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CANADIAN ARCHITECT AND BUILDER.

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CANADIAN ARCHITECT AND BUILDER,

A Monthly Journal of Modern Constructive Methods,

(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD).

PUBLISHED ON THE THIRD THURSDAY IN EACH MONTH IN THE INTEREST OF

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

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TO ADVERTISERS.

For the benefit of Advertisers, a copy of this journal is mailed each week to persons mentioned in the CONTRACT RECORD reports as intending to build, with a request to consult our advertisement pages and write advertisers for material, machinery, etc.

WHILE the present number of the ARCHITECT AND BUILDER is being printed, the American Institute of Architects is meeting in annual convention at St. Louis, Mo.

The Royal Institute of British Architects has raised a fund and secured facilities for the thorough testing of bricks and brickwork. The work will shortly be entered upon.

THE recent mishap to the conduit pipe of the Toronto waterworks should have a tendency to popularize the electric elevator, resulting as it did in stopping the operation of every hydraulic elevator in the city.

A MONUMENT is to be erected in Quebec to the memory of Samuel de Champlain, whose name is so intimately connected with the early history of Canada. Artists, sculptors and architects are asked to send in plans, models or drawings up to Jan. 2nd, 1896. The cost is not to exceed $30,000.

"THE manufacturers make more nails every year than can be sold," a Montreal manufacturer gives as the justification for a pool which has just been formed by the nail men in Canada. Combines among nail manufacturers have been in existence in the United States for years, but this is the first time, so far as we know, that a united move to diminish the output and increase the price has been made in this country. How long will it last?

IF the amount of building in a city is an evidence of prosperity, and no doubt it is, Chicago must be enjoying a return of good times. During May, June, July and August permits were issued for the erection of 3495 buildings, with a frontage of over 17 miles. The cost will reach $20,000,000. In 1894 permits were issued for the same four months to the amount of $11,539,065 and in 1893 for $7,638,455. The Windy City seems to be growing.

A POINT of considerable interest to contractors in Toronto is said to be likely to come up for decision at an early date. At the solicitation of the Trades Unions of the city, the Toronto Public School Board recently placed a clause in its specifications for work on public school buildings, providing that the contractor must pay his workmen the union rate of wages. On a recent contract, the contractor made an agreement with journeymen bricklayers to work at 30 cents per hour. It is reported that notwitstanding this agreement, these workmen propose to bring an action to compel the contractor to pay them at the rate of 36 cents per hour. Thirty-six cents was the rate which obtained under the recent agreement between the Bricklayers' Union and the Toronto Builders' Exchange. It will be remembered that this agreement lapsed on the 1st of May last, and the contractors contend that since its termination there has been no recognized scale of wages for journeymen bricklayers. This is the point upon which the decision is likely to turn should the matter be brought into the courts, and the outcome will be looked for with interest.

ACCORDING to a recent decision of the Court of Appeal in New York, builders of fire escapes are legally responsible for loss of life or limb which may arise from defects in their construction. In the case under review, a man while escaping from a burning factory was scorched by the flames issuing from a window and lost his footing, falling not on the platform of the escape, but to the ground. The Court held that the escape was not so constructed as to afford a safe means of retreat, and awarded damages.

THE galleries of the Parliamentary Library at Ottawa are floored with semi-transparent glass, which has the effect of shedding downward natural light in daytime, and upward artificial light at night. The Chief Librarian, Mr. Griffin, is of opinion that it is the material best adapted for the purpose. The problem now confronting the Librarian and Parliament is how to meet the requirements for increased accommodation without impairing the architectural beauty of the building. The only road out of the difficulty seems to lie in the direction of an additional and distinct building.

MR. Joseph Neilson, a well known engineer and railway contractor, of London, England, was in Toronto recently, and paid the city quite a compliment on the excellent condition of its streets. Nor is it the first compliment of the kind which Mr. Neilson has paid Toronto, for after a previous visit in 1868, and seeing our wooden block pavements on plank foundation, he offered to lay a similar pavement in London. The offer was refused, but subsequently block pavements on concrete foundations were adopted. In the moist climate of England asphalt is so slippery as to cause serious disadvantage. Jarrah wood from western Australia, which is very dense, is being substituted for pine and asphalt.

A WRITER in Architecture and Building puts in a plea on behalf of high buildings, but he seems to look at the matter largely from a selfish standpoint. He professes not to understand the agitation which has arisen against these huge structures—scientific monuments of the resources of our times, as he calls them—and condemns in no measured terms the enactment of laws against them. As we understand it, the agitation is based largely on sanitary grounds. A street lined with sky-scraping buildings can get little sunlight, and sunshine is a necessary requisite to health and comfort. It does not seem strange, to our way of thinking, that there should be a revulsion against these towers very early in their history.

IT is undoubtedly to the interest of the architect to seek a wide acquaintance in the community where he resides, as upon the number and character of his friends, combined with his own individual ability, will depend the volume of his practice. Attention has recently been directed to this phase of architectural practice by the fact that a commission has very unexpectedly reached a Toronto architect from Christiana, Sweden, to prepare plans for three dwellings of American type to be erected in that city. The client is a Swedish gentleman who for a couple of years occupied a position in one of the Toronto banks, but afterwards returned to his native land, accumulated money, is about to marry, and wishes to enjoy the comforts which the domestic architecture of Canada affords.

IN designing their buildings architects should endeavor to keep out of ruts. It is not unfrequently possible to distinguish the architect of a building by a single feature of design to which he has become partial, and which he has repeated over and over again in his practice. The writer has in mind a certain style of turret, the favorite of a certain architect, and which may be seen adorning the corners of half a dozen new residences, all within a quarter of a mile of each other. Because an architectural feature has been found to look well in a certain position is not sufficient reason for its unlimited reproduction. By working thus in a groove, architects are standing in the way of variety of architectural expression, and helping to perpetuate the monotony which marks to too great an extent the appearance of many of the business and residential streets of Canadian towns and cities.

WHEN we read in foreign architectural journals accounts of the conventions of the National Associations of Builders of the United States, Great Britain and Australia, we are led to wonder to what may be attributed the entire absence of organization on the part of Canadian builders and contractors. Are the conditions here so nearly perfect that there is nothing in the nature of reforms to be considered, either in methods of construction or as regards the relation of the building trades to other branches of business, or are the builders of Canada behind the times in the matter of organization?

A USEFUL little pamphlet entitled "How to construct and equip mills, factories and warehouses as fire hazards," has been issued by Messrs. Scott & Walmsley, fire underwriters, of Toronto. The authors regard fireproof construction as impracticable, but suggest means to bring about slow combustion, and facilities for extinguishing fires. Special stress is laid upon the danger of hollow spaces in walls, roof and floors, where fire may lurk unobserved, and which it is difficult to reach when discovered. If builders would follow the suggestions contained in this useful little work fires would be of less frequent occurrence.

THE rapid increase in the use of concrete for sidewalks, floors and other like purposes, has caused an unprecedented demand for cement. A large proportion of the cement is imported from England, Germany and the United States, but there is no reason why more should not be manufactured in Canada. We have the raw material, and a little capital and enterprise would keep some of the money at home which is now sent abroad. The main difficulty is that extensive experience is required, and that kind of experience which can only be acquired on the spot, for material from which cement is made varies greatly in quality, and unless properly worked the output is very liable to be inferior.

PARIS has hitherto been supposed to possess the largest theatre in the modern world, though our ancient friends could outdo us in this respect. But Ichabod, the glory has departed from the gay French capital, and the largest city in the world now possesses the largest theatre. It was opened in London, at Earl's Court exhibition, on August 31st. The building is 417 feet long and 220 feet wide, and the height of the roof 117 feet. The stage is 315x100 feet, large enough surely to accommodate any company. There are nearly 5,000 seats, and being without pillars, the view is good from nearly all of them. We are not told about its acoustic properties, but presume they are as perfect as can be secured. Compared with the Massey Hall in Toronto, this new theatre has considerably greater accommodation, the Massey Hall having seats for 3,500 in front of the stage.

IN the last number of the ARCHITECT AND BUILDER we referred to the by-law in force in Toronto restricting the area of certain classes of buildings to 4,000 feet, and the way it is ignored. Since then the matter has come before the City Council, a movement having been made to repeal the by-law. Ald. Shaw, Chief Graham, of the fire department, and Mr. Coatsworth, City Commissioner, went to Buffalo to inspect certain fire appliances, and took occasion to visit some of the departmental stores, where they found that there was no restriction, one shop there having an area of 32,900 feet. When they returned they recommended the repeal of the by-law, which recommendation the Fire and Light Committee passed on to the Council with its approval. But the architects of the city rose in arms, and when the matter came up the Council referred it back, so that the restriction continues in the meantime, but parties who have violated it will not be prosecuted. Our opinion remains unchanged. If an unlimited area is wanted the building should be made fire-proof. It is not right that any one should jeopardize his neighbor's property. Immense floor areas, filled with inflammable materials, whether goods in a departmental shop, or oil or other material in a factory, are hazardous, and the by-law is founded on a just conception of the situation We do not need to follow the example of Buffalo or New York in this matter

IN connection with improvements which are being made to Queen Victoria School, Toronto, Mr. Thos. Cruttenden, the contractor for the brickwork, was recently charged, at the instance of some of the workmen on the job, with having used inferior material in the construction of one of the walls. The Public School Board employed Mr. Siddall, architect, to examine and report upon the work, and his report entirely exonerated the contractor. The charge is alleged to have been prompted by spite on the part of some of the workmen who had been discharged on account of their irregular habits. Notwithstanding the annoyance and loss to which the contractor has been subjected, as the law stands at present he has no redress. He might bring suit for damages against the workmen who incited the charge, but the chance of securing compensation from such a quarter would be so extremely doubtful as not to justify proceedings on that line. Thus it appears that contractors are at all times in danger of being injured in reputation and put to financial loss whenever it may suit the purpose of an unscrupulous employee to fabricate a charge against them. It would seem but right that the law should be so amended that spite work of this character would be punishable with imprisonment.

THE ivy plant, which for centuries has lent attractiveness to the towns and cities of England, has within the last decade come largely into prominence in some parts of Canada, more particularly perhaps in Toronto, where in certain residential localities it may be seen clinging to the walls of almost every house. Judiciously employed, it greatly enhances the beauty of residence thoroughfares, but it should not be allowed to obscure the architectural beauty of our buildings. It is difficult to discover the wisdom of erecting costly buildings, displaying wealth of carving and other interesting features, to be hidden from view in a few years by the luxurious ivy. An English writer declares that there is no ground for the opinion which many persons hold, that ivy is a cause of destruction to buildings and of injury to the health of the occupants. On this point he says: "So long as such opinions prevail it cannot be too often repeated that the attachment of ivy to walls is an advantage altogether. If the walls are damp before the ivy is planted, the damp will disappear as the ivy overspreads their surfaces. If the walls are dry to begin with, ivy will keep them so by a double action, for should dampness occur through some accident, the ivy will suck out the moisture into its own substance, and in the event of driving rains, that occasionally act with force on walls, the imbrication of hard leafage will prevent the access of rain to the structure, and thus ivy is not only a remover, but a preventer of damp. As regards the integrity of the structure, however, the case is less clear. Fissures in walls clothed with ivy will sooner or later be discovered by the plant and filled up, and then mischief may be expected. When a shoot or root pushes through a fissure in the wall, and is left undisturbed, its natural growth soon begins to tell upon the structure. As the little nut tree carried the millstone, so the slender shoot of ivy will, by increase of girth, begin to push against the sides of the fissure, with the certainty of increasing it, and the probability of bringing the wall down. But where the wall is sound it is exposed to no such danger. Ivy does not make fissures, however quick it may be to discover them where they already exist. It follows, therefore, that, as a rule, ivy may be regarded as defending against time and accident, the walls that afford it support."

AN ARCHITECT'S VIGOROUS INDICTMENT.

WE are in receipt of a copy, in pamphlet form, of the address of Mr. C. Baillargé, C.E., etc., delivered before the Quebec Association of Architects, on the occasion of his vacating the presidency at the recent convention of that body. It bears the somewhat pretentious title, "Bribery and Boodling, Fraud, Hypocrisy and Humbug, Professional Charges and Pecuniary Ethics," and is a scathing indictment of the methods practised by some contractors and others to swindle the public and line their own pockets. We should be sorry to think that the practises Mr. Baillargé condemns prevail to any great extent—that they did would shake one's faith in the goodness of human nature—but we fear he is speaking by the book, and that in his city (Quebec) and province there has been far too much boodling and bribing in connection with contracts. Nor would we forget that recent events have shown that we cannot cast a stone at our neighbors in this respect. Mr. Baillargé's words of warning are therefore well timed, and though somewhat too forcibly expressed in places, and partaking to some extent of a personal character, should have the effect of putting architects, and others who heard them, on their guard against such practices. Want of space prevents us giving extracts, but we must express our appreciation of Mr. Baillargé's boldness in dealing with such a subject.

THE SIMPSON DEPARTMENTAL STORE.

THE Simpson building, now towering up at the corner of Yonge and Queen streets, in Toronto, taking the place of that destroyed last January, presents some unique features, which render it interesting from an architectural point of view. During the Industrial Exhibition, when its large iron skeleton stood out, without any covering, it attracted much attention, and few visitors passed without stopping to gaze on a structure, the like of which many of them had never before seen.

The building is considerably larger than the one whose place it takes. It covers an area of 118 feet on Yonge street by 157 feet on Queen street, with an annex 24 feet square on the south west corner, extending in the rear of the buildings on Yonge street. It is six stories high besides the basement, so that the total floor area, most of which will be utilized for selling goods, amounts in all to nearly 134,000 square feet.

The building is practically indestructible by fire. Should a conflagration occur in any flat among the goods, it can easily be confined to that flat, and the building itself would not burn. Stand pipes will be provided on every flat, with hose, available at all times. So-called fireproof buildings have shown that they are not such in great conflagrations. The iron beams and columns which enter into their construction will not burn, it is true, but they warp and twist with the heat, being thereby rendered useless, while their removal becomes all the more difficult and expensive. Measures have accordingly been taken in this building to fireproof the iron, if such a paradoxical expression may be allowed. The outside columns and beams are covered with stone and brickwork, those within are enclosed in concrete. Boxes were erected around the uprights and the concrete poured in, the boxes being removed when it had set. The beams are covered with slabs of concrete, and the joints will be filled with the adamant plaster put on for finish. This is a new method of fireproofing such a building, introduced into Canada for the first time. The work is being done by a firm in Pittsburg, Penn. The spaces between the floor beams will be filled in with hollow blocks of concrete, and on these the floors will rest. They will be of hardwood, and in the event of fire would only char, even if not flooded with water. The shelving and counters will of course be of wood.

The fronts of the first and second stories, facing on the two thoroughfares, will be filled in with plate glass. The four upper stories are of brick, built on to the iron frame. The rear walls are of solid brick, thick enough to resist any attack by fire from the outside. The roof will be of concrete blocks covered with felt and gravel.

The total weight of iron in the skeleton of this great building is about 3,000,000 lbs. The girders were prepared at the Hamilton Bridge Works, and had only to be assembled and riveted together when brought on the ground. So rapidly was the work done that in seven weeks from the time the first column was set the iron work was completed, and 13 or 14 weeks will see the building closed in ready for the inside finish.

The cost of the building will be in the vicinity of $250,000, and it shows what the departmental shop has become when Toronto can afford such a palatial structure in the retail trade.

Messrs. Burke & Horwood are the architects.

A nail combination has been formed which includes all Canadian manufacturers, and prices will likely be advanced.

THE City Council of Toronto will consider an amendment to the building by-law, to prohibit the erection of any dwelling house, on any street, lane or open space less than thirty feet wide, and providing that every dwelling house must have at least 300 square feet of land attached to it on which no building is maintained.

TORONTO CITY ENGINEER'S REPORT.

THE annual report of the Toronto city engineer for the year 1894 has just been distributed, and forms quite a bulky pamphlet. It contains full and complete information respecting the public works carried out during the year under review. A reference to some of the points brought out will be of interest.

We have had recent evidence of the extent to which the source of our water supply may be affected by the sewerage of such a city as Toronto. Perhaps it is not to be wondered at when we consider that 227¾ miles of sewers are constantly pouring their filth into the bay. It cost $5,146 to flush 112½ miles of sewer, a rate of $45.70 per mile, a reduction from $59.65 per mile the previous year. An extension of 2.67 miles of sewer costs $12,-964.89, nearly all being built by contract. Private drains to the number of 489, making a mileage of 2.06, were also constructed from the main sewers to the property line.

The plumbing department made inspections to the number of 8,000. The number the previous year was 14,605, the falling off being doubtless due, in a large measure, to the restriction in building operations.

The question of roadways is and always will be an important one in Toronto. To find a paving material which will stand the traffic and resist the effect of climate, and at the same time not prove too expensive, has puzzled engineers and city councils everywhere. Asphalt seems to best meet the two first named requirements, but it is an expensive pavement, and has not therefore come into general use. If vitrified brick could be supplied at a cheaper rate it would without question be extensively used, and it will, we think, be one of the principal pavements of the future; but at present it is nearly as expensive as asphalt, and therefore cedar blocks, despite the objection to them on sanitary grounds, continue to be largely employed. The amount of new pavements laid last year was 8.15 miles, divided as follows:

Asphalt	3.067 miles.
Stone Setts on Concrete	2.563 "
Cedar Block on Sand and Plank	0.852 "
" on Concrete	0.826 "
Brick Setts	0.787 "
Scoria, Tamarac and Cobble	0.060 "

The total length of streets in the city is 253.48 miles, with roadways as follows:

Cedar Block	111.16 miles.
Macadam	35.95 "
Asphalt	13.70 "
Cedar with Asphalt on R. R. track	6.35 "
" " Brick " "	4.50 "
Stone and Scoria	0.81 "
Macadam with Stone Setts	0.54 "
Wood on Concrete	0.49 "
Unpaved	79.98 "

It will be observed that cedar blocks, which were put down so extensively a few years ago, still lead by a long way, though rapidly going out of favor. In 1890 there were fifteen and a half miles of cedar block pavement put down; in 1894 less than one mile. There are, however, over 24 miles of cedar blocks on which the time for payment of the local improvement tax has expired, which are in a bad state of repair and require to be renewed. This the engineer recommends should be done. Poor roadways mean a heavy tax for repairs and cleaning, to say nothing of wear and tear of horses, harness and vehicles. The strength required to haul one ton on a smooth pavement is between 16 and 20 lbs., on a broken stone road it is 60 lbs., and on a cedar block pavement in bad condition, from 100 to 150 lbs. That means that four or five horses are required to do the work that should be done by one. This aspect of having bad pavements does not perhaps present itself to the average mind with sufficient force.

As compared with other cities, Toronto's percentage of paved streets to the population shows up well. The following are the figures in a number of the leading cities:

	Per cent.
Toronto	68.5
Louisville	53.5
Buffalo	43.8
Detroit	41.8
Rochester	35.8
Jersey City	35.1
Kansas City	31.4
Milwaukee	12.6
St. Paul	11.9

But although Toronto has 54¼ per cent. of its streets paved, after deducting what is covered with cedar block there is only 10½ per cent. with anything like a durable covering.

As to sidewalks, during the year 1.148 miles of concrete and 18.03 of plank sidewalks were constructed. A small section of brick has been laid down on Gerrard St. East as an experiment. If it proves satisfactory brick will be more largely employed in the future. The mileage of plank sidewalk built has decreased each year since 1890, in which it was nearly 58 miles, showing that wood for sidewalks, as well as roadways, is rapidly going out of favor.

The asphalt pavements are kept clean on what is called the "orderly system," and it is carried on from May 1 till December. The cost is $1,236 per mile for the season. On the other streets the cost is $22.76 per mile. 59,172 loads of scrapings were removed.

The disposal of the waste of such a city is a serious matter. 103,333 loads of garbage were collected, of which 26,665 were consumed in the eastern and western crematories. A large quantity was deposited on the extension of the Esplanade on the water front. The removal of ashes and garbage from the outlying sections is now done by trolley car.

On the streets where railway tracks run the track allowance is watered by tanks mounted on trolley cars. Three such cars perform the service, for which the Railway Co. is allowed 65 cents per mile for the double track, sprinkled four times daily. The tanks hold from 2,500 to 2,800 gallons each. The company was paid for this service $1,972.42.

Mr. Ellis, the assistant engineer in charge of roadways, goes more fully into the question of brick pavements in his part of the report. In deciding on the best brick for the purpose, tests are applied for abrasion, absorption, crushing and transverse strength. Results are satisfactory as to our Canadian bricks, but the price rules them out. The lowest price quoted is $16 per 1000 for Canadian bricks, while in the United States they are laid down for $8.50 per 1000, and in some cases for less.

Mr. Ellis also gives some interesting facts as to the effect of water upon asphalt pavement, the latter sometimes rotting if the water is allowed to remain on it for any length of time, to such an extent that a knife may be inserted as far as the concrete. The cause of this is the destruction of the petroline, or bitumen, which becomes changed by oxydation into asphaltine, a substance resembling coke and of no value as a cement. Trinidad asphalt proved itself to be possessed of the greatest tensile strength. The concrete foundations of the asphalt pavements have stood the test well, in some cases having supported the roadway, under heavy traffic, where the earth had washed away below.

A somewhat curious and interesting test was applied to ascertain the effect of good roadways on the traffic. A census of travel had been taken on Yonge street in May, 1890, when it was block paved and in a very indifferent condition. The census was repeated in August, 1894, when it was asphalted. Though the number of street cars had increased from 818 to 1178 daily, the effect of which would be to drive ordinary vehicles to other streets, the average number of tons per day for each foot in width of roadway increased 24 per cent., or from 59.15 tons to 73 tons, and this notwithstanding a considerable decrease in the number of vehicles, proving that good roadways conduce in a very marked degree to economy in transport.

The report, which shows great care on the part of Mr. Keating in all that pertains to his department, contains much valuable information respecting works of construction in such a city as Toronto. The above references will give some idea as to the information it conveys.

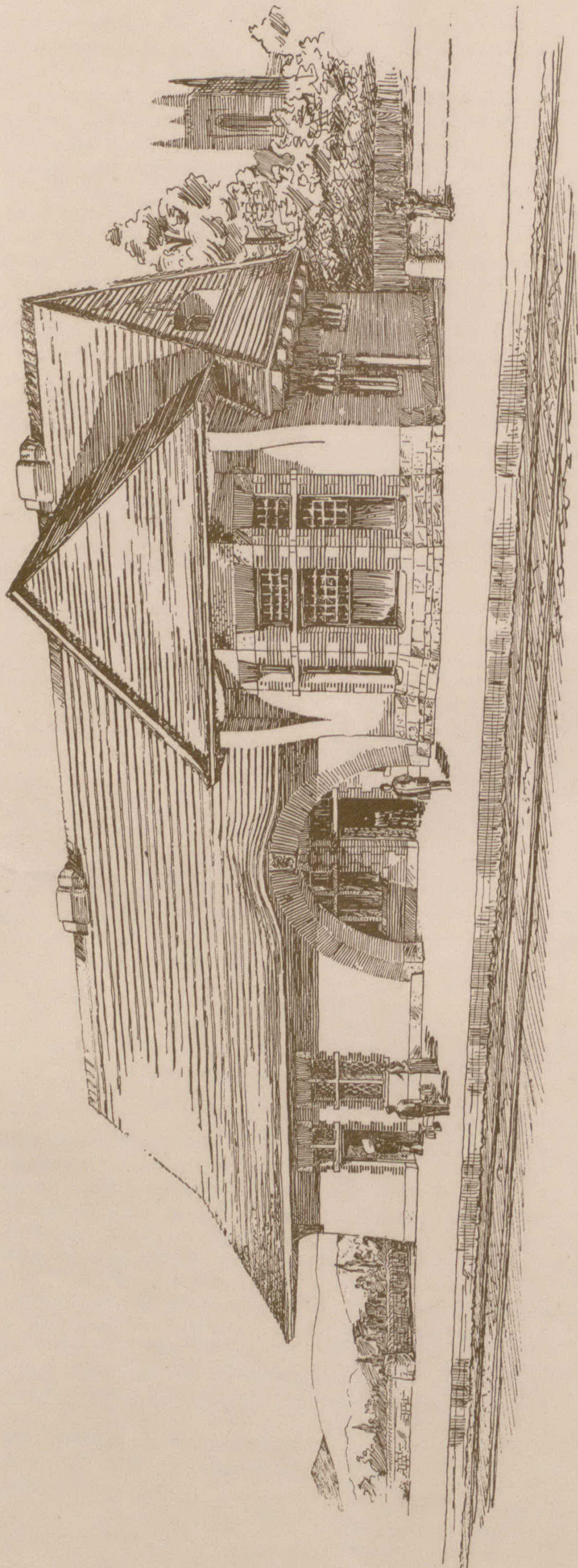
PERSONAL.

Mr. James Snoddy, of Snoddy & Bros., plumbers, Hamilton, died last week.

Mr. Samuel Edger, secretary of the Owen Sound Portland Cement Company, died suddenly at that town on Sept. 23rd. He was 50 years of age, and an old resident.

Mr. James Herbert Marling, a talented young architect, who began his professional career in the office of Messrs. Darling & Curry, Toronto, died recently of apoplexy at Buffalo, N. Y.

It is with much regret that we have to record the death of Mr. L. M. Bowman, who was formerly in practice as an architect at Lindsay, Ont., but latterly held a position in the Medical Health Department of Toronto.



A COUNTRY RAILWAY STATION.

F. S. BAKER, A.R.I.B.A., ARCHITECT.

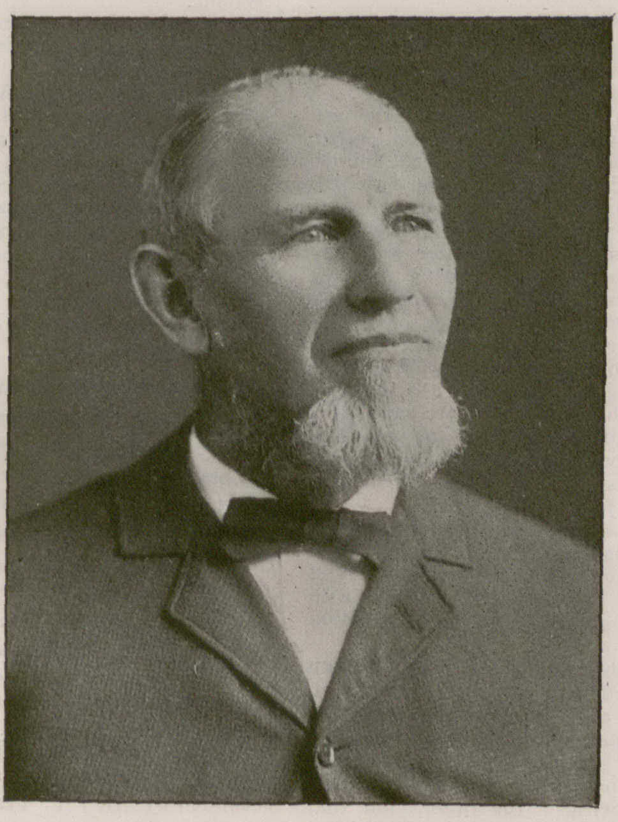
RESIDENCE for A. A. DICKSON · ESQ. TORONTO ·
SIDDALL & BAKER Architects.

MR. A. C. HUTCHISON, R.C.A.

ALEXANDER Cowper Hutchison, R.C.A., was born in Montreal in 1838. His father was a builder, and in company with James Morrison, erected some of the principal buildings in Montreal. Mr. Hutchison, after leaving school, entered as an apprentice to his father as stone cutter, also attending a private school during the first two years of his apprenticeship. At the age of twenty he was entrusted with the superintendency of the stone work of Christ Church Cathedral, known to be the finest example of Norman Gothic on the continent. He afterwards removed to Ottawa, where he was engaged for three or four years on the Parliament Buildings, in charge of the stone cutting. He then left the capital and returned to Montreal to take charge of drawing classes in connection with the Mechanics' Institute. He afterwards conducted the same classes in connection with the Board of Arts and Manufactures, and while engaged at this work he decided to commence practice as an architect in 1863, and soon secured a large practice. He was appointed a member of the Royal Canadian Academy by the Marquis of Lorne in 1880.

THE SIZE OF WINDOWS.

IT seems a self-evident proposition, yet one that is continually disregarded, says Aston Webb, that the size of the windows must be regulated by the size of the rooms that they are intended to light, yet nothing is more common than this example, where three windows all of the same size, "to preserve the uniformity of the elevation," as the speculative builder says, light three rooms of totally different sizes, the result being that one bedroom is fairly lighted, the other is very dark, while the dressing-room is so light that you hardly dare dress in it without the blind being drawn down, as you seem to be quite out in the open air. It is extremely difficult to lay down any law giving exact rules as to the proportion of lighting space necessary for a given room—much depends, for instance, on the position of the light. In the well-known example of the Pantheon at Rome the building is amply lighted by a small circular opening in the roof. The cubic contents of this building are given at 1,934,460 cubic feet, and the area of the circular opening only 572 feet, or about one-third the amount required had the lighting been from the side. The rule said to have been adopted by Sir William Chambers is to add the depth and height together and an eighth of the result will give the width of the window. Gwilt gives, as a general rule, 1 foot super. of light in a vertical wall to every 100 cubic feet in the room. Robert Morris says that the superficial area of the window should equal the square root of the cubical contents of the room. This, however, though no doubt approximately true, must evidently be open to large variations according to the width of the street, and especially according to the aspect and the climate, and the exact size of certain windows to suit certain shaped rooms can only be learned by observations and experience. It should also be borne in mind that certain rooms will require more lighting than others: a drawing-room more than a dining-room, a dressing-room more than a bedroom, and so on. And if this is carefully attended to (and, of course, taste and discrimination used), the elevation will at least be an honest and truthful one, and you will not find the principal window on the ground floor lighting, as is often the case, a cloak-room or a water-closet.—Carpenter and Builder.



MR. A. C. HUTCHISON, R.C.A.
President Province of Quebec Association of Architects.

MONTREAL.

(Correspondence of the ARCHITECT AND BUILDER.)

THE Canada Life Assurance Company's building, the most important building being erected in Montreal this year, is fast approaching completion. The contractors certainly deserve praise for the celerity with which they have conducted their work, affording a remarkable contrast to the slowness of completion of the unfortunate Street Railway Company's building, the structural iron of which is not even yet completed, although it was commenced long before the first named structure.

As the roof of the Canada Life Building is now being put on, it is safe I think to indulge in a few comments regarding it, as what remains to be done will not materially alter its exterior appearance. It is another proof of how an inferior design can be made to look well, and the influence it may have on the decision of unprofessional judges in competitions, when it is effectively rendered in perspective by an artist.

I hear that designs much superior in composition to the accepted design were submitted by Montreal architects in private competition, but unfortunately their authors overlooked the absolute necessity of rendering their drawings brilliantly and effectively in order to be successful under the circumstances.

In the upper storeys there are faults violating the most elementary rules of art, as, for instance, the idea of superposing two rows of columns on top of one another, with the lower row much thinner and weaker in construction, and more delicate in design than the one above. The mouldings, although good enough in profile, are so placed and arranged as to make the building appear to have been erected in sections, and the parts present no relation to one another. The doorway is also much too low for a building of such importance. Altogether the design does not reflect any more credit on the architect than the Ontario Parliament Buildings, and it certainly does not seem to be necessary to look outside of this country for architects to design our most important buildings, if the public feels satisfied with such architecture.

An exhibition exclusively confined to artists and works of art will open in the Drill Shed on the 14th inst., for the benefit of Notre Dame hospital. Most of our painters in this province are represented, but unfortunately the architects did not see fit to avail themselves of the opportunity to bring their work before the public, which, I believe, is the only and surest way of elevating the architectural profession to the level of that of the painters in the eyes of the public. Artists across the ocean have gained their prominence by exhibiting their work constantly before the public, and by establishing permanent exhibitions; we must do likewise if we desire that art in all its branches be as honored and respected as it is in the old countries. Apart from the paintings are quite a number of water colors, but the architectural section will be represented only by "A Vestry," a school "projét" of the "Ecole des Beaux-Arts," by J. O. Marchand, who exhibits also a water color representing a racingyacht.

Messrs. Patterson & Wallace, architects and engineers, 217 St. James street, announce their intention of opening evening classes, in which students of architecture and engineering may receive instruction in drawing, mathematics and designing.

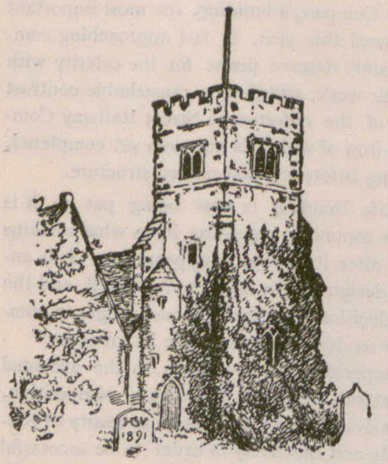
The Toronto Radiator Manufacturing Co. are said to have sold in one week in New Brunswick one hundred and ninety-five radiators.

Mr. D. L. Brown, formerly of Deseronto, Ont., has the contract for building a large school house at St. Johnsville, N. Y.

A new City Hall is being built at Quebec to cost $117,000. Sixty thousand dollars have already been expended, with only $130 for extras.

A quarryman named Fairweather has brought action against the Owen Sound Stone Co. for $10,000 damages, sustained by him when working for the Company. He was drilling out a charge when it exploded, causing the loss of his eyes. The case was tried once, but a new trial has been ordered.

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.



THE fifth annual meeting of the Province of Quebec Association of Architects was held in the city of Quebec, as announced, on the 2nd instant, at the "Chateau Frontenac." The morning session opened at 10:30 o'clock, at which were present the following members: Messrs. Chas. Baillairgé, President, in the chair; A. C. Hutchison, 1st Vice-President; A. T. Taylor, 2nd Vice-President; J. Venne, Secretary; J. Perrault, Treasurer; J. Nelson, R. Findlay, F. X. Berlinguet and J. B Bertrand, Councillors; and also S. Lesage, H. Staveley, J. F. Peachy, J. P. S. Dussalt, G. E. Tanguay, J. P. Ouellet, Geo. Bussières and D. Ouellet.

The President having taken the chair, the Secretary presented his report for the year just closing, which in substance is as follows:

SECRETARY'S REPORT.

"The Council of the Province of Quebec Association of Architects presents to the Association the following report of its transactions during the year 1894-95:—

The architectural exhibition held in connection with the last annual meeting, although quite an innovation, was attended with signal success, and we can only recommend that annual exhibitions of architecture, and perhaps in connection with arts and crafts, be held under the direction of the Association.

The most important work of the year has been the revision of the building by-laws for Montreal. A committee was appointed consisting of the following members: Messrs. A. C. Hutchison, A. T. Taylor, J. Nelson, A. Raza, J. Venne, J. Perrault, J. Z. Resther and W. E. Doran. This work has been completed and submitted to the City Council in last April, and has lately been returned to our Council for the revision of the French translation made by the civic authorities. It required over sixty meetings to complete the work, and we have good reason to believe that if these building by-laws are passed in Council, which we trust will be done, they will be an immense improvement on the previous ones, and be of great benefit to everyone concerned, and to the city.

The library is increasing slowly, and we beg to acknowledge donations from Messrs. Chas. Baillargé, A. T. Taylor and J. Venne. Twenty-five volumes have been handsomely bound during the year, and it is intended to supply each member with a catalogue of all the books in the possession of the Association within a reasonable time.

We regret to report that notwithstanding the trouble taken by the Council and the correspondence with the Government, that the question of the Schedule of Charges is not much advanced. There being two alternatives presented by the Government—first, an arbitration to decide upon the items of charges and the opportunity to make them obligatory by law, the Association paying all the expenses; the other, and that which seems to be preferred, is that the Association shall issue said schedule and force it into use, und that it shall become law by long and united usage. What arises from all this is that the profession would gain enormously by a greater unanimity of action, for the common interests of all.

We think it is only due to ourselves that frequently foreign architecture are employed in the Dominion, especially in Montreal, Toronto and Quebec. It is not too much to assert that the Canadian Associations of Architects have amongst them able and distinguished members, who can compare advantageously with those architects who are confiscating work to which Canadians are entitled. It is time time to protest against a thing which has become an abuse, causing prejudice, not only to our profession, but indirectly to the whole country at large, in that it deprives a good proportion of the population—architects, mechanics, manufacturers, etc.—of their just rights. The Federal Government has done something in the matter by levying a custom duty on plans coming from abroad, but more is required.

Your Council has presented to the Montreal City Council a petition urging the organization of an Art Standing Committee, which should examine and report on all plans, designs and models of monuments and embellishments of our public squares and avenues. The adoption of this suggestion would not entail any additional expense to the civic treasury, and could do only good to the public in fostering the art feeling, which is rather weak. The City Council, having many vexed questions on the tapis, has apparently been unable to consider the proposal as yet, but it is hoped that it will soon do so.

At the winter examinations held in Quebec in January, four candidates passed successfully—three candidates were for preliminary examinations and one for final. At the July examinations held in Montreal four candidates presented themselves, all of whom passed.

The Association now numbers 63 members—11 from Quebec, 1 from Laprairie and 51 from Montreal.

For the first time since its foundation the Association elected honorary members, viz: His Excellency the Lt.-Governor of Quebec, the Premier and the Minister of Public Works, Quebec; the Mayors of Montreal and Quebec; Sir Donald Smith, the Hon. Geo. A. Drummond and Mr. R. B. Angus.

As a trial the Council invited a competition for designs of a seal and letter heading for the Association, and offered $10 as a first premium. Several designs were received, but were not considered fully satisfactory by the Council. It may not be out of place to impress on the members of this Association the advisability of inducing the governments and municipalities to have the designing of public buildings thrown open to competition to recognized architects—members of some Association of Architects, throughout the Dominion, under well defined and dignified rules. We feel sure it would tend to improve the standing of the profession and help to create a greater national interest in architecture. It may be advisable to have a special committee to consider the matter or to refer it to the new Council for action.

During last winter the Association had its usual monthly dinners and meetings. These meetings are capable of being made very pleasant and useful by interesting members in them. Papers were read by Messrs. A. C. Hutchison, A. T. Taylor and J. Venne.

Six members have requested the aid of the Council to solve some professional difficulties, and the Council gladly gave such aid as was possible.

The possession by the Association of a portrait of Mr. Chas. Barry, hung in their rooms, has inspired Mr. J. Venne to present one of Victor Bourgeault, a well-known architect of Montreal, who died just soon enough to deprive the Association of his services. The idea has been suggested that the Association should possess the portraits or some memento of the most eminent of its deceased members, to serve as a remembrance to younger members, and more especially to their old pupils.

We must before closing acknowledge the good-will of the press and their readiness to report to the public anything that was considered of interest during the year, transacted by the Association."

The report was unanimously adopted. The report of the Treasurer was also adopted.

The President read two letters, one from the Prime Minister and one from the Minister of Public Works, expressing their regret at being unable to attend the luncheon in the evening.

The meeting then proceeded to the election of officers and Council, with the following results:—President, A. C. Hutchison; 1st Vice-President, A. T. Taylor; 2nd Vice-President, J. F. Peachy; Secretary, Jos. Venne; Treasurer, Jos. Perrault. Council: C. Baillairgé, 1st member; R. Findlay, J. Z. Resther, A. H. Lapierre, G. E. Tanguay and Theo. Daoust. Messrs. A. J. Fowler and C. Chausée were selected as auditors.

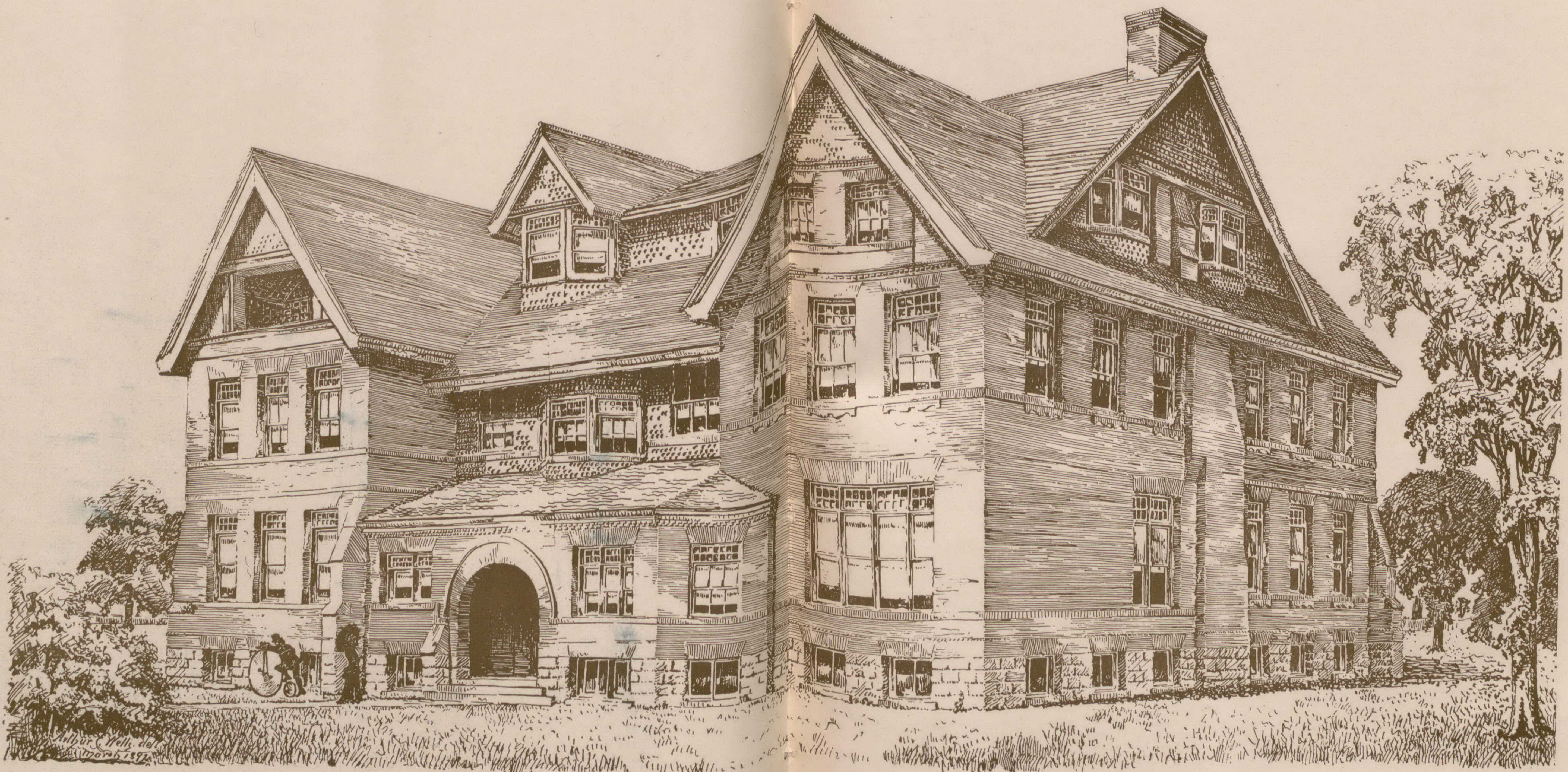
The newly-elected President, Mr. A. C. Hutchison, took the chair, and a vote of thanks, proposed by Mr. H. Staveley, seconded by Mr. J. F. Peachy, was passed to the retiring officers for their efficient services to the Association.

It was resolved to have a new official list of the members of the Association printed, containing also the names of the honorary members and those of the officers and Council at the head.

On motion of Mr. J. Venne, seconded by Mr. G. E. Tanguay, it was decided that steps be at once taken for the organization of an architectural exhibition and of the allied arts, in connection with the next annual meeting, and that the Council be authorized to take action in the matter.

Moved by Mr. S. Lesage, seconded by Mr. A. T. Taylor, and resolved, that the Association take the necessary steps to have the Augé Bill amended to meet the views of the architects, or to secure its repeal.

Mr. A. T. Taylor explained what had been, and what he would propose should be done in connection with the creation of an Art Standing Committee in Montreal, to advise the City Council regarding the selection of sites for projected monuments of public character, and the erection of the same, as well as the opening of new streets and boulevards, or things of similar character, relating to the embellishment of the city. The need of such a measure is to be observed in the old city of Champlain where action is necessary to preserve the few souvenirs of its glorious past that we have left. Several of the members of Que



COLLEGIATE INSTITUTE, SARNIA, ONT.

S. H. TOWNSEND, ARCHITECT.

bec touched upon the subject in the same strain, and it was agreed that action be taken in the matter.

A series of amendments to the charter and by-laws were submitted by the Quebec section for oonsideration by the Council during the year.

Mr. R. Findlay submitted for consideration a standard form of contract for use between proprietor and contractors ; the Council will report on same at next annual meeting.

The meeting adjourned at this point till 3:30 p.m.

AFTERNOON SESSION.

At 3:30 o'clock the members again met at the "Chateau Frontenac."

A paper was read by Mr. Baillairgé on "The Bearing and Resisting Strength of Structures," (printed elsewhere in this paper) and on "Bribery and Boodling."

Mr. J. F. Peachy urged that action be taken to make the tariff of charges recognized by the public, his remarks being followed by a discussion as to whether the architect should refuse work when the superintendence of same is refused him. The majority of the members were of opinion that when the architect is deprived of the superintendence he should be free of all responsibility.

It was decided on motion of Mr. J. Venne, seconded by Mr. A. T. Taylor, that the Council consider the advisability of a proposition which would have for effect inducing the governments and municipalities giving out their work by competition on a basis guided by proper rules prepared by the Council for the purpose, and that the Council be also authorized to communicate with sister societies to discuss the matter at as early a date as possible.

It was agreed that the examiners shall receive in future $10 each for their services at each examination.

It was proposed that the Montreal and Quebec sections organize in their own locality sketching classes for the use of the members, in the interest of their advancement, and with the effect of promoting fraternity

Mr. J. Venne took a retrospective view of the position in which the profession has stood during the last ten years.

It was moved by Mr. Geo. Bussières, seconded by Mr. F. X. Berlinguet, that the meeting be adjourned, and that the next annual meeting be held in Montreal at a date to be fixed by the Council, but preferably to fall in September.

THE LUNCHEON.

The luncheon given in honor of the visitors at the Chateau Frontenac was one of the best ever given in Quebec. The ladies' ordinary was handsomely decorated for the occasion. President Baillairgé occupied the chair, having on his right Mr. Hutchison, the new president, and on his left Mr. J. M. Lemoine, ex-President of the Royal Society of Canada. Mr. Berlinguet occupied the vice-chair. About thirty sat down to the well spread tables. After the toast of the Queen had been duly honored, Mr. Hutchison proposed the health of Mr. Baillairgé and the Quebec section, to which the retiring president made a forcible reply. After urging a strong plea for the retention of of the French language, and condemning any scheme for the assimilation of the currencies of nations, their methods of computing time, or their weights and measures, all of which he asserted would have a tendency to reduce the demand for labor, he went on to express regret that the Montreal visitors could not remain longer with them, in order that they might make a return for hospitalities shown by that city at a former meeting. Addressing himself specially to the Montrealers he then proceeded :

"In your legitimate pride as metropolitans, you make little of us, Quebecers,—we are at the end of the world, and it is exceptional to find in your city press more than three lines at a time devoted to the doings of the olden capital. Our turn will come, and may be it is close at hand. If Quebec to-day is attractive to tourists only, due to its drives, its points of view, its terraces, the surrounding landscape, its unrivalled port, its carnivals of ice and fire—if commerce, business, have for 30 years past eschewed, abandoned our port, and rendered us disinterested to the extent of cutting our own throats to favor Montreal, to make it an ocean port, the head waters of ocean navigation, by spending our millions in deepening Lake St. Peter—nature is about to force you to return to your whilom loves—for apart from the Chicago canal, which will lower the St. Lawrence between Quebec and Montreal and up to Lake Ontario by fully 5 per cent.—and I was the first to call the attention of our people to this unwarranted, unauthorized international spoliation—apart, I say, from the tapping of our waters to draw them off towards the Gulf of Mexico—there are other schemes upon the tapis (the Deep Water Convention now being held at Cleveland is proof to what I say) : canals, one or more, which will run another 10 per cent., another 20 of our noble river, from the great lakes towards the Atlantic by the Mississippi and the Hudson ; and this handiwork of man is already being added to by natural causes ; our waters as you see on all hands are being lowered, shallowed. Man is and has been the direful agent in bringing this about—he has, under our Government's most unwise policy of timber limits, with no reserve cut down our forests, left bare the ground, the country ; instead of the wise policy of France and of the Mother Country, to cause the forest to persist, by sparing every tree less than twelve inches in diameter—he has swept the surface clean, and where the axe has been impotent to do the unhallowed work, man has abetted fire in its devouring greed to lay waste our God-given patrimony of wealth and plenty. Well, see you how it is? You are astonished nowadays at the greater frequency of cyclonic winds, and storms and inundations. No wonder, though this should be so, when the winter's snow, which formerly, protected from the sun's rays by the foliage, melted and ran off slowly into rills and rivulets and rivers ; now melts, as it were, all at a bound of sunshine and rushes along in its maddened devastating course, carrying away mills and bridges and whole villages, and increasing our waters to a depth unknown before in spring ; while per contra, the rains of summer which, when the lands were wooded, ran from them slowly and measuredly, as in the wisdom of God it had been willed they should, reaching in time our lakes and rivers through their tributaries, these waters now are sucked up by the sun, before they reach their destination, or on the way, absorbed by the dried up, parched beds of the unprotected rivers ; and hence in every way the St. Lawrence is gradually growing less ; and gentlemen you will have to come to us to get deep water ; for, thank God, the Ocean is still there, and the moon far enough away from man in his destructive rage, and though he may bring it within a stones throw by the telescope, to be not able to interfere with it, much less the sun in giving us the tides which, if they connot reach to Montreal, will continue to Quebec, and make this the head of ocean navigation, the true ocean port for steamers of draught too great for shallowed Lake St. Peter. Now think ye, gentlemen, that we dote on these possibilities of the near future ; think ye that we tell you this in proud retaliation of the past? Not so, by any means, we look forward to it with pleasure, to do you good, not harm ; to help you find a remunerative field for your unexpended and ever increasing millions. Come to us, we are ready to receive you with open arms ; we have for some years past been endeavoring to put on the new man—not the new woman with her unfeminine, unloveable prerogatives—we have a new parliament, a new post-office, new Courts of Justice, new hospitals, new hotels : the Florence, Clarendon, Victoria, and Chateau Frontenac, adequate to all tastes, all purses, all aspirations—we have a new city hall by our friends Tanguay and Vallée and a new Mayor full of youth, talent and initiative enterprise. He saw as I pointed out that the westward cry must be abandoned, and that instead of St. Sauveur, St. Roch or Mount Pleasant, the walled portion of the city was geographically the most central for Quebec's future, and now the extension of the city is going forward towards Montmorency, between which and the city proper there is a stretch of six or seven miles of unimproved territory. This is where we await your Montreal millionares, and we will not be jealous if they bring you down with them to build them up and tell them how to make available ground of the Beauport foreshore by building return tramways to the close by heights and quarries, where lie ready, centuries of quarry refuse which would reach its destination by gravitation only and the loaded cars return the empty ones. Ground can be made here for almost nothing. Gentlemen, this is no idle theory of mine—already some of your own people are here at work. Messrs. Whitehead & Co. have erected vast cotton and woollen factories at the Montmorency, and one of yourselves, Walbank, is the architect. The thriving village of Hedlyville is advancing to meet La Canardière and Richardson's factories. Messrs. Parent and Bedard, both ex-Mayors of the large and thriving parish of Beauport, have for the fourth time in nearly three centuries rebuilt the as often fired brewery of Racey memory and celebrity, the water from the river Beauport being pronounced by analysts amongst the very best in America for the required purpose. This factory of beer and lager will do much good in weaning men from their whiskeying propensities, it will render them stern and strong and healthy, and fit them for your purposes of building you up docks, elevators, refrigerators for your transatlantic business, while the want of water at Montreal may seriously impair the utility of your Hochelaga and other schemes. Once more then, gentlemen, let us say, come to us and we will receive you for our mutual benefit with welcome and outstretched arms.

A number of other toasts were given and responded to, after which the very pleasant gathering terminated.

Mr. S. G. Beckett, architect, 15 Toronto street, Toronto, would be pleased to receive samples of materials.

STUDENTS' DEPARTMENT.

"CANADIAN ARCHITECT AND BUILDER" COMPETITION FOR A CITY STORE FRONT.

THE competitions previously held under the auspices of the CANADIAN ARCHITECT AND BUILDER were especially designed to test the student's ability to properly design and plan various kinds of buildings. The object of the present competition is to test his knowledge of construction. It is to be feared that many students who have the ability to make pleasing sketches, are less proficient as regards a knowledge of the character of materials and the proper method of employing them in building construction.

With the object, as stated, of bringing to the proof the knowledge of this character which they may possess, students of architecture residing within the Dominion of Canada are invited to submit competitive designs for a city front for a retail jewelry store on a leading street.

The building is to have a frontage of 35 feet, and to be 5 storeys in height, with a retail store on ground floor, and a side entrance affording access to upper storeys, which are intended to be used for office purposes.

Drawings must be made with PEN and BLACK INK on WHITE cardboard, drawing paper or tracing cloth. On one sheet is required an elevation and plans of ground and first floors of the building, drawn to ⅛ scale; on another sheet, working details of ground floor, drawn to ¾ scale, and sufficiently coarse to admit of reduction to 15 x 10 inches in size.

Each competitor is required to mark his drawings with his nom de plume only, and to forward his drawings, so marked, post-paid, addressed to the editor of THE CANADIAN ARCHITECT AND BUILDER, Confederation Life Building, Toronto, at a sufficiently early date to enable them to reach their destination before 5 o'clock p.m. on the 3rd day of December next, at which time the competition will close.

Each competitor must forward with his drawings a sealed envelope, containing his nom de plume as it appears on his drawings, together with his full name and address, and a brief description of his design, stating the materials proposed to be employed in its erection.

The first premium in this competition is $10.00, the second $5.00, and the third one year's subscription to the CANADIAN ARCHITECT AND BUILDER.

The competition will be decided by a Committee of three members of the Ontario Association of Architects.

The CANADIAN ARCHITECT AND BUILDER reserves the right to publish any of the drawings submitted. All drawings will be returned to their authors within a reasonable time after the competition is decided.

Competitors are urged to pay strict regard to the above stated conditions. Drawings which do not conform to the conditions will not be considered.

DRILLING GLASS.

GLASS can be drilled with a common drill, but the safest method is to use a common broach drill. No spear-pointed drill can be tempered hard enough not to break. The broach can be either used as a drill with a bow or by the hand. It should be selected of such a bore that it will make a hole of the required size, about 1 in. from the end. It should be broken off short with a pair of pliers, at about 1½ in., and when the sharp edges are blunted by drilling, a fresh end should be made by breaking off ⅛ in., and so on, until the hole is bored. It is always desirable to drill from both sides, as it prevents the glass from breaking. Drill lightly and lubricate with spirits of turpentine and oil of lavender, or a little camphor instead of a little oil of lavender. Holes may be drilled through plate glass with a flat-ended copper drill and coarse emery and water. The end of the drill will gradually wear round, when it must be reflattened, or it will not hold the emery. The best means of drilling holes in glass is by using a splinter of a diamond. A brass drill is made to fit the drill stock, sawn down a little way with a notched knife to allow the splinter to fit tight, and the splinter fixed in the split wire with hot shellac or sealing wax. The drill is to be used quite dry and with care. If the hole to be drilled is wanted larger than the tool, drill a number of small holes close together to form a circle as large as the holes required: then join the holes with a small file.

USEFUL HINTS.

The French and English papers, which are now used, come without friezes, which is a distinct gain in the matter of height, while it possibly detracts from the breadth of a room.

It is with color as with every form of art, it can only be handled by those who delight in it. Bright, pure colors are the basis of richness and purity of hue, but their successful use demands a delicate handling of subordinate hues and tints.

Strong liquid ammonia mixed with an equal bulk of turpentine may be used with advantage in removing old paint. It is unnecessary to apply anything additional to the surface of the wood for repainting, as is the case when lye is employed.

In experiments conducted by the German government on steel and iron girders, the soft steel girder proved twenty-two per cent. stronger than the iron girder. The strength of steel girders appeared to be about the same for the flanges, if made alike in sections.

Paper that is difficult to remove, even by the application of hot water, should be given a coat of hot paste. The paste assists in preventing the water from running off the surface; it will soon soak through. In the case of varnished papers it is necessary to score the surface with a chisel.

Blue walls, or those with blue lights in the color, make a room seem large, as blue recedes from the eye. This color must be skilfully used, however, for if too pale it is cold and unsympathetic; if crude it takes all color from the complexion of its mistress. The shades of blue that wear the best on the nerves and senses are toned with grey, yellow or pink.

The wall papers shown in New York this season are said to be much darker, and, like everything else, show elaborate floral decorations. Even a black surface is shown, with garlands or festoons of gay flowers. Maroon is very effectively used; it forms such a pleasant background for pictures. Artists claim that the use of the very light papers of the past few years has detracted from artistic effects, and a return to more pronounced colors will greatly increase the richness and beauty of interior decorations.

It is not generally known that the word "Anaglypta" has a classical origin. To the ancient Greeks the "glypta" meant every variety of engraved wood, until at a later date cameo cutting became popular among them, and it became necessary to add to their vocabulary in order to define the new art. "Cameo" was, of course, raised work, as distinct from "intaglio" or incised cutting, and the "ana," meaning raised, was therefore added as a prefix to the preceding term, in order to express this meaning. Subsequently the word "Anaglypta" came into general use to describe every kind of bas-relief.

A cement for wet places, like aquariums, is made of litharge, fine white sand and plaster of Paris (calcined plaster), each 1 part, and resin ⅓ part. The ingredients should be thoroughly mixed and made into a paste with boiled linseed oil to which a drier has been added. It should then be thoroughly mixed by beating and allowed to stand four or five hours before being used. It should not stand much longer than this, as the cement becomes worthless after it has been mixed twelve or fifteen hours. Glass may be cemented to wood or metal with this preparation, and it will resist the action of both fresh and salt water.

The ancients, according to Palladio, first squared and worked the sides of the stones which were to be placed one upon the other, leaving the other sides rough. The edges of the stones, being beyond the square, were then smoothed. But the roses between the modillions and similar ornaments of the cornice, which could not commodiously be done when the stones were fixed, were carved upon the ground. If the works were very great, as the Arena of Verona, the Amphitheatre of Pola and other buildings, to save expense and time, they worked only the imposts of the arches, capitals and cornices; the rest they left rough. But in temples and other buildings which required nice work, they spared no pains in the execution, glazing and smoothing even the very flutes of the columns and polishing them carefully.

Chimney felling is an art little known. Mr. Smith, a Lancashire steeple-jack, recently disposed of his forty-sixth tall chimney with ease and despatch, thereby forstalling the laws of bricks and mortar, which threatened a descent without Mr. Smith's assistance. It seems to be the easiest thing in the world. The stack has lumps of it cut out at the base, one side being left alone, and props are then introduced into the gaps, shavings, paraffin, and tar being liberally added, as the cookery books have it. When all is ready, a match is applied, the smoke of its own burning rushes up the chimney, and in a few minutes the whole thing collapses. The chimney, which was 135 ft. high, came down twenty-five minutes after the match was applied in the most docile fashion, and, what is more, it disposed its remains exactly as Mr. Smith, who stood close by, had arranged.

A solution of 50 parts of commercial alizarin in 1000 parts of water, to which a solution of ammonia has been added, drop by drop, until a perceptible ammonia odor is developed, will give to fir and oak a yellow-brown color, and to maple a red-brown. If the wood is then treated with a one per cent. aqueous barim chloride solution, the first named becomes brown, and the latter a dark brown. If calcium chloride be used instead of barium chloride, the fir becomes brown, the oak red-brown, and the maple a dark brown. If a two per cent. aqueous solution of magnesium sulphate be used, the fir and oak become dark brown, and the maple a dark violet-brown. Alum and aluminum sulphate produce on fir a high red, and on oak and maple a blood-red. Chrome alum colors maple and fir reddish-brown, and oak Havana brown. Manganese sulphate renders fir and maple a dark violet-brown, and oak a dark walnut brown.

THE LATE PETER THOMSON.

We give in this issue a capital likeness of the late Peter Thomson, who, at the time of his death, occupied the position of superintendent of Algonquin Park, the reservation set apart in the northern part of the province, by the Ontario Act of 1893, as a preserve, to be kept in its natural state for the use of the people. Previous to entering the employ of the government, Mr. Thomson was in business as a building contractor. He learned the trade of a carpenter in his youth, and after living in the United States and Hamilton for a time, settled at Brussels, in the county of Huron, where he lived for some 35 years. While there he erected many buildings in the neighborhood. Removing to Toronto some years ago, he continued in the same line, the construction of the Arlington Hotel being one of his largest contracts. Since 1893 he was employed by the government on colonization road work, superintending the building of some of their bridges, and was always considered a careful and competent man for the work. In July 1893, he was appointed chief ranger of the Algonquin Park, and in the following year became its first superintendent. He died at headquarters in the Park, on 5th September, of paralysis, at the age of 61.

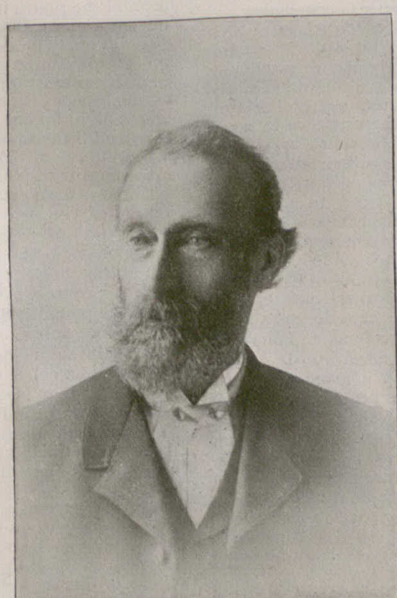
A LEGAL VIEW OF AN ARCHITECTS' RESPONSIBILITY.

A case of more than ordinary interest to architects was recently argued before a judge in the town of ——— Ontario.

An architect, a member of the Ontario Association of Architects, received instructions to prepare plans and specifications and obtain tenders for the erection of an hotel building in a country village. The owner, after the plans and specifications had been explained to him carefully, accepted tenders and instructed the architect to proceed with the work, and supervise it.

The architect being unable to collect his commission and having waited until the last day, caused a lien to be registered against the building for the balance of the commission and later, failing, still to get his money, entered suit under power of the lien for the balance due him.

The defense set up that as there was a defect in the building they were entitled to damages from the architect therefor.



The Late Peter Thompson.

There had been a building on the site which had been destroyed by fire and it was decided to re-use the old foundation walls as far as possible, the owner undertaking to clear away all debris and leave the walls clear for examination and work. This was all clearly set forth and shown in the plans and specifications, the latter stating that it was to be assumed that the foundation walls were in good condition and would only require to be pointed up. The owner urged upon the architect the necessity of getting the building ready for occupation with the utmost dispatch.

The defect referred to was a slight sinking of the floor in the centre of the building and showing in one of the principal rooms and the main hall, a condition which might have been brought about by the frost (the building was put up in winter) leaving the foundation wall, or by the wall plate under the partition never having been set level, or by the joists themselves never having been levelled properly. The amount that the floor was out of level was one thirteenth of an inch to the foot one way and about one sixth of an inch across. No plaster was cracked, no doors bound and no inconvenience of any sort was occasioned except that the apparent deficiency in the maple floor offended the refined eye of the defence. They also claimed that one riser of the steps from the street to the building was out of plumb, another serious defect.

The defence secured the services of an architect who swore to the levels which he had taken at the building and also to the riser being out of plumb, but could not say just how much.

A member of the Ontario Association of Architects was called by the plaintiff. He swore that he had visited the building and inspected it. He considered that the plans and specifications had been unusually well carried out for that class of work and that the deflection of the floor was scarcely sufficient to be called a defect in a country job.

The owner admitted in cross examination that he had got a first class job, but claimed that it would cost him so much to rectify the error and that the architect should allow him for it.

Two practical builders swore they had been in the building and never noticed the deflection. The mason and carpenter each swore that they had carefully levelled that part of the walls and floor and admitted that if there was anything wrong they were to blame, and finally the architect swore that he had levelled the ground floor joist himself when they were laid on and left them true and level. As for the riser—well there were many ways in which it might have got out of plumb after six months use.

The judge in summing up the evidence said that undoubtedly there was a defect in the building and he would give judgment for the plaintiff with costs, less a sum which it had been shown would be sufficient to raise the floor and make it level (?). He did not refer to the riser.

Virtually he held that the architect was responsible and should pay for a defect which was admitted by the contractors to be their fault.

Those who are not properly informed as to the duties of an architect assume that he should be held responsible for any and every defect in a building, notwithstanding that he may have little or no say in the choice of the contractor. It is utterly impossible for an architect to obtain perfect work in these days of keen competition, more especially when the proprietors refuse to pay for perfect or even passable work. In this instance the class of work was an inferior grade and the defect was a matter of no moment. An architect should be held responsible for defective work when it is self evident that he could not prevent same except at such an undue loss of time on his part as would make it advisable for him to pay the proprietor to take his work elsewhere. A commission of 5% on the total cost of the work will not permit of an architect remaining on a building and acting the part of foreman for all the trades thereon employed.

The question now arises as to whether this architect should not claim and be awarded damages against his lawyer because he had not brought out sufficient evidence at the trial to secure for his client a complete victory.

The cases are analagous and if such a case were tried before the same judge, in the same court under similar circumstances, surely he would have to give similar judgment.

It would be interesting to know if an architect had ever before been held responsible or made to pay for a defect in a building after the contractors had been paid in full and the building taken off his hands by the owner.

The Egyptian decorator was a priest, or a priest's servant, and his business became hereditary. The Indian decorator was a servant of the family, and his situation also frequently descended to his son. In China and Japan the decorators were in the earlier times priests working from a religious motive. With the Greeks, too, religion fostered the arts: so in the mediæval ages. It was not till the Renaissance, when the invention of printing led to the spread of knowledge, that individual excellences brought the individual out from obscurity, and we have styles of decoration as diversified as the people who produced them. In Japan the decorator originally worked with the utmost patience and loving care to illustrate his religion; thus decoration came to be practiced by princes and persons belonging to great families. At last it came down to the art workman, who, in Japan, with no competition, no machinery and but few wants, made everything he produced instinct with beauty.—Work.

ON THE BEARING AND RESISTING STRENGTH OF STRUCTURES AND THAT OF THEIR COMPONENT PARTS AND MATERIALS.*

By Chas. Baillairge.

Many failures have, of late years, occurred of various buildings or of portions thereof, due to faulty, hasty or unmatured construction, and hardly a day passes but what the newspapers chronicle some catastrophe, some collapse of a building just finished, or even before it is finished, as evidently incapable of supporting its own weight, let alone that of the living or dead weight, or both, which it should have been made strong enough to bear. Such failures have occurred, in Canadian as well as in United States and European cities, and in most cases with the loss of one or more lives.

Much more attention should also be bestowed on the erection of temporary stages or platforms in cases of reviews, races, athletic and other performances; but with this, which is of secondary importance, and where sufficient solidity of construction can be arrived at without subjecting the structure to abstruse calculations, or to anything more than giving it due consideration, we do not intend to deal.

The engineering of architecture must be more closely attended to by architects, as the engineer will take the matter out of the architect's hands; and that would be a slur to the profession which should and must be avoided. Not that engineering structures in this respect are always scathless, for there are also many cases on record of the failure of a bridge, a subaqueous tunnel or other such structure, but these are comparatively few and far between, while architectural mishaps are of far more frequent occurrence.

Our friend Mortimer, publisher of the Canadian Architect and Builder, rehearses the fact at page 112 of his "Hand-Book" that the ultimate strength of a wall or pier of good hard burnt bricks in good lime mortar, as given by Kidder, of Boston, is 1,500 lbs. to the square inch, say 216,000 lbs. or 108 tons to the square foot—while the use of Portland cement with the best hard burned bricks, increases the resistance to 2,500 lbs. to the inch, or 180 tons to the foot—though previous competent authorities have given results from 30 to 50 per cent. less than these. Assuming therefore the known weights of mortar and cement brickwork per cubic foot, it would require a wall or pier to be from 1,600 to 2,700 feet high to crush the bottom bricks; and since such extreme cases have not and can never occur in practice, and that walls do fall notwithstanding, which do not even reach to one-tenth of the height, it is evident that not only must the mere crushing elements be made factors of, but other important data of length, breadth, height and thickness, and these are the considerations which apparently, from seldom or ever entering a builder's mind or that of a would-be architect, lead to the repeated accidents and fatalities of every day occurrence in some part or other of the civilized world.

Now, this knowledge is at hand and to be found at page 109 of the "Canadian Contractor's Hand-Book," which gives the proper thickness of brick walls for dwelling houses up to 100 ft. in height; though, of course, there are other considerations to be dealt with, such as the supporting, staying or stiffening ministry of the successive tiers of joists or beams, whether of wood or iron, which enter into the structural arrangements of the building, important among which is the necessity that beams which would be otherwise of too lengthy a span and therefore liable to dangerous oscillation and destructive leverage on the walls, be supported at intermediate points by other walls and piers restorative of the necessary stiffness to insure stability.

When, however, a structure becomes very high and heavy, as with the present tall buildings like the Philadelphia city hall, the New York World (22 story) printing establishment, the American Surety building (307 ft. high above the sidewalk and may be 20 to 30 ft. below that level), the Manhatten and others in New York and Chicago, and a beginning in that way in Montreal and other cities—it then behoves the architect charged with designing the structure to take crushing weights into consideration, and especially when the buildings are designed to be fire proof, and that, to that end, the floors are beamed with iron joists, brick or terra cotta archings or vaultings between, and concrete haunch or spandril filling with tile or cement floors to boot; and which, including weight of superincumbent partition walls and columns of the floor or story next above or resting on and supported by the columns next below, and with 90 lbs live and dead weight additional for persons, furniture and fittings of all kinds, may be taken at 300 lbs. per foot sup. of floor space.

To this end, I have thought on retiring from the presidency of the Association of Architects of the Province of Quebec, it might not be amiss for me to tabulate, as I have done herein-below; and for the ordinary spans or intercommunications of 10x10 ft. centres, 10x12 ft. centres, and 20x20 ft. centres, or for floor spaces of 100, 200 and 400 ft. area respectively, and for each and every successive story of a building as I have done, the sectional area in square inches of steel built columns to support the weights, the thickness of their component plates, the weights in tons to be supported and in the last three vertical columns of the table the corresponding prices at a uniform rate of 5 cents to the pound—while if 6, 7 or 8 or ten cents to the pound or even more or less are to be allowed, as fluctuating with the market value of the metal to be put in place at any time, then can the whole, the total cost be added to or deducted from by a known percentage of 20 for one cent additional, 40% for 2 cents, 50% for 2½, 60% for 3, and 100% for 5, and so on; for in addition to the possible price of iron or steel being greater or less, there is also to be estimated the average cost of first raising the weights to the average height of the structure, which, should the stories average 12 ft. in height, would be 120 ft. for a 20 story building, 60 ft. for a 10 story building, and so on of other average heights.

To simplify and speed me in the computation of the table, I have assumed one unique type of section or build of the supporting column of 12"x12" from out to out with central web, the whole put together with valley, or angle or flange iron, riveted together as shown in diagram in the margin or herein below; but, as with this form and size of section, the plates for a 20 story structure reach to two inches in thickness or more, it is evident how by increasing the size of column to two feet square instead of one, or four feet bearing area (2' x 2') the plates would thus be reduced to ½ an inch in thickness instead of 2" or to a thickness of one inch, by doubling the bearing area of column or making it 1.'42 x 1.'42=2.0164 square feet, or simply 1.'4 x 1.'4.=1.96 square feet, which is near enough for all practical purposes, when the factor of safety, as in this case, is already on the safe side.

Or again, instead of the posts or columns being exactly square, it might suit better to double the dimension one way, leaving the other as it is: for instance, 1 ft. x 2 ft., or 12 in. x 24 in. for inch plates instead of 2 in., or for ½ in. plates 1 ft. 6 in. (18 inches) x 2 ft. 8 in. (32 inches,) or any other form of section to suit, as round or oval, etc.

The tabular statement does not give weight of column, but taking item No. I, the sectional area in square inches is given as 10 square inches and the thickness of plates at 0.1 in. (one-tenth of an inch). Now, how this is arrived at will be immediately seen on reference to the diagram, for, as evident, there are four plates each 12 in. wide, one web plate 6 inches, and 8 valleys of 3 in. x 3 in. or 6 in. in developed breadth, together 102 or say 100 inches in total horizontal girth. Now 100 in. x 0.1 in. = 10 in. or 5/6 of a square foot, of inch thick iron per lineal foot of column. Again, wrought iron being 480 lbs. to the cubic foot, gives 40 lbs. to the square foot of inch thick space, or for 5/6 of a square foot 33⅓ lbs. per lineal foot of column, and this into 14, the assumed height or length of column, gives 467 lbs., or with rivets say 480 lbs., which at 5 cents the pound, give the figures $24.00 in the corresponding column opposite item No. I of table.

Or it may be plainer or easier to say that 102 inches total horizontal girth of plate and valley iron in the section, gives (dividing by 12) 8½ superficial ft. of iron or steel plate 1/10 in. thick, and as iron 0.1 in. thick = 4 lbs., therefore does the 8½ ft. give as before 34 lbs., or neglecting the 2 odd inches (more than allowed for in not deducting the twice computed angles of the valley irons) 33⅓ pounds.

Now this unit of weight and cost of column opposite item I for a 20 ft. x 20 ft. space or 400 ft. area, which at 300 lbs. a foot of floor surface gives the 60 tons in the sixth column, must of course be half of itself when the supported area is only 20 ft. x 10 ft., and ½ of this last or ¼ of itself, where the supported area is only 10x10 or 100 sup. feet, and so is also the thickness of iron reduced to 0.05 in. and to 0.025 in. respectively, and the corresponding prices in the two last columns to $12.00 and $6.00 respectively.

Again, as herein before stated, as to how to increase the area of bearing surface of column to reduce thickness of plates to inch or half inch—so in a converse manner may the 12 in. x 12 in. columns of the upper floors be reduced to half their size, or to 6 in. x 6 in., instead of 0.1 in., or to 6 in. x 12 in., and the plates increased to 0.1 in. for column 7 of table instead of 0.05 in., and to 0.05 in. instead of 0.025 in. for column 10 of table.

It will likely be evident, or at any rate there can be no harm in remarking, that in computing by this table for a building of any number of stories the process must be from above downwards, and can not be from below upwards, except in the case the table is made to suit, to wit: A building 20 stories high, for the upper story supporting only the roof will remain invariable, and if the total height of structure were, for instance, only nine stories, then would item No. 9 represent the data for the first tier or story above street level with Nos. 10 and 11 for basement and sub-basement.

I herewith also give a table for a corresponding building with brick piers instead of iron, where the cost of brick work in cement at as high as $20.00 per mil (taking its crushing strength at 180 tons to the square foot, with a factor of safety of 6, or assuming the square foot of pier as capable only of supporting 30 tons) just comes to half the corresponding prices of iron or steel at 5 cents a pound, or would be a quarter of the cost thereof if at 10 cents the pound. Such piers as those given of a sectional area of only one square foot opposite item No. 1 of table, column No. 7, and of ½ a square foot on the same line of column No. 10 (the latter especially not being possible in practice), it would of course be necessary with such weights to bear, to have made of steel or iron or corresponding strength, or as indicated at columns 7 and 10 of table No. I—and it might moreover be prudent to do the same with the smaller or more delicate piers of items Nos. 2 and 3, or if not, to continue up these piers of undiminished size from items Nos. 3 or 4, or even 5, according to circumstances—as, though theoretically capable of bearing the weight, such light brick structures would be dangerous of overthrowal by a comparatively slight side thrust.

On the other hand, as seen by the table, the corresponding sizes for the lower floors or stories become so great, that they would be altogether inadmissible on account of the space thereby lost to useful purposes; and the object of this second table is rather to show the inadmissibility altogether of brick work in the premises, as even though the cost of structure might be thereby reduced, it would be false economy to lose so much useful space, to say nothing of the very awkward appearance of such a structure; and again, with most companies requiring such structures and with no want of funds to provide them, cost is generally a secondary consideration—each insurance or other company or trust or syndicate striving to outvie its neighbors in magnificence and cost of structure. And this emulation exists even among individuals, as I am proof to, when on one of my visits to New York on inspection of an ordinary 25 ft. brown stone front dwelling house on Fourth avenue, which with its marble stairs and skirtings, etc., had cost its proprietor $100,000, the proprietor of the neighboring lot with an old-fashioned brick house thereon, seriously asked his architect if he could not build him one which would cost more money, to which, of course, the architect immediately assented. We don't have such chances as that in poor old Quebec, where we are on the contrary always met with the demand to do things for half their value.

The construction of these high buildings is rendered possible only by the use of steel frame or skeleton work. The older type of buildings, whether of stone, brick or iron, depended for its strength upon its walls. The modern tall office building has a steel frame. This carries merely the whole weight, and the walls, solid and massive as they may appear, do not support the structure, but simply fill the interstices. It is startling to think of the entire superstructure of a 20 story building resting on some 30 or 40 columns; yet, without this modern development, without the use of steel, the walls would have to be so thick at the lower stories that there would be no room left for offices. The steel represents the osseous structure of the animal, while the enveloping masonry surrounding the same exemplifies the flesh or meat, which saves the skeleton from the extremes of temperature and thus from the exertion of contractive and expansive forces which might otherwise jeopardize the structure.

It becomes important also, if not imperative, as a factor in the computation of the necessary bearing areas of the foundations supporting structures of the kind, to consider as data for comparison, what weights are permissible to the square foot of underlying piles or piers, or of the natural soil when of a nature to subserve the purpose—some of the columns bearing weights varying between 600 and 1,300 tons in the American Surety building already alluded to.

The inequality of the weights borne by a square foot of the foundations of the buildings mentioned in table III may appear striking at first sight, but they are due to the weights being distributed over greater or lesser areas of the supporting soil. For instance, in table I, item No. 21, we have 1,260 tons supported by a steel column a foot square, while in the American Surety building some of the columns are loaded to 1,280 tons, but these

*Paper read before the Province of Quebec Association of Architects at their annual meeting at Quebec, October 2nd, 1895.

ST. MARY'S SCHOOL, HALIFAX, NOVA SCOTIA.

DAVID STERLING, ARCHITECT.

are about 2 feet square, or of an area of 4 feet, which at once reduces the pressure per super foot to 320 tons; and if the foundation piers bearing these and transmitting their weight to the solid rock below were only 10 feet square, or 100 feet area, the weight per foot reduces to a little less than 13 tons; while if the pier be made 14 feet square, its area is doubled and the 13 tons reduced to 6½ or 6 as set forth in table. As stated last year by the writer in his paper on the foundations of heavy structures, the question is not so much the number of tons which 1 foot of bearing surface is loaded with, as that (not to prevent settlement which is inevitable, but to render it equal throughout) the bearing surfaces of foundation be equally loaded—the whole front of the new Joliette church having to be rebuilt at a cost of some $10,000 because, while the side walls bear with only 2 tons weight or pressure on their footings, the tower and front wall bearing on their footings with a pressure of 4 tons or double the weight. The tower, when I saw it three years ago, had torn itself and the portal away from the aisle walls and sank to a depth of more than 11 inches below the latter, completely dislocating and destroying this portion of the structure and requiring its entire demolition and reconstruction.

One would think at first sight—that is, the popular idea may be and is—that a solid structure or one of solid masonry like the pyramids, is that which with the same height and weight of material, bears heaviest on its foundations, but such is by no means the case, the greatest pressure being generally borne by the piers of a domed church or other structure, each pier being loaded, in addition to its own weight and portion of dome bearing directly on it, with one quarter of such portions of the vaulted or arched structures as correspond to the archways or openings of the aisle and transept, and which, as in the case of St. Peters of Rome, must be close upon 35 tons to every square foot of the supporting pier.

Nor is there anything extraordinary even in this figure, as I believe some of the so-called chapter houses of churches in England support weights even in excess of this, where one-half the weight of the domed or stone groined vaulted ceiling is borne by a single marble column of only a few inches in diameter at the centre of the structure. Another example of heavy weights borne by a small base is where a 100 ton gun, for instance, or ponderous piece of machinery supported by the jib or boom of a derrick, is thus transferred to and supported by the derrick mast or upright post, which, if say of a 14 inches square piece of timber, giving a sectional area of only 2 feet or less, loads the bearer with a weight of 50 tons, together with the additional weight of the derrick itself, representative also the derrick post or mast of a column in any building and the boom or jib with its suspended weight, of the 100, 200 or 400 ft. area of supported flooring with column at 10'-10' centre, 10'-20' or 20'-20' distance apart, or (at 300 lbs. the ft.), 15 30, and 60 tons respectively.

Now, even 60 tons, or 160 to a square foot of a solid stone pier, not monolithic, but made up of monolithic or large and closely fitting cut stones, is in no way excessive, since good cement brick work will bear 180 tons, while good ordinary cement stone masonry will bear twice that weight or 360 tons, and up to twice that figure or even more; for the experiments made on a brick pier, for instance, are so made on one of only a foot square, and those on piers of masonry have also been made on comparatively small based areas, where there was no lateral support or resistance round about to prevent the giving away by lateral failure.

Again, the strength of piers of stone masonry may be made to approximate almost indefinitely to that of the stone itself, as given in the ensuing table IV, where crushing powers are recorded of as much as 1,200 tons and over to the square foot, or rather equivalent thereto, and which would be much greater if it were possible, which it practically is not, to test a foot of stone in the same manner instead of only a small cube of an inch or an inch and a half square and then reduced to inch; for the small cube, as would also be the case with a larger one, must necessarily fail first at the angles or corners and along the edges, while if the same weight or pressure were applied to an equal area at the centre of a 12 inch stone or more, it is evident it would produce no effect, the tendency to crush and crack being counteracted by the lateral support given to the central portion by the strength and resistance of the outlying margin of the material experimented on.

And not only would the crushing weight of masonry approximate to that of the solid stone, as determined by experiments upon the tiny cubes thus treated, but there can be no doubt of it, go far beyond such data and indefinitely so, for even if the nucleus of the earth be fluid, and the crust only 40 miles in thickness as geologists pretend, and if the crust be stone and even if no heavier than granite, then would we have on each square foot of the inner rim or area of base thereof, more than 200,000 cubic feet of stone, and at 160 lbs. to the foot, a crushing pressure of 16,000 tons, but which, were it ten times greater, a hundred or a thousand times, could never crush the stone, supported on all sides as is every foot of the crust or solid component masonry thereof by the equally resisting power of every other foot hemming it in on all sides and preventing the possibility of its ceding or giving away to any other force than the disrupting seismic action of the interior.

I must, gentlemen, insist again, as I did in my last year's paper on "Foundations in Deep and Unreliable Soils," on the necessity of a consideration, not only of absolute, but of comparative stresses to secure uniformity or prevent inequality of settlement—that being the all-important desideratum.

The very term "the engineering portion of architecture," or rather the necessity for such a term, is a slur on the profession, an insult so to say to any architect who pretends he knows his business; for if we are to call in the superior scientific acquisitions of the engineer in dealing with the foundations, then, a fortiori, shall we have to do so in dealing with the stresses, much more difficult of calculation, of a domed structure, for instance; and surely it never shall be said that the architect has come down from the high pedestal on which, long before the days of engineering science, stood and stand to this day the Bramantes and the Michael Angelos, the Perraults and the Mansards, the Jones (Inigo) and the Wrens. Well may we hide our heads if ever that should come to pass, for, without the aid of the engineer, we architects can do as they do, and thus make themselves appear more scientific than they really are. Can *we* not also call in the aid of a mathematics, and direct a professor or expert at that science to calculate a stress of any kind, whether of direct weight, lateral pressure, or resistance to overthrowal by a cyclonic wind or pressure.

If the profession would have that standing which it had of yore and still lays claim to in other countries, I must tell you, and I do so squarely—we must hear of no more such failures as those at Nicolet, St. Bastile, Joliet, Cornwall and elsewhere. Nor should there be any more roof failures, whether from rain saturated snow or due to faulty construction. Montreal must not in respect to falling buildings emulate New York, where such accidents are the order of the day, which are to the disgrace of the profession.

But though or while giving you a table for calculating the component weights and strengths and costs of a building up to 20 storeys in height, I hope none of you will ever be called on to design such an ungainly, unaesthetic piece of construction, and at any rate that you will set your face against anything of the kind elsewhere than in but a purely manufacturing or suburban district, and not where its presence would mar the landscape and architectural effect of surrounding common sense structures; and I here transcribe a most pertinent article from the "London Surveyor." It reads as follows:

"A *propos* of a monstrous "sky-scraper" apartment house recently erected at Washington, the American Architectural Record has a deservedly severe article on "Architectural Aberrations," and puts forward the plea that city authorities should be allowed to veto plans for new buildings, not only if they sin against sanitary laws, but if they outrage the canons of art. As it pertinently remarks, "There is a patent absurdity in taking thought and spending vast sums of money for the purpose of making a harmonious city, and then permitting any promiscuous private person who can get possession of a piece of ground, and raise money enough, to put a building on it, to nullify all your dispositions and vulgarise your town." There is much in the protest, and though we do not suffer so badly as our cousins do from the *piled-up monuments of bad taste and cupidity*, still even London suffers from the tall-house mania, not to mention other hideous forms of architectural aberrations. Edinburgh, too, will note the timely protest with interest. But the task of acting as censor would be full of difficulties where mutable taste rather than positive science would have to be the guide."

To this I would add that there should be no foolish rivalry in such matters, as it is as easy for one architect to outdo another in height as for a naval architect to beat the record in point of length and strength, or for an artillerist to design a target that will resist a shot, a shot to pierce it, another target to resist the latter and again another shot to hole it, and so on, without end; but though there may be a reason for this when a nation wishes to retain its prestige over its neighbor; and though engineers are forced into long and still longer spans for bridges due to the widths and depths of rivers to be traversed and to conditions imposed by the authorities—as in the 1,700 feet twin spans over the Firth of Forth in Scotland, the Brooklyn suspension bridge and now the 3,200 feet span structure about to be thrown over the Hudson between New York and Jersey City—no similar necessity exists for structures of the Eiffel tower type, which all Paris is clamorous to have demolished, though it certainly is not an outrage to artistic taste and merit in any way approaching the super-

Type of steel-built column on which calculations of stresses, weights and prices are based. for computation of data in Table I.

Scale, ¼ inch to one inch.

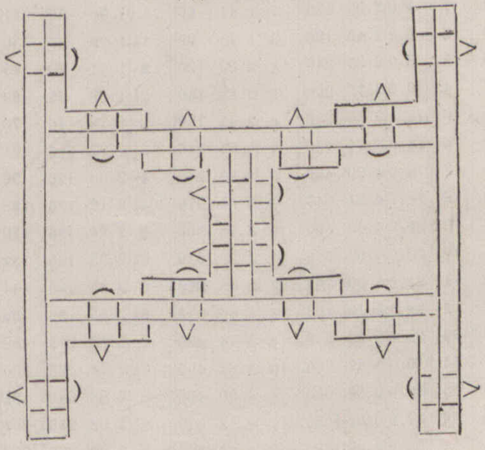


TABLE I.

Table of steel thicknesses and sectional areas, box built columns to support fire proof or iron, brick and concrete floorings in buildings from 1 to 20 stories high. Weight per sup. or square foot of roofing and flooring, partition walls, etc., 300 lbs., including 90 lbs. live load. Factor of safety = 5 or 1/5 of crushing load.

No. of Item for reference	No. of stories counting up-wards.	No. of stories counting down-wards.	Columns at 20' - 20' centres. Area supported 400 sqr. ft.			Columns at 10' - 20' centres. Area supported 200 sqr. ft.			Columns at 10' - 10' centres. Area supported 100 sqr. ft.			At 14 ft. long in position & at 5 cts per lb.		
			Thicks. of plates.	Sectional area.	Weight supported in tons.	Thicks. of plates.	Sectional area.	Weight supported in tons.	Thicks. of plates.	Sectional area.	Weight supported in tons.	Cost of each column at 5 cts lb. 20' - 20'	Cost of each column at 5 cts lb. 10' - 20'	Cost of each column at 5 cts lb. 10' - 10'
			Inches.	Sqr. Inch.		Inches.	Sqr. Inch.		Inches.	Sqr. Inch.		$	$	$
1	Roof	Roof	0.1	10	60	0.05	5	30	0.025	2.5	15	24	12	6
2	20	1	0.2	20	120	0.10	10	60	0.050	5.0	30	48	24	12
3	19	2	0.3	30	180	0.15	15	90	0.075	7.5	45	72	36	18
4	18	3	0.4	40	240	0.20	20	120	0.100	10.0	60	96	48	24
5	17	4	0.5	50	300	0.25	25	150	0.125	12.5	75	120	60	30
6	16	5	0.6	60	360	0.30	30	180	0.150	15.0	90	144	72	36
7	15	6	0.7	70	420	0.35	35	210	0.175	17.5	105	168	84	42
8	14	7	0.8	80	480	0.40	40	240	0.200	20.0	120	192	96	48
9	13	8	0.9	90	540	0.45	45	270	0.225	22.5	135	216	108	54
10	12	9	1.0	100	600	0.50	50	300	0.250	25.0	150	240	120	60
11	11	10	1.1	110	660	0.55	55	330	0.275	27.5	165	264	132	66
12	10	11	1.2	120	720	0.60	60	360	0.300	30.0	180	288	144	72
13	9	12	1.3	130	780	0.65	65	390	0.325	32.5	195	312	156	78
14	8	13	1.4	140	840	0.70	70	420	0.350	35.0	210	336	168	84
15	7	14	1.5	150	900	0.75	75	450	0.375	37.5	225	360	180	90
16	6	15	1.6	160	960	0.80	80	480	0.400	40.0	240	384	192	96
17	5	16	1.7	170	1020	0.85	85	510	0.425	42.5	255	408	204	102
18	4	17	1.8	180	1080	0.90	90	540	0.450	45.0	270	432	216	108
19	3	18	1.9	190	1140	0.95	95	570	0.475	47.5	285	456	228	114
20	2	19	2.0	200	1200	1.00	100	600	0.500	50.0	300	480	240	120
21	1	20	2.1	210	1260	1.05	105	630	0.525	52.5	315	504	252	226

posed box-like piles which are now in a fair way to disgrace our neighbors in the eyes of European nations.

Gentlemen, let us also be severe in architectnre, to the extent at least of not allowing it to assume, as it is bidding fair to do in Ottawa, tee phase of what may be called "bed post architecture," and in truth, though there are hundreds of otherwise very pretty villas and cottages in the new Capital, quite a number of their verandas and entrance porches are rendered hurtful to the eye of good taste, by being supported on bed posts, for they certainly cannot be called columns. And to cap the climax, in some of the twin dwelling houses or where there are two doors side by side, with a veranda or portico in common, the separation between the doors is for all you can imagine, of the exact shape of a partition between two horse stalls.

TABLE II.

Comparative table of sizes or sectional areas of brick piers to support fire proof or iron, brick and concrete floorings in buildings from 1 to 20 stories high. Weight per sup. ft. of roofing, flooring, partition walls, etc., 300 lbs., including 90 lbs. live load.

No. of Item for reference.	No. of stories counting up-wards.	No. of stories counting down-wards.	Piers at 20' - 20' centres. Area supported 400 sqr. ft. Area of pier in Ft. — In.	Size of pier square.	Weight supported in tons.	Piers at 20' - 10' centres. Area supported 200 sqr. ft. Area of pier in Ft. — In.	Size of pier square.	Weight supported in tons.	Piers at 10' - 10' centres. Area supported 100 sqr. ft. Area of pier in Ft. — In.	Size of pier square.	Weight supported in tons.	Piers calculated at 14 ft. high, 20 bricks per ft. cube. Cost of each pier 20' - 20' at $20.00 mil.	Cost of each pier 10' - 20' at [illegible]	Cost of each pier 10' - 10' at [illegible]
	Roof	Roof	' "	' "								$	$	
1			2.0	1.41	6	1	1.00	30	½	0.70	15	12	6	3
2	20	1	4.0	2.00	120	2	1.41	60	1	1.00	30	24	12	6
3	19	2	6.0	2.45	180	3	1.73	90	1½	1.29	45	36	18	9
4	18	3	8.0	2.83	240	4	2.00	120	2	1.41	60	48	24	12
5	17	4	10.0	3.16	300	5	2.24	150	2½	1.58	75	60	30	15
6	16	5	12.0	3.46	360	6	2.45	180	3	1.72	90	72	36	18
7	15	6	14.0	3.74	420	7	2.65	210	3½	1.87	105	84	42	21
8	14	7	16.0	4.00	480	8	2.83	240	4	2.00	120	96	48	24
9	13	8	18.0	4.24	540	9	3.00	270	4½	2.12	135	108	54	27
10	12	9	20.0	4.47	600	10	3.16	300	5	2.24	150	120	60	30
11	11	10	22.0	4.69	660	11	3.32	330	5½	2.35	165	132	66	33
12	10	11	24.0	4.90	720	12	3.46	360	6	2.45	180	144	72	36
13	9	12	26.0	5.10	780	13	3.60	390	6½	2.55	195	156	78	39
14	8	13	28.0	5.29	840	14	3.74	420	7	2.65	210	168	84	42
15	7	14	30.0	5.47	900	15	3.82	450	7½	2.74	225	180	90	45
16	6	15	32.0	5.65	960	16	4.00	480	8	2.83	240	192	96	48
17	5	16	31.0	5.83	1020	17	4.12	510	8½	2.92	255	204	102	51
18	4	17	36.0	6.00	1080	18	4.24	540	9	3.00	270	216	108	54
19	3	18	38.0	6.16	1140	19	4.36	570	9½	3.08	285	228	114	57
20	2	19	40.0	6.32	1200	20	4.47	600	10	3.16	300	240	120	60
21	1	20	42.0	6.48	1260	21	4.58	630	10½	3.24	315	252	126	63

TABLE III.

WEIGHTS PER SQUARE FOOT OR SUPERFICIAL FOOT BORNE BY PIERS AND FOUNDATIONS OF CERTAIN BUILDINGS, BRIDGES AND OTHER STRUCTURES.

Says Professor Butler, as given by Mortimer at page 104-5 of his "Hand-Book":

	Per sq. foot.
The load on the monolithic piers supporting the large churches in Europe does not exceed (early builders using much more massive masonry, proportionally to the load to be carried, than at present)	
The Toff bridge in France	30 tons.
Former bridge at same place said to have failed at	21 "
Rennie subjected good 4 ft. rubble piers to	64 "
Granite piers Saltask bridge, England	22 "
Brooklyn bridge piers	9 "
St. Louis bridge piers before completion	29 "
The same after completion	38 "
Niagara suspension bridge limestone towers failed under	19 "
Maximum pressure on rubble masonry and cement mortar of some of the large masonry dams	36 "
Proposed Quaker bridge dam—270 ft. high	14 "
	17 "

The following are from the writer and others:

At centre of the Cheops pyramid say	
Piers of the dome at St. Peters (the great thickness of these piers, say 20 to 30, renders the confined centre as resisting, so to say, as solid rock), say about	40 "
Weight on foot side walls Joliette church	35 "
Weight under tower (causing failure by sinking or settlement)	2 "
Strasbourg Cathedral tower, say	4 "
Washington monument, 555 feet high	40 "
Tower of Babel or of Belus, 650 ft. high, say	45 "
Central piers Britannia bridge	52 "
"Manhatten Life" building, 353 ft. high	33 "
The "Equitable" building and Union Trust, built with wide footings, load the foundations, it is said, only to	15 "
Proposed Hudson river bridge, 3,200 ft. span piers	3 "
The Stock Exchange, Chicago, is said to load the foundation soil at	26 "
Allowed by New York city regulations	4 "
Load per foot square of foundation brick piers of American Surety building, say	15 "
The author's design for the proposed London Eiffel tower (see fig. 5, page 18, of the 68 designs sent in, printed and published for "The Tower Company, Limited," by "Industries," 358 Strand, London, under title of "The Great Tower for London." Height of tower 1,600 ft., diameter at base 280 ft., total weight 14,303 tons, 20' wide offset balconies at every 200 ft. of total height, greatest weight on lower column at centre	6 "
	117 "

	Per sq. foot.
Average weight on the 312 first tier columns	46 tons.
Total weight distributed by inverts or footings over the 61,600 ft. area, less than	¼ "
Weight at centre distributed by inverts or footings over the 100 ft. sup. of bearing to each colum at centre of tower	1⅙ "
Brunel (Paris) design for proposed London Eiffel tower, 500 ft. square, 2,296 ft. high, of granite, weight 196,902 tons, weight per foot square supported by bottom piers	160 "
Weight per square foot distributed over soil area of 250,000, say	4/5 "

TABLE IV.

CRUSHING TESTS OF BUILDING STONE.

For many years the resistance to crushing force shown by a building stone has been considered high evidence of its homogeneousness and durability.

The following table gives the resistance to crushing per square inch, shown by various stones, granites and marbles, and is compiled from General Q. A. Gillmore's report to the Chief of Engineers, United States Army; from Haswell's Engineer's Pocket Book; from "Stones for Building and Decoration," by Dr. Geo. P. Merrill, of the Department of Geology, Smithsonian Institution, and from tests made by Mr. Ira H. Woolson, C.E., at the request of the Professor of Geology of Columbia College School of Mines, on the Emery testing machine belonging to the college. Where tests have been made on a number of specimens, the highest result is given.

Paving brick should stand 10,000.00 to inch crushing force and absorb not over 2 to 3 per cent. of water.

CRUSHING WEIGHT PER SQUARE.

	Inches in Pounds.	Feet in Tons.
Aberdeen, Scotland, Granite (Haswell)	10,760	774.7
Albion, New York, Sandstone (Gillmore)	13,500	972.0
Altamount, California, Sandstone (Merrill)	1,149	82.7
Arbroath, England, Sandstone (Haswell)	7,850	460.2
Aquia Creek, —— Sandstone (Haswell)	5,340	389.5
Bardstown, Kentucky, Limestone (Gillmore)	16,250	1,170.0
Bay of Fundy, Canada, Granite (Gillmore)	12,020	865.5
Bedford, Indiana, Oolitic, Limestone (Merrill)	10,125	729.0
Belleville, New Jersey, Sandstone (Gillmore)	11,700	842.4
Berea, Ohio, Sandstone (Gillmore)	10,250	738.0
Billingsville, Missouri, Limestone	7,250	522.0
Caen, France, Limestone (Gillmore)	3,650	262.8
City Point, Maine, Granite (Gillmore)	15,093	1,086.7
Cleveland, Ohio, Sandstone (Gillmore)	7,910	569.5
Connecticut, Freestone (Haswell)	3,319	238.9
Cornish, Wales, Granite (Haswell)	6,339	456.4
Craigleith, Scotland, Sandstone (Gillmore)	12,000	864.0
Dix Island, Maine, Granite (Gillmore)	15,000	1,080.0
Dorset, Vermont, Marble (Gillmore)	8,670	624.2
Dorchester, New Brunswick, S. S. (Gillmore)	9,412	677.6
Dublin, Ireland, Granite (Haswell)	10,450	737.4
Duluth, Minnesota, Granite (Gillmore)	19,000	1,368.0
Edinburgh, Scotland, Sandstone (Merrill)	12,000	864.0
English Magnesian Limestone (Haswell)	3,130	225.3
English Auglesa Limestone (Haswell)	3,600	259.2
Fairhaven, Vermont, Slate (Merrill)	12,870	926.6
Fond du Lac, Wisconsin, Sandstone (Gillmore)	6,250	450.0
Fox Island, Maine, Granite (Gillmore)	15,062	1,084.4
Glencoe, Colorada, Sandstone (Merrill	12,752	918.1
Glen Falls, New York, Limestone (Gillmore)	11,475	826.2
Greenwich, Connecticut, Granite (Gillmore)	11,700	842.4
Harbor Quarry, Maine, Granite (Gillmore)	16,837	1,212.3
Haverstraw, New York, Sandstone (Gillmore)	4,350	313.2
Hummelstown, Pennsylvania, Sandstone (Merrill)	13,610	979.9
Huron Island, Michigan, Granite (Merrill)	20,650	1,486.8
Hurricane Island, Maine, Granite (Gillmore)	14,937	1,075.4
Italian Marble (Merrill)	12,156	875.2
Joliet, Illinois, Limestone (Gillmore)	16,900	1,216.8
Jordan, Minnesota, Sandstone (Merrill)	3,750	270.0
Kasota, Minnesota, Sandstone (Gillmore)	11,675	840.6
Keene, New Hampshire, Granite (Merrill)	10,375	747.0
Little Falls, New York, Sandstone (Gillmore)	9,850	709.2
Long Meadow, Massachusetts, Sandstone (Merrill)	8,812	634.4
Manitou, Colorada, Sandstone (Merrill)	13,046	939.3
Marquette, Michigan, Limestone (Gillmore)	8,050	579.6
Marquette, Michigan, Sandstone (Gillmore)	7,450	536.4
Marblehead, Ohio, Limestone (Gillmore)	12,600	907.2
Massillon, Ohio, Sandstone (Gillmore)	8,750	630.0
Medina, New York, Sandstone (Gillmore)	17,725	1,276.2
Michigan Sandstone (Merrill)	6,323	455.2
Middletown, Connecticut, Sandstone (Gillmore)	6,950	500.2
Mount Raymond, California, Granite (Merrill)	5,970	429.8
Monson, Massachusetts, Granite (Merrill)	15,390	1,108.0
New Gunnison, Colorada, Sandstone (Merrill)	9,903	713.0
New Haven, Connecticut, Granite (Gillmore)	9,750	702.0
New London, Connecticut, Granite (Merrill)	12,500	900.0
Newry, England, Granite (Haswell)	12,850	925.2
North Amherst, Ohio, Sandstone (Gillmore)	6,650	478.8
North River Limestone (Gillmore)	13,425	966.6
Oswego, New York, Sandstone (Merrill)	6,220	447.8
Patapsco, Maryland, Granite (Haswell)	5,340	384.5
Port Deposit, Maryland, Granite (Gillmore)	19,755	1,422.3
Potsdam, New York, Sandstone, from a quarry of the Potsdam Red Sandstone Co. not crushed (Woolson)	42,804	3,081.8
Quincy, Massachusetts, Granite (Gillmore)	17,750	1,278.0
Quincy, Illinois, Marble (Gillmore)	9,787	704.0
Rawlins, Wyoming, Sandstone (Merrill)	10,833	779.9
Richmond, Virginia, Granite (Merrill)	19,104	1,375.5
Rockport, Massachusetts, Granite (Gillmore)	19,750	1,422.0
Scotch Whinstone (Haswell)	8,300	547.6
Seneca, Ohio, Sandstone (Gillmore)	10,500	756.0
Stoney Creek, Connecticut, Granite (Merrill)	16,750	1,206.0
Stockbridge, Massachusetts, Marble (Haswell)	10,382	747.5
Taylor's Falls, Minnesota, Sandstone (Merrill)	5,500	396.0
Tuckahoe, New York, Marble (Gillmore)	13,594	978.7
Vermillion, Ohio, Sandstone (Gillmore)	8,850	637.2
Vermont Marble (Merrill)	13,400	964.8
Vinalhaven, Maine, Granite (Gillmore)	16,750	1,206.0
Warrensburg, Missouri, Sandstone (Gillmore)	5,000	360.0
Westerly, Rhode Island, Granite (Gillmore)	17,750	1,278.0
Williamsville, New York, Limestone (Gillmore)	12,375	891.0
Yorkshire, England, Sandstone (Haswell)	5,710	411.1

ILLUSTRATIONS.

A COUNTRY RAILWAY STATION.—F. S. BAKER, ARCHITECT.

PROPOSED HOUSE FOR MR. A. A. DIXON, TORONTO.—SIDDALL & BAKER, ARCHITECTS.

ST. MARY'S SCHOOL, HALIFAX, NOVA SCOTIA.—DAVID STERLING, ARCHITECT.

THE building is situated near to the Cathedral, and faces on Barrington street. It is constructed of pressed brick with granite facings.

COLLEGIATE INSTITUTE, SARNIA, ONT.,—S. H. TOWNSEND, ARCHITECT, TORONTO.

THIS building, erected in 1890, is constructed of plain brick with tile gables. It was built by day labor, a local builder, Mr. Proctor, acting as clerk of the works. The cost was about $25,000. The building is 80 × 95 feet in size, and in plan is acknowledged to be particularly well adapted to the requirements. In the basement are large play rooms to meet the needs of the students for recreation when the weather is unfavorable to outside sports. The top story of the building is occupied by an assembly hall, with pannelled walls and open timbered roof, and fitted up with dressing rooms and stage.

SIDE TALKS WITH THE BUILDER.

THERE are many builders who have a practical knowledge of brickwork and know how to construct an excellent piece of brickwork, writes R. N. Buell in The Brickbuilder, but are careless or ignorant regarding that most important part of every building, and that upon which their structure depends most entirely. A poor stone wall has been the cause of ruining many a noble and otherwise perfect edifice. Let me give my brother masons a few pointers on laying stone—not that I shall attempt in these columns to give an exhaustive treatise on the subject, but simply to place before him a few simple rules, which may possibly be the means of saving him many dollars.

Of whatever quality the stone may be of which a wall is to be built, it should consist as much of stone and as little of mortar as possible. If it be inferior in durability and power in resisting the action of the atmosphere, etc., to the mortar, besides the certain fact that the mortar will yield until it has set hard, and so far act injuriously, no ulterior good is gained; and if the stone be the more durable material, the more of it that enters into the wall the better. Indeed, in rough walling, if the stones be laid so that the most prominent angles on their faces come into actual contact, the interstices being occupied by mortar, it will be better than if a thick, yielding mass were allowed to remain between them. Absolute contact, however, should not be permitted any more than in brickwork, lest the shrinkage of the mortar in drying leave the stones to such unequal bearing as the prominent parts alone would afford.

Stone being generally of a less absorbent nature than brick, it is not a matter of so much importance that it be wetted before setting. Nevertheless, adhesion on the part of the mortar is more certain and more complete if the stones be worked in, at least, a damp state.

Bond is not of less importance in stone walling than in bricklaying. Instead of carefully making the joints recur one over the other, in alternate courses, as with bricks and gauged stones, the joints should as carefully be made to lock so as to give the strength of two or three courses or layers between a joint in one course, and one that may occur vertically over it in another. In bonding through a wall or transversely, it is much better that many stones should reach two-thirds across alternately from the opposite side than that there should be a few through stones, or stones extending the whole thickness of the wall. Indeed, one of the many faults of stone masons is that of making a wall consist of two scales or thin sides with through walls now and then laid across to bind them together, the core being made of mortar and small rubble merely. This is a mode of structure that should be carefully guarded against. There is no better test of a workman's tact and judgment in rubble walling than the building of a dry wall, or a wall without mortar, affords.

Walls are frequently built with mortar that without it would have fallen down under their own weight in a height of 6 feet in consequence of their defective construction, thus rendering it evident that they are only held together by the tenacity of the mortar, which is very seldom an equivalent for a proper bond of stone. Masons are very apt to set thin, broad stones on their narrow edges to show a good face, by which the wall is injured in two ways. It tends to the formation of a mere case on the surface of a wall, and it for the most part exposes the bed of the stone to the atmosphere, as a stone is more likely to be broad in the direction of its bed than across it.

ST. JOHN, N. B., EXHIBITION.

THE recent Exhibition at St. John, N. B., reflected credit upon the Maritime Provinces, and attracted not only local exhibitors, but manufacturing companies in the upper provinces. The attendance was worthy of the interesting character of the exhibition.

The Toronto Radiator Manufacturing Company, and the Toronto Steel Clad Bath Company had interesting exhibits of their goods at this Exhibition. The exhibits were in charge of their St. John agents.

Amongst other exhibits of materials relating to architecture and building was a display of memorial art glass by Mr. Frank Reardon, of Halifax, N. S., and an exhibit by the Mosley Folding Bath Tub and Water Heating Company, of Chicago. Mr. Frank Welliday, of St. John, N. B., is the Company's Canadian agent.

PRESTIGE.

IN an interesting paper on the subject in Fame, Mr. Milton J. Platt says:

"Here is a simple question. Do advertisers for high class patronage pay sufficient attention to the prestige of the mediums they use?

"Prestige is not a mushroom growth, it cannot be bought; it must be earned. Space in the medium possessing it is worth to the seeker for a high grade of patrons an incalculably greater sum than space in the medium without it. This is also true, even though the latter's circulation equalled that of the former, and even though it were claimed for it, that 'it goes to the same class of readers.'

"Webster tells us that prestige at one time meant 'delusion; trick; illusion.' Those definitions are no longer applicable to the word itself, bnt they very nicely express some of the qualities attaching to more than one publication which claim kinship with those commonly known to be above suspicion. The present use of the word implies weight of influence drawn from past success; expectation of future achievements founded upon those already accomplished. This is the prestige the wise advertiser will look for, and the names of the magazines or other publications possessing it will at once occur to him."

THE WIDOW'S TENTH.

A CASE of unusual character came before Judge Ferguson at Osgoode Hall, Toronto, the other day, in the way of appeal from the finding of the master. Mrs. Nightingale, of North Toronto, filed a claim against the executors of her husband's estate, under an agreement which had been made between her husband and herself when he commenced business as a brick maker, to the effect that she should receive one brick in every ten manufactured. The judge decided in her favor.

The case of Mr. Neelon, contractor for the Toronto Court House, against the city of Toronto, has reached the Supreme Court at Ottawa, where it is now being argued.

Supplementary letters patent have been issued to the Hamilton Bridge Works Company authorizing an increase of the capital from $10,000 to $150,000.

Complaint is made that a contract for $1,099 worth of sewer pipe for Victoria, B. C., was made by the sewer committee without the consent of the city council, or advertising for tenders. The rule is that no liability exceeding $50 can be incurred except by the council as a whole.

Joseph Lamarche, contractor, is suing the city of Montreal for $7,500 damages for injuries sustained by him in May last, when he fell and broke his leg. He claims heavy damages on the ground that it interfered very much with his business and that he suffered for the above amount.

USEFUL HINTS.

The French and English papers, which are now used, come without friezes, which is a distinct gain in the matter of height, while it possibly detracts from the breadth of a room.

The correct principle to observe in hot air heating is to supply a large volume of warm air, at a lower temperature flowing through the registers. Don't use a small furnace heated to a red hot heat, with small cold air supply, and a high temperature at the registers; the latter plan is one that causes trouble, and brings condemnation to furnace heating.

AUTOMATIC COPYING OF LARGE DIAGRAMS.—To secure exact copies, by the action of light, of large-sized illustrations and diagrams the prepared paper must be in immediate contact with the glass negative or the drawing. A certain pressure has, therefore, to be exerted, which is apt to break the glass. Mr. H. Sack, of Dusseldorf, spreads the paper on a rubber plate, and creates a partial vacuum between the rubber and the glass. The frame is made of pitch-pine: the apparatus resembles a light table running on four rollers. The vacuum can easily be produced by means of a hand-pump, a pipe for establishing connection being fixed to the table.

TRACING DRAWINGS. — A correspondent writing to an English architectural journal relative to the method of tracing drawings presents the following suggestions: Prepare the tracing cloth or paper by first rubbing on it some finely powdered French chalk, and then for doing the tracing use Indian or Chinese ink, in which a small quantity of prepared ox-gall has been rubbed up in ink. The tracing may be done by means of a good drawing pen.

A fire-proof building is being erected on the corner of Craig and St. Lambert sts., Montreal, for the main office of the Street Railway Company. About 500 tons of iron girders will be used in it. The floors will be of terra cotta. It is so constructed that none of the weight of the upper storeys rests on the walls.

SURVEYING BY PHOTOGRAPHY.

AT a recent meeting of the Geographical Society, Mr. Bridges Lee, M.A., F.G.S., described a new instrument for surveying by the aid of photography. The instrument, says Invention, consists essentially of a photographic camera fitted inside with a magnetic needle which carries a vertical transparent scale divided and numbered to 360 degrees, and also with cross fibres which intersect at right angles. The fitting and adjustments of the instrument are of such a character, that the camera can be accurately levelled and directed towards any point in a horizontal direction, and when a photograph is taken in any ordinary way, the bearing of the median vertical plane which bisects the instrument through the photographic lens will be recorded automatically on the face of the photograph which markes the median vertical on the image. The horizontal fibre is adjusted to mark on the image the horizontal plane which bisects the ppotographic lens. The camera rests on a divided horizontal circle, which can be adjusted to a truly horizontal position by levelling screws. There is a tripod stand and head, with suitable appliances for supporting and adjusting the instrument in position. The camera is provided with a rapid rectilinear lens and iris diaphragm, and focussed by rack and pinion. It is made of aluminium, and it is surmounted by a telescope, adjustable in altitude, and fitted with vertical and horizontal webs; and it is also surmounted by a revolvable tubular level.

Fifty-four out of sixty-one glass factories in the United States have consolidated with a capital of $25,000,000. Prices have been advanced and importing jobbers are to be squeezed out.

THE WEATHERING OF STONES.

SPEAKING of the weathering of stones employed for building purposes, a correspondent of Indian Engineering says the subject is one which does not receive the attention it deserves. The older architects appear to have given it far more consideration, and it is quite common to see the older part of a building in good condition, so far as weathering is concerned, while the newest additions to it are in immediate want of repairs. Some stones are most liable to attack by chemical agency. Dolomites and limestones, for instance, both the marbles and the common varieties, are more susceptible to action by the gaseous constituents of the atmosphere than to the disintegrating effect of heat and cold. If anything, dolomites are more durable than limestones in this respect. Of course we have always present in the atmosphere carbon dioxide, tending to form acid carbonates with calcium and magnesium; these compounds being soluble, are washed away with each shower of rain, leaving fresh surfaces for further attack. Where coal is burnt in any quantity sulphuric acid will make its appearance as sulphate of lime; as, almost absolutely insoluble, this forms temporarily what should be a protective coat to the stone. Unfortunately, the coat formed, impervious though it is, is not in effect protective. Disintegrating changes are always found to be going on underneath, often very rapidly. Nitric acid is another active agent in the destruction of these stones. Oxygen and nitrogen, in the mechanical mixture which forms our atmosphere, appear to have no action at all; but where combination is brought about—as it is for instance, during thunderstorms, forming oxides of nitrogen and oxygen—nitric acid immediately makes its appearance, and to its eroding properties many rapid disintegrations owe their origin. As the result of this action calcium nitrate is sometimes found crystallised on the walls of houses, often with phosphorescent effects like those of luminous paint.

All the chemical actions are likely to affect the cement substances of the stone first. Dolomites and limestones may be roughly viewed as consisting first of granites and crystals, secondly of materials making these granites or crystals to cohere. The latter material—which may not differ chemically from the former, but which often combines more iron and such like elements—we may call the cement substance of the stone. It is always the softest part, and, therefore, the most liable to attack. Thus the result of the chemical action is to leave the surface of the stone intersected with minute cracks, and so open the way for the destructive action of frost. A great deal may be learnt of the probable durability of a stone by examining a section under the microscope. The tiny cracks or rifts, precursors of more serious disintegration, can here be seen perfectly. Also the various constituents of the stone may be seen and their arrangement clearly made out. Pyrites, for instance, is a most objectionable ingredient, as it generally decomposes with ease, leaving an unsightly black spot to mark the place. If the grains of pyrites are imbedded in a porous light-colored matrix, this defect will be exaggerated accordingly. If, however, the grains of pyrites are confined to a hard, compact, non-absorbent part of the stone, the decomposition may take place and be carried out without leaving a trace; and, moreover, pyrites in sharp, well-defined crystals often resist decomposition entirely. Thus in this respect alone a microscopic examination may prove of the greatest service. The chemical changes described, and particularly the decomposition of pyrites, is greatly aided, if not entirely due, to the actinic rays of the sun. The sun, indeed, is the great chemist of nature as it stands, and few natural chemical reactions can be brought about in the absence of sunlight, or, at least, daylight. Passing on to the consideration of granites, we find the causes of disintegration quite different. Whereas limestones and dolomites succumb chiefly to chemical action, the disintegration of granite is due almost entirely to mechanical strain. The surface of granite is so compact and non-absorbent that frost alone would be quite without effect, since its destructive action only obtains after the stone has absorbed a certain amount of water. The same may be said of diabases, porphyrys and basalts when magnetite or secondary calcite is not present in large quantities. These rocks, however, are all very bad conductors of heat; consequently, where changes of temperature are frequent and considerable, only a thin outer layer of the stone would be concerned in the changes, and the various stresses brought about by these conditions initiate the fine rifts and cracks which are necessary for the effectual action of the frost as a disintegrating agent. Thus a granite, quite unattackable in a place where the changes of temperature are small and slow, may be disintegrated rapidly in places where the opposite conditions prevail. According to Dr. Hague, the granite obelisk in Central Park, New York City, is now suffering from the execrable climate of that city. Another reason why changes of temperature should have a particularly evil effect upon granite is the different co-efficients of expansion possessed by its various constituents. And not only has each constituent a different co-efficient of expansion from the remainder, but the co-efficient of each constituent varies according to the axis of crystallization parallel to which it is measured. How great the differences are may be demonstrated in one example: Hornblende gives .0000095, .00000084, .0000081 as the co-efficient of expansion parallel to its three axis respectfully. Quartz presents even greater variations. If we wish to compare the expansibility of one of these constituents with that of another, as a whole, we must, of course, consider their co-efficients of cubical expansion. Here again the differences which obtain amply explain the susceptibility of granite to disintegration in climates of great variability. How in the world granites got their reputation as fire-proof materials, a property they are still supposed to possess, it is difficult to understand. A greater delusion it would be hard to find, as the foregoing considerations testify. People certainly could not have taken experience as their guide. Every great fire demonstrates the superior virtues of sandstone, and even limestone, as a fire-resisting material. It is not to be understood that granite is absolutely impervious to chemical action; the micas rust and the feldspars may be kaolinised, but the changes are so minute and slow as to be practically negligable. It is a pity the durability of stone excites so little interest.

PUBLICATIONS.

The Architects' Directory for 1895-6, containing a list of the architects in the United States and Canada, has reached our table. The names are classified by states and towns. Wm. T. Comstock, publisher, 23 Warren street, New York. Price, $1.00.

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