorials has, however, not always been happy, and thus they are often lacking in artistic interest. No doubt the most impartial and expert of experts may make a blunder, but the impartial expert has had, as a rule, little to do with the selection of designs for public memorials in the modern city, whether in Europe or America.

Yet, especially during the past few years, public taste has been greatly educated. This has been accomplished in the first place by the increased number of persons who have received in some degree artistic training, and in the second place by the extension of appreciation produced by the knowledge of artistic movements to be derived from magazines and from exhibitions of pictures. This extension of appreciation is also, no doubt, aided by travel, although in art as otherwise the extent of a traveller's excursions depends upon the extent of his resources.

The effect of all this upon the selection of public monuments has not been fully felt because, with respectful acknowledgment of his many valuable qualities, the civic ruler is not in general elected on account of his capacity to estimate the relative merits of designs in painting, sculpture or the like, but on other grounds, and thus the selection of designs has been done everywhere, more or less, by haphazard. Even Paris is studded with gigantic and costly blunders, the result of unintelligent and misdirected national and municipal encouragement of art.

The Guild of Civic Art, while not arrogating to itself the position of a Court of Art, does attempt to provide the machinery by means of which, as occasion arises, a consultative committee might be formed which would aid the public authorities in arriving at a decision upon designs which may be submitted to them. The Guild also may be able from time to time to suggest the adoption of measures for the beautification of the city or of its buildings.

Thus, under as competent guidance as in each case it may be found possible to procure, the Guild might expect to be led to choose those designs which might most appropriately and worthily be carried out for the enrichment of the city, and thus be enabled to render an important service to the civic authorities and to the citizens.

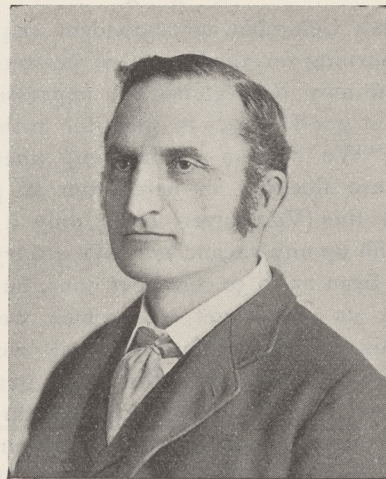
Such service can be effectively rendered by the Guild only if it is strongly supported by public opinion and by public confidence. Its membership is open to all who have an interest in art and who are anxious to extend and to render more intelligent the knowledge of it. While the membership is thus open, the Executive Committee of the Guild is composed partly of artists and partly of laymen.

Among the methods of embellishing public buildings by way, on the one hand, of expressing public magnificence, and on the other of stimulating the appreciation of art, mural painting has, during the past few years, taken perhaps the most prominent place. In Paris, the government, the university, the municipality and other public authorities have recently given to the Pantheon, to the New Sorbonne, and to other public buildings, mural paintings which have been epoch making in the history of art. The elementary schools in Paris have even been enriched with works of the same kind. In Edinburgh for some years a similar movement has been going on, by means of which, for example, University Hall and St. Mary's Song School have been endowed with notable decorations by Scottish artists. More recently the fashion has crossed the Atlantic, and the Public Library at Boston, the Congressional Library at Washington, the Walker Art Building at Bowdoin College, the Astoria, Manhattan and Plaza Hotels in New York, as well as several banks and private houses, have been decorated with mural paintings by French and American artists.

The exhibition of the Copley Prints now being held in the rooms of the Ontario Society of Artists, has been promoted with the object of indicating how other cities have encouraged art by acquiring for their public places great mural decorations which may afford their citizens free enjoyment for some generations to come. The exhibition also discloses how the intelligently directed efforts of a few public bodies in the United States have called into existence a school of decorative painting, and have given at once opportunity and fame to a number of artists whose works must otherwise have been seen by the public only at infrequent intervals in exhibitions.

A most conspicuous advantage possessed by mural painting is to be found in the necessary condition of the work. If it is not actually produced in the place which it is to occupy, as is the case with fresco, it must at least be produced for the place. The decoration to be successful must meet the conditions of lighting, etc., which the position of it affords. It ought, therefore, always to be seen to advantage, unlike a picture which, tossed about from one wall to another, or from one gallery to another, probably is never seen in the position which the artist intended it should occupy.

This condition of placing leads to the observation that mural painting is not to be looked upon as a mere embellishment of a



MR. W. A. LANGTON,
Secretary Toronto Guild of Civic Art.

building; but ought rather to be regarded as an integral part of it, designed as a portion of its architectural detail and as necessary as any other portion to make the building a unity. This, of course, is another way of saying that art is not a mere addition to life, but a part of it, and that the intelligent cultivation of it is as necessary as the intelligent cultivation of any other function of individual or social well-being.

A nation or a city loses much in possible vitality which does not cherish its artists and encourage them by discriminating appreciation and appropriate opportunity.

A specific lesson may, perhaps, be drawn from a chapter of civic history elsewhere. About ten years ago, the city of Glasgow built a municipal palace by the side of which our own civic build-

ings might go not unworthily. The designs of that building included suites of rooms elaborately panelled in rare woods, alabaster staircases and other costly items upon which the workmanship was the least, while the material was the greatest part of the cost. These rarities were brought from the ends of the earth at great expense and for no other reason than that they were expensive, for they certainly were not beautiful. Ten years ago also a small band of artists were struggling in Glasgow against public neglect. Had the civic authorities had intelligence and foresight enough they could have had the town hall filled with mural paintings at a cost trifling compared with their alabaster staircases, by artists whose works are now as eagerly bought at St. Louis as at Munich, and who have made the name of the Glasgow School famous all over the world. Had they done so they would have compelled lovers of art to make pilgrimages to Glasgow to see the mural paintings as they do to the town halls of Germany, Italy and Belgium.

The opportunity which Glasgow failed to embrace is actually now at hand for Toronto. There is a civic building, and there are the artists, many of whom no whit less competent, though at present less known, than those of the Glasgow School.

THE EXHIBITION OF COPLEY PRINTS.

On the occasion of the opening to the public of the exhibition of Copley Prints in the Art Society rooms on April 16th, the president, Mr. B. E. Walker, gave a further explanation of the aims of the Guild of Civic Art, in the following admirable address:

The Advisory Board have thought it well that I should at this time say a few words as to the objects of the Toronto Guild of Civic Art. Its constitution states that it will "act as a purely supervising, consulting and advisory body to promote and encourage civic art, including mural painting and decoration, sculptures, fountains and other structures or works of art or of an artistic character; and to arrange for the execution of works of art by competent artists, to be chosen by competition or otherwise, and to hold exhibitions from time to time of works of art more especially connected with mural decoration, architectural and stained glass designs, sculpture and kindred subjects." The members of the guild believe that the time has come in the history of Toronto when the services of such a body are required, but the guild can effect little or nothing unless it is encouraged and supported by an intelligent and active public opinion in favor of its purposes. The city of Toronto is rapidly emerging from the initial stages in its development when little in the way of architectural beauty or of taste for art was to be expected. The improvement in the character of the exhibitions of the works of our artists, the numerous societies of painters, decorators and architects now established here, the improved taste of our people in the selection of pictures and works of art for their homes are all evidence that whether we have cause to be satisfied with our progress or not we are none the less progressing. The change is quite as noticeable when we turn to the art of the street and square so far as external architecture is concerned, but whatever may be said of the interiors of our residences little surely can be said in praise of the interiors of our public buildings.

We have culminated an extraordinary era of building in Toronto by the erection of two great buildings destined to remain most prominent landmarks for perhaps centuries and each costing between one and two millions of dollars—the Parliament Building and the City Hall. They are both, architecturally, important specimens of a revival in art, which is, at all events, partially Byzantine in the external decoration, but the one building which is finished internally is conspicuously marred to the eye by its bare white walls. If the scheme of art suggested by the exteriors is to be carried out the walls of the interiors should be gradually covered with mural paintings commemorating the history and the arts of our country and illustrating also our intelligence and skill in mere decoration. If this were done, perhaps in some far-off century the students of the present Byzantine revival may find our interiors as interesting as when in old Ravenna to-day in the interior of buildings nearly ruined externally by time he finds as fresh and rich in color almost as when executed the splendid Byzantine mural decorations in mosaics of the sixth century. We would not, however, have you think that we are indulging in dreams of large expenditures for art or the rapid fulfilment of any such ideal. Our ideas of what it is possible to accomplish are very modest indeed. But we do wish to excite public opinion to the extent of desiring that the first modest steps shall be taken in these two great public buildings to show that we are people of taste, that we care for our history, that we are at least aware that a splendid revival has come in many if not all of the great nations

of the world, in that ancient, almost the most ancient of all arts, mural decoration. If a few panels are executed yearly the cost will be trifling, very trifling, and two great purposes will be served. First, these public structures will be adequately ornamented. Second, our artists will have the opportunity to exhibit their skill adequately. It is in wall painting that the greatest work of many great artists has been done. It does not matter whether it be Perugino or Rafael, Signorelli or Michelangelo, Ford Madox Brown or Leighton, Puvis de Chavannes, Hunt, Sargent or any of those who are reviving wall painting, it is upon some great wall space that they have shown the breadth and perfection of their art, and not where the scope of the easel has constrained them.

Turning to other fields of art, if we have extensive parks we are certain to have works of sculpture. I am sure we have all wished at times that the earth might open and swallow up the specimens of sculpture which sadden the hearts of men in so many cities, and should we not hope to escape from a similar fate? And in more practical matters, such as the proportions of a city square, the design of a fountain or bridge, there is room for beauty or the reverse. We are a prudent people and I wish to point out emphatically that the main purpose of this guild, rightly understood, is economy. Public or private money will be spent to decorate the interior of the buildings referred to and to erect statues, fountains, bridges, etc. The real question is, do we wish to get the maximum of beauty for the money we spend or not? The object of the guild is to provide a means of obtaining as nearly the maximum as possible. Over and over again in public expenditure the same money which might have purchased beauty and lasting pleasure has purchased the reverse. When the authorities of a city build a water or a drainage system or undertake the making and paving of a road they employ engineers and other experts to superintend the work. They do not imagine that members of the Council are able to direct such matters without the aid of expert knowledge. Is there not even more reason for the use of expert knowledge when the matter is one of beautifying a city? We realize that public opinion will not justify the payment of money for anything so vague as good taste. The guild, however, offers the services of such experts or judges as it may nominate for any particular task, free of cost to the city, except in cases where long and continuous labor is required by men professionally engaged in the supervision of similar work, such as an architect.

We are encouraged to hope that the guild will be able to perform the work for which it was created, from the experience in other cities where similar efforts have been successfully made. We have not time to refer fully to the work done in many cities in Europe and America, but it may be well to indicate the measure of success attained in New York. The necessity for expert ability in connection with every item of public work in which artistic taste may be displayed has been fully recognized. The charter of Greater New York provides for the appointment of an art commission to which all such matters must be referred, and without whose approval the city is unable to authorize or permit the execution of any work of art. The various art societies of New York form what is known as the Fine Arts Federation, and this body is empowered to suggest names to the mayor from whom selections for the art commission are made. This commission, as at present constituted, consists of three laymen, supposed to suggest good judgment in matters of art, one painter, one sculptor, one architect, and the following ex-officio members: The Mayor, the President of the Metropolitan Museum of Art, the President of the Public Library (Astor, Lenox and Tilden bequests), and the President of the Brooklyn Institute of Arts and Sciences. The services of this commission, like those offered by the Toronto guild, are without cost to the city. We would be sorry if it were supposed that the members of the Advisory Board consider themselves to be judges in all such matters. The function of the Advisory Board is merely to select the necessary judges or experts.

Turning now to the exhibition to which your attention is invited. We are able through the Copley prints to give some idea of what our neighbors in the United States are doing in this great revival of mural decoration. We may not hope to rival the work which has been done in the new Library of Congress at Washington or in the Boston public library, but can we not make a beginning? We shall hope that this exhibition will at least open the eyes of many Canadians to our short-comings. You are aware that a plan of decoration for the council chamber of the new city hall was placed before the council. It was intended that this should serve as an example of what was possible in this great structure, and it was hoped that gradually over a long range of years panel

after panel through the main halls and rooms of the building might be executed by such Canadian artists as from time to time were thought worthy of being permitted to aid in the undertaking. It was a very modestly and carefully prepared plan so far as the cost in money was concerned, but it was declined by the council. Since then Mr. Reid has offered to execute two panels gratuitously, the work to be done under the supervision of the Guild of Civic Art. This generous missionary effort on the part of Mr. Reid should be watched most carefully by all who care about the development of art in our city. If as a work of art it meets with general approbation, may we not hope that we will have the active support of every one present here to-day when another effort is made with our city council looking to a scheme of adequate decoration for the interior of these public buildings?

MANUFACTURES AND MATERIALS

The Gurney Foundry Co., of Toronto, have made arrangements to open an agency at Winnipeg.

Messrs. Close & Co., of Woodstock, Ont., recently filled an order for brick-making machinery for St. Petersburg, Russia.

The James Smart Manufacturing Co. of Brockville are preparing to put on the Canadian market a complete line of hot water boilers.

The necessary authority is being sought to change the name of the Toronto Radiator Manufacturing Co. to that of the Dominion Radiator Co., Limited.

The Spanish-American war is reported to have seriously affected the business of the plaster manufacturing companies in New Brunswick and Nova Scotia.

A new stone quarry has been opened a few miles west of Calgary. The stone will be dressed there and shipped to Vancouver. A large number of stone cutters will be employed.

Mr. Samuel Menard, of St. Camille, Que., has instituted an action against the Dominion Lime Co. to recover damages for the death of his son, who received fatal injuries while acting as fireman for the company.

Mr. John Gunn has recently discovered valuable deposits of stone, suitable for building, monumental and lithographic purposes, at Stonewall, Man. The stone, which can be easily quarried and worked, is pink and blue in color.

There is reported to exist at present in Winnipeg a "corner" in bricks, in consequence of which a large order has gone into the hands of a manufacturing firm at Grand Forks, Dakota. The local manufacturers expect to have 2,500,000 bricks ready for use next month.

Mr. Frank Gutteridge, a prominent builder and contractor of Seaforth, Ontario, has constructed a machine by means of which from eight to ten thousand pressed cement bricks can be manufactured per day. Bricks of this character are said to have been put in use in Seaforth with satisfactory results as regards appearance and durability.

From experiments which were conducted at the Watertown Arsenal it would appear that the average strength of a bolted joint is only about two-thirds that of a rivetted joint of the same sort, and that, if the diameter of bolts or rivets is rather small in comparison with the thickness of the plates, the strength of the bolted joint may not be much more than one-half that of a rivetted joint.

SILICIZED STONE.—Already, according to the report of United States Land Commissioner Hermann, a company has been formed in South Dakota for cutting, polishing and marketing the stone or silicified wood found in such marvellous quantities in the forest located near Holbrook, Apache county, Ariz. The largest, finest specimens of such petrified wood in the world there exist. Whole trunks of trees and stumps with portions of the roots appear, converted into stone as dense and hard as the finest agate, every cell and fibre of the former wood being preserved in stone. A forest of trees seems to have been entombed in the rocks and to have been preserved by a slow process of replacement by silica from solutions permeating the bed; subsequently, the surrounding sediments were washed away, but the fossils of the tree remained.

Mr. Thos. Canty, of Ottawa, has been appointed by the government superintendent of masonry construction at the new drill hall at Kingston, Ont.

CORRESPONDENCE.

Letters are invited for this department on subjects relating to the building interests. To secure insertion, communications must be accompanied by the name and address of the author, but not necessarily for publication. The publisher will not assume responsibility for the opinions of correspondents.]

THE LONDON BUILDING DISASTER.

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

SIR,—Allow me to call attention to what I consider an error in one point stated by Mr. Baillarge in his letter which appears in your February number.

He says, "It will be noticed that no strength or resistance or support is attributed to the flooring beams, which of course there would have been had the joists been all or even half of them of a single length or stretch."

At first sight it does seem as if additional strength or support would result from the adoption of single-length joists, whereas exactly the opposite is the case, and in designing a beam to support a load where the joists are continuous, five-eighths of the uniformly distributed load should be assumed to be carried by the beam, and not one-half only, as in the case of half-length joists.

For full information on this point I refer to Prof. Johnson's "Theory and Practice of Modern Framed Structures," Chap. X., Page 161.

J. W. BALMAIN, C.E.

SANDON, B.C., 14th April, 1898.

QUALITIES OF CEMENT.

DESERONTO, May 2nd, 1898.

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

SIR,—A "User of Cement," in the April number of your journal, has evidently not heard of the "old saw"—"Give your opinions, but don't give your reasons." Had he been content to simply express such an opinion over a *nom de plume*, it would not have been worth while to discuss the matter, but as a reason for the opinions has been given, it may not be amiss to examine into the question.

First, his premiss is not true in fact. Canadian Portland cement not only shows a higher tensile strength either neat or with sand at seven days, but maintains the lead until the end of all records we have. The following experiment may surprise a "User of Cement": Take a sieve of 40,000 meshes to the square inch and thoroughly sift all the cement that it is possible to get through; try to make a briquette out of the residue. Unless he succeeds better than I have been able to, he will find that the residue is merely sand, having no cementitious value whatever—thus showing beyond question that the active part of Portland cement is the fine, impalpable powder or flour; the residue which he admires is wholly inert, and of as much value as sand.

I feel assured Canadian manufacturers would welcome the news, if true, that they were burning their clinkers too hard—it might save a few cents a barrel. Perhaps "A User of Cement" does not know how very hard our burnt clinker is, and that the harder it is burned the more difficult it is to reduce the clinker to the necessary fineness modern specifications demand.

The truth is that the Canadian manufacture of Portland cement is and has been in advance of the requirements of our engineers and architects. For the past 10 or 15 years the best minds in the engineering world have been studying the question. On certain points there is a practical consensus of opinion. One of them beyond rational criticism is, that the finer a cement is ground the better; hence, the degree of fineness is merely a question of commercial practicability. A second point on which there is a fair degree of agreement is, that a Portland cement should show a proportionate increase in strength at seven days over what it does at three days, but it surely will not be contended that if a given cement gives 600 lbs. in seven days and in one year increases to 700 lbs., that a second brand which gives only 300 lbs. in seven days and at one year shows barely 500 lbs.—that the second is better than the first. I venture to submit, the quicker a cement reaches its maximum strength the better, always provided it does not go back later on.

Yours respectfully,

M. J. BUTLER, M. Can. Soc. C.E.

The new building now in course of construction for the Molson's Bank at Vancouver, B.C., will be five stories in height, 90 x 100 feet in size. The basement story will be built of granite, the stories above of Calgary freestone. The banking room, 70 x 30 feet, will be finished in quartered oak and marble, with mosaic floors. Messrs. Taylor & Gordon, Montreal, are the architects.

LEGAL.

DENISON V. WOODS.—Judgment by Chief Justice Burton in the Court of Appeal, Toronto, on appeal by defendant from order of Rose, J., dismissing defendant's appeal from report of Neil McLean, an official referee, upon a reference to him for trial under sec. 107 of the judicature act. The action was brought by Arthur R. Denison, an architect, against Michael J. Woods, to recover remuneration for certain services rendered to defendant in respect of valuations of Toronto Island property and in preparing case for arbitration and plans, etc. The referee found that plaintiff was entitled to be paid \$397.50, based upon an allowance of \$2 an hour for 142½ hours of his time and \$1.25 per hour for 90 hours' time of his clerks. The plaintiff was paid by defendant before action \$25 on account, and defendant paid into court with his defence \$300, leaving \$72.50 due, according to the report. The referee found that no proper tender was made before action, and plaintiff was entitled to his costs. The defendant contended that upon the evidence a much smaller sum should have been allowed. Appeal dismissed with costs.

PERSONAL.

Mr. Joseph Roy, contractor, has been elected a member of the Council of St. Cunegonde.

The death is announced of Mr. W. L. Prince, a well-known contractor of St. John, N.B.

Mr. Chas. M. Whitney, a well-known plumber, died recently at his home in Woodstock, Ont.

Mr. E. Adams, architect at the Kingston Penitentiary, who was recently suspended as the result of a disagreement with the deputy warden, has been reinstated.

Mr. Ernest R. Rolph, of Fort Macleod, N.W.T., formerly of Toronto, was married in Toronto on April 26th to Florence May, daughter of Solon W. McMichael, of H.M. Customs.

Mr. Geo. Taylor, representative of the Gurney Foundry Co. in London, England, has resigned and accepted the position of manager of the Toronto branch of the Gurney, Tilden Company's business.

Messrs. Darling & Pearson, architects, will shortly remove from the Mail Building to the top floor of the Toronto Street Railway Company's new building, corner of King and Church streets. A handsome suite of offices is being fitted up for their accommodation in this new building, in which they will be the only tenants.

A SERIES of experiments were recently made by Prof. Frank Soule in the laboratory of the Engineering Department of the University of California, to determine the holding power of cut and wire nails. The wood used in the tests was Oregon pine and redwood. The general conclusion arrived at as the result of these tests, is that for most uses and under most conditions, the cut nail is superior to the wire nail.

HEAT-RESISTING PUTTY.—A handful of burnt lime is stirred in 120 grams of linseed oil and boiled down to the ordinary consistency of putty. The elastic mass, says the Werkstatt, is then allowed to dry in a thin layer in a place not reached by the rays of the sun. It becomes very hard. For use the putty is held over the fire or the cylinder of a lamp, and the cracks caused by heat or the cracked pieces are cemented with it. Over the lamp cylinder the putty becomes soft and very pliable, but after cooling it gets very hard and binds the different materials very firmly together.

WHAT TO STUDY.

PROF. Norton, in an address before the Boston Architectural Club, advised young students of architecture to study poetry above all other things. Not merely the poetry of Shakespeare, of Byron, but the poetry which finds expression in the west front of Rheims Cathedral, in the campanile of Giotto, in the score of the Moonlight Sonata, in the sentiment of Murillo's madonnas, the study, in fact of the finer qualities which tend to cultivate the taste, to make the architect an artist, and to fit him for the large æsthetic responsibilities which he must assume if he is true to his profession.

This is, after all, the real object in view in foreign travel. It matters not whether we sketch or measure, whether we look with the eyes or with the finer inner senses. The prime object of all travel is to enlarge the æsthetic appreciations, and when it comes down to a practical application the successful traveling student must think out for himself the particular lines of expression in drawing or in study which would best develop the qualities which he feels are most lacking in his composition.

TESTS OF BRICK PIERS.

A SERIES of tests of brick piers was recently conducted at McGill University, concerning which Prof. Cecil B. Smith writes to the Brickbuilder as follows:

The following tests of the crushing strength of brick piers are interesting both as regards the absolute loads recorded, and also because, while with lime mortar brickwork the strength of the mortar determines the load which the pier can carry, this is not so where good Portland cement mortar is used. The tests show that the quality of the brick determines the pier strength, as the first and second brands of cement were rather superior to the third and fourth, as is shown by the tests of a cube of mortar from the same mixing; but the superior strength of the pressed brick became evident in spite of this.

Another interesting point always brought out by such tests is that the pier strength per square inch is considerably less than that of a single brick on its flat, but considerably more than cubes of mortar, i. e., beds of mortar are far stronger than cubes, and single bricks than built walls.

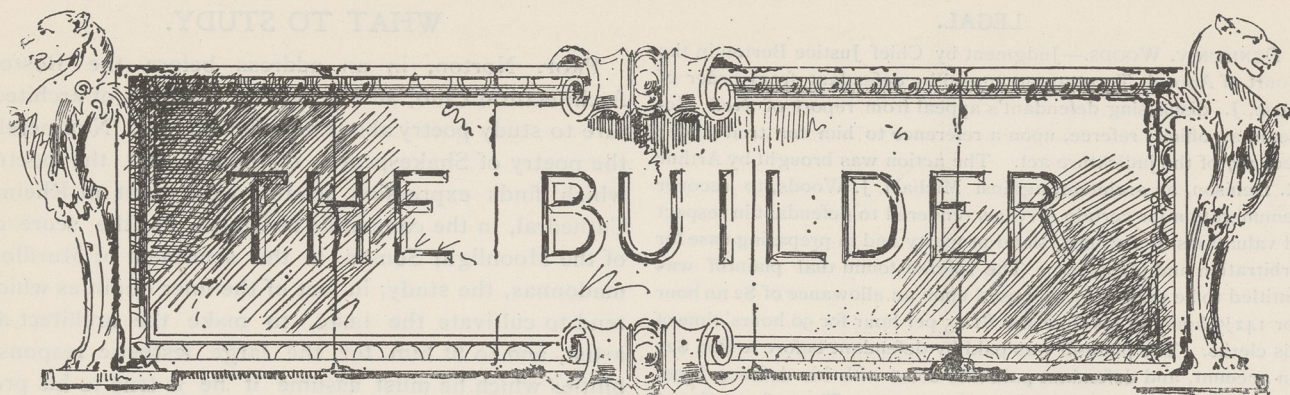
The compressions recorded are very small, owing to the rigidity of the mortar, but piers laid in lime mortar give very much greater compressions per unit load.

TESTS OF BRICK PIERS.

McGILL UNIVERSITY LABORATORIES, MARCH, 1897.

Dimensions of Pier.	Mortar.	Brick.	Crushing Strength, lbs. per square inch.		Age.	Failure.		Compression per foot.		Strength of Mortar 3 in. x 3 in. cube.
			At 1st Crack.	Maximum Load.		Initial.	Final.	400 lbs. per square inch.	800 lbs. per square inch.	
8.1 ins. x 8.1 ins. 11.6 ins. high. Joints, ½ in. thick.	1 Canadian Portland. 3 Sand.	Ordinary well-burnt Flat Brick.	822	1,234	3 Weeks.	In the Brick.	In the Brick.	.001 ft.	.0025 ft.	711
8.1 ins. x 8.1 ins. 11.6 ins. high. Joints, ½ in. thick.	1 German Portland. 3 Sand.	"	990	1,230	"	"	"
8.2 ins. x 8.3 ins. 10.5 ins. high. Joints, ½ in. thick.	1 English Portland. 3 Sand.	La Prairie pressed, Keyed on one side.	1,130	1,524	"	"	"	.0025 ft.	.004 ft.	...
8.4 ins. x 8.4 ins. 10.75 ins. high. Joints, ¼ in. thick.	1 Belgian Portland. 3 Sand.	"	1,204	1,985	"	"	"	.003 ft.	.0045 ft.	677

N. B.—The crushing strength of a brick similar to those in piers Nos. 1 and 2, laid on flat and bedded in plaster of Paris, was 1,400 lbs. per square inch for first crack, and 2,400 lbs. per square inch maximum load.



[THIS DEPARTMENT IS DESIGNED TO FURNISH INFORMATION SUITED TO THE REQUIREMENTS OF THE BUILDING TRADES. READERS ARE INVITED TO ASSIST IN MAKING IT AS HELPFUL AS POSSIBLE BY CONTRIBUTING OF THEIR EXPERIENCE, AND BY ASKING FOR PARTICULAR INFORMATION WHICH THEY MAY AT ANY TIME REQUIRE.]

Slates.

SLATES should always be laid with a certain lap, that is, each course should cover the next but one below it to a certain extent, just the same as shingling, and the amount of surface covered should not be less than two inches on the length of the third slate. Thus, there will be a certain width of slate exposed to the weather; this width grows less as the lap of the slate increases. The weathering or gauge for any kind of slating is found by deducting the lap from the length of the slate and then halving the remainder, thus: If counters slates are to be laid with a 3-inch lap, the weathering will be $\frac{20-3}{2} = 8\frac{1}{2}$ inches, the counters being 20" long. Each course of slates "breaks joint" with the one below it. The average weight of ordinary slating may be taken at 700 lbs. per square of 100 superficial feet. The valleys of slated roofs are generally laid with lead, as this metal is superior to tin or galvanized iron for the purpose, the lead being turned up the roof on each side of the valley sufficient to drain away all water. Hip rafters are often covered with sheet lead, which is the best method, or finished with thick, saddle-back slates finished on top with some sort of an ornamental roll, which is cut to fit over the angle. Slate does not absorb water, and, as it is hard and close grained and smooth on the surface it can be laid safely at as low a pitch as $22\frac{1}{2}$ degrees, and its lasting qualities are very great; and, everything taken into consideration, it is a very much cheaper roofing material than shingles in the end. One fault of slate is that it will not resist a very great heat, and is often dangerous on that account, as a fire in an adjacent building may be so hot as to start slates breaking and falling on the heads of onlookers, even if the buildings are thirty or forty feet apart. With the exception of tiles, slates make the prettiest of roofs, if the pitch is not too low, but it seems to be one of the faults of our designers to make their slate roofs much too low in the pitch, owing, no doubt, to reasons of economy. To look well a slate roof should never have less than a one-third pitch, and as much more as circumstances will permit.

A GOOD serviceable drain tile may be made by any bricklayer or plasterer in case the ordinary tiles are not available.

Provide a centre core of such size as may be required to form the diameter of the pipe. Stand this in a box—a round mould is better—leaving space enough around the core to allow of sufficient thickness of pipe; and if a number of pipes are to go together, provide—by a mould—some means for making a connection. Mix two parts of best Portland cement with three parts of clean sand, the latter to be of various degrees of fine-

ness, from the very finest to the size of a pea, and in such proportions that the finest will fill up all vacancies as the cement finely coats each particle; that will be about $1\frac{3}{4}$ parts of fine sand, $\frac{3}{4}$ parts of medium, and $\frac{1}{2}$ part of the coarser kind. These materials must be thoroughly mixed dry, and the mortar rammed solid into the mould, and the core must be turned partly around every now and again, in order to keep it loose. It is highly important that the right amount of water be used, as every particle of cement and sand should be wet, but the mortar should be left stiff enough for the rammer to bring up solidly on it, and press the material firmly together instead of displacing it horizontally. The core may be withdrawn almost immediately after the pipe is finished, and in good weather the outside mould may be removed in about half an hour. The pipes should be kept under cover for about two weeks, and then put out in the sun and air and well wet every day. They will be ready for use in about six weeks after being made. Pipes made this way possess several advantages over the regular glazed drain tiles, and are specially adapted for carrying away sewage as they are not affected by the chemicals and gases that are generated from sewage. Any carpenter can make proper moulds in which these pipes may be made. The core may be made in the lathe, having a shoulder turned on the expanded end to form a joint for the small end of the pipe. The outside mould may have a square outside, but the inside should be made the shape the outside of the pipe is to assume. It should be in two halves, and may be hinged on one side, and fastened, when in use, on the other side by hooks and staples or other device. The core should always be withdrawn before the outside mould is removed.

Kitchen Traps.

THE traps in general use under a kitchen sink ought to have a separate ventilation pipe leading from the upper side of the trap to the roof or other safe place. If this system is adopted, it will render the gases and bad smells emanating from the slops or sewage from the main drain, or other obnoxious features, that sometimes result from siphonage, harmless, as the draught in the ventilating pipe will carry away any sewer gas that may reach the pipe. There are very few traps placed under sinks that do their work effectively, owing to the fact that, as a rule, they are not of sufficient diameter. The water seal in a trap of small diameter is easily broken both by siphonage and by evaporation, and these are the main reasons why the trap should be of large calibre or have separate ventilation. An authority on the subject of traps gives the following as the requirements for effective performance of a kitchen trap:

"(1) It should do its work by means of a water seal alone, which may be accomplished if sufficient water be injected and held in it. (2) It should be self-scouring. (3) It should be capable of resisting the severest tests of siphonage, momentum, and back pressure that can ever possibly be brought to bear in plumbing, and this without the aid of special ventilation. (4) It should contain a body of water large enough to be practically proof against evaporation. (5) It should be simple. (6) It should be economical to manufacture. (7) It should be made of durable material. (8) It should be so constructed that its interior can be inspected without removing the trap or any part of it. (9) It should have a tight fitting clean-out cap, arranged to be removed with perfect ease, and to admit of removing any foreign substance that may have lodged in any part of it. (10) All parts of its clean-out cap should be under water, to insure detection of leakage if any occurred. (11) It should be so formed as to offer the minimum of resistance to the flow of water through it. (12) It should be independant of the fixture to which it is attached, and should be easily connected or disconnected." This, of course, is an ideal trap, and no such thing is made, or perhaps ever can be made; but several of the requirements as set forth may be obtained in the one trap. For instance, heavier traps than are now used may be attached to the ordinary waste pipes, thus securing a larger body of water for the seal, which would offset evaporation to a large extent, and in some measure prevent a back flow of gas. Then the clean-out cap might be made much larger, so that the interior of the trap could be more readily got at to clean. Traps themselves should be placed in positions where easy access to them obtains.

CANADIAN white maple, when properly seasoned, makes a good durable floor if care is taken in laying it, and placing it where it will not be exposed to damp, or likely to be soaked with water at any time. Where possible, the material used should be weather seasoned, as maple that has been kiln dried is apt to swell with the least possible moisture, such as being washed, or by absorbing the damp from newly plastered walls, and expands to such an extent that injury may result. Weather seasoned maple does not swell so readily nor so much when moist, and experience has proven that its lasting qualities are greater than when kiln dried. As of maple, so of black birch, that which is weather seasoned is, in many respects, better than when kiln dried. In weather seasoning maple, birch, cherry and beech, it should be so placed that neither rain or the sun will get on it, as the first will be sure to doze it, while the second will crack, split or warp it. If intended for flooring, warping does not much matter, as it will be ripped into strips less than three inches in width, so that when it is run through the flooring machine, the warping will be pretty well taken out of it. Beech makes a very handsome floor, and if used in a room where it is intended there will be no carpet, it may be waxed or polished, and will have a fine metallic lustre. Red beech, of course, is the wood intended. Cherry, while one of the handsomest of woods, is not very well adapted for flooring, as it is rather soft, and shoes with sharp angles, or having metal nails in them, would be apt to mark it if the floor was left bare and polished. Perhaps, after all, there is no wood grown in Canada

that so well fills the requirements needed for a good floor as our white oak. This wood, which deserves more attention by architects and builders than it usually receives, makes at once a handsome, durable and lasting floor; and if quarter sawn and wisely selected, is superior in appearance, when properly finished, to any other wood grown. A quartered oak floor, laid in a room where all the woodwork is quartered oak finish, is a sight that is sure to impress everyone who sees it with an idea of solidity and worth, that never obtains in the use of other woods. It is not a very good method to mix maple and birch together in the one floor. They do not last equally, neither do they wear equally, and when a floor wears out in one part, the whole of it must come up, the worn and the unworn, whereas, if it had been of one kind of material it would have worn evenly, and throughout. Another reprehensible custom is that of laying flooring in dark and light strips alternately. By so doing it gives the floor a sort of "cheap John" appearance, and every joint is so emphasized, that what would not be noticed if the boards were all of one color, will be sure to attract the eye when the joint is defined by a change of color. The flooring should be selected for color as well as for widths, and all that of one color should be laid together. It is better to wax a floor than to oil it; in fact, an oiled floor, unless well rubbed in and shellaced, is a perpetual nuisance, as it is almost impossible to keep dirt from working its way into the pores of the wood with the oil, and ruining it forever so far as its appearance is concerned.

Useful Hints.

IN order to cut a rafter of any pitch to the proper bevels with the aid of the steel square, proceed as follows: Fig. 1 shows a diagram of a roof, having a twenty-six foot span—any span will answer. The span of a roof is the distance over the wall plates, measuring from A to A. Here are two rafters shown in position, the one on the left having a pitch of one-quarter, and marked B, the rafter on the right marked C is one-third pitch. Their angles, or inclinations, are called quarter and third

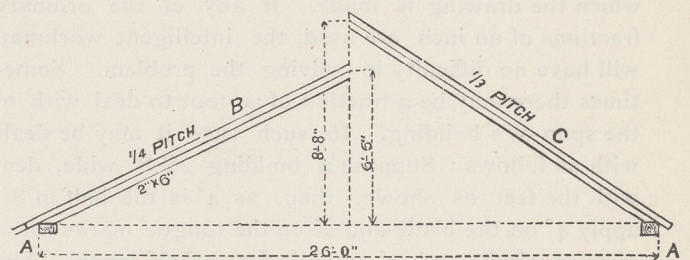


FIG. 1.

pitch respectively, because the height from level of wall to ridge or peak of roof is one-quarter or one-third the width of the building, as the case may be. Two pitches are shown here in order to exemplify the methods of obtaining the different bevels. At Fig 2 the rafter B is shown drawn to a larger scale; it is for the quarter pitch. It is supposed to consist of a piece of stuff 2 x 6 inches, and 17 ft. long. The portion of rafter at O is left 3" wide only, and when in place projects over the building and forms the eave. This may be left of such length as may be desired. A centre line is marked on the width of the scantling, and it is from this line the square is worked. Apply the square on this line as shown in the sketch using the figures 6 and 12, which give both the proper angle and the exact length. Work from right to left, placing the 6" mark on the

tongue and the 12" mark on the blade, over the working line. The tongue gives the cut for the top of the rafter, and blade gives the cut for the bottom. As the building is 26 feet wide, we must repeat the marking on the working line thirteen times, as thirteen is half of 26. Care must be taken in laying of the lengths or the rafter

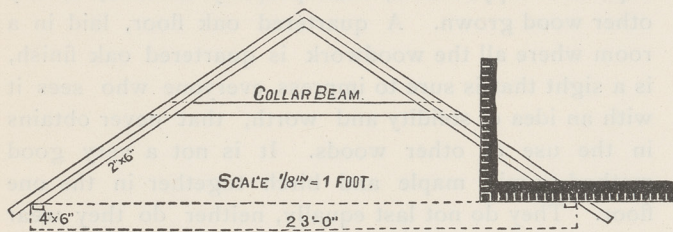


FIG. 2.

will not fit exact. To get the length and bevels of a rafter for a one-third pitch the figures to be employed are the 8" and 12" marks. The square must be applied as before, using the 8" mark on the tongue and the 12" mark on the blade. Keep the tongue to the right, which gives the plumb cut on the top of the rafter, while the blade gives the level or bottom cut. The square must be applied thirteen times as before. In all cases the square must be applied half as many times as the span measures in feet. Roofs more acute than the ones shown may be dealt with as follows: For instance, if the roof is half pitch or at right angles, 12" and 12" on the square will give both pitch and bevels. When a roof is more acute or "steeper" than a right angle, take a greater figure than 12" on the blade, but keep the 12" on the tongue, thus: For a three-quarter, or "gothic" pitch, take 16" on the blade and 12" on the tongue, and repeat on the pattern, half as many times as there are feet in the span. Whenever an architect's drawing for a roof is to be followed, it is an easy matter to find out how to employ the square to get the length and bevels of the rafters, by laying it on the drawing as shown at

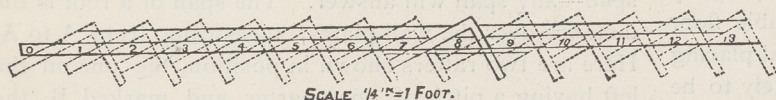


FIG. 3.

Fig 3. Of course, something depends on the scale to which the drawing is made. If any of the ordinary fractions of an inch are used, the intelligent workman will have no difficulty in solving the problem. Sometimes there may be a fraction of a foot to deal with in the span of a building. In such case it may be dealt with as follows: Suppose a building 26' 8" wide, deal with the feet as shown, then, as 4" is the half of 8", apply 4" on the blade and 2" on the tongue marks for a quarter pitch, and 4" and 4" for a half pitch. The lines down the tongue will be the plumb cuts at the top of the rafters, and the lines along the blade will be the bevels to sit flat on the top of wall-plates. To make good close work, be exact in lining off and sawing, and the result will be satisfactory.

SOME PAINT TESTS.—The results of some paint tests were exhibited at the October meeting of the Civil Engineers' Society of St. Paul, says the Railway Master Mechanic. Twenty odd samples were shown of black and more or less rust-roughened plates of sheet iron, which had undergone six months' exposure to locomotive smoke while suspended from the roof of the Union Depot train shed, about 50 feet above the tracks. The iron plates, originally new and bright, had each received one coat of paint and had been subjected to equal exposure. The red lead samples gave the best results; next came the white lead, followed by the iron oxides and the asphaltum, which were generally in much better condition than the graphites. An anti-rust specimen was the brownest specimen of the lot.

DOMINION PLUMBING AND HEATING SUPPLY ASSOCIATION.

THIS is the title of a new organization, composed of manufacturers and wholesale dealers in plumbers' goods and heating apparatus, formed at a meeting held for the purpose in Montreal on April 15th. The following officers were elected:

President—J. R. Wilson, of Thos. Robertson & Co., Montreal.

First Vice-President—A. A. McMichael, of James Robertson & Co., Toronto.

Second Vice-President—W. H. Wiggs, of the Mechanics' Supply Co., Quebec.

Secretary-Treasurer—A. G. Booth, of Toronto.

The above, with the following, compose the Executive Committee: Col. F. Massey, of the Gurney-Massey Co.; Wm. Greig, of Warden, King & Son; A. Lariviere, of Amiot, Lecours & Lariviere, and J. M. Taylor, of the Toronto Radiator Co.

A gentleman interested, to whom a representative of the ARCHITECT AND BUILDER applied for information, stated that the new association was simply an enlargement of the local association established in Toronto last year. The restrictions imposed by the Dominion Plumbers' Association had become so burdensome that the manufacturers and wholesalers were compelled to organize for mutual protection. As an illustration of the nature of these restrictions, this gentleman stated that manufacturers of brass goods were forbidden to sell to the T. Eaton Co., who are extensive buyers of this class of goods. Another regulation is that wholesalers shall not sell to or recognize as a legitimate plumber a person who does not carry on business and display his goods in a window on a business thoroughfare. As a proof of the absurdity of this regulation, it is stated that two of the leading plumbers of Montreal have no office or workshop on a business street, but make their headquarters at their place of residence.

While apparently willing to comply with what they consider to be reasonable regulations for the welfare of the trade, the members of the Dominion Plumbing and Heating Association express their determination to unitedly resist arbitrary dictation at the hands of the master plumbers' organization. They affirm that all the supplies required by the trade can now be produced and sold in Canada at much lower prices than the plumbers would be obliged to pay for imported goods of equal quality.

THE CANADIAN CEMENT INDUSTRY.

THE annual report of the Ontario Bureau of Mines, recently published, states that the number of men employed in the manufacture of cement in the last four years has increased from 168 to 231, the wages paid for labor from \$44,878 to \$89,060, the quantity of cement manufactured from 85,903 barrels to 181,495 barrels, and the value of the cement from \$109,834 to \$246,425. The greatest increase, however, has taken place in the production of Portland cement, which has gone up from 30,580 barrels to 96,825, while the natural rock cement has only increased from 55,323 barrels to 84,670. In value natural rock cement shows an increase of \$27,349, while Portland cement shows an increase of \$109,242. This no doubt is largely if not chiefly owing to the growing interest in the building of good roads in our towns and cities.

Arrangements are in progress for the annual convention of the National Master Plumbers' Association which is to take place in Quebec the latter part of June. The President, Mr. Joseph Wright, of Toronto, is at present on a visit to British Columbia.

ENGLISH VIEWS ON HOT WATER HEATING.*

W. J. MAGUIRE.

If the boiler is making a fuss, he will be suffering either from wind in his stomach, or from a stoppage in his circulating tubes or his inside, tending to choke him to bursting. If the noise be a soft and regular one—thump, thump, thump—heard all over the house where the pipes run, you may safely diagnose air lodgment as the complaint. If the noise be a succession of sharp, loud, irregular raps, as of iron struck with a hardwood mallet, you will probably be correct in deciding that a deposit is choking the flow or return pipe, or both, and you will apply prompt remedies to prevent fatal rupture. Every high pressure circulating boiler should be so made and fixed that no bubble of air can find an abiding place in the interior, or in other words, so that the boiler shall be always absolutely full of water in actual contact with the whole internal surface.

The ordinary boiler, in section like a boot, is very often improperly formed and badly fixed. Every boot boiler should have the top of the boot—the instep—sloping upward from the front, or toe, to the back. When flat, some internal inequality of surface will be found to hold air, and thus create constant noise and be a cause of weakness where the boiler is exposed to fierce heat by keeping the water from internal contact with the iron or copper plate. The boiler toe next the fire should be rounded, not angular, and sharp angles should be avoided where in contact with fire or flue heat. Every such boiler should have a perfectly smooth level top, or be otherwise formed to secure the easy exit of every bubble of air through the outflow pipe.

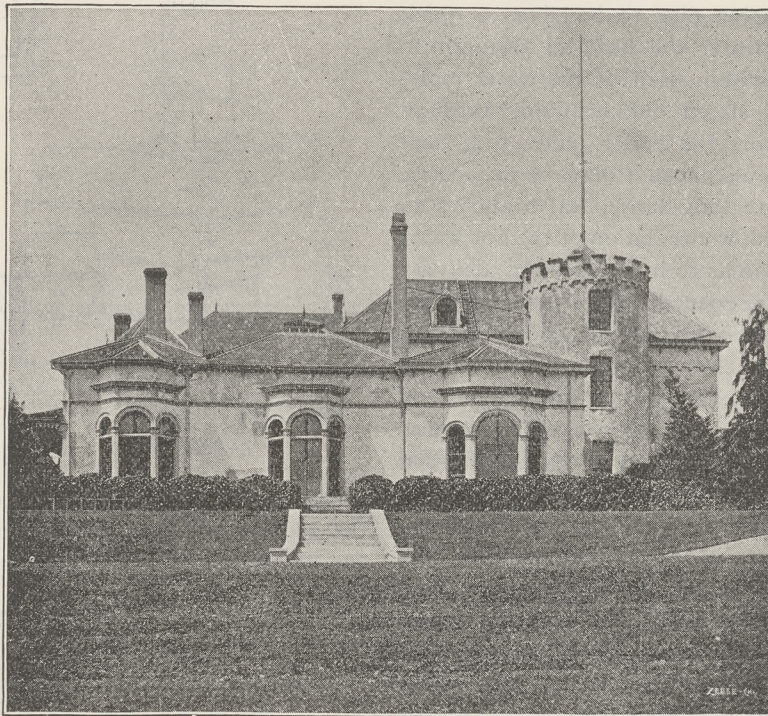
Manholes should be provided both on the top of boot and on the front of the body of the boiler for efficient cleansing. In fixing the outflow, the end of the pipe should not be entered one hair's breadth below the inner top surface. A flange socket screwed down on the top of the boiler, into which the outflow pipe can be screwed, the hole drilled in the boiler being one-eighth of an inch smaller than the outer diameter of the pipe, will effectually prevent the pipe entering the boiler if screwed down too far in the socket. For the same reason, the outflow pipe should always be led from the top plate, as it is almost impossible to take it from the side or back without leaving space for air. I give diagrams of these methods to explain the dangers. For convenience of manipulation in fixing and cleansing, I prefer the return pipe carried through the top of the boiler also, and extended to within six inches of the

bottom inside by a short piece of pipe of the same diameter as the return pipe screwed on. The outlet and inlet pipes should be kept as wide apart as possible, to leave space for the flue damper to work between them, and also to allow the boiler to be set slightly out of level, the outlet end being say one-eighth of an inch higher than the inlet, to insure free escape of air bubbles; if the outlet is not drilled at the extreme end of the boiler, then the top must be set dead level, else the bubbles will lodge at the extreme end beyond the outlet and cause trouble.

Every boiler should have a pipe taken from its lowest point with a plug stopper or locked valve for cleansing, but no pipe for drawing water for house use should be taken off the boiler direct.

The intermediate hot cylinder system of circulating hot water pipes is now generally adopted; it is safe, and certain to yield hot water when hot water is wanted. We know this is not the case with hot cisterns placed on the same level as the cold cistern, generally hidden

away in a roof, where we have to creep on our hands and knees, as if we were exploring the recesses of the Pyramids of Egypt; have no light to see nor room to turn when we get there, and now and again succeed in setting fire to the house in striking matches or letting sparks fall from our taper. The intermediate cistern of galvanized iron or copper may be placed in such a position above the boiler level as to allow a quick gradient to the circulating pipes, within say 10 to 30 feet from the boiler, and where heat radi-



CAREY CASTLE, VICTORIA, B. C.

ated therefrom may be utilized as in a linen closet. The hot cistern should be tested to stand double the pressure due to the head of water from the cold cistern. The best form of cistern to resist pressure is a cylinder, though any form capable of resisting the pressure is admissible; a cleaning door screwed down securely should be provided for each hot cistern. Five strong screwed bosses should be affixed to the hot cistern and galvanized over after being fixed—two on the top and three round the bottom—in proper position to receive the two circulating pipes, one supply pipe, one basement draw-off pipe, and one upward expansion pipe.

In general practice no question of importance arises concerning the arrangement of these pipes, except as to the cold supply pipe. Some authorities contend that it should be led direct into the boiler, but I hold it to be bad practice to allow dead cold water to enter a very hot boiler which is in direct contact with the intense fire of a close range. Other authorities contend that the cold supply pipe should branch into the return pipe from the hot cistern, but here the same objection exists, with another added, for the junction, being subjected to sud-

*Registered Master Plumber. Condensed from Manchester Health Lectures.

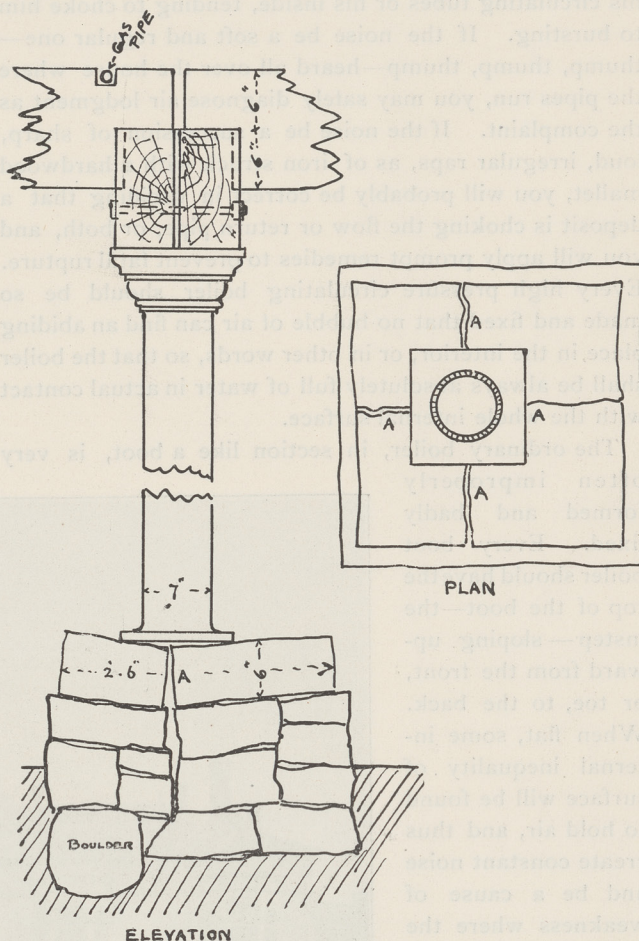
den alternations of extreme heat and cold, is liable to give way. I have seen numerous failures in joints so formed.

The proper method is to connect the cold supply into the hot system at the lowest level and opposite the return pipe opening to the boiler, so that the cold water being the heaviest may enter and flow straight across in the direction of the return pipe and down to the boiler, mingling but slightly on its way with the lowest stratum of warm water in the system, so as not to enter the hot boiler dead cold, and yet not to intermingle with the upper and lighter strata of hot water in the cistern, so as in any way to prevent the very hottest water being drawn off when required. The basement hot supplies may be taken from the special basement hot pipe, so as not to affect the hot supply to baths and upper floor hot draw-off taps. And all the hot water supplies to levels above the basement may be branched direct from the upward expansion pipe. There is no positive objection to allowing all the hot supplies to the basement and upper floors to be drawn from the one upward expansion pipe. By placing the hot cistern judiciously, so as to allow this upward expansion pipe to be given a quick ascending gradient, the water will heat all through to the top by a circulation within itself of the water molecules and by the air and steam bubbles rising through the column of water from the boiler, conveying heat with them; but in some instances it may be necessary, especially where there are long horizontal branches to baths, etc., to induce a slow circulation of the hot water along the branch pipes, so as to insure prompt delivery of hot water when taps are opened. This can be effected by running a small half-inch bow return pipe back from the far end of such branches to the hot cylinder. A definite plan to suit all cases can not be laid down; each arrangement for each house and all the circumstances require consideration. Abundant opportunity is afforded for the exercise of ingenuity and forethought. The master plumber's practical experience, and his knowledge of the laws that govern the movement of hot and cold water through pipes, will stand his employer in good stead. Ask a dozen men to explain the cause of circulation of hot water through pipes, and ten of them will tell you that the hot water rises because it is lighter than the cold, and they will also tell you that smoke rises up a chimney because the heated air is lighter than the air in the house. But the fact is that neither the heated water nor the heated air rise actively. They are both, if active at all, trying to fall toward the earth, for each have a certain gravity or weight of their own; on each column of heated air and heated water, the attraction of gravitation acting from its centre in the earth is exerting its utmost force, and if left to its influence they would certainly descend toward the earth; but the columns of hot air and hot water, though they do not actively rise, are actively pushed up by the superior gravity or weight of the corresponding columns of cold air or cold water, as the case may be, just as the heavy side of a scale pushes up the lighter side. It is therefore accurate to say that hot water and hot air are forced to rise by the attraction of gravity drawing down the cold water and cold air; and it is therefore inaccurate to say that they rise because they are lighter. It is important to know and remember this in the practical arrangement of hot water circulating pipes and in the ventilation of buildings and drains.

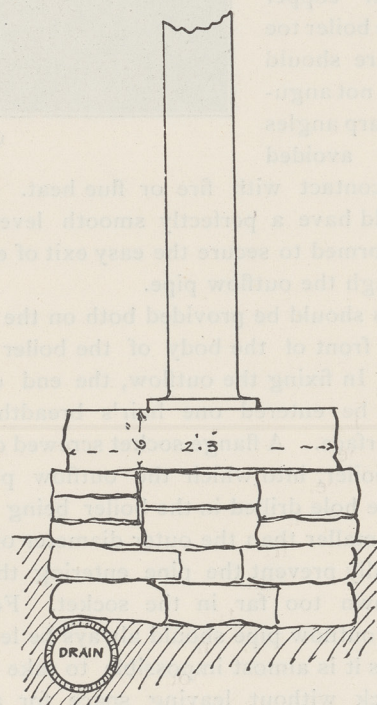
The disagreement as to wages which threatened to cause a strike on the part of the journeymen plumbers of Winnipeg, has been satisfactorily adjusted.

DOES THE PUBLIC NEED PROTECTION?

The accompanying sketch is a sample of work done without qualified architectural supervision. It occurred in a building where hundreds of people assembled every week, and it is a mystery that a serious accident did



not occur under the circumstances. To all appearances, the addition of a few tons more in weight would have caused several of the columns to drop through the



badly bonded piers, and a drop of only a few inches would have permitted the joists to drag away from their slender hold on the beams, and precipitated hundreds into the basement.

Four of the piers with their cap stones were split, as

shown in sketch at A A, while a drain pipe ran beneath one side of one of the remaining piers.

That the public needs protection is well demonstrated in this specimen of work, and it should serve to punctuate the lessons taught by the London City Hall disaster and the collapse of the roof of the public hall in Oshawa.

It is high time that the government should insist that every person who desires to assume the title of "architect," shall first pass an examination to discover his fitness for the responsible duties which an architect is called upon to perform.

ST. JEAN BAPTISTE CHURCH COMPETITION.

FOLLOWING are the conditions and the report of the judges in the recent competition open to the Catholic architects of Montreal for plans for the new St. Jean Baptiste church to be erected in that city:

CONDITIONS OF COMPETITION.

The syndics and churchwardens of the Parish of St. John Baptist of the city of Montreal invite the Catholic architects of this city to compete for the preparation of plans for a church, vestries, parochial residence, a chapel for the use of congregations, and a sub-basement, that the above named parish proposes to erect on Rachel street.

Two or three competent judges will be named to choose the plans.

The following are the conditions governing the competition:

1st. The successful architect will prepare all final plans and specifications with the help of the syndics and churchwardens.

2nd. The second prize will be \$200.

3rd. The third prize will be \$100.

The churchwardens will entrust the preparation of final plans and the superintendence of the works to the successful architect, provided said architect shall possess the proper qualifications and give the required securities.

The plot of ground on which the proposed buildings are to be erected is situated on Rachel street, facing also Sanguinet and Drolet streets, and on a lane in the rear.

For the size of ground see the plan exhibited in "Hospice Auclair."

The competitors are not compelled to follow a special style—Gothic only being excluded.

The "facade" of church must face on Rachel street, the parochial residence on Sanguinet street, and the vestries on Drolet street. The chapel to be situated where deemed best by the architect.

All drawings to be made to a $\frac{1}{8}$ " scale.

The following plans are required: Front elevation, side elevation, plan of sub-basement, plan of main floor, longitudinal section, transverse sections of sanctuary and of galleries.

All the plans to be drawn on ordinary drawing paper, not glazed nor polished.

Plans to be lined only, with the exception of floor plans and sections which shall be colored so as to show the nature and kind of materials used in the proposed construction.

The plans must not bear the author's name, but will be marked with a motto or signed with a fictitious name. A sealed envelope marked with the motto or fictitious name, and containing the name and address of the competing architect, will be sent in with the drawings, and the said letter is to be opened only if plans bearing same motto or name are accepted. All drawings to be delivered without cost at "The Hospice Auclair" on or before the twenty-fifth day of April, 1898, without any indications whatever of the name and residence of the sender.

The churchwardens allow 35 days for the preparation of plans, commencing to count at the time of the first publication of advertisement in La Presse and La Patrie.

The total amount voted for the construction of proposed buildings is \$130,000.

The roofs and walls are to be fireproof.

The church is to be sufficiently large to contain 450 pews. The same number of pews to be placed in the basement.

The sub-basement must be 14 feet high, and be filled with closets, etc., etc.

In the church the following requirements to be considered:

An incline organ loft; at least two concealed galleries for religious congregations, each of which must seat from 50 to 60 people; one specially wide aisle in the centre; one good aisle (transverse); eight confessionals in the main church and eight in the basement; one room for catafalco; one baptismal font, and one record room; an easy communication for choir boys from basement to sanctuary; several doors on main facade and as many as possible on other streets—one on Sanguinet street and one on Drolet street; the sanctuary floor to be above the level of communion rail; as few columns as possible, and at all events not more than six; the pulpit to be as near the sanctuary as possible; the altar, now under construction, not to be taken into consideration by the architects; the chapel to contain from 800 to 1,000 people; the chapel to be so situated that on particular occasions it may be opened and permit those occupying the chapel to see the ceremonies in the main church; the heating apparatus to be placed under the sacristy and to heat the several buildings; the building to be particularly well drained; a door to be provided in cellar for carriages.

Size of vestry, about 26' x 30', fitted with wardrobes, closets, etc., etc. For other details see the parish priest.

REPORT OF THE EXPERTS.

In estimating and deciding the merits of the different competitive plans, we were compelled to guide ourselves by the written conditions imposed on the architects, and to follow them very strictly.

We first took into consideration the main object of the proposed

building, the place occupied by the public, compared with the situation of the sanctuary where the ceremonies will be celebrated, and the facilities offered the audience to hear the predication.

Starting from this principle, we made a thorough study of all the drawings, trying to determine which plan solved most perfectly the problem of disposition of pews and pulpit, and also of acoustics.

We are of the opinion that all minor detail of plans must give way before those primordial conditions.

An important condition imposed by the wardens of the parish of St. John Baptist is the limited cost of \$130,000. We consequently had to carefully study the different schemes and propositions of the architects in the light of the probable cost of their proposed building.

After a very careful study of all plans and propositions submitted, as well as written explanations sent in by some of the competitors, and guiding our decision by the conditions imposed by the churchwardens of the parish of St. John Baptiste, we came to the conclusion that the plans signed "In hoc signo Vinces" were those which best answered all the imposed conditions.

The second prize is given to the plans marked "Ad Dei Gratiam," and the third to those marked "Ecce."

We cannot but feel that praise is due to all the other competitors. Their plans were all very artistic, beautiful and rich in ideas.

We had a very hard task before us, and it was not without much study that we came to a decision.

Hoping that this will be accounted satisfactory, we remain, very humbly,

(Signed) P. AUDET, Ptre.
F. X. BERLINGUET, Architect.
DECARIE, Ptre. (Dissident).

THE COMPETITION EVIL.

THE following letter, from the chairman of the committee in control of the Stratford City Hall competition, in reply to objections urged by a Toronto firm of architects to the terms of the competition, clearly indicates that by entering competitions of this character architects are cutting their own throats:

GENTLEMEN,—In reply to yours of the 11th inst., would say: (1) The regular architectural fees at the present time are simply a matter of bargain, and we know for a fact that 4% is above the average paid for such work this season, and furthermore, some of your best Toronto men would only be too pleased to secure the appointment at that figure (no travelling expenses either). (2) The information we have sent out we consider covers quite sufficient instructions to enable an architect to form an idea of what we require, unless relating to the old building. This should be personally inspected in order to obtain the necessary information required. Several architects have already done so. (3) Experts may be appointed to assist us in the final selection of plans, but we will reserve the right to make such appointment. However, you may rest assured no favors will be given; we want the best. (4) As to being misled regarding final cost, I would refer you to "Municipal Buildings" Toronto. Expert work no doubt—but from such Good Lord deliver us, or we are swamped.

In conclusion, would say the terms we are offering are much more liberal than those lately given by St. Thomas. We are informed that that municipality had a large number of first class designs submitted—quite sufficient to choose from and obtain a most creditable building, fully in keeping with their other public edifices.

Yours respectfully,
GEO. F. INGRAM.

THE ST. THOMAS CITY HALL COMPETITION.

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

SIR,—The experience gained by at least some of the gentlemen who ventured the risk of competing for the building plans, elevations and specification of the new St. Thomas town hall, lately advertised in your admirable journal, is not a pleasant one.

That they might fail in such a competition was one of the contingencies for which they were quite prepared; but that the Chairman of the Building Committee should have failed to acknowledge the receipt of the papers, and also to advise them of the result of the competition, was what they did not expect.

After retaining the papers about a month they were returned, subject to express charges and without a line of advice or information from the Council as to the result.

They would still be ignorant of the fact that the first and second prizes were awarded by the councillors to two of their own townsmen (the only two local architects competing) had they not seen the announcement in one of their city papers.

The amenities usually prevalent among business men seem to have been entirely ignored.

JUDEX.

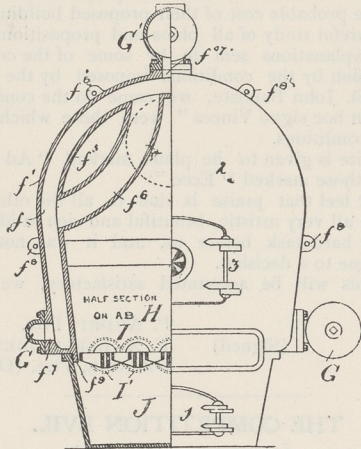
12th May, 1898.

Mr. C. B. Chappell, architect, Charlottetown, P.E.I., in renewing his subscription to the ARCHITECT AND BUILDER, writes: "I take three or four other architectural papers, but would not be without yours."

Hammers are represented on the monuments of Egypt twenty centuries before our era. They greatly resembled the hammers now in use, save that there were no claws on the back for the extraction of nails. The first hammer was undoubtedly a stone held in the hand. Claw hammers were invented some time during the Middle Ages. Illuminated manuscripts of the eleventh century represent carpenters with claw hammers. Hammers are of all sizes, from the dainty instruments used by the jeweller, which weigh less than $\frac{1}{2}$ oz., to the gigantic hammer of ship-building establishments, some of which weigh as much as fifty tons, and have a falling force of from ninety to 100. Every trade has its own hammer and its own way of using it.

NEW HEATING FURNACE.

A PATENT has been granted to Mr. David W. Robb, of Amherst, N. S., for a new heating furnace, as shown herewith. The claim is in the combination of a series of upright tubular sections, having the contour of a horse-shoe, the inner walls of the tubes projecting and rounding inwardly from the edges, the sides of the arch provided with segment-shaped circulating tubes, a special front section of the same general character but without circulating tubes and having boxed enclosing spaces, fire-door, and boxed hearth plate extending across the front of the grate, a special fire



NEW HEATING FURNACE.

bridge section having circulating tubes and boxed fire bridge, a special section at the rear of the fire bridge section having the tubular boxing continued across the lower ends and having the circulating tubes replaced by a boxed deflector, a rear section having boxed rear enclosing spaces with smoke flue and soot holes, and the tubular boxing continued across its lower ends, an ash-pan forming part of the base and supporting the sections and a grate in said ash-pan. The circulating tubes are D shaped in

cross-sections with the flat face turned outwards and continued to project beyond the tubular space to form rims, one of which is rabbeted to form joints, and tubular sections provided with segmental circulating tubes in the crown and with nozzles at the lower ends and the top of the crown. The inner wall of the tube resembles the elongated bottom of the letter U in cross-section, a square edged rim at one end of said wall projecting at a right angle to plane of said section, and a similar but rabbeted rim at opposite edge, with bolting logs on said rims and a segmental circulating tube in each side of crown, etc.

Oil must be used in the first coat of paint for brickwork, says the Painters' Magazine, for it is the oil which forms the material which binds the pigments together. Certainly brickwork must be perfectly dry when the paint is applied, for otherwise it would soon scale off. If the proper precaution is observed in the work of painting this kind of work there will be little cause for complaint and the protection added to this kind of work by paint is almost as great as is the protection added to woodwork.

ARTIZANS' HOMES

\$500 - PRIZE - \$500

The Massachusetts Charitable Mechanic Association appropriates this year the sum of \$500, the same being a portion of the income of a fund bequeathed by Dr. George O. Shattuck, to be awarded as a single prize to the author of best scheme for housing fifty artizan households.

The programme is an unusually interesting one, since the requirements are few and the greatest freedom is allowed to competitors.

The prize will be awarded by a jury of experts.

Drawings must be delivered on or before September 12, 1898. For programme and full particulars, address

HENRY D. DUPEE, Secretary Executive Committee.

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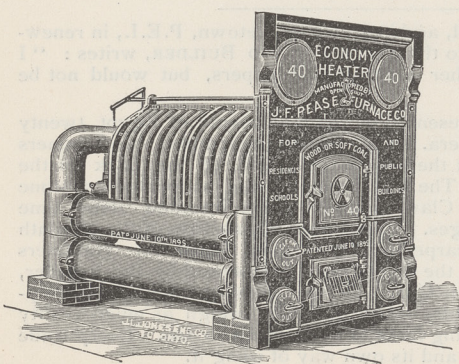
a Complete Success. Burns Soft Coal or Wood. Like all Pease Apparatus, it is Thoroughly Original in design.

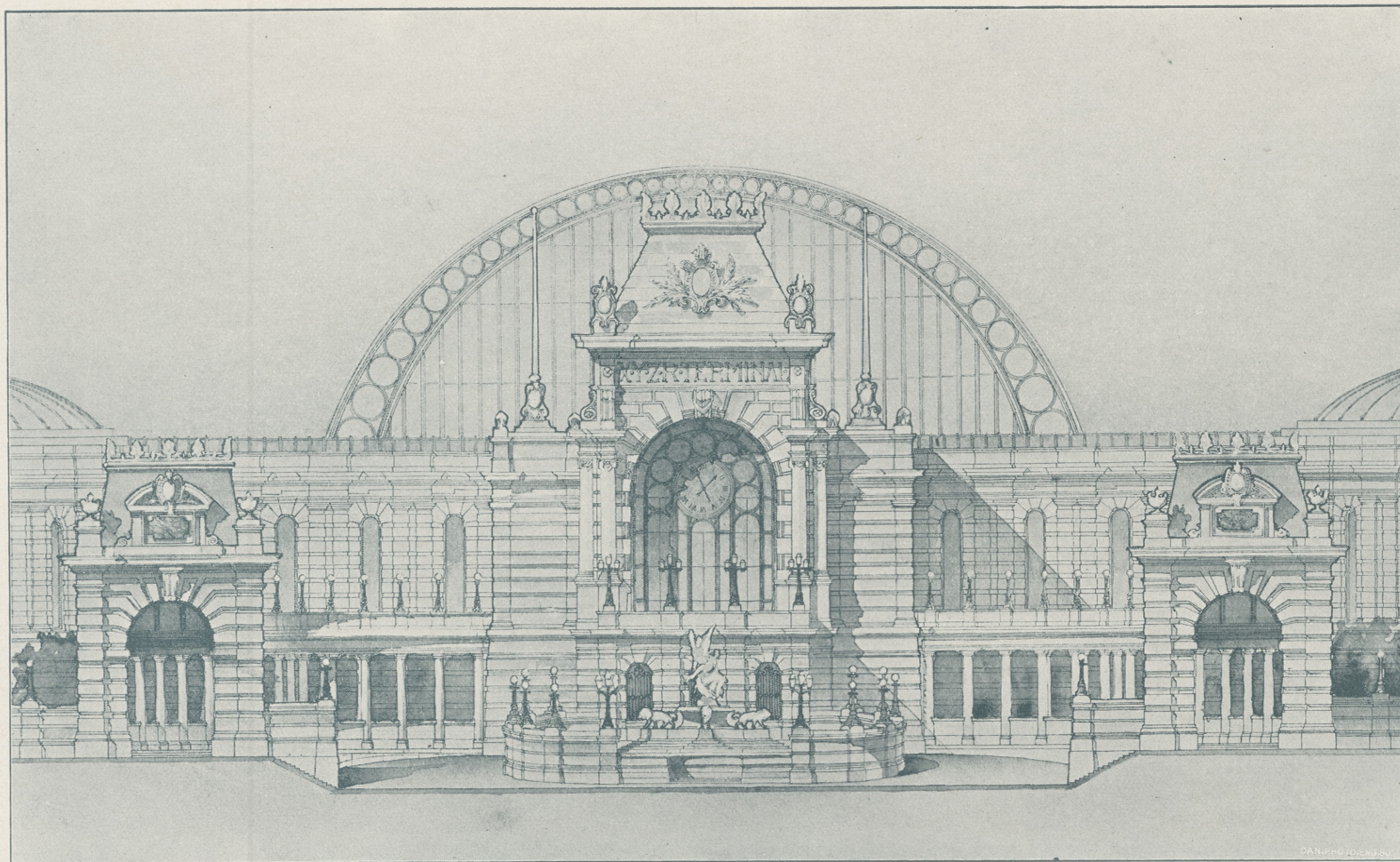
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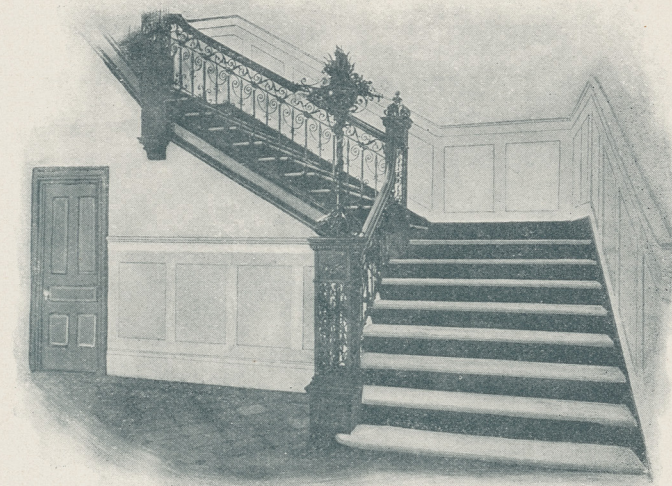


A DESIGN PREPARED FOR THE TENTH ANNUAL COMPETITION OF THE ARCHITECTURAL LEAGUE OF NEW YORK.
SUBJECT:—ENTRANCE TO A TERMINAL RAILWAY STATION.

ARTHUR E. WELLS, ARCHITECT.



CASHIER AND LOAN DEPARTMENT.



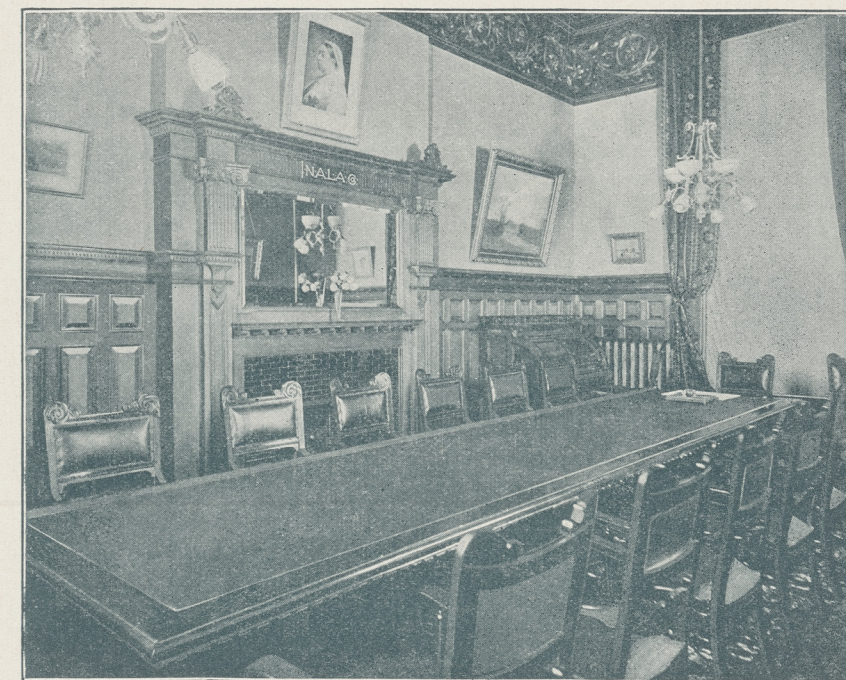
STAIRCASE LEADING FROM HALLWAY.



FACADE ON KING STREET.



VESTIBULE ENTRANCE.



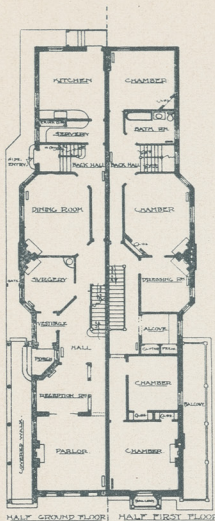
BOARD ROOM.

NORTH AMERICAN LIFE ASSURANCE COMPANY'S OFFICES, KING STREET, TORONTO.

ERECTED FOR THE UNITED EMPIRE CLUB, 1875.—GRANT & DICK, ARCHITECTS.

REMODELLED FOR THE NORTH AMERICAN LIFE ASSURANCE COMPANY, 1897.—LANGLEY & LANGLEY, ARCHITECTS.





RESIDENCES FOR MISS MORRISON, AT 34 AND 36 CARLTON STREET, TORONTO.

LANGLEY & LANGLEY, ARCHITECTS.



A CORNER OF THE TORONTO HUNT CLUB.

DARLING & PEARSON, ARCHITECTS.

ILLUSTRATIONS.

A CORNER OF THE TORONTO HUNT CLUB.—DARLING & PEARSON, ARCHITECTS.
 RESIDENCES FOR MISS MORRISON AT 34 AND 36 CARLTON STREET, TORONTO.—LANGLEY & LANGLEY, ARCHITECTS.
 DESIGN PREPARED FOR THE TENTH ANNUAL COMPETITION OF THE ARCHITECTURAL LEAGUE OF NEW YORK; SUBJECT, ENTRANCE AND APPROACHES TO A TERMINAL RAILWAY STATION.—ARTHUR E. WELLS, ARCHITECT.
 NORTH AMERICAN LIFE ASSURANCE COMPANY'S OFFICES, KING STREET, TORONTO, ERECTED FOR THE UNITED EMPIRE CLUB, 1875.—GRANT & DICK, ARCHITECTS.
 REMODELLED FOR THE N. A. L. A. CO., 1897.—LANGLEY & LANGLEY, ARCHITECTS.

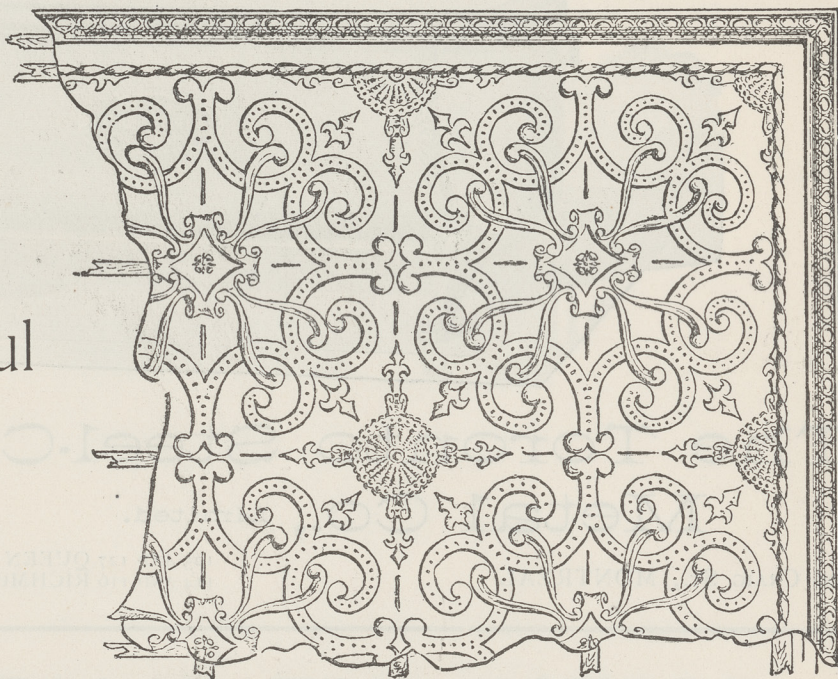
The corrosion which takes place on the bottom of iron railings set in stonework with melted lead is, according to Professor J. M. Thomson, largely due to galvanic action, and the same action will exercise its influence in all cases where two different metals come in contact, unless that contact be as perfect as possible. But the action of acid vapors which are in the atmosphere of some towns on iron and zinc is considerable, especially when the metals are in

the form of thin or perforated sheets and gauze. Professor Thomson observed the action of the air of Glasgow on a window blind of fine iron wire gauze during a period of about seven years. Although originally protected with lacquer, the lower portion of the blind in position opposite to where the window had been daily raised from its sash had been gradually eaten away. There is no doubt that such corrosive actions are assisted by the simultaneous process of oxidation, but there is, at the same time, evidence of the direct action of the acid vapors. The principal conditions under which lead fails are when it comes in contact with air, moisture and carbonic acid, more especially if organic acids derived from the soil or other sources are also present. In this case rapid corrosion may be expected, the action being similar to that already mentioned in the formation of the basic carbonate or white lead. This action being continuous in the presence of the chemical substances mentioned, the lead becomes finally entirely converted. The rusting of grey cast-iron is apparently slower than that of wrought iron, the different varieties corroding more quickly as the amount of carbon increases in the iron. A cement known under the name of "rust-joint cement" is employed in the junction of iron pipes. It is composed of 80 parts fine iron filings, 1 part of ammonium chloride, and 2 parts of sulphur made into a paste with water. When this is packed into the joint it sets into a hard cement, apparently produced by the formation of mixed oxide and sulphide of iron.

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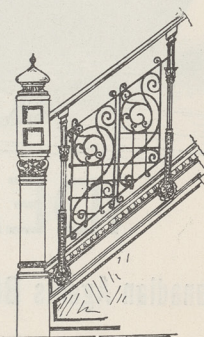
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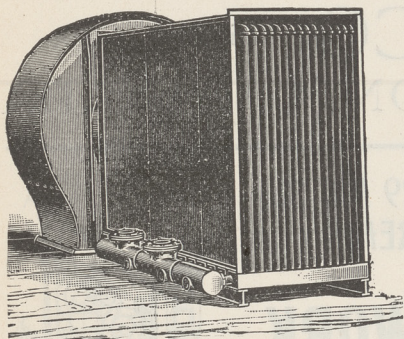
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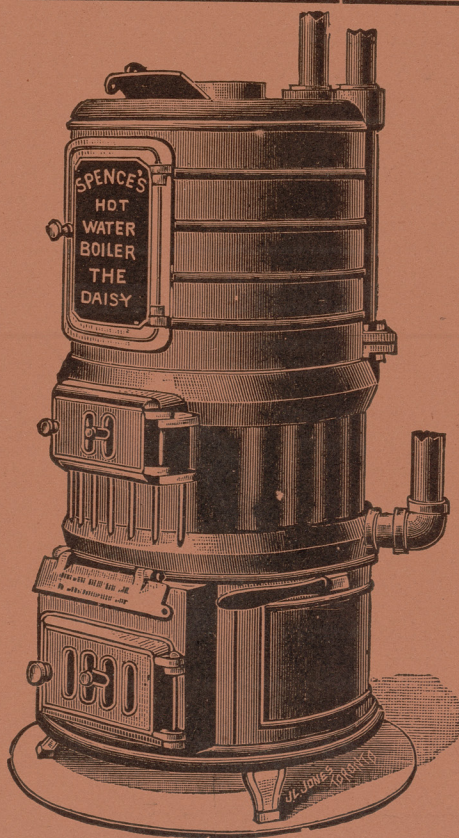
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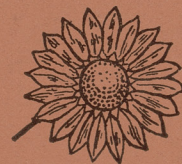
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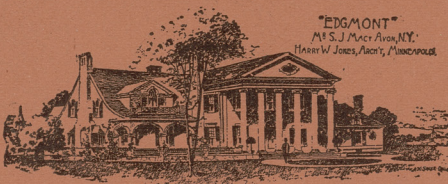
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