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MISSING

CANADIAN ARCHITECT AND BUILDER.

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—THE—

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ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS, DECORATORS, BUILDERS, CONTRACTORS, AND MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

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Heating Methods in Europe and America.

GREATER intensity of cold, a desire for a higher inside temperature due to a dryer atmosphere, and an inclination to save manual labor, are the causes to which the London Builder attributes the practically universal abandonment in America of the open fire place, as a warmth producer and distributor. While maintaining that the European method is scientifically correct, our contemporary is nevertheless led to admit that "Even in England, the efficiency of the open fire is limited and its costliness considerable; therefore we may with advantage take cognizance of the results and the experimental efforts of our inventive rivals." That this opinion is making rapid headway in Europe is proven by the increased demand for Canadian heating appliances—the growth of which demand has led to the establishing of agencies for the goods in all the leading cities of Great Britain and the continent.

Co-operation of Architects and Engineers.

IN connection with the erection of modern large buildings in which structural iron and steel are largely employed, it is no unusual thing for the architect to associate with himself a civil engineer whose education has been such as to qualify him to assist in solving the many structural problems incident to the use of new materials. In New York and Chicago, engineering experts have found, in connection with the erection of numerous gigantic architectural steel constructions, a new and profitable field for their services. In consequence, the question has to some extent been seriously discussed, whether, ere many years shall have passed, the architect may not find his occupation gone. To those, however, who have given the subject proper consideration, it is easily apparent that the architect is in no danger of being supplanted by the engineer. The latter has quite enough to do to qualify himself to deal with the many and complex problems of a profession the scope of which has greatly widened during the last decade. On the other hand, there is a possibility that the architect may be called on to advise and assist the engineer to so design his structures as that they shall present a pleasing and artistic appearance. A recent article in the Engineering Record, pointing to the necessity of the aesthetic element in the design of engineering structures, says: "To design work of this character, it is true, involves the exercise of powers acquired through a somewhat broader training than engineers usually enjoy at this time, and that fact indicates two proced-

ures necessary to remedy the professional defect, one of which is the association of a qualified architect with the engineer on large works, and the other is such an extension of the engineer's educational training as will supply him, if possible, with the necessary artistic discrimination. It will probably be a long time before the second method is pursued to any considerable extent, for the curriculum of engineering study is sufficiently full already, but the procedure first named is at once available. While it is exceedingly rare that an architect and an engineer are associated for this purpose in works of construction, there is no reason whatever why they should not be, and there are many good reasons why they should be so associated in works of great magnitude. Such works involve the expenditure of large sums of money; they are usually of a monumental character, and frequently are located where they become objects of public sight. In not a few cases they may add beauty and dignity to the landscape or irretrievably mar it."

The Law of Light.

A RECENT decision by Lord Justice Lindley, of the British Court of Appeal, serves to clarify the legal interpretation of the law on this subject. While affirming the generally accepted principle that a grantor may not derogate from his own grant, that is to say, in the case of the sale of a house, a vendor may not afterwards, if he owns the adjoining land, obstruct the lights of the house which he has sold, the Lord Justice made reference to cases to prove that the right may in particular cases be modified or limited. In the present instance, however, while the defendant was able to show that the plaintiff knew that houses were to be built on adjoining land, he was not able to show that there was any nnderstanding that the lights of the house sold were to be seriously obstructed; on the contrary, it was shown that the defendant had built higher and closer than was in contemplation. The result of the case is, therefore, that the mere fact of a purchaser knowing that adjoining land will be ultimately built on does not constitute acquiescence in a future obstruction.

A Curious Method of Construction.

A CURIOUS method of construction, which is said to have been much in use in Ireland upwards of a century ago, came to light recently in connection with the attempt to straighten the spire of a church in the county of Cork. After the spire had been examined by an architect, and the contractors had set about taking it down, with the view of rebuilding, the surprising discovery was made that it could not be taken down except it was done en masse, as the stones of which it is built were hermetically bound to each other with a combination of molten lead and sand, which rendered it absolutely impossible to separate one stone from another, the whole spire being, as it were, one solid block. On further and closer inspection it was found that the entire building was erected in a similar manner, no other mortar or binding substances of any kind being used save the sand and molten lead. A huge iron shaft runs through the top portion of the spire, on which the stones were slipped like rings and irrevocably rivetted with lead and sand. Under this extraordinary circumstance the idea of taking down the tower had to be abandoned, as being quite impracticable, if not utterly impossible, but the desired end is said to have been satisfactorily attained by an ingenious and clever method adopted by the contractor and his staff, particulars of which are unfortunately not supplied.

The Future of Toronto.

THE City Council, in conjunction with the citizens of Toronto, should seriously consider what steps should be taken to ensure the future stability and growth of the city. Influences are at work tending to lessen her present importance and check her future growth. We hear it constantly affirmed that the influence of the C.P.R. is being steadily exerted for the purpose of diverting trade from Toronto. The Ottawa and Parry Sound Railway is likewise proving a means of carrying away from Toronto the trade of northern Ontario, which, geographically speaking, should belong to her. This trade is finding an outlet in Ottawa and Montreal, both of which cities are profiting at the expense of Toronto. The centralizing influence of the departmental stores is also seen in the diminished number of wholesale establishments. Owing to the failure of the Councils of past years to accord liberal treatment to manufacturers, this important class have given Toronto a wide berth in favor of Hamilton and smaller towns, where shipping facilities are equally good and taxes either nominal or entirely abolished. Unless Toronto is content to become a purely educational and residential centre, her public bodies and citizens generally should arouse themselves from the lethargy which in recent years seems to have settled down upon them, and try to evolve means of maintaining in the future the advancement which has marked the city's history in the past.

The Proposed Victoria Square.

IT is gratifying to observe that the City Council of Toronto is still being urged to purchase or lease for the purposes of a public square the property at the south-east corner of Bay and Queen streets, opposite the new city and county buildings. The square would be formed by extending James street through to Richmond street. The present owners of the land would derive large advantage from the valuable frontages which this extension would afford, and are consequently favorably disposed towards the project. If the land required for the square were leased by the city the annual ground rent would amount to $6,400, of which sum the property owners benefitted offer to contribute $2,000. Or the city might purchase the property outright. The Council have instructed the Assessment Commissioner to learn the exact terms on which the land can be obtained. A public breathing and resting place in the business district is one of the greatest needs of the city at the present time, and will become more vitally necessary in years to come. The square is also required to enhance the appearance of the new civic buildings. Lastly, no more fitting memorial could be devised to commemorate one of the greatest events in British history, the Diamond Jubilee of Her Majesty's illustrious reign. We trust that before the Jubilee year shall close, the Council will consummate the purchase or lease of the property required for this proposed Victoria Square.

Mr. W. C. McDonald, to whose generosity is due the endowment of the Department of Architecture at McGill University, of which Prof. Capper is the head, has recently donated to this department a number of folio volumes treating of Egyptian and Venetian architecture.

ESTHETIC VALUE OF MOULDING AND PROFILE.*

By Jos. Venne

The moulding is, without doubt, one of the most necessary details of architecture. It is the prime ornamental feature which appears at the origin of art. At the outset, simple chamfer, fillet or bead, it has grown into more definite and refined forms with the development of the styles. Did it appear at the beginning principally as a useful accessory or as a purely ornamental detail? This I will not attempt to say, but a thing certain is that it admirably fulfils both functions in all known styles. I will not lay stress on its utility or even necessity. I shall content myself, in these brief notes, with a rapid and incomplete review of the evolution of moulding and profile as they appear on the monuments of different ages.

As an element of style, it possesses a prime importance, and nothing can take its place with advantage, not even the most refined and architectural carving. A structure all covered with carving, without any other element of architecture, cannot easily be conceived, while many monuments exclusively ornamented with mouldings are quite satisfactory, and easily suffer the lack of carving sculpture—in fact, the style and age of a monument can be more easily detected solely by the aspect of any of its mouldings than by any other detail.

The shape of the moulding is not arbitrary in any style; it follows the fluctation of the style; it bears analogy to the other details which constitute a style. It is scarce and thin in some of the styles, rich and frequent in others; it has definite forms, whether situated at the base or at the crowning of a building. At all advanced periods, artists have given particular attention to the effect of light and shade, of softness, lightness, sharpness of mouldings.

Let us consider what are known as the historic styles of architecture, and the value given to mouldings, in accordance with the degree of artistic culture acquired by the nations, and also according to the individual tastes of the artists and the expression they wished to imprint upon their works.

We shall pass by primordial epochs, which would take too much of our attention with researches more curious than useful, and rapidly pass in review the most renowned architectural periods.

The mouldings in Egyptian architecture offer little variety in their forms. A plain bead usually ornates the angles of buildings, and frames the several panels filled with hieroglyphics; a listel, a large cavetto and plinth make the crowning part to almost all the monuments actually known. But the least initiated feels the intention of the artist to give a definite aspect to his buildings, by the especial disposition and form of his mouldings.

The Greek architecture is far more expressive in its marvellous examples. One is struck by the infinite care and attention given to each moulding and profile. I take at random a parallel of a few Doric capitals (Fig. 1), covering about the whole period of the development of the Doric order of architecture, which will serve to emphasize the admirable care, study and research brought to bear upon the composition of mouldings and the importance given to that detail of architecture. The monument of Lysicrates (Figs. 3 and 5) is another striking example of refinement in the composition of profiles. The profile of the monument as a whole shows how well each value, if I may so call it, is placed. How well balanced are the first steps springing from the ground, and giving a basis quite satisfactory for the most critical eye. The cornice of the stylobate comes after, with its forms, still strong and rather massive, but as a transition leading to the delicate columns. The bases of these columns, the simple profiles of the capitals, and the admirable entablature, stand as perfect models and as a reproach to our haggard profiles and mouldings, lacking not only in taste, but being too often placed without reference to convenience and common sense. Examples might be multiplied in Greek architecture only, which has never been surpassed for grace and perfection of all its parts. I will only refer to a few details of the Erecteion (Figs. 2 and 5); they speak for themselves with an eloquence I am unable to describe.

The Roman architecture offers some good models of mouldings, but they are inferior to those of the Greek orders, from which they are derived. They are lacking in character, and very often are without refinement. Compare, for instance, the profiles of the Roman adaptation of the Doric order, with all its curves drawn with the compass, to the Greek order, with its swelling and studied forms, full of refinement, and showing a persistent aspiration towards ideal beauty.

The first Romanesque period, in its clumsy profiles and mouldings, its inert masses of materials, exhibits a confusion of ideas which has its parallel only in our confused times, and more especially in America.

That barbaric period, the offspring of anarchy and confusion, is followed by another, still Romanesque, but more homonogeneous, the mouldings of which attain a great perfection and diversity—Romanesque of the eleventh, twelfth, and part of the thirteenth centuries, of which Figs. 11 to 13 give an idea.

From this period to the end of the last century the form and expression of moulding follows a definite and normal evolution, in this, that its forms are constantly controlled and studied. It is, without doubt, massive and superfluous—I was about to say heavy—with the beginning of the mediæval period, and becomes more delicate, even meagre and scarce in some instances, but it always possesses expression, movement, and is expressive of skill and ingenuity. But it loses with the last period many of its useful characteristics, for which reason greater value attaches to the architecture of preceding epochs (Figs. 15 to 17).

The Renaissance period has chiefly been inspired by the Roman ruins still in existence, but it retains that diversity and boldness derived from medieval periods.

It has devolved upon our times to return to the barbaric confusion of the primitive periods of early Romanesque architecture. The ease with which one can, in our days, style himself an architect, without having any genuine feeling for the art, and having scarcely any knowledge of it, together with the immense quantity of artistic materials, in the shape of pictures, photographs and the like, which is thrown into the hands of everybody, has brought about confusion in the minds of many, causing them to mix mouldings at random as they would do anything else. I lately came across a very bad example of such work, and I cannot resist the temptation to illustrate it by Fig. –, and also give a few models of mouldings designed by modern French architects (Fig. 16).

The study of good profiles and mouldings, outside of any other details of architecture, will well repay the student, assisting him to acquire a power of analysis, which is much required in modern architecture.

* Paper read at the seventh convention of the Province of Quebec Association of Architects. For figures referred to in this paper see illustration sheets.

BY THE WAY.

The new Female Seminary at Washington, Pa., has been designed by Miss Elsie Mercur, of Pittsburgh. The contractor is also a woman, Mrs. Clara Meade, of Chicago. There will be a lively time when women also invade the ranks of the trades unions.

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There are in the world persons so dull-witted or lacking in sensitiveness that sarcasm is thrown away upon them. An amusing illustration of this has just transpired in England. With the object of putting a check upon vandalism, the authorities at Darston Head had placed at the entrance to an enclosure containing antiquities, two stone slabs, bearing this inscription: "Persons who are anxious to write their names will please do so on this stone." A number of persons accepted the invitation in good faith, and forthwith proceeded to inscribe their names.

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A peculiar occurrence, and one which by fortunate chance, did not result in heavy destruction of life, took place on Sept. 13th last at the newly opened quarries at Windmill Point, Ont., from which the stone is being obtained for the new breakwater at Buffalo. During a thunder storm the guy ropes supporting the derricks served as lightning conductors. At the junction of two ropes the lightning went to earth. One of the six holes, charged with about five pounds of explosive, happened to be directly in the course of the electric current, and was discharged in the midst of a large staff of workmen. Fortunately the other pockets were not discharged, and nobody was hurt.

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A German inventor is said to have constructed a house in which a series of vertical and horizontal pipes are arranged in all the walls, floors and ceilings, so

that they can be filled with water under pressure and afford a continuous circulation throughout. The water is heated in winter to 100 degrees at the entrance to the system, and is discharged at 40 degrees. In summer cold water is circulated and is discharged at a considerably higher temperature. The thought has frequently come to me that common sense would seem to indicate the use of piping and radiators, in hot water heating systems for the purpose of cooling the atmosphere in summer. Who will be the first architect and manufacturer to introduce the innovation?

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A RECENT report of the British Cosnul to China gives us some interesting particulars regarding customs and regulations in the building trades in that country. Neither masons or carpenters begin work in winter much before 9 a. m. In summer they knock off work for a long two hours' siesta in the middle of the day, and at all seasons of the year smoke, drink tea, and rest whenever it suits them. According to the regulations of the Builders' Guild, wages, if the men find their own food, are 180 cash (about 5¾d.) per diem. These wages are supplemented in the case of skilled laborers by their apprentices' wages, which are paid at the same rate. Apprentices are bound for three years, and as evidence of the scarcity of skilled labor it may be mentioned that on many works half the people are apprentices. As accidents are frequent in the trade, and especially among the unskilled hands, the parent of the apprentice has to give an engagement in writing holding the boy's master free from all liability for loss o life or for injury incurred during the term of apprenticeship, but a present is expected in case of an accident. No interference is permitted, under the rules of the Builders' Guild, with a customer engaging any builder preferred by him. Touting for employment is punishable by a fine, to be fixed in public meeting. No outside firm is allowed to work unless it has joined the guild and received a certificate, the fee for which varies. Assistants or foremen who endeavor to obtain business on their own account from persons for whom their masters work are liable to heavy fine. Masters have to pay the guild at the rate of about one-twentieth of a penny per diem for every man employed by them, to form a fund to meet subscriptions for canal works, etc. A similar tax is levied on assistants to meet the cost of festivals, illuminations, etc. If trouble occurs between a builder and his employees and work is stopped no other labor can be engaged until all outstanding accounts are settled. Breaches of the rules are punishable by fine levied in public meeting. Attendance is obligatory at meetings called to fix the quota to be paid towards subscription funds. Disputes between masters and men are not allowed in the guild house. They must be arranged in the tea houses and opium shops.

INTERIOR OF PUBLIC LAVATORY, ADELAIDE AND TORONTO STREETS, TORONTO.

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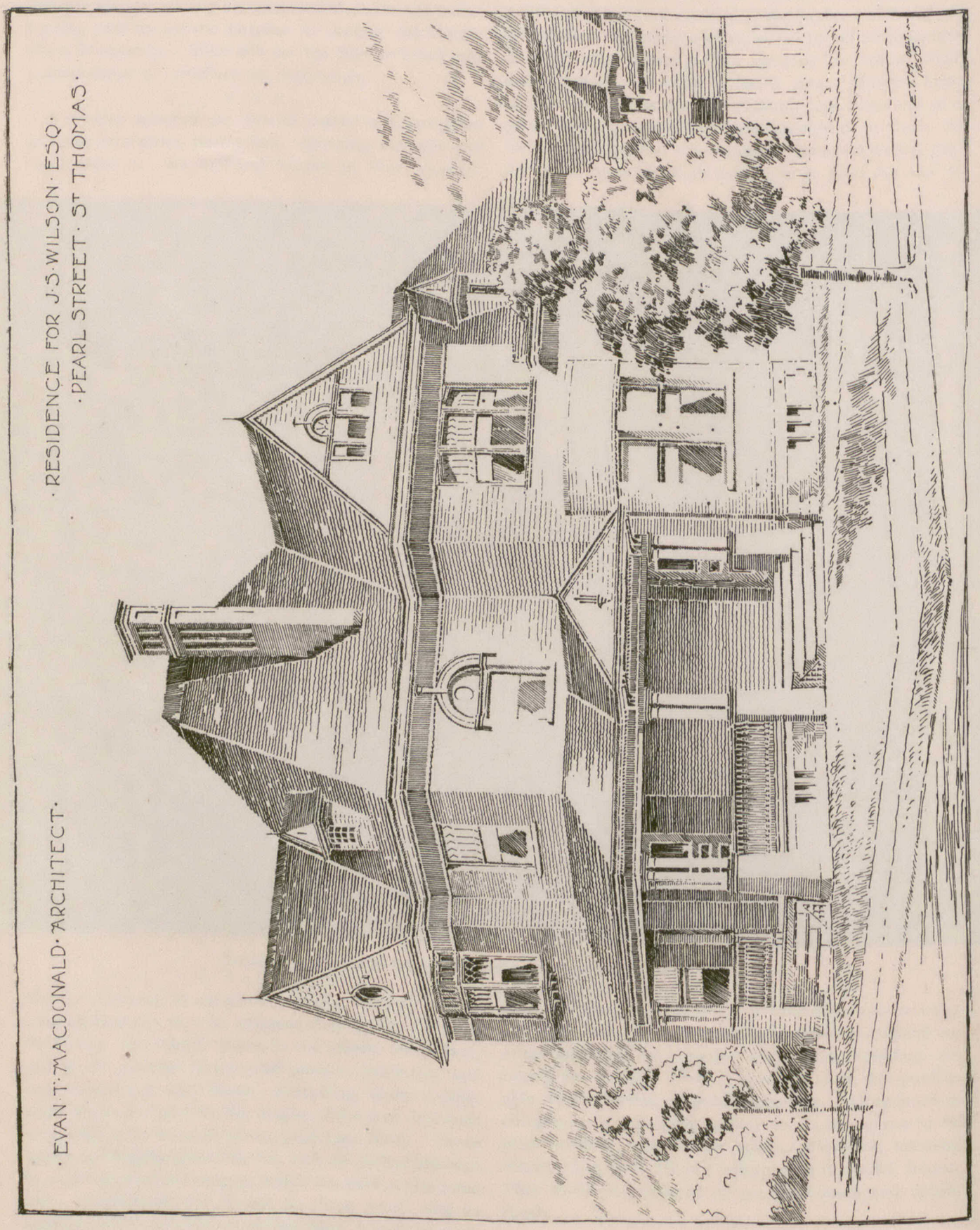
THE interesting features of the Ontario Legislative buildings are only beginning to be recognized. A reporter of a city paper has discovered that "shortly after noon when the sun first strikes the scroll work the shadow thrown is a remarkably exact likeness of the


·RESIDENCE FOR J·S·WILSON·ESQ·
·PEARL STREET· ST THOMAS·
·EVAN·T·MACDONALD·ARCHITECT·

CHURCH OF ST. JOHN THE BAPTIST, MONTREAL.

JOS. VENNE, ARCHITECT.

Right Hon. W. E. Gladstone. An hour later it becomes a clear outline of the late Sir John Macdonald's profile, and then, as if to render impossible any accusation of partisanship in Canadian politics, the shade finally transforms itself into a silhonette of Sir Wilfred Laurier's features." This discovery should lead those who have hitherto regarded these buildings as a pile of uninteresting ugliness to study them more closely in order to find the features of interest which the architect in his wisdom did not think advisable to make plain to the eyes of persons who look only on the surface of things.

PROPORTIONS OF WINDOWS.

Proportions of window openings and interspaces of openings and their architraves must in practice materially depend upon necessity, and, moreover, it may be remarked that even where windows have only the same space as themselves between them, the same idea of breadth and strength which more than double their width between them gives may be gained by extra height between their heads and the cills of the next floor openings, and though we owe much to the investigators on proportion as to the effect of inter-widths, we have no data about inter-heights, which, for a noble appearance in a building, should be as great as is usually possible. As to the proportion of architraves being not less than a sixth or more than a fifth of the void, it is difficult to conceive on what ground it is asserted. Many most excellent openings, even in Italian architecture, are more ; the gate of Ghiberti at Florence, for instance. In other styles it would be useless to particularize what should be the general rule. Not that from this it is to be inferred that in Classical art these rules of proportion can be harmlessly played with by everyone. Rules of whatever kind are most valuable when not meant to repress design, and as a starting-point from which we may see how we can effect improvement; indeed, though they have had the effect of making architecture a commonplace business, executed by commonplace men, yet to one who has been tossed about in the uncertainty of original design, they are like terra firma to his unsteady footing. These rules of proportion especially are most difficult and most valuable, and that they have been departed from at times with great success is no depreciation of their use for the ordinary practitioner ; those deviations were effected by men of great genius, guided by study.

LIGHTNING CONDUCTORS AT ST. PAUL'S.

Mr. John Faulkner, of Manchester, has written to give the history of the lightning conductors at St. Paul's. For about sixty years after Wren's cathedral was completed there were no lightning conductors of any sort, and the new building was liable to suffer in thunderstorms—just as its predecessor had been liable and had suffered before it. In 1769 a committee of the Royal Society took the matter in hand, and under their recommendation the metal work of the lantern was connected to the lead of the dome by means of strips of lead and one and a quarter inch square iron bars, the lower portion of the dome's lead roof being connected to the down spouts on the stone gallery, and so to the down spouts of the roof of the nave, and ultimately with the ground, into which the lead down spouts pierced for three feet, a distance considered to be sufficient to carry away any electricity collecting on the building. The pine-apples on the summits of the western towers were similarly connected to the ground by way of the nave roof. In 1873 these arrangements were examined, and it was found that not only had the iron rods rusted so as to be in themselves a positive source of danger, but that in many cases the old iron hoods of the rain pipes, which hoods had originally acted as the connection between the rods and the pipes themselves, had been exchanged for granite hoods six or eight inches thick, through which the electric discharge was left to pierce. Upon this state of affairs becoming known, the dean and chapter appointed Mr. Faulkner to provide efficient protection against lightning, with the result that the top of the cross surmounting the dome and the tops of the pine-apples on the western towers were then connected with the sewers in a manner believed to be capable of thoroughly protecting the cathedral from any peril by lightning whatsoever. Mr. Faulkner says that he knows of no building in London which was protected against lightning by a system of conductors prior to 1769, when, as above shown, the cathedral conductors were first erected.

THE EXPANSION AND CONTRACTION OF A BRICK.

Considering the great importance of the changes in volume of a brick, which result from variations in temperature both during the manufacture and the subsequent use of the brick, it may be interesting, says the British Clayworker, to briefly discuss the subject of contraction and expansion. And in connection therewith it will be especially worth our while to point out definitely the difference between the true contraction of a body and an apparent contraction which sometimes takes place.

Let us begin with a wet brick, that is to say, a mass of particles of clay, amongst which is contained a good deal of water. This water is contained in one and the same brick in two distinct ways :—(1) Some of it is simply mechanically included amongst the solid particles, i.e., in the pores and other cavities which are always found in solid bodies. This water is usually termed "hygroscopic water." (2) Some of it is contained in chemical combination with various of the substances in the brick, and is termed "water of combination."

Let us now heat this wet brick. For a time the total volume of the brick will decrease, and yet not one of the chemical substances usually found in bricks contracts when heated. This apparent contraction of the brick is due simply to the loss of its hygroscopic water. For, as the water is expelled, the clay particles will necessarily be brought into closer contact, hence the shrinking ; and accordingly the water which is lost in this way during the first part of the heating is called "water of shrinkage."

Let us now suppose that all this water of shrinkage has been expelled. There is water in the brick still. For although the clay particles are now in as close contact as possible, there are pores which still contain water, and this "water of porosity" will be expelled by further heating. But during this stage of the process a slight expansion of the brick takes place, for, although it is losing water, the clay particles do not come any nearer each other, and each individual particle is expanding.

The brick has now lost all its water of shrinkage and water of porosity, but there is water in the brick still,

viz., water of combination. Let the clay now be raised to a red heat. This will cause the water of combination to be expelled, and a second shrinking of the clay takes place. This is usually termed "fire shrinkage." It may be mentioned, by the way, that this last shrinking can be counteracted by adding sand or chalk; and indeed, if these substances be added in proper proportions, we can produce a slight expansion. The last shrinking due to heat has now taken place, and the brick will now and afterwards behave in the usual manner of solid bodies—it will expand when heated, and contract when cooled.

The whole process may now be summarized in periods as follows:—

(1). A period of shrinking during the loss of some of hygroscopic water ("water of shrinkage.")

(2). A period of slight expansion during the loss of the remainder of the hygroscopic water ("water of porosity.")

(3). A second period of shrinking during the loss of the water of cambination.

And now to conclude with a few remarks on shrinking and true expansion. The expulsion of water from a solid body when heated may be very simply and effectively demonstrated by means of a "lucifer" match. Take an ordinary wooden match and light it; the flame will travel along the wood, and as it does so, a drop of water will be seen moving in front of the flame, although, to all appearances, the wood seemed quite dry. As regards true expansion it is a general law in physics that bodies expand with heat and contract with cold. To this law there are three or four most remarkable exceptions. It has been found by experiment that the following substances contract with heat, and expand with cold:—(a) India-rubber. (b) Garnets. (c) Iodide of lead. (d) Iodide of silver (up to 156 deg. C.) (e) Rose's fusible metal. This substance behaves in a most extraordinary way; it at first expands when heated, but after reaching a certain point it then contracts with further heating. There is another peculiar thing to be noted about this metal, it is an alloy of four parts of bismuth, one of lead and one of tin; and its melting point is as low as 94 deg. C., although that of bismuth is 266., that of lead 326 deg., and that of tin 232 deg.

Let it be noted that in the above list (which is taken from the best authorities on heat) there is not one of the ordinary constituents of clay or bricks.

ILLUSTRATIONS.

CHURCH OF ST. JOHN THE BAPTIST, MONTREAL.—JOS. VENNE, ARCHITECT.

SUN LIFE ASSURANCE COMPANY BUILDING, OTTAWA, ONT.—E. L. HORWOOD, ARCHITECT.

RESIDENCE FOR J. S. WILSON, ESQ., PEARL STREET, ST. THOMAS.—EVAN T. MACDONALD, ARCHITECT.

SKETCHES ILLUSTRATING MR. JOS. VENNE'S PAPER ON "THE ÆSTHETIC VALUE OF MOULDING AND PROFILE."

ARCHITECTURAL COMPETITIONS.

An invitation is given to architects everywhere to submit competitive designs for new buildings to be erected in connection with the University of California at San Francisco. Plans of site and other particulars will be placed at various accessible points in Europe and America, and ample time will be allowed for the preparation of the designs.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

SERIES OF PUBLIC LECTURES.

The St. Jean Baptiste Society have inaugurated a series of public lectures to be given in the Monument Nationale during the approaching winter. The subjects of these lectures, which will be delivered from 8 to 9 p.m. on week days, and at 3 p.m. on Sundays, are as follows:

Monday—Mines and Metallurgy; Mr. A. Roy, professor.

Tuesday—Architecture and Construction; Mr. Jos. Venne, professor.

Wednesday—Universal History; Mr. P. Demers, professor.

Thursday—Applied Mechanics and Machinery; Mr. A. V. Roy, professor.

Friday—Commerce; Mr. S. Cote, professor.

Saturday—Political Economy; Hon. Jos. Royal, professor.

Sunday—Agriculture and Colonization; Mr. J. X. Perrault, professor.

THE PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

The dinners and lectures instituted in former years by the association will be maintained during the coming winter months. With this object committees have been organized as follows:

Committee on Lectures—Messrs. A. Raza, A. T. Taylor and Professor Capper.

Committee on Dinners—Messrs. James Nelson, O. Mailloux and A. Arthur Cox.

Messrs. S. H. Capper, Professor of Architecture at McGill University, Edward Maxwell and Jos. Venne, of Montreal; Chas. Baillairge, F. X. Berlinguet and Harry Staveley, of Quebec, have been elected examiners in their respective cities for the Association Examinations in Architecture in 1898.

As decided at the last annual meeting, the Association will apply to the legislature at its approaching session for amendments to its charter, and especially to article 13. We hope success will crown these efforts, which have for their object the promotion of the interests of architecture.

AN IMPORTANT LEGAL DECISION.

A case of considerable interest to architects, builders and owners of real estate, has just been argued and decided in the courts of Montreal. Action was recently brought by the city building inspector against Mr. Eusebe Paquette, a local contractor, for violation of the city building by-law, by having used porous terra cotta blocks instead of ordinary bricks, in the construction of the interior partition walls of a building. Several of the leading architects of the city were called to give evidence regarding the strength of the material of which complaint was made. The defence also submitted results of the material made at McGill University as follows:

FACULTY OF APPLIED SCIENCES,
McGill University.

TESTING LABORATORIES.

Results of crushing test of two specimens of terra cotta lumber:

Specimen 1, tested on flat—		
Dimensions	equal to:	12 × 8 in.
Sectional area of hollows	"	3⅜ sq. in.
Total crushing strength	"	46,000 lbs.
Crushing strength per sq. in. of bearing surface	"	479 lbs.
Specimen 2, tested on flat—		
Dimensions	equal to:	12 × 8 in.
Sectional area of hollows	"	3⅜ sq. in.
Total crushing strength	"	67,000 lbs.
Crushing strength per sq. in of bearing surface	"	677 lbs.

[Signed] HENRY T. BOVEY,
Dean of Faculty of Applied Sciences,
McGill University.

September 9, 1897.

It was established that terra cotta blocks had been in use in the city for a number of years. The Recorder's decision, which was given in favor of the defendants, will be published in full in a later issue.

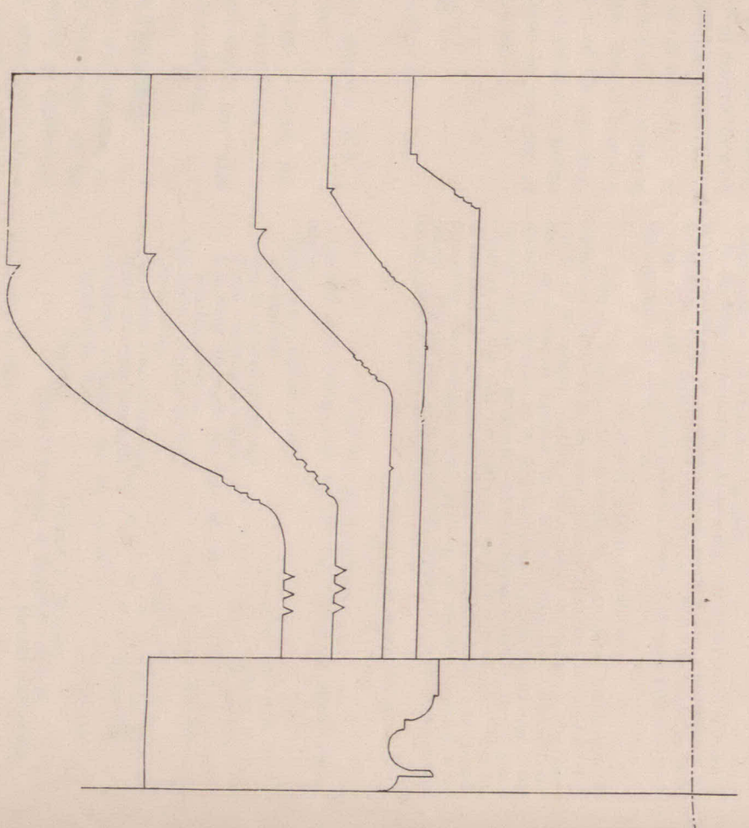


Fig. 1

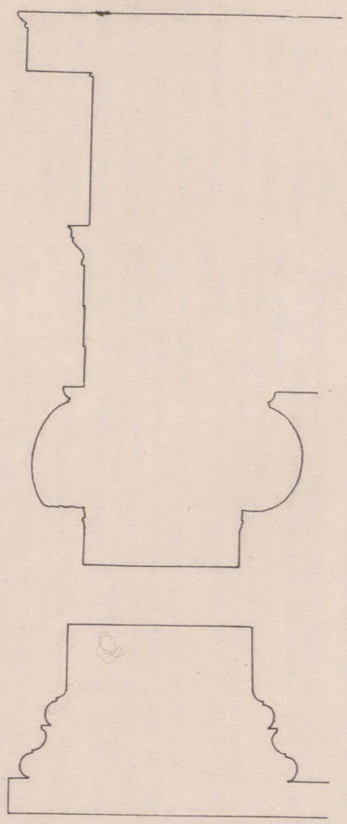


Fig. 2

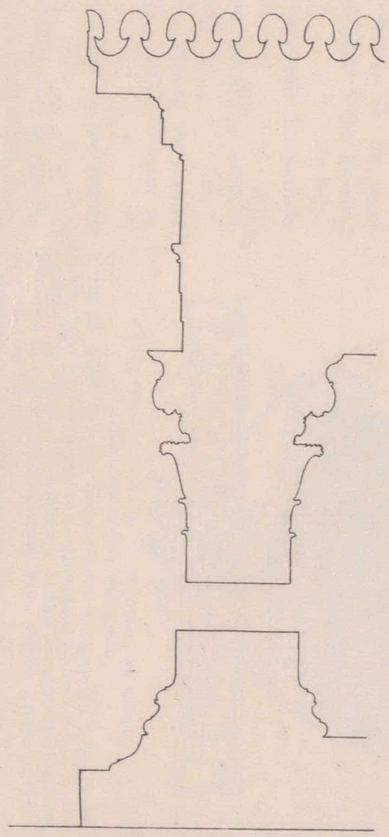


Fig. 3

Fig. 16

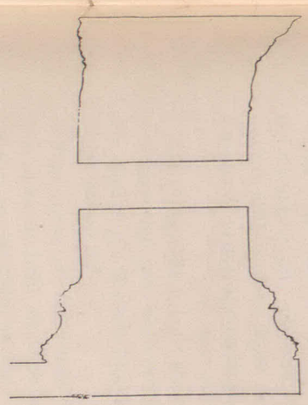


Fig. 4

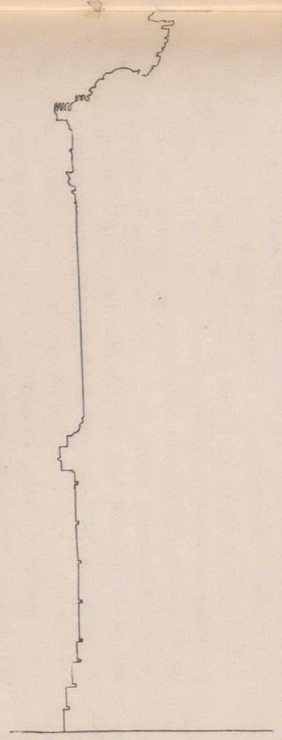
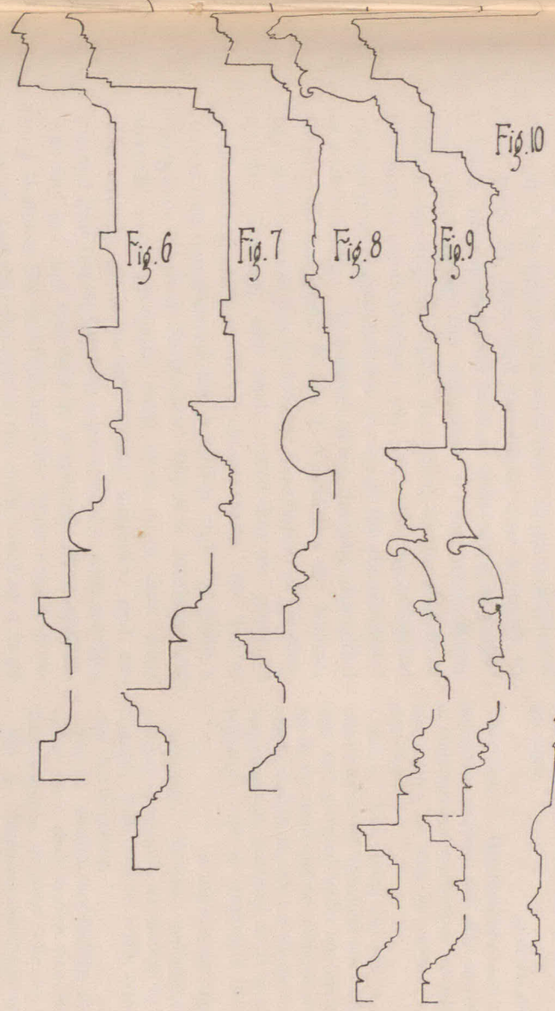
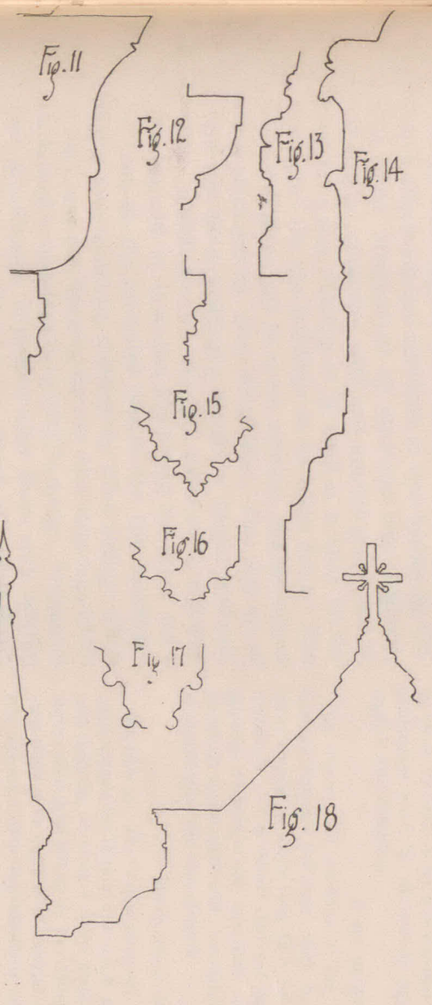


Fig. 5





SKETCHES ILLUSTRATING MR. JOS. VENNE'S PAPER ON "THE ÆSTHETIC VALUE OF MOULDING AND PROFILE," IN THIS NUMBER.

LEGAL.

J. RAWSON GARDINER v. MICHAEL C. FOLEY.—This was a case argued before Mr. Justice Davidson, at Montreal, October, 1897, in which Mr. Gardiner, an architect practising in Montreal, sought to recover from defendant the sum of $384 for professional services rendered in connection with and in preparing plans for certain alterations and additions to two houses on Victoria street, Montreal, at an estimated cost of $6,000, and also in connection with and preparing two sets of plans for a new building to be used as a hotel on the same site—the old buildings to be taken down. The first set of plans was to cover two lots and the second set of plans was to cover three lots. This last set of plans was for a building 4 stories in height and estimated to cost (at 12 cents per cubic foot) $38,400. The plaintiff in this case was billing defendant for 1 per cent. on the estimated cost of the last building—that is for preliminary sketches for this building—which is $384, and not charging for the other drawings which he claimed he was legally justified in doing. Defendant filed a confession of judgment for $100, with interest and costs for a like action, which plaintiff refused. Plaintiff in his evidence showed that the plans produced were made by him, and had taken over a month to produce, and claimed that he was undercharging rather than overcharging the defendant for the work done, besides claiming his right, according to the custom of the profession to charge 1 per cent. on the estimated cost for preliminary sketches in case of the abandonment of such building. In support of his claim he also called three other architects, Mr. A. T. Taylor and Mr. Nelson, past presidents of the Architects' Association of Quebec, and Mr. Findlay, who each stated that the plans as produced were fully worth the charge made. Mr. Taylor also stated that plaintiff had a further right to make a charge for his time on the first two sets of plans and that the plans produced were even more than what was usually given as preliminary sketches, and explained that the reason why 1 per cent. for such services was fair and just was that in preparing those preliminary sketches the architect used his knowledge and experience, and that the rest of the work could to a large extent be worked up by draughtsmen from these sketches and by more or less mechanical means, but it was from these preliminary sketches that the planning and designing, or otherwise the art and talent of an architect, were shown. The judge dismissed the defendant's plea and said that he had not proved by his own evidence that the work was not done according to his wishes, or that the plaintiff's charge was contrary to the custom of the profession. He therefore maintained the action—pro tanto—and condemned the defendant to pay plaintiff the sum of three hundred dollars with interest from May, 1897, viz., the date of service of process, cost of suit, etc.

Mr. Singleton: Isn't that the house that Planns, the architect, has just been building for his mother-in-law? Mr. Gotwun: It can't be! don't you see there is a lightning rod on it?

The attractive feature of the Trans-Mississippi Exposition, to be held at Omaha in 1898, is to be a silver palace, to be used entirely for the display of mineral and other products of the west. The building will be 400 feet square, surmounted with ornamental towers, and the entire structure covered with rolled silver.

CHICAGO ARCHITECTS' BUSINESS ASSOCIATION.

THE Chicago Architects' Business Association has adopted the following rules of practice:—

DRAWINGS.

SECTION 1. All drawings forming a basis for contracts shall be drawn to a scale of not less than one-eighth of an inch to the foot, in ink or by some other process that will not obliterate. General dimensions shall be accurately figured and the drawings made explicit and complete.

SCALE DRAWINGS.

SECTION 1. All portions of the work that require a larger scale to illustrate the same shall be drawn full size or to a scale large enough to make them fully set forth what is required by the architect. No architect shall ask for bids on any work until all general drawings are complete and sufficient details made, which, in connection with the specifications, will settle all questions affecting the cost of work.

SUPERVISION OF WORK.

SECTION 1. The supervision of an architect shall be such as shall require the faithful execution of the work according to the true meaning and intent of the plans and specifications, but such supervision does not cover the duties of a clerk-of-the-works. In case there is no clerk-of-the-works provided by the owner, contractors must refer any questions about which there can be any doubt to the architect for decision before proceeding to execute the work.

SPECIFICATIONS.

SECTION 1. Specifications must be prepared in ink or by some permanent process, and shall clearly explain the kind and quality of materials and methods of construction, and give such further information as may be needed to definitely supplement the drawings.

SEC. 2. Everything that will be required in the work must be mentioned in the specifications as far as practicable, being classified and grouped under appropriate headings, and work called for by the plans and not referred to in the specifications and vice versa, shall be included same as if mentioned by both plans and specifications, provided such work comes clearly within the branch or branches covered by the contract.

RULES FOR LETTING CONTRACTS.

SECTION 1. Written invitations for proposals will be forwarded contractors for work to be let, stating when bids will be opened. This does not apply to public work requiring advertisement for proposals.

SEC. 2. Contractors desiring place upon the roster of an architect's office shall furnish reference to mechanical ability and fidelity and be prepared to furnish a good and sufficient bond.

SEC. 3. Proposals shall be presented on the day set for opening same and will be opened in the presence of a representative of the bidders.

Proposals shall be opened, read and posted at the time specified before such bidders as are present. Contracts shall be awarded by owners or architects within a reasonable time thereafter.

Bidders shall not be held on proposals retained longer than ten days after date of opening.

SEC. 4. The lowest bidder will not be permitted to change the amount of his bid, but must sign contract or withdraw. The right is reserved to reject any or all proposals.

SEC. 5. If, after the opening of bids, changes are made in the plans and specifications amounting to not more than ten per cent., the lowest invited bidder shall tender a detailed proposition for said changes, subject to the approval of the architect and owner, and, if found fairly detailed, the contract shall be awarded to him upon his bid so changed.

SEC. 6. Lack of ability to carry out the work in a proper manner, want of fidelity, or disposition to render less than is due the owner in strict conformity with the terms of contract, shall lay the contractor liable to be dropped from the roster of the architect temporarily or permanently, as in the judgment of the architect is just and right, and in the interests of his clients.

SEC. 7. Final certificates of payment on a contract shall not be issued by the architect until the contractor has returned all plans and specifications to the office of the architect.

H. B. WHEELOCK, President.
C. R. ADAMS, Secretary.

Adopted September 9, 1897.

STUDENTS' DEPARTMENT.

ON OBSERVATION.*

BY LEONARD STOKES, F.R.I.B.A.

CURIOUSLY enough, our English system of apprenticeship is based almost entirely upon the system of observation. The young man observes how the old man does it—in the same way, somewhat, it is true, as a conjurer may be observed to bring two live rabbits and a bunch of flowers out of an empty hat, placed on a small three-legged table placed under our very noses. Well, as there are smart conjurers and clumsy conjurers, so there are good architects and slovenly ones. In each case their tricks—for they are really little else—can be acquired by some of us, but I regret to say that the tricks of the clumsy are more easily observed, and therefore acquired, than those of the smart and good.

The pupil in a moderately good office undoubtedly enjoys many advantages, but if he only observes the rules of the office and does what he is told he will not get very far, I fear. No, he must not only observe for himself how certain problems are overcome on paper, but he must also observe for himself the effect and result in actual work. He might observe, for one thing, how a mistake made on paper—perhaps by himself—may involve the modification of a whole feature, or even the whole end or side of a building, when it comes to be put up. He may observe how a carelessly made and unworkable section—when reduced to bricks and mortar—produces unthought of difficulties such as want of head-room on your stairs, or suchlike trifles; how foremen will always follow the wrong drawing if two don't happen to agree, and how easy it is for him to go wrong if there is any ambiguity in them at all. These observations will, I hope, teach him the desirability of making drawings accurate; for unless a drawing is accurate, it is very little use at all, unless it is to show to a client to whom, correct or incorrect, it is, in 99 cases out of 100, simply so much Greek. Showy drawings are, no doubt, a kind of credit to the office, and it is always a pleasure to look at a drawing that has some style about it, but after all drawings are only a means to an end, and that end should always be kept well in view. If you want to win a competition, make your drawings as showy and as inaccurate as you like, but if you wish to get your building put up as you want it, then let your drawings be as numerous as possible and absolutely correct; of course if you can make them look well into the bargain, so much the better.

Now the advantage the pupil has is that he sees so many things going on around him, and if he is worth his salt he will take advantage of this, and the observations he should make at this period of his career will be of the greatest use to him in after life. He can, you see, train his eye on the works of his master. I don't mean that his master will let him design or alter anything much, but what the pupil must do is to observe how the design looks on paper, and form his own opinion as to what it will look like in execution (this he had better, perhaps, keep to himself), and when he sees the work in reality, he must note how far his judgment has been right, or how far he has been led to misjudge the whole by not being able to see it in his mind's eye whilst looking at the drawing only. Situation, too, may have something to do with it, and what he thought would look heavy or clumsy on paper, may look just the reverse when put in position and seen in conjunction with its surroundings—and this question of surroundings should have a great deal to do with the question of design, although I fear that enough attention is not always paid to it.

Another form of observation, which cannot well be over-estimated, is sketching and measuring existing work. You see what we have to do now-a-days is to make paper designs, which, when executed by the builder, will, firstly, answer the purpose for which they are intended, and secondly, satisfy the eye. Now, a young man wanting to learn how to do this has to work backwards, so to speak. He must first find his ideal building, and then set to work to reduce it to paper; and, having done so, he should be able to look at his drawings and see the building standing out in all its balance, dignity and beauty. The more careful the study the greater the reward; and, after a time, he will be able to think on paper to any given scale, and these thoughts, when handed over to the builder, can be worked out so as to produce just the effect desired.

The eye, too, should be trained to see things in perspective, even though they are only drawn in elevation and, if the eye cannot at first be brought to do this, the hand may be sworn in, for the habit of thinking, sketching and seeing things in perspective will be found of the greatest use in designing. Far too much work is thought out, only on the flat, and hence, when executed, is unsatisfactory; observation is the never-failing remedy, and it is surprising, how, after a little bit of it, your brain and eye become most obedient and expert, and you can either think or see round corners with the greatest ease.

Besides the study of what is generally called old work, the study of contemporary work should follow, hand in hand. Observe again, how our best men get their best effects, and observe also where they fail; for, perhaps, one of the greatest uses of observation lies in its teaching us what to avoid. Books, too, may be of great use to us if used judiciously, but I am inclined to think they are often very much abused, and many a man's work bears the impress of book knowledge where it should rather give evidence of independent thought and a living treatment. Photo-lithography may be a blessing in some ways, but our streets should not be simply composed—as they too often are—of a collection of the most fashionable plates that have appeared, from time to time, in the building journals; adapted it may be, to some extent, to their new requirements, but never looking more than make-believes at the best.

A young architect should, of course, read, and there are some books, that he must almost live with, as they will help him to appreciate what is good and noble about his calling, and lift his drooping spirits after a day's specification writing or drain planning. But I cannot help feeling—take it for what it is worth—that an hour in a fine building will open a man's soul more than a week's reading, and sketching in a museum will do him more real good than all the histories of architecture that were ever written. Do not misunderstand me, pray; I am speaking of the young architect, and of what will help to develop the architect within him; but, of course, the young gentleman—forgive the term—must not be forgotten, and he must acquire many things, such as history and knowledge of the styles,

* From a paper read before the Liverpool Architectural Society.

etc., for general purposes, such as passing examinations and to commit him for committee meetings and architectural societies. But it is a man's soul that has to be developed if we want to make an architect of him; and few book-worms have, I think, large souls, their chests are too narrow, and I can hardly fancy a good architect with a narrow chest even, for good work seems to come from the chest and shoulder as much as anywhere; and, if these are bent and hollow, so will the work they produce be weak and lifeless, however full of precedent and learning it may be.

HINTS TO DRAUGHTSMEN.

Draughtsmen, as well as others, have their little kinks, and the publishing of these kinks often helps others. A practical draughtsman gives the following simple suggestions, which will likely prove useful to some reader: In mixing up inks the process is very much expedited by heating the dish and water in which it is mixed before commencing. It often happens in the summer that the flies walk over a tracing and eat off the ink in a very provoking manner. The use of vinegar instead of water will prevent this. In making a tracing the cloth will take the ink much better if it is rubbed over with chalk. Tracing paper that has been rolled up may be straightened out effectively and expeditiously by drawing it over the edge of a table or drawing board, holding it down meantime with an ordinary three-cornered scale. Where there are a large number of drawings made and kept, a great deal of trouble and confusion can be avoided by making all the drawings on extra standard sizes. If a size of 16 in. by 24 in. be adopted, then the next larger size would be equal to two of these, or 24 in. by 32 in. This enlarging or reducing may be carried as far as the circumstances require, but it is altogether best to do it by the doubling or halving process if possible. One of the advantages of standard sizes of drawings is that they may be kept in a case of drawings, the size of which is made to accommodate the standard sizes determined upon.

In the imperial Russian theatres a new prompter's box has been introduced which offers a problem in acoustics, which has a wider application. In many cases the occupants of the boxes nearest the stage can hear the prompting almost as well as the actors. The new Russian invention consists of a box that resembles a shell, and which is enclosed within a short cylinder. The timber employed is perfectly dry; it is then thickly varnished and covered with alternate layers of felt and compressed paper. The prompter is at a depth which makes him invisible to the audience, and not one of his words can be heard in the auditorium. But from the form and method of construction of the box a whisper can be heard distinctly on the stage.

Hardening Cement Paving.—Portland cement paving will attain a considerable degree of hardness without any dressing or any special treatment; but paving laid in damp weather will ultimately attain a greater degree of hardness than that laid in very hot weather. Further hardening of the surface may be produced by keeping the work moist by means of wet clothes, or by damped sawdust or sand laid over the paving as soon as it has set; flooding the work with water, where this is possible, will be best of all. Miller mentions that cement work may be rendered very tough and hard by gauging the material with 10 to 15 per cent. of minion—the siftings of ironstone after calcination. Indurating concrete slabs causes them to become very hard; by it their density is increased and their porosity lessened. A solution of soluble silicate of soda 1 part to 10 parts of water may be applied to in situ paving, but the pickle should not be applied until after the lapse of a couple of days, by which time some of the moisture will have evaporated and thus allow the silicated solution to penetrate the pores of the material, for which the silicate has a great affinity.—Building World.

PERSONAL.

F. X. Pronoveau, sr., contractor, Montreal, is dead.

John Reilly, of the firm of Reilly Bros., contractors, Regina, is dead.

Messrs. Hewitt & McLaren, architects, have removed their offices from Brantford to Ottawa.

Mr. H. A. Englehardt, a well-known landscape gardener, died in Toronto in the early part of the present month.

Mr. Barrow, city engineer, of Hamilton, was recently elected a member of the Sanitary Institute of Great Britain.

Mr. John M. Gill, president of the James Smart Manufacturing Co., of Brockville, was tendered a complimentary banquet by the employes of the company on his return from Europe recently.

Mr. Beaumont Jarvis, architect of Toronto, is receiving the congratulations of his friends on his recent marriage to Miss Anna Adeline Hamilton, daughter of Mr. James C. Hamilton, L.L.B., of Rosedale, Toronto.

The death by suicide is announced of Mr. John McIntosh, of Stellarton, Nova Scotia, a prominent and highly respected contractor. His death is believed to have been in a measure due to anxiety resulting from losses sustained by the recent fire at Windsor, Nova Scotia.

Wm. Craddock, a prominent contractor of Chatham, Ont., died in that city a fortnight ago, aged 73 years. Deceased was a native of Cornwall, England, but spent many years of his youth in France. In 1848, one year after his marriage, he came to Canada and located at Chatham, where he continued to reside, and where he occupied various important public offices.

USEFUL HINTS.

Asphalt Varnish for Iron.—A tar-asphalt varnish for iron consists of 30 parts West India copal, 30 parts American pine resin, 30 parts mountain asphalt, 6 parts yellow wax, 6 parts Venetian turpentine, melted, and mixed with 12 parts rosin oil, 10 parts linseed oil varnish, 30 parts oil of turpentine and 30 to 45 parts benzole.

Acid-Resisting Putty.—A putty which will even resist boiling sulphuric acid is prepared by melting caoutchouc at a moderate heat, then adding 8 per cent of tallow, stirring constantly, whereupon sufficiently slaked lime is added until the whole has the consistency of soft dough. Finally about 20 per cent. of red lead is still added, which causes the mass to set immediately and to harden and dry. A solution of caoutchouc in double its weight of linseed oil, added by means of heat and with the like quantity (weight) of pipeclay, gives a plastic mass which likewise resists most acids.

Double Windows.—According to Dr. Didtmann, of Linnich, the advantages of double windows may be cheaply procured by puttying in a second pane of glass in the inner rim of the window frames, on the outer rim of which the first one is put in. This creates between the two panes a layer of air inaccessible for the room air as well as the street air, which layer is a bad conductor of heat. In puttying in the pane, care should be taken that not only the inner surfaces are cleaned of dust and dirt, but also that the air between the panes be dry; hence the work should be performed in dry weather only. Frostwork will never appear on such windows. In summer these windows are also a protection against the annoying heat of the direct rays of the sun. A room containing windows with double panes, at a temperature of about 90 degrees Fahr., will remain 8 degrees cooler than with single panes.

All iron that is used for structural work should be thoroughly covered or painted with a good preservative paint, just as soon as it is possible to do it after it leaves the foundry, or place where it is shaped up. The reason for this is that the moisture in the atmosphere permeates the pores of the iron and starts the rust to forming. These little corpuscles that gradually grow larger and larger with age, are not noticeable at first, and the iron is placed in position without anything being done to obliterate them. A great many are ignorant of the fact that because the rust cannot be seen, therefore there is no rust. There never was a greater mistake. Rust will always form on unprotected iron or steel, no matter how much it is protected under cover of bricks or stone, or wood either. Wherever the air can penetrate, it causes the moisture to settle, and this dampness breeds the rust; the rust then feeds upon air and the substance on which it is first found.

THE NEW YORK STREET BRIDGE, TORONTO.

THE York street bridge, Toronto, an illustration of which is given on this page, is now completed, and gives a much needed and convenient access to the various rowing, canoe and yacht clubs, and to the steamboat wharves which are located on the new Lake street now being constructed on the water front, without the dangerous and inconvenient level crossing over the several railway tracks. This bridge has been erected in accordance with Clause 7 of the Esplanade Agreement between the city and the railway companies, which provides that "an overhead traffic bridge, with ramps and approaches for vehicles and foot passengers, is to be constructed by the C. P. R. Co. along the east side of York street, according to plans and specifications to be approved of by the City Engineer of Toronto and by the chief engineers of the G. T. R. and C. P. R. Companies, such bridge to be a public highway and to be of sufficient width to accommodate a double street railway track, with side spaces for vehicles and foot-walks, and to be so constructed as to give access for passengers by means of foot-walks, stairways, or otherwise, to the platforms of the proposed Union Station." The bridge is of the type known as the Deck Bridge, and consists of about 35 spans, varying from 70 feet, the longest, and 13 feet 2 inches, the shortest. This variation in span was necessitated by having to cross railway tracks already in existence and others contemplated, also railway station platforms and roadways.

NEW YORK STREET BRIDGE, TORONTO.

The plans for this bridge were prepared by Mr. P. A. Peterson, chief engineer of the C. P. Railway Co., which, after some alterations, were approved of by Mr. E. H. Keating, City Engineer. The approach from Front street is of masonry, and is 85 ft. 10½ in. in length. The two south approaches (one from the east and one

from the west) are also of masonry, and are each 115 feet long ; the width of the roadway from Front street to the approaches on Lake street is 37 ft. 6 in., with a sidewalk on each side of 7½ feet clear. The approaches on Lake street have a roadway of 31 ft. 6 in., and a sidewalk on the north side only of 7½ ft. wide, making a total length of roadway, including the east and west approaches, of 1,580 ft.

The piling for the piers and abutments was done by the C. P. Railway Co.; the contract for masonry was awarded to the Owen Sound Stone Company, and the iron and steel work was furnished by the Central Bridge Co., of Peterboro', Ont. The Bridge Company commenced their erection on the 23rd of October, 1896. The deck and sidewalks were laid by the C. P. Railway Co., and consist of 4-inch creosoted southern pine, upon which was laid rectangular pine blocks, all interstices being filled with paving pitch.

The sidewalks are of 2-inch tamarac planks. The parapet railing and the terminal posts are of a substantial character, but neat in design.

TORONTO—LOOKING EAST.

Probably, as the result of the petition of the P. Q. A. A. to the City Council of Montreal, the suggestion has been made in the Council of the suburban municipality of Westmount, that a committee be appointed to regulate the erection of public monuments and memorials, and pass upon the design of public buildings.

MASTIC.—A French engineer recently discovered a new kind of mastic, which is already largely employed throughout France, and which has even begun to be exported in considerable quantities, especially to eastern countries. The product, which, it is asserted, is indestructible, is composed of linseed oil mixed with ninety-three parts of powdered brick and seven parts of litharge, the brick and the litharge being pulverized separately, then well mixed and reduced to a paste by means of the oil. The object to which the mastic has to be applied should first be dampened with a sponge. After application, in say about three or four days, the coating becomes perfectly hard, and will effectually prevent the filtration of water in terraces, basins and masonry in general.

MANUFACTURES AND MATERIALS

NEW ARTIFICIAL FLOORING.

A NEW artificial flooring material is said to be meeting with success in Germany. The material, which is the invention of a German named Knoch, is called Xyolith. It is said to be proof against sound, water, dampness and fire, and can be colored to represent tileing, or finished to represent wood or woods, varnished, polished, stained or finished in almost any way desired. It is very easy to the feet in walking, makes a very warm flooring, harbors no insects of any kind, is very easily kept in order, and is adapted for the walls and ceilings as well as floors. It is made by the following process :

Dissolve chloride of magnesium in water till the solution shows a hydrometer strength of 27-B-(Alkali Hydrometer). In another vessel dissolve a pound of salt in a little more than a quart of water, and see that every particle of salt is dissolved. Into a tub put sixty-six pounds of burned powdered magnesia and four and a quarter pounds of leather meal, made of ground up leather scraps. Pour on the salt solution and mix all together, then put in thirteen and a half pounds of the chloride solution, and knead all into a stiff paste. Great care must be taken to have this very thoroughly worked and of uniform consistency in all respects.

The material is now ready to spread on the walls or to lay on the floors, or to plaster on the ceilings. In covering on the floor, the whole floor can be covered at once if so desired, or it can be blocked off, and laid in figures and colors, as one's taste may indicate. In any case, the surface, floor or walls, should be smoothed as soon as possible. It hardens rapidly, and a floor laid one day is fit for use the following day. Increasing the amount of leather meal very much improves the durability and appearance of the material. Floors of this kind can be laid over old floors, if they are solid, and over stone, brick, tileing, or anything that affords a good sure foundation.

BUILDING MATERIALS.

FROM the sixth annual report of the Ontario Bureau of Mines it is learned that there has been a steady decline since 1891 in the amount and value of various kinds of building materials manufactured in Canada. The statistics of the stone quarries show that the value of product in 1891 was $1,000,000 and the amount paid in wages $520,000. In 1896 the value of product was only $394,000, and the wages paid amounted to but $273,000. In 1891 there were manufactured 160,000 common brick, valued at $950,000, and 7,500 tile, valued at $90,000. The wages paid totalled $432,000. In 1896 there were manufactured 105,000 bricks, valued at $577,000, and 13,200 tiles, valued at $144,000. The wages paid amounted to $306,000. It will be noticed that prices and wages have both declined. The comparison for pressed brick, roofing tile and terra cotta stands as follows : 1891, 13,617,909, value, $156,699, wages, $58,000 ; 1896, 12,201,000, value, 129,845, wages, $60,000. Here we have a considerable decline in prices and an increase in wages. The production of lime in 1891 was 2,350,000 bushels ; value, $300,000 ; wages, $116,000. In 1896 the production was 1,880,000 ; value, $220,000 ; wages, $85,000.

Regarding cements, the report states : "The production of natural rock and Portland cements is well maintained as compared with previous years ; but while the makers of Portland cement have been steadily increasing the output of their works, and improving the quality of the cement, they are far from being able to supply the requirements of the country. The raw materials for Portland cement are so plentiful in Ontario that we might be making largely for the export trade instead of importing for consumption." The increase has been much greater in Portland than in natural rock cement, the output of the former being 154 per cent. more in 1896 than in 1894, whereas that of the latter has been less than 10 per cent. The price is lower than in 1894, Portland cement having fallen from $2 to $1.77, and natural rock from 88 cents to 72½ cents per barrel. The quality of both kinds is well maintained, and the fact appears now to be generally admitted that the Portland cement compares very favorably with the best of the same class made in Europe. The manufacturers, however, are not yet able to meet the demands of the home market, for during the fiscal year ending June 30, 1896, Canada imported 210,065 barrels, valued at $255,029. The output of Canadian Portland cement is, however, likely to be very considerably increased this year.

The following table gives particulars of the production of various kinds of materials for the year 1896 :

Product	Quantity	Value.	Employes.	Wages.
Building stone, rubble, etc..		$394,000	780	$273,000
Cement, natural rock, barrels	60,705	44,100	56	15,200
Cement, Portland, barrels...	77,760	138,230	120	48,400
Lime, bushels.....	1,880,000	220,000	430	85,000
Drain tile, number.....	13,200,000	144,000	1,850	306,000
Common brick, number.....	105,000,000	577,000		
Pressed brick, plain, number	10,774,400	88,945		
Pressed brick, fancy, number	1,256,600	9,910	180	60,824
Roofing tile.....	170,000	6,800		
Terra-cotta.....		24,190		
Sewer pipe.....		49,875	41	17,774
Gypsum, tons.....	3,500	10,500		
Calcined plaster, tons.....	700	10,250		

PUBLICATIONS.

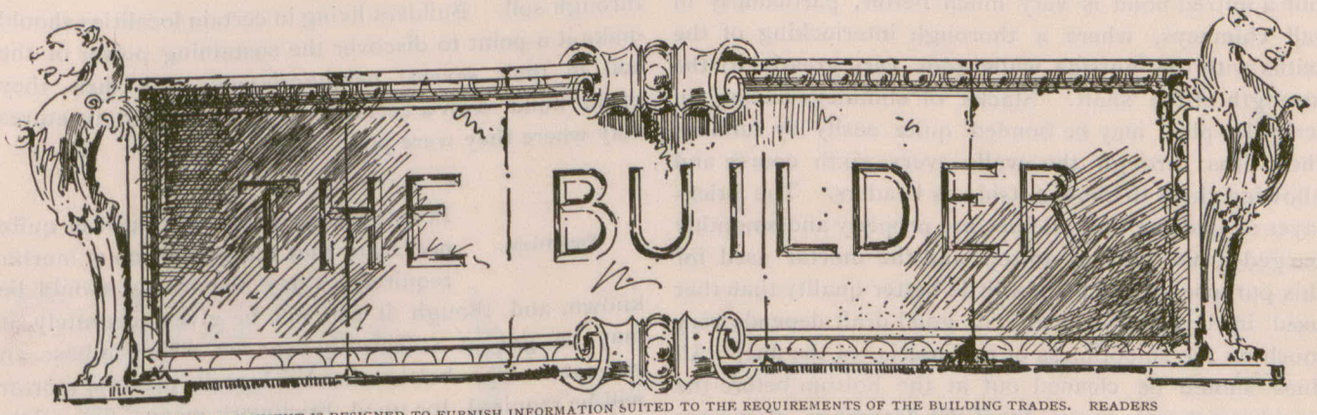
The Toronto Radiator Manufacturing Co., of Toronto, have just issued a handsome supplemental catalogue for the years 1897-98.

A copy of the proceedings of the twelfth annual meeting of the Association of Ontario Land Surveyors is to hand. It is a volume of over two hundred pages, and is rendered especially interesting by the many valuable papers on surveying and engineering subjects, which shows the association to be progressive. Copies of the report may be obtained from the secretary, Mr. A. J. Van-Nostrand, Yonge street arcade, Toronto. The price is 75 cents.

Sandpaper is made with powdered glass instead of sand. Glass is easily powdered by heating it red-hot, throwing it into water, and finishing the powdering in an iron mortar.

The new Wortley road Baptist church, at London, Ont., of which Messrs. Burke & Horwood, Toronto, are the architects, was formally opened a few days ago. It is a brick structure costing $7,500, and has a seating capacity of 400.

According to Engineering, a few days ago, the uses of a new cement, or petrifying substance, were demonstrated to a large party of Glasgow gentlemen at the works of Messrs. Morrison & Mason, Limited, Polmadie. For this new substance, to which the name of "Petrifite" has been given, many marvellous properties are claimed. It is a Continental invention, and already the patent rights have been taken up in Germany and Russia. Petrifite is a flour-like substance, composed, it is understood, of a peculiar kind of lime-stone mixed with chemical matter. Like Portland cement, it binds together gravel and sand ; but while Portland cement can only be used as a binding element for washed sand and gravel, it is claimed for petrifite that it can be used for binding earth, peat, clay, lime, chalk, waste of mortar, pottery, glass, slate, any kind of sand, coal, burnt ballast, clinkers, ashes, straw grass, vegetable or animal fibre, alkali waste, sawdust, asphalt, pitch, etc.; and as the results of the petrifying process there may be produced building stones, ornaments, statuary, bricks, billiard balls, marble blocks and paving stones.



[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.]

Finish.

BUILDINGS of to-day are very much different to buildings erected earlier in the century, so far as the finish is concerned. The builder of to-day is satisfied if he can put a good front on his work, and give an air of neatness to a room ; but he seldom cares to waste time in making good and secure the work to be covered. Grounds, skirtings and linings are put in place and nailed fast without reference to their being true on any edge or side, than the one to be worked on. Wainscoting and other beaded stuff is just as often set up out of plumb as it is on purely vertical lines ; door and window frames are frequently set out of plumb, and as often out of square, but, if the eye cannot detect it without the aid of an appliance, it is let go, and if the work has a good appearance, that satisfies the modern workman. He mistakes neatness for finish in nearly everything he does, whereas neatness has been well described as a cheap substitute for refinement. That is to say, he is satisfied if he scrapes his surfaces clean and smooth and leaves the woodwork on the exposed surface in good order for the painter, whom he allows to hide many a blemish with putty and paint. A repetition of sizes, in doors and windows, in moulding, in ornament, and in everything that can be repeated, is the rule, and every irregularity is scrupulously avoided. He prefers monotony, for it is cheap, and if he can repeat one window a hundred times, so much the better, and if a set pattern of factory wrought moulding can be utilized, it will surely find a place, as it is cheap and neat. Such work may go under the name of neatness, it may look neat, in fact it is neat, but it is not finish as finish is understood by people of taste. One of the characteristics of finish is contrivance ; another is fitness. Doubtless the contract system is accountable for much of the sameness of finish now in vogue, and architects, when designing, too often take their mouldings, doors, newels, brackets, &c., from the catalogue and price-list of some manufacturer, from whose stock of dry wrought stuff the contractor draws his supplies.

Imitation.

WHILE it is a truism that the free use of machine wrought stuff has lessened the cost of building very much within the last thirty years, and thereby enabled many a poor man to own his own homestead, it has had the effect of lowering the standard of good taste in the art of building in many departments. Let us, for instance, take as an example modern joinery, which is now mostly prepared by machinery, especially as applied to openings. It is quite the exception now to find mouldings worked from the solid as they formerly were. Moulded doors are doors that have mouldings planted in the panels and nailed or glued in place. Door jambs for brick or stone walls were framed and panelled, and had soffit linings panelled and were fixed to plugged backings or framed grounds. Such work nowadays is simply a wide jamb of two-inch plank, rebated to receive the door, and finished with architraves on each face, with a band moulding made at the factory and having the same section as thousands of feet of other mouldings from the same factory. The windows and frames are put together as cheaply as possible, and if they answer the purpose at the closing of the building contract, that is sufficient to make them pass muster, and it is no wonder that in many modern houses the windows continually want the doctor. In the older period, and in the older towns of the country, it was the fashion to have the old double-hung sash windows, with panelled backs, elbow linings and panelled shutters hung in two or more leaves, which folded back into boxings, and in good work the shutters and flaps were all made to appear alike ; the back lining was carefully tongued into the lining of carved frame, and also into the ground of boxing. The hinging was skilfully managed, and everything was done when the shutters or blinds were closed to make the screen look finished. There are many examples of this complete finish still existing in old Montreal, old Toronto, old Hamilton, St. Catharines and other frontier towns, and it would be an object lesson to many young carpenters, to see and study one of these old time windows when all, or nearly all, the work was done by hand, and the mouldings worked from the solid. There was no imitation in the work, no two buildings were finished alike.

Something for the Bricklayer.

ALL flue-doors, ash-doors, stove-rings and ventilating registers are generally marked on well-prepared plans, and should be placed in position as the work goes on. If left for subsequent cutting in the wall, they are sure to be forgotten. Rings for furnace smoke-pipes should never be less than sixteen inches from the cellar ceiling. All flues must be closed at the bottom, unless they are intended to ventilate the cellar or joists under the foundation, but where this is the case, no smoke pipe or fire-place must connect with that flue. Flues should not connect with one another, but should be kept separated to the top. The withs or walls should not be less than four inches thick, and should be bonded once in every eight courses at least, in ordinary chimneys, by having the bricks roughly mitred with the stretchers in the wall. "Sometimes," says Clark, "ties of tin or hoop iron are laid in the points to sustain the withs,

but a mitred bond is very much better, particularly in tall chimneys, where a thorough interlocking of the withs with the outside walls adds very greatly to the strength of the shaft. Stacks of chimneys having an irregular plan, may be bonded quite easily by running the withs through the walls every sixth course and allowing them to show outside as headers. The bricklayer should see that all flues are properly and smoothly parged from bottom to top, and the mortar used for this purpose should be of a little better quality than that used in laying the wall. A good draft depends very much on the smoothness of the interior of the flue. All flues should be cleaned out at the bottom before the bricklayer leaves them, for if the droppings of mortar are left in them for a time, it is next to impossible to clean them out, the mortar will have so hardened. If carried up smooth and fairly straight inside, and without twisting or narrowing up anywhere, a flue 8 inches by 8 inches will be large enough for any stove and for many furnaces, but, when space will allow, it it always better to have a flue for the furnace 100 inches in area. Stove pipes are usually seven inches in diameter. In no case should a flue have a less area than the pipe entering it, if a good draft is desired. If this rule was strictly observed, it will be seen that the customary method of making the area of a flue one brick long and a half a brick wide, would not be allowed ; and it may be put down as a fact, that the smoking of one half of the chimneys is due to the flues not having sufficient area.

Foundations. No part of a building is more important than the foundation and more cracks and failures in buildings will be found to result from defective foundations than from any other cause ; and for such defects resulting from the neglect of the builder, the owner will have a fair claim for damages ; therefore, if for no other reason, the builder should use every precaution to have his foundation substantial and sufficient to carry the load intended to be placed upon it. For ordinary two story brick buildings, such as one erected for domestic purposes, there should be no trouble whatever in putting down a foundation sufficient to carry it, unless the ground be a swamp or a swail. For a building of the kind named, if the bottom is sand, gravel, shale or sandy loam, footings two feet wide and five or six inches thick, will be ample to carry a fourteen inch wall two stories high. The footings should be of good, sound quarried stones, and should be laid below the frost line ; on these footings build a good rubble wall not less than one foot six inches wide, and as high as required. If the earth is of clay, the builder must exercise his judgment in the matter, for if it is a soft yielding clay his footing will have to be much wider than two feet. Indeed, it may be that he may have to lay oak or cedar planks under the footings, making a foundation of five or six feet wide at the bottom ; this, however, will depend on the nature and dryness of the clay. For dry, a width of two feet will be ample, but if wet or moist, the width and depth should be increased accordingly. It is quite safe to build on any kind of rock without extra footing, as the softest rock, if not shaley, is as good as the best earthy bottom. When building on a rock bottom, some measures must be taken to allow of water flowing away from under the foundation, as it cannot soak through the rock as it would through soil. Builders living in certain localities should make it a point to discover the sustaining power of the soil in their several neighborhoods, and then they could build with a certainty of having their structures stay where they were put.

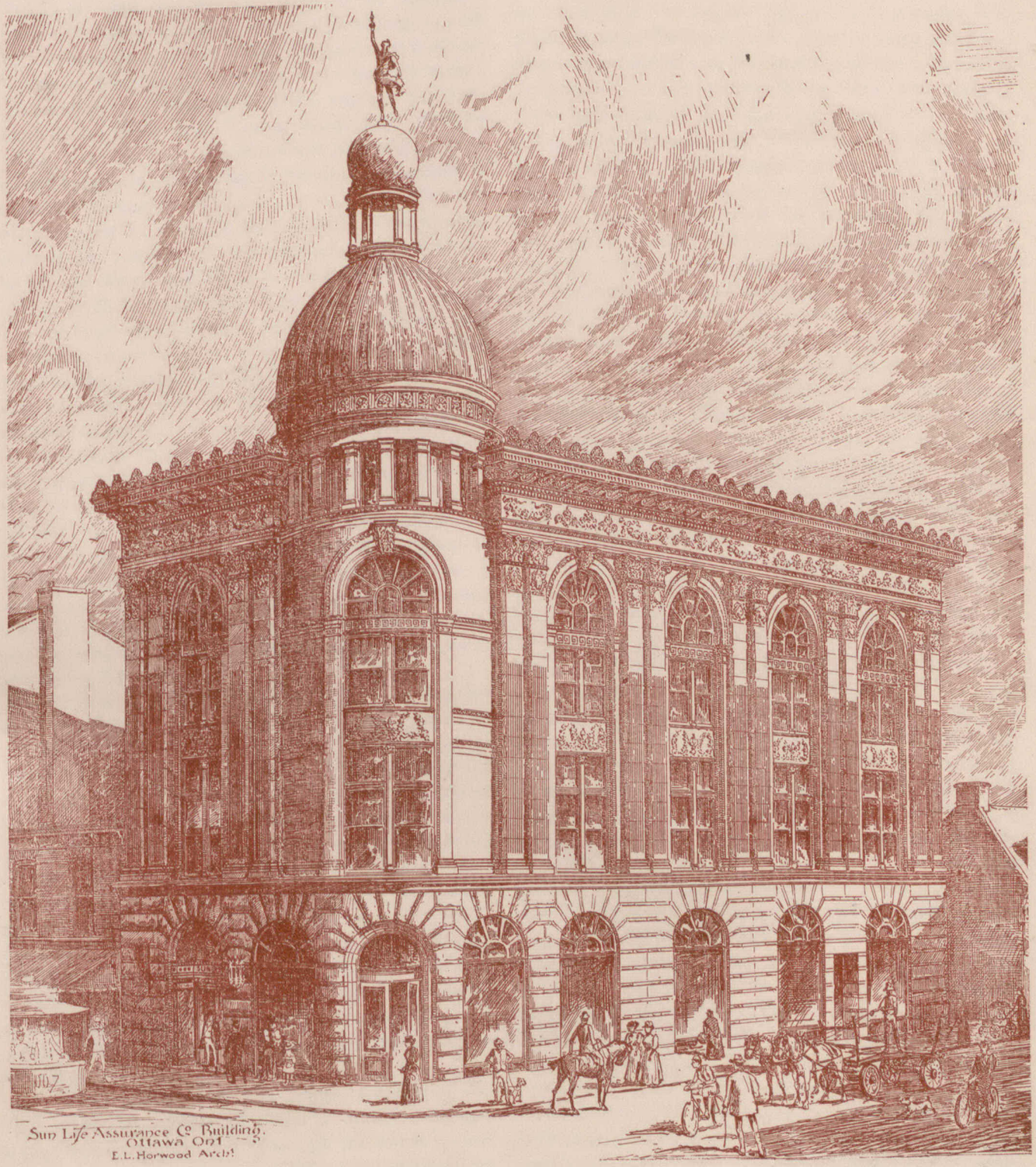
Proportions. In estimating for brickwork it is quite necessary that the proportion of mortar required to lay the bricks should be known, and though it can not be given accurately, it may be got at sufficiently near on which to base an estimate. The better the brickwork, the less mortar will be required, for good brickwork means fine joints and little mortar, while coarse brickwork means great grinning joints and wide spaces. With bricks of $8\frac{1}{4} \times 4 \times 2$ inches, the following are the quantities of mortar as compared with the whole mass ; and the number of bricks required for a cubic yard of massive work :

Size of joint.	Amount of mortar in mass.	No. of bricks in cubic yard.	No. of bricks in cubic foot.
$\frac{1}{8}$	$\frac{1}{6}$	638	23.63
$\frac{1}{4}$	$\frac{1}{4}$	574	21.26
$\frac{3}{8}$	$\frac{3}{10}$	522	19.33
$\frac{1}{2}$	$\frac{1}{3}$	475	17.60
$\frac{5}{8}$	$\frac{4}{10}$	433	16.04

From the foregoing, the bricklayer can easily figure out how much mortar he will want for each thousand bricks laid, knowing the price of lime and cement, for often he may be called upon to lay his bricks in cement.

Electric Bells. Nearly every house of any pretention is supplied with electric bells and annunciator in the kitchen, and perhaps other electrical appliances in various parts of the building. Where the carpenter does this work, he should make it a rule to have all wires running from the various bells to batteries, concealed either behind the lath and plaster or along the line of some woodwork where they will not be noticed. All wires used for this purpose, must of course, be of copper and insulated, that is, covered with some non-conducting material. In choosing bells, it should be seen to that no two bells have a like tone, or confusion will surely take place in answering them. There will be no trouble in procuring bells with different tones. Ordinarily five bells will be sufficient, and they may be arranged as follows : One from front door to kitchen ; one from outside to inside of kitchen ; a foot-bell from dining room to kitchen ; one from parlor to kitchen ; one from second story hall to kitchen. Of course there may be a greater or lesser number according to the size and character of the building. There is no trouble in placing and putting in working order these bells, and any country carpenter with any brains at all, may, with a half an hour's study, be able to install a set of bells such as is here described. All the material can be purchased from any dealer in electrical supplies, and books of instruction may be had for the asking when supplies are purchased. Electric bells are great conveniences, and should be more used in country residences than they are, and it is thought they would be if the country contractor was only able to put them in buildings cheaply and efficiently.

An old landmark in the city of Ottawa has disappeared in the removal of the old stone building, formerly known as the Globe Hotel, at the corner of Sparks and Kent streets. It was built upwards of sixty years ago by John Burrows, C.E., of the Ordnance Department, when there was but one other stone building in Upper Town.



SUN LIFE ASSURANCE COMPANY BUILDING, OTTAWA, ONT.

E. L. HORWOOD, ARCHITECT.

SEWER VENTILATION.

THE following paper on the above subject, prepared by Mr. J. W. Hughes, a well-known Montreal plumber, was presented for the consideration of the members of the American Public Health Association at the annual convention of that body held in Philadelphia on the 28th ultimo :

It has for some time been accepted as an imperative requirement of a properly planned plumbing system that provision be made for a free circulation of fresh air at all times through not only the main internal sewers of a building, but also through the smaller branches known as the waste pipe, in other words, that there be no dead ends, but that each and every part of a properly planned system of sewers for a building be constantly swept by a current of air ; and carrying out this principle provision is made in the planning of up-to-date public sewer systems for the ventilation of the same. The private sewers and waste pipes of a building, forming as they do but a part of the general system, should in my opinion be treated as a part of the whole ; and the attempt to cut them off as is done by fitting what is known as the intercepting trap is a mistake. First, because it interferes with the basic principle of the water carriage system for the disposal of sewage, which is that the sewage should in the most rapid manner possible and without obstruction be carried from its source to its destination, yet the advocates of the intercepting trap place an obstruction (in other words a miniature cess-pool) just at the point where it will do the greatest possible injury, and obstruct the rapid carrying away of the sewage, and defeat at the start the main principle on which the system is based, namely, the rapid removal of sewage and its carriage by an ample supply of water to its destination.

The advocates of the intercepting trap claim that the improved forms of this cess-pool offer very little obstruction to the flow. Such a contention is absurd, as if they did not obstruct the flow, catch and hold the sewage they would not be traps. Again, it is claimed that the improved traps are continually washed out or scoured to a certain extent. This is true as compared with the older forms ; but let any one who has had occasion to open the cleaning eye of one of these traps that has been for some time in use speak of the conditions found, and he must tell of stored-up putridity, sickening odors, and a condition of things unsanitary, not to be found even in the main sewers of the streets, and certainly not to be found in any other portion of the pipes in a building where the sewage has had an unobstructed flow.

My second charge is that it completely defeats any effectual general system of sewer ventilation by preventing free circulation of air through the whole system of main sewers and that part of them consisting of the building sewers. To offset this in part what is known as the fresh air inlet is placed between the intercepting trap and the building. This is a pipe brought to the surface and fitted with a suitable terminal ; the proper name of this pipe is a " stink outlet," as when a fixture is used the rush of water from it must force a portion of the air out of the inlet, and then it of necessity becomes a stink outlet, and as a rule in cities this pipe must be so placed as to make it a dangerous nuisance even to the wayfarer, or if at a distance from the foot walk to the inmates of the building with which it is connected, as the foul air escaping from it gains access to the building it is proposed to protect through doors and windows. " But," says the advocate of the intercepting trap, " would you advise arranging pipes so that the air of the street sewers would have free passage through the pipes in a building ? " To this my reply is, yes. And there is no other safe plan. People who live in populous districts must bear each and every one his part of the risks as well as sharing the benefits of the whole. No one living under conditions imposed by the concentration of large masses of people on a limited area can escape and the principle of the greatest good to the greatest number must apply.

The advocates of the intercepting trap do not deny the necessity of sewer ventilation, but they attempt to provide for it in detail instead of as a whole, and so defeat the object they wish to attain. They will tell you that the street sewers must be ventilated by having perforated man-hole covers placed at regular intervals along the line of street sewers by means of the trap, but let the main sewers have free and open connection with the street. Now as the streets of a town are the sources from which the buildings derive their greatest supply of fresh air, my claim is that such a course is wrong and insanitary. Given pure air in the streets, and there must be pure air in the buildings, the local cause of air pollution being, of course, excepted. Do away with the trap or the private sewers, continue the interior sewers of the building, full size through the roof, carrying them to a sufficient height to be well above adjacent windows ; then there will be a natural circulation of air through the entire system of both public and private sewers, and the outlet from the sewers, which is acknowledged to be a necessity, will be above the general line of the house-tops, and not at the street level, as is the case when the intercepting trap is adopted. The higher temperature of the pipes passing through the building, especially in the cold season will insure this circulation at the time when it is most required. Of course there are exceptions to all rules, and there are no doubt in all cities certain places where the local traditions would call for the placing of a trap in the private sewer ; such cases call for the exercise of the skill and experience of the practical plumber and the sanitary engineer. It is no more possible to lay down a rule covering every possible contingency called for in scientific plumbing and ventilating than it is to apply fixed rules to the practice of medicine. If it were there would be little need of skilled and experienced physicians. The principles of scientific medicine and plumbing are fixed, but the application of these principles calls for the intelligence acquired by education and developed by practice.

Much injury has been done by attempting to frame plumbing by-laws that will apply to every case. The conditions vary in almost every building, and to adapt the principles to the special requirements requires not only practical but scientific knowledge. If the American Publie Health Association would make a study of the general principles covering this question and embody them in a code having its endorsation, leaving the practical application of these principles to those whose special duty it is to apply them, much good would result. In conclusion conditions exist in northern climates during that portion of the year when snow is on the ground that completely neutralize the effect of the perforated manhole covers over the street sewers, and during such time, in cities where the intercepting trap

is in general use, the main sewers are without ventilation, and a serious condition of affairs exists, as the building being heated to a greater degree than the outer air, has a cupping action, and draws the air from the sewers, into them, beneath the frozen and almost impervious top soil and paved roadways. Where the soil is porous, this is sure to occur, even when the buildings are situated a considerable distance away from the main sewers.

Sewers breathe! Under certain conditions the air will rush into them; again it is being expelled, with considerable force. Atmospheric conditions partly account for this, but the varying quantities of solid and liquid matter constantly entering and leaving them has an important bearing on the question. Such being the case, proper breathing places must be provided, and any attempt to bottle up the sewer air will end in failure. What place so suitable as above the roofs of the buildings, where the winds will disperse the foul gases and the light and air disinfect them.

COUNT THE COST.

Too many painters, like business men in other lines, seem to think that they must be prospering if they are only doing a large business. If they can underbid another man and succeed in getting a large contract from him they chuckle with glee, even though they have figured the price down so close that there is absolutely nothing left for profit, with the chance of coming out on the wrong side of the ledger. It seems a curious phase of the American character that this mania for doing a large business should so often be allowed to run away with good judgment, and the question of whether the business is a profitable one should be so frequently entirely overlooked. Many men, especially in the painting trade, have no idea whatever what it costs them to run their business. They figure that if they employ a man for $3 a day, and can charge $3.50 for his time, that they are making a profit of half a dollar on the work of that particular man, but they fail to take into account all the numerous items of shop expense which must be added to the wages paid to that man to get his actual cost to the employer. There is insurance, rent, interest on the cost of stock, wear and tear on scaffolds, tools, etc., brushes, cartage, telephone, shopman's wages, clerk hire, and numerous other incidentals that must be paid for, somehow, before any profit can be realized from the wages of the workman. In a shop employing an average of from ten to twelve men, these shop expenses, leaving out all question of profit to the employer, will often amount to $7 or $8 a day, or some 75 cents per man. Yet the employing painter goes blindly on, figuring that he is making a profit when he charges his customers half a dollar a day on the wages of his men. Perhaps he thinks he is covering the shop charges by the profit on material, but let him figure it up carefully, and he will find that this is seldom done. Yet he goes right along in the same old rut, taking a job for a low figure because some other painter has offered to do it for that price, without even stopping to figure whether he will make a profit or not. He argues that if the other man can do it for that much money, certainly he can. Like as not, the other man's low figure exists only in the mind of the customer who is trying to beat down the price. This is too often the reason why painters are slow or uncertain pay, and why the manufacturers do not co-operate with them more readily to grant special trade discounts, or similar favors that thoughtful men believe should be legitimately granted.—Painting and Decorating.

MR. WILLIAM SMITH.

We present herewith a portrait, accompanied by a few personal particulars, of Mr. Wm. Smith, of London, Ont., vice-president of the Dominion Master Plumbers' Association, and an enterprising member of the trade.

Mr. Smith was born in Toronto on July 27th, 1854, and received a fair education. At the age of 15 years he was apprenticed to the late Geo. Harding to learn the art of plumbing, steam and gasfitting, and served faithfully five years. After working a year as a journeyman, he decided to see some of the world, and for several years worked in many of the large cities of the United States. He then returned to Canada, and after having worked another year as journeyman, became ambitious to engage in business on his own account. With this idea, he started west, and thinking the city of London was in need of a first-class plumber, stepped off and secured a job there, and after having worked for some time as a journeyman, started business for himself. He has now been in business for 12 years, and is classed as one of the most successful master plumbers in the Dominion. His success is attributable to honest dealing—he will not employ anything but first-class labor and material.

Mr. William Smith,
Vice-President Dominion Master Plumbers' Association.

Mr. Smith has done the plumbing and heating of many of the large buildings in the west. As above mentioned, he at the present time holds the position of vice-president of the Dominion Master Plumbers' Association, and was vice-president of the London Local Plumbers' Association. His efforts were instrumental in bringing about the formation of master plumbers' associations in London, Stratford, Windsor and St. Thomas, and he was also one of the founders of the Dominion Master Plumbers' Association. Mr. Smith is a young man yet, and has a bright future before him. He has one of the finest plumbing establishments in the Dominion, and is proud to be the possessor of bronze, silver and gold medals secured for his superior workmanship. Mr. Smith's genial disposition and ability have secured for him honors from the Grand Lodge of Canada A. F. & A. M., as well as other fraternal organ zations.

THE UTILITY OF GRANITE.

THE difficulty of working granite was once notorious; indeed, fer centuries the architect rather shunned this refractory material. But science has come to the rescue, and by mechanical help great results are obtained from the hardest rock. Where labor cost next to nothing in very early times, granite was selected for the images of gods, the tombs of kings, for their statues and temples, and for the monuments of great events. And in their choice of granite for their purposes the ancients were not mistaken. To this day the monuments of Egypt are almost as fresh as if just from the sculptor's chisel.

As the cost of working granite gradually decreases, we shall see more and more of it used in architectural work. It will be used in numberless instances where the wind and rain beat, and where it is so admirably adapted to withstand these influences. In this way it might prove a permanent and enduring assistance to buildings composed in other parts of more perishable materials. Granite can now be obtained of so many different shades of color that any building stone can be found to harmonize with it easily. The sculptor has tried to use granite in his art, but its mottled appearance and often faulty composition are sadly against it for his purpose. It is needless to quote churches and buildings in this country in which granite has been employed in past ages. Nearly all of them show no symptoms of decay, but in some cases disintegration, or decomposition has taken place, and this from the selection of unworthy examples of stone, for it appears that there are some granites no more proof against the weather than the poorest limestones.

Hard and compact as granite appears, it is, nevertheless, sufficiently open and porous to admit a considerable amount of moisture. By absorption it will take up nearly 1½ per cent. of water, and where disintegration takes place it is owing mainly to this circumstance. In all stones that admit water, and all do, frost employs its terrific force and separates particle after particle till the surface is destroyed. Water conveys the chemicals which exist in the air to the interior, and by its solvent power, due in a great measure to the carbonic acid it contains, decomposes all stones. To judge of the great power exercised by carbonic acid gas as a solvent, it may be mentioned that all the silica that exists in the vegetable world (and no plant can grow without it) is derived from the stones and flints of the earth, and absorbed by the microscopic capillary cells in the roots, but the solid silica could not pass through these cells, and water, we know, will not dissolve flint.

How then is it to be accomplished? The rain that falls collects the carbonic acid of the air, and acquires the same from the soil through which it passes, and in combination therewith it dissolves the flinty rock and stone, and thus conveys the necessary support to the roots of all vegetation.

In the selection of granite for enduring purposes those in which the constituent minerals are most evenly proportioned are the best. Like small paving stones each particle seems to help the other, and the smaller the grain the more completely is this the case. Large crystals of feldspar are always objectionable on account of their readiness to decompose. For ornamental purposes almost any granites are available, many affording very rich combinations of color, and if the surface be polished the weather has less hold upon it and it lasts longer. If granite be totally submerged in water and never exposed, it will last unimpaired forever, thus showing that water alone, without the agency of air and decrease of temperature to the freezing point, will not materially affect it.—The Stonemason.

ORGANIZATION AS AN ADJUNCT TO THE BUILDING BUSINESS.

THE average business man seems fully alive to the value of system in conducting the details of his business; and seems to understand the importance of careful organization of all the parts in order that they may work together with the least possible friction, and therefore the greatest possible efficiency. He knows full well that disorganization and lack of system are certain to cause inefficiency and waste, and in exact ratio with the extent of their operation, cause a reduction of profits and loss of income; and still, except in very rare cases, the value of organization as a means of harmonizing the business interests of a community seems never to occur to him.

The customs that have grown into existence through neglect and disorganization in the building business are a constant demonstration of the crying need of organization, and yet the experience of the National Association up to the present time demonstrates the fact that builders throughout the country have largely failed to comprehend either the character, latent possibilities, functions, or results of organization.

Such local exchanges as have in any degree applied the true principles of organization which it has been the constant effort of the Association to define, have demonstrated in corresponding degree the value of organization, and, through the operation of such principles, have come to understand in a measure the benefits growing out of concerted endeavor; but in so far as exchanges have failed to apply these principles, they have demonstrated failure to appreciate the results which must inevitably follow their application to the conduct of business affairs.

Correspondence with the National Secretary is indicative of the fact that builders have so little knowledge of the benefits of organization that the subject fails to excite their interest unless some pressing need or emergency confronts them. Questions are daily asked, the answers to which were printed by the National Association five years ago, and placed in the hands of all its members individually, as well as in the hands of builders generally throughout the country.

In the minds of the majority of the builders throughout the country the value of organization is limited, apparently, to combination for the purpose of resisting attack by forces too strong to be controlled by the individual. In operation, builders have largely limited its work to affairs of the moment, and for the enforcement of conclusions in the main obstructive rather than constructive. The power in organization for the correction of evils which daily menace builders, and for defining the principles upon which their business should be conducted, thereby anticipating and obviating the difficulties which are now left for settlement till the friction point has been reached, is practically lost sight of.

The truth of the axiom, "Prevention is better than cure," is accepted the world over, and builders should recognize that in organization lies their only hope for the comprehensive and efficient application of this

principle. This power, which is applicable to every condition under which the building business is transacted, lies fallow at the present time because of failure on the part of those most interested to understand the great importance of preventing evil conditions rather than curing them after they have gained foothold. There is no condition to which the building business is subject which is not capable of beneficial treatment by united action on the part of the builders ; organization presents the means for united action, and out of the solidity thus obtained beneficial results must inevitably follow. — Bulletin of the National Association of Builders.

THE LIAR AND THE CONTRACTOR.

FROM a compilation of proverbs in all languages, those referring to the liar number 101. We were seeking a proverb that would fit the case of the liar as he is known at contract-lettings for stone work on public buildings. No. 85 in the list seems to most forcibly express an idea we had in mind to write about. It reads : "The credit got by a lie lasts only till the truth comes out." This fits us for a text. The contractor who secures a job by misrepresenting the actual quality of material, or the character of the workmanship he pledges himself to put into the structure, holds credit "only till the truth comes out," and that usually makes its appearance before the contractor "hangs up his fiddle and the bow," and retires from active business life. We might cite the career of more than one stone contracting firm to prove that it doesn't pay to be a liar, and be solicitous at the same time to secure other contracts. The evil they have done lives after them. On the other hand, the reputation of the honest contractor precedes him, and where he has to deal with honest men on boards he is likely to succeed if he can make figures to come within the appropriation. A notable incident illustrative of this point is fresh in the minds of stone contractors, where the record of what the successful contractor has done in an honest way for many years was of itself sufficient to put to rout the half dozen slick workers combined against him.— Stone.

Mr. W. G. Elliott, of the firm of Elliott & Phin, contractors, Brantford, has lately purchased an interest in the firm of Workman & Watt, brick manufacturers, of that city. The name of the new firm will be Workman & Elliott. They will manufacture red and white brick and other materials. Mr. Workman has also joined Mr. Elliott as a partner in his contracting business, the firm name being Elliott & Workman.

WANTED TO ADVERTISE HIS TRADE.

A VERDANT yourh dropped into a jeweler's, and after gazing at some fraternity pins in the show case, said to the proprietor :

"Them's mighty nice breastpins you got there, mister."

"What kind of a pin would you like to look at ?"

"How much is this one with a pair o' compasses and a square ?" pointing to a Masonic pin.

"Five dollars."

"Five dollars, eh ! You haven't got one with any handsaw on it, have you. I'm just outer my time, and as I'm going to set up as carpenter and jiner, I thought I'd like to have somethin' to wear, so folks would know what I was doin'. Well, I'll take it, though I'd like one with a handsaw, but I guess mebbe that's plain enough. The compasses is to mark out your work, and the square is to measure it when marked out, and any durned fool knows G stands for gimlet."

Excess of water in a concrete mixture is bad practice, as only a fixed equivalent of water can chemically combine with cement. The surplus water simply displaces so much of the solid contents of the mass and leaves voids after it has evaporated. This makes the hardened concrete porous so it will absorb moisture ; this is a source of great weakness, as the water held in the interstices during frosty weather expands and thus the cement begins to show cracks or other defects.

In the United States there are State boards of arbitration. The master builders of Boston are not afraid to declare that the board before whom their disputes are brought is unfair, untrue and disposed to suppress facts. As the master builders have advocated the principle of arbitration, they now suffer like the engineer who was "hoist with his own petard." "We do not relish," they say, "the misrepresentations and the patronising suggestions which the State Board of Arbitration sees fit to publicly visit upon us, even after they have been given the fullest and freest information as to our functions and purposes, and as to the efforts which we have been making toward securing peaceful solution of labour troubles. If this sort of treatment by a board which is expected to be fair and dispassionate is thought to be in the line of conciliation, then we do not properly understand the term. There is something wrong, either in the system or its administration, something that militates seriously against any great good to be secured by and through this expensive department of the State." The law courts are likely to sympathise with the master builders, for they cannot approve of new fangled processes for ascertaining the truth.

HEATING DEFECTIVE BUILDINGS.

Some buildings are so badly constructed that it is impossible to warm them to a temperature of seventy degrees Fahrenheit, the outside temperature being below zero. When surveying a building for the purpose of making a proposition to heat it, its construction should not be overlooked, says Domestic Engineering. Outside brick walls are sometimes plastered upon the brick. A construction of this description is difficult to heat. It will require a very large heating apparatus to warm a room with walls of this description. The cooling effects of these walls require an abundance of hot air to overcome—in fact, it is not overcome with the ordinary furnace work of the present day. Outside stone or brick walls should be lathed upon strips of wood not less than one inch thick, so that an air space may be left between wall and plaster. This will insure a dry and comparatively warm wall, reducing to a large degree the loss of heat that must necessarily take place in a building with exposed walls plastered upon the brick.

Loose fitting doors and windows, a common fault in cheaply constructed buildings, is another cause of failure in house heating. This defect, like the cheap built wall, cannot be laid at the door of the heating contractor, but when he draws the owner's attention to these defects and lays the blame for the non-fulfillment of his guarantee upon the bad construction of the building, he is told that he had an opportunity to examine the building and accepted it in its present condition, therefore he must carry out the guarantee and warm the building as agreed. This is a state of affairs to be avoided, for there is no way out of a difficulty of this kind that does not entail loss and trouble to the furnace man and considerable annoyance to his customer.

It is perhaps impossible to do a heating business and have easy sailing all the time. Heating men do not expect it, for let them do their work ever so well, there are cranks to be dealt with who would not be satisfied with the best job that money can purchase. Failure in heating buildings is caused by men doing a heating business who are deficient in knowledge of the requirements needed to make a successful heating system, and by experts in the business, through being too hasty in their examination of a building or too eager to close a contract, taking the job at a low figure and trying to carry it through at a profit, with the usual results—an unsatisfactory heating plant and a condemned furnace.

Mr. Geo. McArthur, a builder of St. John, N.B., is credited with having recently erected a brick building, 60 x 24 feet, two stories and basement, ready for roofing, in thirty-two hours.

The City Council of London, Ont., have under consideration a plumbing by-law, which provides that the inspector shall be paid by fees. The City Solicitor having given it as his opinion that the Council had no power to provide for payment of the inspector's services otherwise than by stated salary, the Legislature is to be asked to grant the necessary authority to have the inspector paid by fees.

The granite cutters on the new legislative buildings at Victoria, B.C., recently went on strike because some of the workmen were given "piece-work," and also because of the employment of American labor. The contractor states that he only employed foreign labor when the necessary number of granite cutters could not be obtained in the local market, and that the men who were given piece-work were incapable of earning the rate of wages demanded by the unions. The dispute has been laid before the government.

ESTIMATING RADIATOR SURFACE.

JAMES Keith, C.E., London, gives the following information for estimating the amount of pipe or radiating surface required to maintain the temperature of rooms by hot water, for direct radiation and where no special artificial ventilation is arranged for :

"Divide the difference in temperature between that at which the room is to be maintained and that of the outside atmosphere, by the difference between the temperature of the pipes or radiators, and that at which the rooms are to be kept ; and the product thereof will be the square feet or fraction thereof, of pipe or radiator surface to each square foot of glass or its equivalent."

e. g. Assuming the average temperature of pipes to be one hundred and fifty degrees Fahr., while the outside temperature is thirty degrees, and the room is to be kept at seventy degeees, we have :

Room minus outside = Difference in temperature.
70 deg. - 30 deg. = 40 deg.

$$\left\{\begin{matrix}150\text{ deg.} \\ \text{Pipes}\end{matrix}\right. - \left.\begin{matrix}70\text{ deg} \\ \text{Room.}\end{matrix}\right\} = \frac{}{80} = 5 \text{ or half sq. foot.}$$

Therefore, about one foot of two inch pipe to every square foot of glass, or its equivalent, will be required to maintain a difference of forty degrees; about twenty-five per cent. to the total being added for safety.

PAGES

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