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MISSING

CANADIAN ARCHITECT AND BUILDER.

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—THE— CANADIAN ARCHITECT AND BUILDER, *A Monthly Journal of Modern Constructive Methods.*

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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.

To the writer, who had occasion recently to visit the Toronto custom house, it seemed incongruous that side by side with iron doors and shutters, and other safeguards against fire, should be seen in active operation that relic of a past era, the coal oil lamp.

JUDGE MCDougall, of Toronto, has decided, in a county court suit for \$147 for 25 toise of stone, that stones are part of the land upon which they are found and cannot be removed by the tenant. Few land owners, however, will be found to object to having the loose stones removed from their property. Quarrying the stone is another matter.

WE referred in a recent issue to the quality of Canadian cement. Since then we have heard of tests applied in Montreal to a cement made at Vancouver, which it is said show it to be far superior to the English article, the difference in breaking strain being as 150 to 90 in its favor. Mr. Warsap, the manager, has just returned from a two months' visit to England, and the manufacture of the cement is to be carried on with renewed vigour.

APROPOS of the reference in these columns last month to the effect of ivy planting upon architecture, the statement has since been made in the daily press that it is the intention of the Ontario government to plant "creepers" round the Parliament buildings. The proposal has our hearty approval. Something in the nature of a disguise to the outside of these buildings has long been recognized by persons of cultivated taste, to be a necessity, and the announcement that the want is to be provided for will be hailed with pleasure.

SOMETIMES when condemning the extravagance of our governors in expending money on needless public works, we have consoled ourselves with the reflection that after all they paid for themselves. Some figures recently presented to the Montreal city council dispel that idea. They show that while the city debt had, during the past six years, increased 120 per cent., with a corresponding increase in interest charges, the revenue had increased less than 50 per cent. It does not pay a community to have its money squandered upon public works.

THE city of San Francisco has recently passed an ordinance limiting the height to which new buildings may be erected to 125 feet on streets over 100 feet wide, and 100 feet on streets of less width. The California Architect, in discussing the ordinance, prints some of the arguments for and against high buildings, and concludes by saying: "It seems to us that all these conflicting interests would be harmonized by the adoption of the rule that no part of a building on one side of a street should extend beyond a line drawn from the foot of the building on the opposite side of the street, at an angle of forty-five degrees; this gives the public and the adjacent owners of property their share of sunlight and air—and at the same time allows a man to build as high as he likes on the rear portion of his lot, as long as he does not obtrude upon that forty-five degree line."

ST. LOUIS, like Toronto, is erecting a city hall, but it is hoped that the experience of the latter will not be that of the former. A committee of investigation has discovered numerous defects and weaknesses in the partially completed St. Louis building, which has already cost the city over \$2,000,000, and which will have to be largely reconstructed. Toronto's complaint is not so much structural as financial.

MR. JAS. J. CURRIE, of Abbotsford, B. C., has sent a long communication to the New Westminster Board of Trade, in which he elaborates a plan for the construction of dwellings for the working classes in London, England, the material to be sawdust and other refuse reduced to pulp and moulded into planks. Artificial lumber of this kind is no new thing, but we question whether the freight from British Columbia on either the sawdust or lumber would not be too high to make it pay.

MR. JOHN J. FOY, of St. Louis, presented to the National Association of Master Plumbers of the United States recently, a lengthy paper, the title of which was, "Should Master Plumbers Handle Tools?" No general answer, affirmative or negative, can be given to this question. If the building business is active in the locality in which the plumber resides, it will probably be more profitable to him to pay journeymen to handle the tools while he devotes his time to securing contracts. If on the other hand, there are few contracts to be got, as has been the case of late in most of the cities and towns of Canada, the master plumber should not allow false notions of dignity to prevent him from taking hold of the tools and doing as much as possible of the actual work himself, thereby adding to his profits the money which under different conditions would be paid out in wages.

WE have recently received a communication from the Secretary of the Institute of Clay Workers, 222 Strand, London, asking our assistance towards obtaining specimens of Canadian manufactured bricks for the Institute's exhibition of manufactures of clay materials. The Secretary of the Institute adds that he would be pleased to see any of the readers of this journal who may at any time visit London, and to show them what is being done in England in the line of brick manufacturing. We trust that some of our manufacturers, in response to this invitation, will send to the Institute specimens of their products. In the manufacture of plain and pressed brick, terra cotta, and other clay materials, Canada has made wonderful strides during the past ten years, and we have little doubt that our productions in this line will compare favorably with those of other countries.

A GUILD of Sculpture has been incorporated in Ontario, to promote and cultivate the study and taste for that art, and for special training in designing, modeling, carving and working in metals. It is the intention to hold exhibitions and offer prizes for statuary, and to promote the establishment of a gallery. Ticket holders will receive statuettes or busts in terra cotta, and have a chance in the drawing of prizes. The president is Mr. L. R. O'Brien, R.C.A., the well known artist, and the Director of Arts, Mr. Hamilton MacCarthy, R. C. A., the equally well known sculptor. Mr. Emerson Coatsworth, M.P., is treasurer, and Mr. James Van Sommer secretary. The studios and office are at 28 Toronto street, Toronto. Officered by such men, and with a promising field, such a guild should, and no doubt will, be a success in promoting a love for this splendid branch of fine art.

A CANADIAN visitor to New York recently was impressed with the difference in methods of construction employed in that city compared with those pursued in Canada. In the construction of long stretches of wall in business buildings, the method usual in Canada of bonding each course of brick, is not followed; instead, it is the practice to lay a bonded course at regular distances, a few feet apart, and to fill in the space between these courses with brick bats, laid directly one upon another with a bedding of cement mortar between each course. It is claimed that this method of construction, which permits of the utilization of a large amount of what is here regarded as waste material, is not only cheaper but actually possesses some advantages over the Canadian method. One of these advantages is, that cracks

due to settlement will affect only sections of the wall and not the entire structure, as is the case where bonded courses are laid throughout the building.

CANADIAN manufacturers who do an export business in iron materials are complaining of the treatment accorded to them by the Government in the matter of refund of duty. With the object of encouraging the use of Canadian iron, the tariff imposes a duty of 20 cents per cwt., or \$4.48 per gross ton, on iron imported for manufacturing purposes from the United States, and in order that our manufacturers may not be placed at a disadvantage with American manufacturers as regards the ability to do foreign business, it provides for a refund of 99 per cent. of the duty paid by the Canadian manufacturer on American iron, when the article in which the iron is used is exported. These provisions are considered fair enough if properly carried out, but complaint is made that the Government has failed to provide any satisfactory means of arriving at the amount of refund, and some manufacturers at least, who are doing quite an extensive export business, have as yet not been able to secure a cent of refund. Manufacturers of iron goods which have to be subjected to steam pressure—as for example radiators—are obliged to use about 60 per cent. of American iron, in order to get the requisite amount of strength for their materials. It is apparent that it would be impossible for the customs inspectors to determine by examining the manufactured article just what percentage of Canadian and American iron it contained. The common sense way would seem to be to compel the manufacturer to submit to the Government proof of the amount of American iron which he is accustomed to use in the manufacture of a certain class of material, and upon this the rebate should be allowed in the case of material exported. Strange to say, however, the Government refuse to adopt this method, while neglecting to make provision of a more satisfactory character. The result is, that manufacturers are getting no rebate whatever, which means that American manufacturers are enjoying an advantage in foreign markets of something like \$6.00 per ton. This condition of things should be remedied without delay.

It is alleged by manufacturers of certain lines of materials that there is need for a revision of the specifications under which tenders are received and contracts awarded for Government buildings. It is stated that under these specifications materials of certain manufacturers, who years ago were the only reliable makers of certain lines of goods, continue to be specified, thus shutting out the numerous other manufacturers who have come into the field in recent years. Some of these goods are of the most simple character, as for example supports for lines of steam piping, which can now be obtained from a score of different sources. It seems only right that all reliable Canadian manufacturers should be given an opportunity of submitting tenders for materials required for use in public works. The following order, recently issued by Secretary Carlisle, of the United States Treasury Department, recognizes the necessity for the change which our manufacturers desire to see introduced: "The supervising architect of the Treasury Department is hereby directed to eliminate from the specifications hereafter prepared in this office for the erection or repair of public buildings all requirements which demand from the successful bidder that he shall furnish certain specific materials or "equal thereto," and shall not use in connection therewith the name or designation of any individual, co-partnership, company or corporation. The said specifications must state in sufficiently descriptive terms the kind and quality of stone or brick desired, without reference to any particular quarry or manufacture; but these, and all other materials must be of the best quality for the purpose wanted, and subject to the approval of the supervising architect, without, however, naming any special make or brand of goods, or in any wise discriminating in favor of one specific kind of material as against similar material of equal quality. The supervising architect is further directed to settle definitely in his designs of public buildings the kind of material with which the walls are to be built, in order that controversies concerning the use of different materials may be avoided. This order shall take effect at once." Complaints are also heard of the difficulty experienced in securing copies of specifications, and answers to

requests for information addressed to the Public Works Department at Ottawa. Mention is made of these matters in order that the complaints, if well founded, may receive attention at the proper hands.

CONCRETE AS A FIRE RESISTANT.

IN the last number of the ARCHITECT AND BUILDER we published a description of the method being adopted to render the new building in course of erection in Toronto for Mr. Robt. Simpson, as a departmental store, fireproof by means of concrete. The article has called forth a letter from "Architect," which appears elsewhere, in which he asserts very positively that concrete is not a fire resisting material, and that it is unsafe to use it where it will be subject to the action of great heat, which would have the effect of causing it to crack and disintegrate.

This is one of those cases where "doctors disagree," and when such is the case, who is to settle it? We have, since "Architect's" letter came into our hands, taken some pains to ascertain the views of different architects and experts on the subject, and find they are as widely apart as the poles. We shall be glad to have the matter discussed in our columns, for it is an important one, in view of the better class of buildings which are being constructed in our cities, and which their architects and owners are desirous of rendering as indestructible as possible.

The quality of concrete depends of course very much on the way it is prepared. If gravel containing limestone pebbles is used the application of heat will slack the lime contained in them and cause disintegration. If, however, slag or screenings are used (and slag, when obtainable, forms the matrix of the concrete used by the Simpson building contractors) disintegration would not occur to the same extent.

We have been shown the results of some very severe tests to which this concrete has been subjected, and assuming that they were fairly applied, they seem to indicate that it is what its supporters claim—absolutely fire resisting. The Board of Fire Underwriters of Alleghany County, Pennsylvania, which includes the city of Pittsburg, lay down the following specifications of a test, which will be required on all non-combustible floor construction before the same will be passed by the board:

"Enclose a space of eight feet square with a brick wall, having a protected steel beam in the center of same, thus having two half spans of floor arch enclosed; said beam must not rest on enclosure wall, but must be a 12-inch 32-pound beam with a span of 16 feet between supports.

Enclosure must be so arranged as to have a flue outlet and a door opening at the other side by which to feed fuel to fire bed.

Place furnace bed 4 feet below bottom of arch and maintain a mixed coke and wood fire at as high a degree of temperature as is possible for at least one hour, then beam and arch must be drenched by a plug stream of water, hose to be two and one-half inch, with a one inch nozzle, under a pressure of 65 pounds.

While fire is in operation the span of the floor must have a load of 750 pounds to the square foot resting on same.

The test must be witnessed, and in charge of an officer of this board."

The concrete appears to have stood this ordeal. The Board of Underwriters gave this certificate:—"As a result of the test of your concrete construction, witnessed by us on the 21st inst., I beg leave to say that we are satisfied with that type of construction for fire-proof buildings." This was signed by Mr. Biggert, assistant secretary of the Board, and addressed to the Columbian Fire-proofing Co., which has the contract for the work at the Simpson building. We understand it is the intention of the company to make some tests in Toronto, and that they desire to make it competitive, so that the relative merits of their system and others may be compared.

An important inquiry is about to be instituted in New York with the object of determining the value of various so-called fire-proof materials, which will throw new light on the subject.

Some of the architects whose opinions we have sought say that their knowledge is only theoretical, but they cannot see why concrete, made with slag, should not be a good fire resistant. One, who used concrete for a hearth in a private dwelling, had an experience which rather surprised him, and which showed that it is not a good non-conductor of heat—a fact not very favorable to its fireproofing qualities. Others declare terra cotta, or preparations of clay, to be the only fire-resistants which can be depended on.

A recent test in Glasgow goes to show that concrete made

with diatomite, which comes from the island of Skye, and consists of fossilized aquatic plants, will successfully resist fire.

It is claimed for concrete that in addition to being fire-resisting in itself, it possesses a great advantage so far as strength is concerned. And here let us correct a slight mis-statement in our former reference to the Simpson building. The spaces between the floor beams are filled in, not with hollow blocks of concrete, but with two thicknesses, having a space between. There are no joints—the concrete forms a monolith—and it is formed around iron bars which give it great strength. In this respect an advantage is claimed over terra cotta, in that the latter has to be put in place block by block, and being brittle, if one block is broken away, in a fire or otherwise, those beside it are liable to be dislodged. Certainly the tests applied to the concrete, as indicated in the Underwriters' requirements referred to above as well as other tests, show it to be possessed of great strength.

The ARCHITECT AND BUILDER simply seeks to give the facts, with a view of determining, as far as possible, what is the best fire-resisting material for buildings. That point it seems to be difficult to settle. The School of Practical Science at Toronto, part of whose work it is to test structural materials, is at present engaged with the matter, but has not as yet arrived at any conclusion. As a thoroughly disinterested investigator the result of its experiments will carry much weight. Would it not be well to employ more freely the facilities which that institution offers for testing materials about the merits of which there is great difference of opinion?

As the authorities differ on the point which has been raised by "Architect's" letter, we shall be pleased to have more light thrown upon it in the form of further discussion.

WHAT IS A FIREPROOF BUILDING?

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

SIR,—Having read an article which appeared in the last number of the ARCHITECT AND BUILDER, referring to the method of construction adopted in connection with the new Simpson building, Toronto, I desire to protest against some of the statements contained therein.

The article states that "the building is practically indestructible by fire," and then proceeds to describe the method of fire-proofing which is being employed, which consists of covering the beams with slabs of concrete, and surrounding the columns with the same material. I quite agree with the writer of the article when he states that "so-called fire-proof buildings have shown that they are not such in great conflagrations," and I have little hesitation in saying that should the Simpson building again become the object of a conflagration, it would prove to be no exception to the above mentioned rule.

Concrete in itself is not a fireproof material, and therefore a building in the construction of which it is used as such cannot be fireproof. It is a well known fact to those familiar with the nature of concrete that its character is changed by the action of fire, which burns out the lime in the material and also causes it to crack and disintegrate, as the result of contraction and expansion. No doubt concrete used in the manner described is in some degree a protection against fire, but it is valuable for this purpose only to a limited extent. A fireproof building should mean an indestructible building, and such a building cannot be constructed of iron covered with concrete.

I have made a careful study of the nature and adaptability of this material, and as a result I never use it in close proximity to steam boilers, or in any other position where it would be exposed to the action of intense heat. For such positions I use hard burned brick, or fire brick. So far as my experience goes, clay is the only material which will withstand the action of fire, and porous terra cotta is the only material which can properly be called fireproof.

I call attention to this matter with the object of endeavoring to dispel some of the ill-founded opinions which exist on the part of architects and the public, with regard to this subject. It is quite time that both architects and the public should clearly understand what constitutes a fireproof building. Only evil can result from misconception of facts, such as there is every reason to believe exists at the present time.

ARCHITECT.

THE fourth annual meeting of the Association of Ontario Land Surveyors will be held in Toronto, commencing on Tuesday, Feb. 25, 1895.

THE TORONTO TECHNICAL SCHOOL.

UNDER the new principal recently appointed the Toronto Technical School appears to have entered upon a fresh era of prosperity. As several new subjects have been added, some of them of great importance in the line of architecture and building, a resume of the history and work of the institution will be of interest.

The school was established in January, 1892. Its principal promoters were the late ex-Ald. Gillespie, who died before it was opened; Dr. J. Orland Orr, the present chairman of the Board, who was the first chairman; the late Mr. J. A. Mills, and Mr. A. M. Wickens.

At first it was thought to be somewhat of an experiment, but the success already achieved has placed it in a more definite position. It is situated on College St., at the head of McCaul St., and directly to the south of the School of Practical Science, in what was formerly Wycliffe College. Permanent quarters have been secured there, and the building so fitted as to be better adapted to the requirements of the school.

It is maintained entirely by the city of Toronto, and is under the control of a Board of Directors composed of seventeen members. Five of these are members of the City Council, five represent the Trades and Labor Council, two the Stationary Engineers, two the Architects, two the Educationists and one the Manufacturers. Regular meetings of the Board are held on the fourth Tuesday in each month during the session, which begins with October and ends with April.

The classes are free to all residents of the city who wish to avail themselves of its privileges. Both sexes are admitted. The course of study to be pursued by any one is optional, and registration and entrance to any class can be made at any time during the session. It is desirable, however, to enter the classes at the opening of the session.

The school has a staff of nine teachers, and the class hours are from 7:45 to 9:45 p.m. each week day evening, excepting Saturdays.

The design of the school is to aid those who have not had the advantage of an education in the early period of life. It is specially intended for the artisans, tradesmen, mechanics, etc., and those who follow the usual occupations of an industrial community.

The nature of the work done is very different from that usually taken up by the ordinary commercial colleges or schools. An enumeration of the subjects taught will give some idea of the work it is doing. They are: Arithmetic and Mensuration, Algebra, Euclid, Descriptive Geometry, Perspective Drawing, Mechanics, Chemistry, Practical Chemistry, in each of which there are both junior and senior classes. Besides these there are courses as complete as the time will permit in Applied Electricity, Heat, Hydrostatics, Steam and the Steam Engine, Hydraulics, Light, Sound, Practical Geometry, Freehand Drawing and Designing, Mineralogy and Geology, and Modelling in Clay. In the draughting room a numerous group of subjects is taken up, as Machine and Architectural Drawing, Industrial Design, Shading, Lettering, Machine Construction, etc.

That the school is doing an important and useful work, and that it is appreciated by the young men of the city, is attested by the fact that the aggregate attendance for last year was 631, while the average nightly attendance for the whole session was 286. This year the attendance is already about 450.

There are no fees for attendance on any of the classes, and each student can take any subject he chooses, or any group of subjects that the time table will permit.

Considerable improvement was made during the holidays by the remodelling of the building and the addition of new classrooms.

The school is now fairly well provided with apparatus in the more important departments for the practical illustration of the

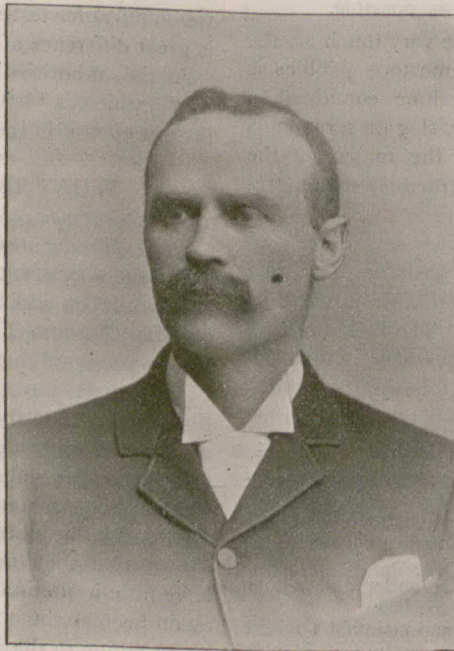
various physical subjects taught. It is intended to make the teaching as practical as possible, and to see that the students know the work and not merely see it done. At the end of the session, or of the work in any subject, examinations are held in the various branches, and certificates are granted to those who succeed. A diploma is also given by the school to those who complete certain definite courses of study. This work, it is thought, will require from three to four years on the part of a student with average ability and but meagre attainments at his entrance upon the course.

Three new teachers have recently been appointed to the staff, and one of the old teachers, Dr. J. McMaster, selected as principal. The new teachers are Mr. James Milne, electricity and steam engine, Mr. D. Hull, mathematics, and Mr. A. V. White, draughting. There are now three instructors in draughting, Mr. E. R. Babington, who also takes modelling, Mr. A. F. McCallum and Mr. White.

Modelling is a new subject and has been added for industrial work. It is well to emphasize the fact that the instruction given by the school is not considered from the side of art, but industrial. It is not intended to train the æsthetic ideas of the pupils so much as to enable them to earn dollars. The class in modelling is at present engaged on the five orders of architecture and is intended for stone cutters.

We subjoin a brief sketch and portrait of Dr. McMaster, the new principal.

John McMaster, B. A., M.D.C.M., the subject of this brief sketch, was born in the county of Simcoe, Ont., in 1857. His parents, who were of Irish lineage, settled in that county a few years earlier. From the age of five till he was twelve, he was as regularly kept at school as the average boy in a newly settled country place can be. At that very early age he learned to plough and became so useful on the farm that he was kept at home, excepting for a few months in the winter. At the age of eighteen it was necessary for him to leave home and to earn a livelihood for himself. At this time his education was very meagre, being confined to reading, writing and arithmetic, at the latter of which he was somewhat expert. As a boy he was very ingenious with his knife, always being mechanically inclined. In spare time, and on wet days, he used to



DR. McMASTER,
Principal Toronto Technical School.

occupy himself making miniature saw-mills, to be driven by a small stream that ran through the farm. Fire-arms made of lead, and bows and arrows of every description, were among his numerous inventions. His desire as a youth was to be an engineer and machinist. In this he never had his father's support, and as he grew older he became more anxious to obtain an education. His first employer owned a small saw-mill and worked a farm besides. John was part of the time engaged in the mill and part on the farm. During this year he bought books and studied Euclid, History and Short Hand Writing. With the money he earned he resolved to begin his own education. After six months in a public school he passed the entrance to the high school, and very shortly afterwards—three months—obtained a second class B certificate. His means being exhausted, he again went to work, and soon secured enough to fit him for teaching. He attended the various training institutions for teachers in this country, and has been engaged in teaching in nearly all the different kinds of schools in the Province. By alternately teaching and studying he was enabled to secure all the different grades of certificates granted by the education department. A degree in arts was the next desideratum. At Toronto University he took a complete honor course in mathematics, graduating in physics in 1886. While there he did not confine himself exclusively to mathematics, but gained a fair knowledge of science, metaphysics and English literature. After graduating he taught mathematics and physics for a few years in different high schools in the province. Not being



CHAS. J. GIBSON ARCHITECT
TORONTO

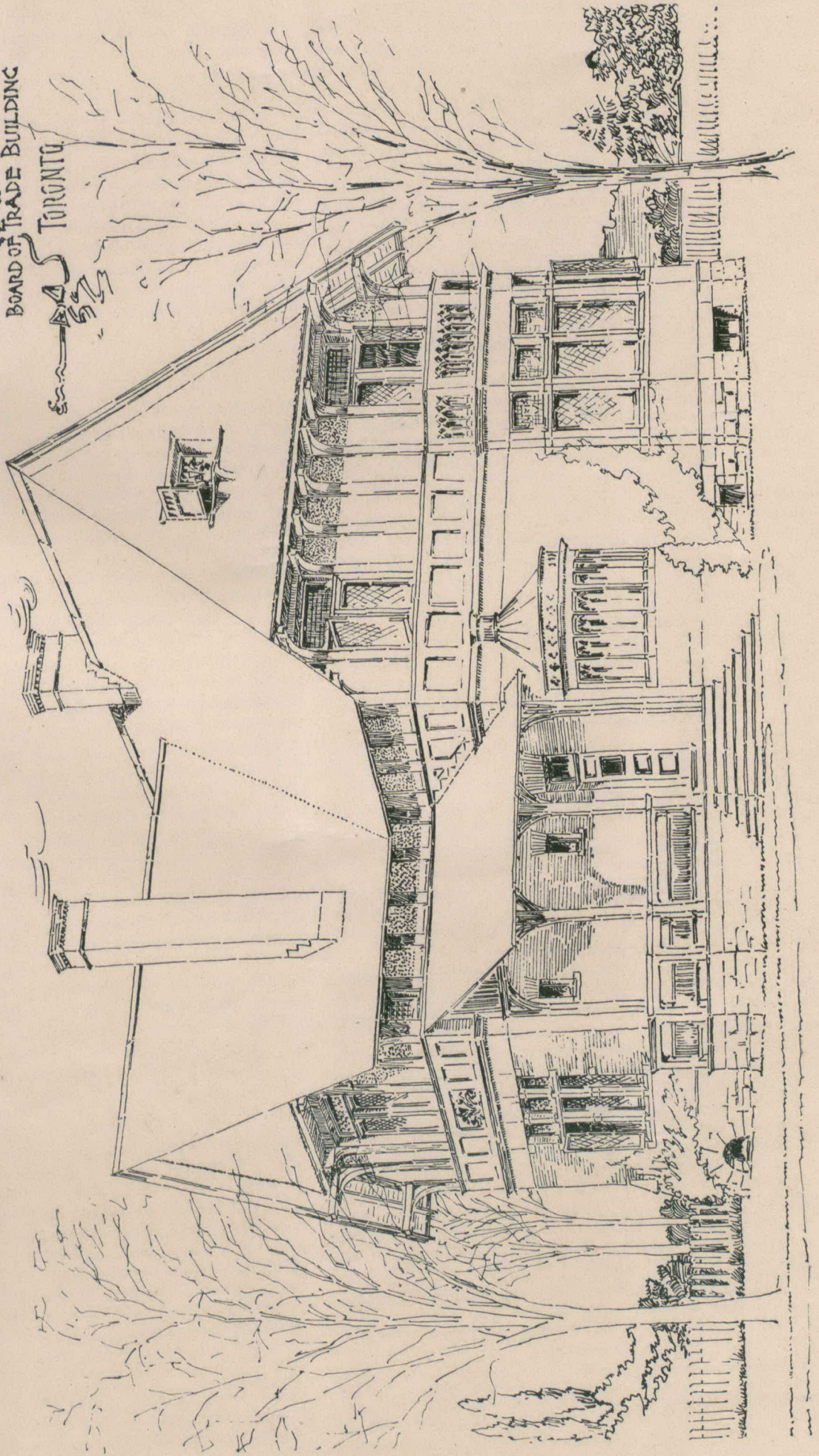
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TORONTO.



satisfied with his attainments, he resolved to take up the study of medicine. At Trinity Medical College he took the regular course in medicine, graduating at Trinity University in the spring of 1894. While an undergraduate in medicine he won considerable distinction among his classmates as a student, carrying off his full share of scholarships and prizes.

Before the Technical School began he was engaged as a teacher in the city night schools for several years, and when that institution was commenced in Jan. '92 he was engaged as one of the teachers. Since that time he has remained on the staff, chiefly being engaged in teaching mathematical subjects. The principalship of the school was declared vacant at a Board meeting in August last, and after duly advertising for applications to fill the position, Mr. McMaster was selected from among a number who applied. His duties as principal began at the opening of the school on the 1st of October.

Judging from his active and energetic disposition, and his varied experience in teaching gained in all kinds of schools, as well as his extensive attainments in the various scientific departments of education, we expect an unusual measure of success for this institution.

THE IRELAND BUILDING COLLAPSE.

THE grand jury in New York has found indictments for manslaughter in the second degree against the architect, inspector, clerk, contractor, superintendent and foreman mason of the Ireland building, which collapsed some time ago and killed fifteen people. This seems to be somewhat wholesale condemnation, but it is only right someone should be punished for a catastrophe which was the result of carelessness, or worse, somewhere.

The grand jury in addition to the indictments, condemn the building department and its regulations and suggest a number of desirable reforms. The principal changes are as follows: That the soil upon which a building is to be erected shall be examined by a competent engineer, and a certificate filed with the department as to the unit of pressure per square foot the soil will sustain; that the department exercise a vigilant supervision by means of experts, over the laying of all foundations, and require a statement as to character and sufficiency of such foundations before the superstructure is proceeded with. The grand jury strongly condemn Mr. Ireland, censuring him for desiring to drive the best bargain possible, regardless of the safety and lives of the men imperilled by his penuriousness. It also points out that such catastrophe should be impossible in a civilized community, and its occurrence proves either a serious defect in the law or culpable negligence in enforcing it. The provisions of the law allow a load of four tons to the square foot on any soil. The jury think one or one and a half tons the limit of safety on soil of a weak and yielding nature.

The testimony at the inquest proved that the direct cause of the disaster was a reduction in the thickness of the concrete footing of the column which gave way, to less than one third of that indicated in the architect's plans and specifications. This shows that there was culpable negligence somewhere.

PUBLICATIONS.

The two architectural and engineering journals of Australia have recently been merged into one, which we trust will be handicapped by nothing but its title, viz., "The Building and Engineering Journal of Australia and New Zealand and Australian Builder and Contractors' News."

We are indebted to the Builders' Exchange of Philadelphia for a copy of their annual Hand Book and Catalogue. The book numbers upwards of 300 pages, and contains illustrations of the headquarters of the Exchange, portraits of past and present officers, the code of practice governing its members, a list of members, the building and sanitary by-laws of the city, and a vast amount of other equally useful information. The Philadelphia Exchange is perhaps the most progressive and prosperous local organization of builders on this continent.

Hon. Russel Sage and other New York capitalists, with Mr. H. H. McLean, of St. John, N. B., are applying for incorporation to take over the patents of the Gold Car Heating Co. for Canada.

Jeremiah O'Neill, of Toronto, is bringing a claim against the Hamilton Bridge Co. for \$1,500 damages arising out of injuries received while employed on the construction of the Simpson building.

MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

ST. JEAN BAPTISTE EVENING CLASSES.

THE inauguration of evening classes organized by the St. Jean Baptiste Society for the benefit of those desirous of obtaining knowledge in the different branches of art and science opened last week in the Monument National. There were on the platform the Hon. Judge Loranger, in the chair; the General Consul of France, Mr. Kleczkowski; Messrs. J. C. Wilson, Judge Jette, J. X. Perrault, L. O. David, L. I. Boivin, Rev. Abbe Colin, S. C. Stevenson, G. Boivin, Hon. Jos. Royal, J. D. Rolland, Jos. Venne, A. Bonnin and Hon. A. Desjardins.

Messrs. Boivin & Wilson spoke on the teaching of arts and trades, and the professors of the different classes each presented the programme they intend to pursue during the coming season, and discoursed briefly at the same time on the various professions they represent. The following is a list of different classes, together with the names of their professors: Hon. Jos. Royal, Political Economy; L. O. David, Universal History; Jos. Venne, Architecture; J. X. Perrault, Agriculture and Colonization; A. Bonnin, Applied Science.

The teaching in the Architectural class will consist of a series of lectures twelve in number, accompanied by lime-light views, illustrations and special geographical maps. The dates of the lectures are not yet definitely arranged, but are expected to be within a few days. The following are the subjects to be taken up at each meeting: 1st, Cursory View of the History of India, Egypt and Assyria, illustrated by special geographical maps; 2nd, Building Construction in Stone and Brick; 3rd, Greece and Rome; 4th, Building Construction in Wood; 5th, The Middle Ages—the Gallo-Roman period; 6th, The Building Trades, of so-called secondary importance, such as copper, galvanized iron, lead, slate, marble, etc.; 7th, The Middle Ages—the Gothic period; 8th, The Modern Industries applied to Iron and Steel, and the Mode of Transportation, and Mechanical Execution; 9th, The so-called Renaissance period; 10th, Organization of Labor, ancient and modern; 11th, The Present Times; 12th, Retrospective Review.

The classes are entirely free of charge to everybody, and all are invited to attend the same, irrespective of condition and position.

MASTER PLUMBERS' ASSOCIATION.

As the result of a conference held recently between the wholesale dealers in plumbing and heating apparatus and the Executive Committee of the Master Plumbers' Association, a Joint Committee was appointed, consisting of Messrs. James Robertson, of Thos. Robertson & Co.; Mr. McLaren, representing the Toronto Radiator Co., and Mr. Lekyer, representing the Gurney-Massey Co., on the one side; and Mr. Jos. Lamarche, President, and Mr. G. W. Hughes, Corresponding Secretary, of the Master Plumbers' Association, on the other, to devise means whereby more satisfactory trade relations than have heretofore existed may be established.

COUNCIL OF ARTS AND MANUFACTURES.

The Plumbing Classes in connection with the Council of Arts and Manufactures will open shortly. The instruction, as in former years, will be given under the direction of a Committee appointed by the Master Plumbers' Association.

ARCHITECTS' ACCOUNTS.

The daily press having been discussing the two accounts of Messrs. Perrault & Mann, architects, rendered the city of Montreal for professional services, and which seem in the eyes of certain aldermen disproportionately high, a representative of your correspondent met one of the architects, with the object of securing enlightenment on the matter. It appears that the account in connection with the fever hospital is not, as many believe, for services in connection with the existing buildings on Moreau street, as there was no architect whatever for the erection of the building, everything being left in the hands of the contractors, but it is for the preparation of a set of plans, estimates, etc., for a new hospital containing 180 beds, and studies for same, together with the expense of a trip to the States for the purpose of visiting similar establishments there, in accordance with orders given jointly by the local and provincial health departments. As to the other account, the Market Committee having no fixed idea as to what it intended to do, had the architects prepare two sets of plans and specifications, which were considered by the Committee, but finally set aside, and for which the architects claim not to have received a cent. Their charges are only at the ordinary percentage rate on such work for the repairs of the market, which the Committee decided in the end to preserve.

OBITUARY.

An old-time Montreal plumber has recently passed away in the person of Mr. A. Lothian, who at the time of his death was upwards of 79 years old. Deceased came to Montreal from Scotland in 1842, and assisted in the construction of the city water works.

THE CITY AND THE C. P. R.

The understanding arrived at some time ago by the city and the C. P. R., under which a new passenger depot was to be erected in the east end, has been disturbed by the substitution of another plan for the one which accompanied the agreement.

STRENGTH OF BRIDGE AND TRESTLE TIMBERS.*

YOUR committee appointed to report on "Strength of Bridge and Trestle Timbers, with special reference to Southern Yellow Pine, White Pine, Fir and Oak," desires to present herewith, as part of their report, the very valuable data, compiled by the chairman of the committee, relative to tests of the principal American bridge and trestle timbers, and the recommendations of the leading authorities on the subject of strength of timber during the last twenty-five years, embodied in the appendix to this report and tabulated for easy reference in the accompanying tables I to IV.

The uncertainty of our knowledge relative to the strength of timber is clearly demonstrated after a perusal of this information, and emphasizes, better than long dissertations on the subject, the necessity for more extensive, thorough and reliable series of tests, conducted on a truly scientific basis, approximating as nearly as possible actual conditions encountered in practice.

The wide range of values recommended by the various recognized authorities is to be regretted, especially so when undue influence has been attributed by them in their deductions to isolated tests of small-sized specimens, not only limited in number, but especially defective in not having noted and recorded properly the exact species of each specimen tested—its origin, condition, quality, degree of seasoning, method of testing, etc.

The fact has been proved beyond dispute that small-size specimen tests give much larger average results than full-size tests, owing to the greater freedom of small selected test pieces from blemishes and imperfections, and their being, as a rule, comparatively drier and better seasoned than full-size sticks. The exact increase, as shown by tests and by statements of different authorities, is from 10 to over 100 per cent.

Great credit is due to such investigators and experimenters as Professors G. Lanza, J. B. Johnson, H. T. Bovey, C. B. Wing, and Messrs. Onward Bates, W. H. Pinley, C. B. Talbot and others, for their experimental work and agitation in favor of full-sized tests. Professors G. Lanza, R. H. Thurston and Wm. H. Burr have contributed valuable treatises on the subject of strength of timber. The extensive series of small and full-size U. S. Government tests, conducted in 1880 to 1882 at the Waterton Arsenal under Col. T. T. S. Laidley, and more recently the very elaborate and thorough timber tests being conducted by the U. S. Forestry Division under Dr. B. E. Fernow, Chief, and Prof. J. B. Johnson of Washington University, St. Louis, afford us to-day, in connection with the work of the above-mentioned experimenters, our most reliable data from a practical standpoint.

The test data at hand and the summary criticisms of leading authorities seem to indicate the general correctness of the following conclusions:—

1. Of all structural materials used for bridges and trestles, timber is the most variable as to the properties and strength of different pieces classed as belonging to the same species, hence impossible to establish close and reliable limits of strength for each species.

2. The various names applied to one and the same species in different parts of the country lead to great confusion in classifying or applying results of tests.

3. Variations in strength are generally directly proportional to the density or weight of timber.

4. As a rule, a reduction of moisture is accompanied by an increase in strength; in other words, seasoned lumber is stronger than green lumber.

5. Structures should be, in general, designed for the strength of green or moderately seasoned lumber, of average quality, and not for a high grade of well seasoned material.

6. Age or use do not destroy the strength of timber, unless decay or season-checking takes place.

7. Timber, unlike materials of a more homogeneous nature, as iron and steel, has no well defined limit of elasticity. As a rule it can be strained very near to the breaking point without serious injury, which accounts for the continuous use of many timber structures with the material strained far beyond the usually accepted safe limits. On the other hand, sudden and fre-

quently inexplicable failures of individual sticks at very low limits are liable to occur.

8. Knots, even when sound and tight, are one of the most objectionable features of timber, both for beams and struts. The full-size tests of every experimenter have demonstrated, not only that beams break at knots, but that invariably timber struts will fail at a knot or owing to the proximity of a knot, by reducing the effective area of the stick and causing curly and cross-grained fibres, thus exploding the old practical view that sound and tight knots are not detrimental to timber in compression.

9. Excepting in top logs of a tree or very small and young timber, the heart-wood is, as a rule, not as strong as the material farther away from the heart. This becomes more generally apparent, in practice, in large sticks with considerable heart-wood cut from old trees in which the heart has begun to decay or been wind-shaken. Beams cut from such material frequently season-check along middle of beam and fail by longitudinal shearing.

10. Top logs are not as strong as butt logs, provided the latter have sound timber.

11. The results of compression tests are more uniform and vary less for one species of timber than any other kind of test; hence, if only one kind of test can be made, it would seem that a compressive test will furnish the most reliable comparative results.

12. Long timber columns generally fail by lateral deflection or "buckling" when the length exceeds the least cross-sectional dimension of the stick by 20, in other words, the column is longer than 20 diameters. In practice the unit stress for all columns over 15 diameters should be reduced in accordance with the various rules and formulae established for long columns.

13. Uneven end-bearings and eccentric loading of columns produce more serious disturbances than usually assumed.

14. The tests of full-size long compound columns, composed of several sticks bolted and fastened together at intervals, show essentially the same ultimate unit resistance for the compound column as each component stick would have if considered as a column by itself.

15. More attention should be given in practice to the proper proportioning of bearing areas; in other words, the compressive bearing resistance of timber with and across grain, especially the latter, owing to the tendency of an excessive crushing stress across grain to indent the timber, thereby destroying the fibre and increasing the liability to speedy decay, especially when exposed to the weather and the continual working produced by moving loads.

The aim of your committee has been to examine the conflicting test data at hand, attributing the proper degree of importance to the various results and recommendations, and then to establish a set of units that can be accepted as fair average values, as far as known to-day, for the ordinary quality of each species of timber, and corresponding to the usual conditions and sizes of timbers encountered in practice. The difficulties of executing such a task successfully cannot be overrated, owing to the meagreness and frequently the indefiniteness of the available test data, and especially the great range of physical properties in different sticks of the same general species, not only due to the locality where it is grown, but also to the condition of the timber as regards the percentage of moisture, degree of seasoning, physical characteristics, grain, texture, proportion of hard and soft fibres, presence of knots, etc., all of which affect the question of strength.

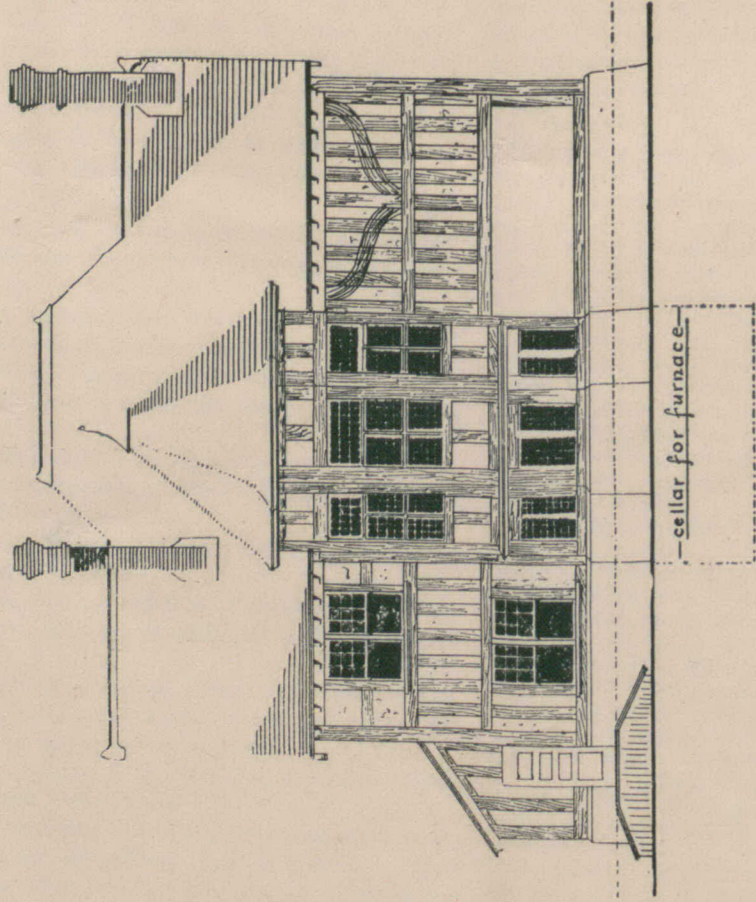
Your committee recommends, upon the basis of the test data at hand at the present time, the average units for the ultimate breaking stresses of the principal timbers used in bridge and trestle constructions shown in the accompanying table.

In addition to the units given in the table, attention should be called to the latest formulae for long timber columns, mentioned more particularly in the appendix to this report, which formulae are based upon the results of the more recent full-size timber column tests, and hence should be considered more valuable than the older formulae derived from a limited number of small-size tests. These new formulae are Professor Burr's, App. I.; Professor Ely's, App. J.; Professor Stanwood's, App. K.; and A. L. Johnson's, App. V., while C. Shaler Smith's formulae will be better understood after examining the explanatory notes contained in App. L.

Attention should also be called to the necessity of examining the resistance of a beam to longitudinal shearing along the neutral axis, as beams under transverse loading frequently fail by longitudinal shearing in place of transverse rupture.

In addition to the ultimate breaking unit stress the designer of a timber structure has to establish the safe allowable unit stress for the species of timber to be used. This will vary for each particular class of structures and individual conditions. The selection of the proper "factor-of-safety" is largely a ques-

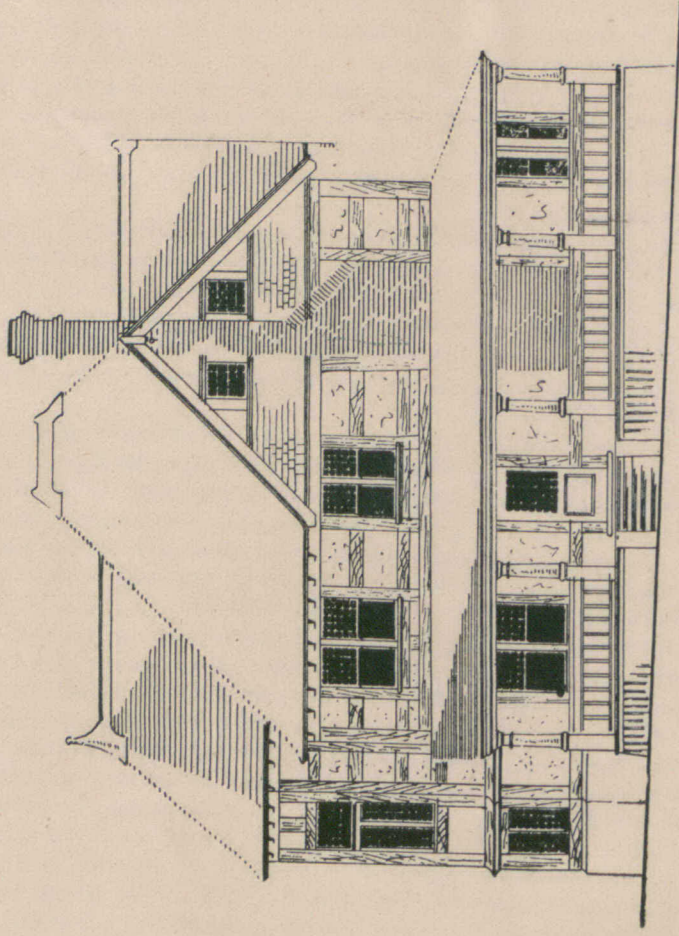
*Report of Committee of American Association of Railway Superintendents Bridges and Buildings, presented at Annual Convention, New Orleans, Oct., 1895.



Back Elevation

Scale

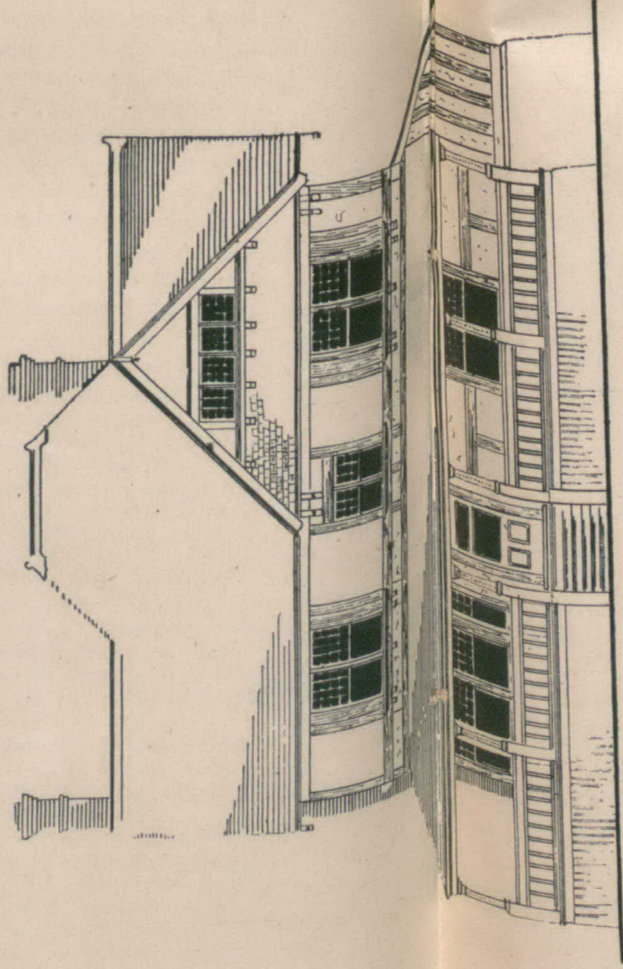
Scale - one eighth of an inch to a foot



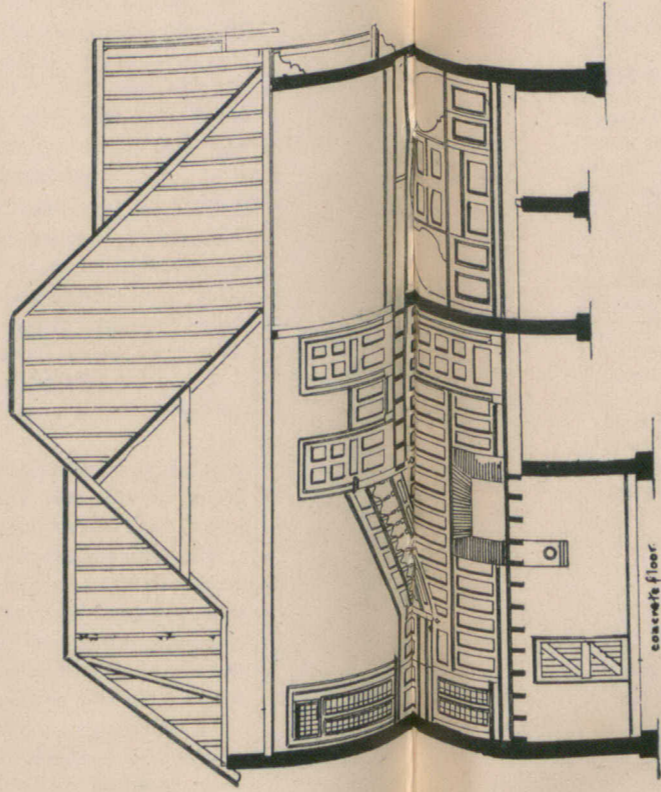
Elevation towards Vernon

Scale

Scale - one eighth of an inch to a foot



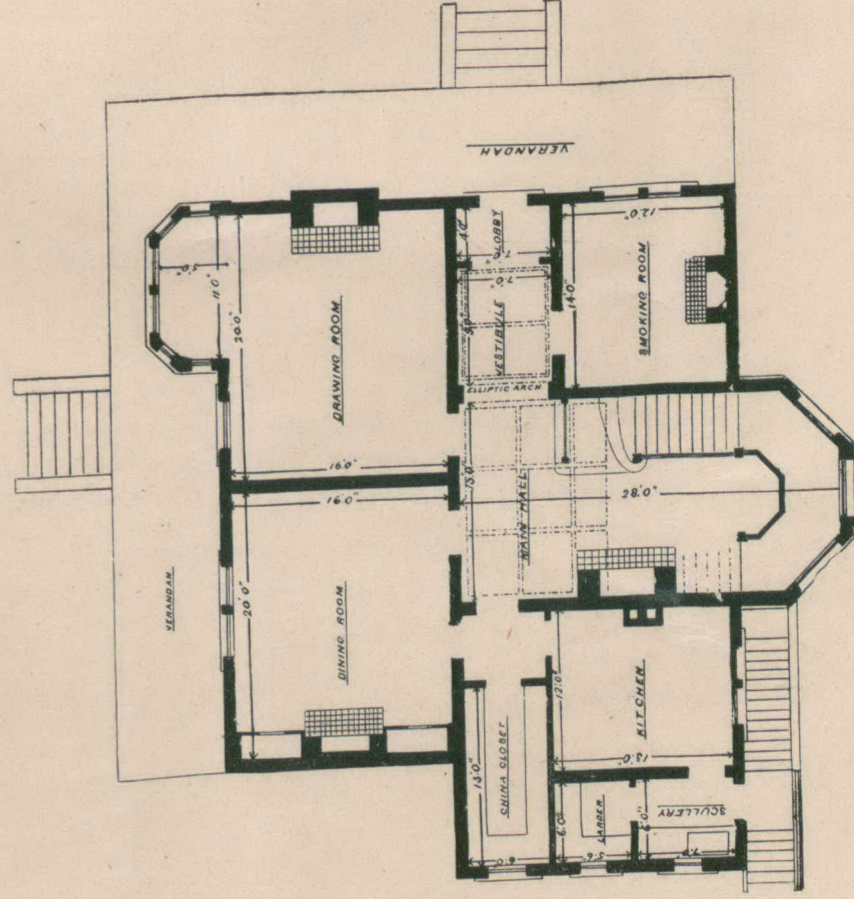
Elevation to Swan Lake



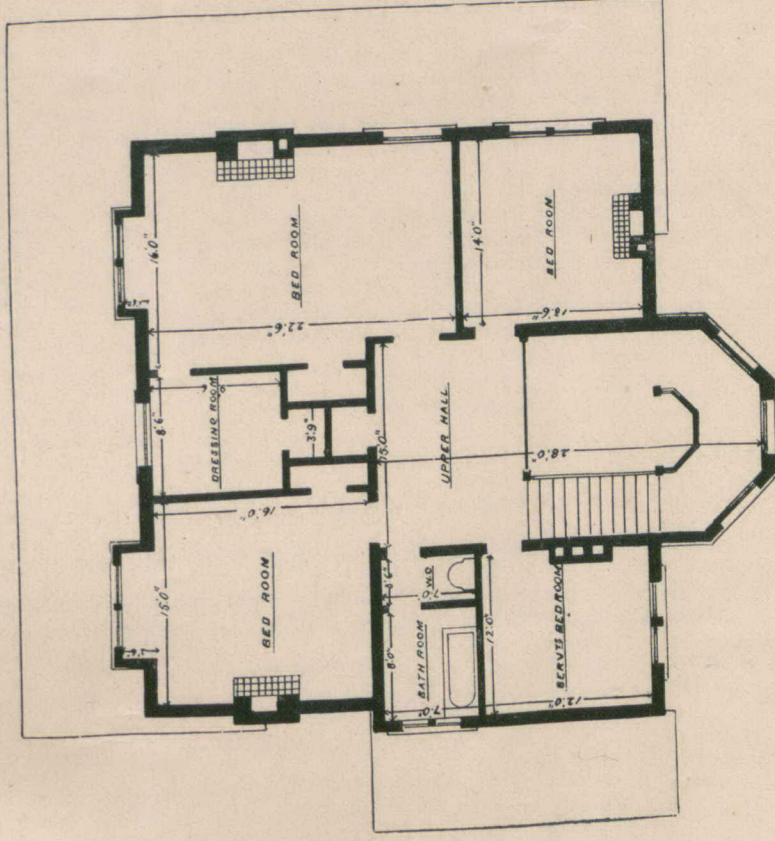
Section on A-B

Residence erected at Swan Lake
 Okanagan B.C.
 for
 Judge Shinks.

R Mackay Fripp friba
 Architect
 March 1912 Vancouver B.C.



GROUND FLOOR PLAN



FIRST FLOOR PLAN

tion of personal judgment and experience, and offers the best opportunity for the display of analytical and practical ability on the part of the designer. It is difficult to give specific rules. The following are some of the controlling questions to be considered.

The class of structure, whether temporary or permanent, and the nature of the loading, whether dead or live. If live, then whether the application of the load is accompanied by severe dynamic shocks and pounding of the structure. Whether the assumed loading for calculations is the absolute maximum, rarely to be applied in practice, or a possibility that may frequently take place. Prolonged heavy steady loading, and also alternate tensile and compressive stresses in the same piece, will call for lower averages. Information as to whether the assumed breaking stresses are based on full-size or small-size tests or only on interpolated values, averaged from tests of similar species of timber, is valuable in order to attribute the proper degree of importance to recommended average values. The class of timber to be used and its condition and quality. Finally, the particular kind of strain the stick is to be subjected to, and its position in the structure with regard to its importance and the possible damage that might be caused by its failure.

In order to present something definite on this subject, your committee presents the accompanying table, showing the average safe allowable working unit stresses for the principal bridge and trestle timbers, prepared to meet the average conditions existing in railroad timber structures, the units being based upon

the ultimate breaking unit stresses recommended by your committee and the following factors-of-safety, viz :

Tension, with and across grain.....	Ten.
Compression, with grain.....	Five.
" across grain.....	Four.
Transverse Rupture, Extreme Fibre Stress.....	Six.
" Modulus of Elasticity.....	Two.
Shearing, with and across grain.....	Four.

In conclusion your committee desires to emphasize the importance and great value to the railroad companies of the country of the experimental work on the strength of American timbers being conducted by the Forestry Division of the U. S. Department of Agriculture, and to suggest that the American Association of Railway Superintendents of Bridges and Buildings endorse this view by official action, and lends its aid in every way possible to encourage the vigorous continuance of this series of government tests, which bids fair to become the most reliable and useful work on the subject of strength of American timbers ever undertaken. With additional and reliable information on this subject, far-reaching economies in the designing of timber structures can be introduced, resulting not only in a great pecuniary saving to the railroad companies, but also offering a partial check to the enormous consumption of timber, and the gradual diminution of our structural timber supply.

WALTER G. BERG, Chairman,
J. H. CUMMIN,
JOHN FOREMAN,
H. L. FRY, } Committee.

AVERAGE ULTIMATE BREAKING UNIT STRESSES IN POUNDS PER SQUARE INCH.

Recommended by the Committee on "Strength of Bridge and Trestle Timbers."

AMERICAN ASSOCIATION OF RAILWAY SUPERINTENDENTS BRIDGES AND BUILDINGS.—5TH ANNUAL CONVENTION, NEW ORLEANS, OCT., 1895.

KIND OF TIMBER.	TENSION.		COMPRESSION.			TRANSVERSE RUPTURE.		SHEARING.	
	With Grain.	Across Grain.	With Grain.		Across Grain.	Extreme Fibre Stress.	Modulus of Elasticity.	With Grain.	Across Grain.
			End Bearing.	Columns under 15 Diams.					
White Oak.....	10,000	2,000	7,000	4,500	2,000	6,000	1,100,000	800	4,000
White Pine ..	7,000	500	5,500	3,500	800	4,000	1,000,000	400	2,000
Southern, Long-Leaf or Georgia Yellow Pine	12,000	600	8,000	5,000	1,400	7,000	1,700,000	600	5,000
Douglas, Oregon and Wash- } Yellow Fir.....	12,000	.....	8,000	6,000	1,200	6,500	1,400,000	600	.....
ington Fir or Pine. } Red Fir.....	10,000	.....	.....	.....	.....	5,000	.....	.....	.....
Northern or Short Leaf Yellow Pine	9,000	500	6,000	4,000	1,000	6,000	1,200,000	400	4,000
Red Pine	9,000	500	6,000	4,000	800	5,000	1,200,000	.....	.....
Norway Pine	8,000	.....	6,000	4,000	800	4,000	1,200,000	.....	.....
Canadian (Ottawa) White Pine.....	10,000	.....	.....	5,000	.....	.....	.....	.....	.....
Canadian (Ontario) Red Pine	10,000	.....	.....	5,000	.....	5,000	1,400,000	350	.....
Spruce and Eastern Fir.....	8,000	500	6,000	4,000	700	4,000	1,200,000	400	.....
Hemlock	6,000	.....	.....	4,000	600	3,500	900,000	400	3,000
Cypress	6,000	.....	6,000	4,000	700	5,000	900,000	350	2,500
Cedar	8,000	.....	6,000	4,000	700	5,000	700,000	.....	1,500
Chestnut	9,000	.....	.....	5,000	900	5,000	1,000,000	600	1,500
California Redwood	7,000	.....	.....	4,000	800	4,500	700,000	400	.....
California Spruce .....	.....	.....	.....	4,000	.....	5000	1,200,000	.....	.....

AVERAGE SAFE ALLOWABLE WORKING UNIT STRESSES IN POUNDS PER SQUARE INCH.

Recommended by the Committee on "Strength of Bridge and Trestle Timbers."

AMERICAN ASSOCIATION OF RAILWAY SUPERINTENDENTS BRIDGES AND BUILDINGS.—5TH ANNUAL CONVENTION, NEW ORLEANS, OCT., 1895.

KIND OF TIMBER.	TENSION.		COMPRESSION.			TRANSVERSE RUPTURE.		SHEARING.	
	With Grain.	Across Grain.	With Grain.		Across Grain.	Extreme Fibre Stress.	Modulus of Elasticity.	With Grain.	Across Grain.
			End Bearing.	Columns under 15 Diams.					
Factor of Safety.	Ten.	Ten.	Five.	Five.	Four.	Six.	Two.	Four.	Four.
White Oak.....	1,000	200	1,400	900	500	1,000	550,000	200	1,000
White Pine ..	700	50	1,100	700	200	700	500,000	100	500
Southern Long-Leaf or Georgia Yellow Pine	1,200	60	1,600	1,000	350	1,200	850,000	150	1,250
Douglas, Oregon and Wash- } Yellow Fir.....	1,200	.....	1,600	1,200	300	1,100	700,000	150	.....
ington Fir or Pine. } Red Fir	1,000	.....	.....	.....	.....	800	.....	.....	.....
Northern or Short-Leaf Yellow Pine	900	50	1,200	800	250	1,000	600,000	100	1,000
Red Pine	900	50	1,200	800	200	800	600,000	.....	.....
Norway Pine	800	.....	1,200	800	200	700	600,000	.....	.....
Canadian (Ottawa) White Pine	1,000	.....	.....	1,000	.....	.....	.....	100	.....
Canadian (Ontario) Red Pine	1,000	.....	.....	1,000	.....	800	700,000	100	.....
Spruce and Eastern Fir.....	800	50	1,200	800	200	700	600,000	100	750
Hemlock	600	.....	.....	800	150	600	450,000	100	600
Cypress	600	.....	1,200	800	200	800	450,000	.....	.....
Cedar	800	.....	1,200	800	200	800	350,000	.....	400
Chestnut	900	.....	.....	1,000	250	800	500,000	150	400
California Redwood	700	.....	.....	800	200	750	350,000	100	.....
California Spruce .....	.....	.....	.....	800	.....	800	600,000	.....	.....

POSSIBILITY OF SIMPLE AND SAFE HOUSE PLUMBING.*

BY HERBERT J. BOWMAN, C. E., TOWN ENGINEER, BERLIN.



FRENCH GOTHIC PANEL.

MR. PRESIDENT AND GENTLEMEN:— In the Statutes of Ontario, 47th Victoria will be found "The Public Health Act, 1884, and appended thereto a by-law, the enactments of which are in force in every municipality till altered by the Municipal Council.

Sections 15 and 16 of this by-law are practically the plumbing regulations in force all over the Prov-

ince, except in the cities and towns that have adopted plumbing regulations of their own.

In order to see whether they are so framed as to admit of the "Possibility of Simple and Safe House Plumbing," it may be interesting to examine these enactments, which are as follows:—

Sec. 15. The following regulations regarding the construction of houses shall be in force within this municipality:

Rule 1.—No house shall be built in or upon any site, the soil of which has been made up of any refuse, unless such soil shall have been removed from such site, and the site disinfected, or unless the said soil shall have been covered with a layer of charcoal, covered by a layer of concrete at least six inches thick and of such additional thickness as may be requisite under the circumstances to prevent the escape of gases into such proposed house.

Rule 2.—The drain of every house which may be connected with a sewer or cess-pool shall be ventilated by means of a pipe extending upward from the highest point of the main soil or waste-pipe, and also by a pipe carried upward from the drain outside the walls of the house according to the principles shown in the appended diagram. These pipes shall be of the same dimensions as the said main soil or waste-pipe, and shall be constructed of the same material or of stout galvanized iron, and no trap shall intervene between the said ventilating pipes. In case a trap shall intervene between the sewer or cess-pool, and the ventilating pipes already described, then a four inch ventilating pipe of the same material as above described shall be carried from a point between such trap and the sewer. All such ventilating pipes shall be carried above the roof of the said house, and shall open above at points sufficiently remote from every window, door, sky-light, chimney or other opening leading into any house.

No pipe carrying air or gas from any drain or soil-pipe shall be connected with any chimney in a dwelling house, unless the same be a furnace chimney used exclusively for the purpose of ventilating such soil pipe or drain.

Rule 3.—Every house drain shall be constructed of vitrified earthenware or iron pipe; and every soil and waste pipe, of iron pipe rendered impervious to gas or liquids, the joints thereof being run with lead and caulked, or of lead pipe weighing at least 6 lbs. to the square foot; and the waste pipe from every closet, sink, tub, wash-basin, safe or other service shall have as near as may be to the point of junction with such service a trap so constructed, vented and furnished, that it shall at no time allow of the passage of gas into such house. All joints shall be so constructed as to prevent gas escaping through them.

Rule 4.—The construction of any closet or other convenience which shall allow of the escape into the house of air or gas which has been confined in any part of it or from the drain or soil pipe, is hereby prohibited.

Rule 5.—No refrigerator waste shall be allowed to connect with any drain.

Rule 6.—No pipe supplying water directly to a water-closet or urinal, shall be connected with the pipe supplying water for drinking purposes.

16. Every person who erects, or causes to be erected, any building shall, within two weeks of the completion thereof, deposit in the registry office of the registry division in which the building is situated, plans of the drainage and plumbing of the

same as executed; and in the case of any alteration of any such plumbing or drainage, it shall be the duty of the owner of the house, within two weeks of the making of the alteration, to deposit in the same manner the plan and record of any such alteration; if such alteration is made by a tenant, it shall be the duty of the tenant or lessee to deposit, or cause to be deposited the plan and record of such alteration.

In examining these statutory plumbing regulations it must be remembered that they were compiled at least as far back as 1884, and that since that time considerable progress has been made toward simple and at the same time safe plumbing, and the methods of good plumbing practice have become more uniform.

Upon looking at the diagram appended to the Health Act, it will be seen that a trap is placed on the drain between the house and the sewer, but it is also indicted by the dotted lines that this trap may be omitted. Thus it will be seen that the views of both the opposing schools of plumbing experts have been met, one insisting upon a trap on the house drain and the other insisting that no such obstruction should be placed there.

The diagram, however, can scarcely be taken as illustrating a typical Canadian house, as comparatively few houses have two bath rooms.

It would have been better to have shown the necessary arrangement for a kitchen sink on the ground floor and also to have shown the cellar excavated, as is now usually done under the greater part of the house, affording a convenient place for the laundry with its stationary wash tubs or the less expensive slop hopper.

Rule 1, dealing with the soil of building sites, does not come within the scope of our present inquiry, so it may be passed over.

Rule 2 requires the extension upwards of the soil pipe (a) through the roof, but goes on to state that this extension may be of galvanized sheet iron. A sheet iron pipe is a cheap and temporary make-shift and should not be allowed in connection with house plumbing. Nothing but cast iron soil pipe and lead or brass waste-pipe are now used in good plumbing. This rule requires an outside ventilating pipe (b), which is quite unnecessary where no trap is placed on the house drain, and where a trap is used, this ventilating pipe, then called the fresh air inlet, is not usually extended above the roof, but only about two feet above the ground. It is very unlikely that the fresh air inlet would act at all were it constructed bending over the roof as shown in the diagram. This rule calls for still another ventilating pipe (c) in case a trap is placed on the main drain. This pipe is to be carried from a point between the trap and the sewer and extend up above the roof, and is an outlay placed upon the householder to ventilate the public sewer. Any bend in this pipe, as shown in the diagram, will cause it to freeze up during our Canadian winters, and even a straight pipe will sometimes freeze up at the top. Partly on account of this, but perhaps more on account of the additional outlay, from which the householder receives no benefit, the pipe is usually omitted in Ontario.

In most of our cities and towns having plumbing regulations of their own it is now required, or permitted, that a house have but one continuous iron soil pipe from the outer connection with the house drain at least three feet outside the wall, up to the opening at least four feet above the roof, the trap and other ventilating pipes being dispensed with. This is certainly the simplest arrangement and quite as safe as any other. It would be better to cut out the proviso that closes this rule and leave it "No pipe carrying air or gas from any drain or soil-pipe shall be connected with any chimney of a dwelling house."

Rule 3 requires that every house drain shall be constructed of vitrified earthenware or iron pipe. By house drain is evidently meant the private drain connecting the house plumbing system with the public sewer, and vitrified clay sewer pipe is almost invariably used, as outside of the house it answers the purpose equally as well as cast iron pipe and costs less than one quarter as much. Inside the house, however, nothing but cast iron soil pipe and lead and brass waste-pipe should be used. The minimum weights per lineal foot for the different sizes of lead waste-pipe should be given, as nothing but drawn lead pipe is now used. The old method of making lead waste-pipe by hand from sheet lead has been entirely discarded, so that the rule should be amended where it says "lead pipe weighing at

* Paper read at annual meeting of Medical Health officers for Ontario, Sept., 1895.

least 6 lbs. to the square foot." The requirement that iron pipe shall be rendered impervious to gas or liquids was probably inserted in this rule to ensure a liberal coating of coal tar to the cast iron soil pipe. It has been found, however, that the coal tar varnish covered up sand-holes and other defects in the pipe, so that now untarred pipes and fittings are mostly used after having been immersed in linseed oil to prevent them from rusting. The only proper way to render cast iron soil pipe impervious to gas or liquids is to require a good thickness of metal, and a standard for the different sizes should undoubtedly be laid down in the Public Health Act. This would please the manufacturers, because they would require but one set of patterns; it would please the wholesalers because they would require to stock only the standard sizes; it would please the master plumbers because they would then not fear the dishonest rival underbidding on light pipe; it would please the plumber because it would lessen the danger of having to remove cracked pipes and fittings when the water-test is applied; and last of all it would be a great benefit to the householder, as he would have the foundation of a good plumbing job ensured.

The requirement that the waste from every fixture should be trapped and vented, is a good general rule, although there are some cases where trap vents are not necessary. The word "safe" must have crept into the list of fixtures unawares, as it has long been considered a violation of the rules of good plumbing to connect a safe-waste direct with any drain. Safes of sheet lead were usually placed under the old fashioned boxed-in plumbing fixtures to prevent water from leaky or defective baths, etc., going through the floor and injuring the ceiling below. It is quite possible that sufficient water might never be caught in a safe to fill a trap on its waste, hence it should not be connected direct with the plumbing system, but empty openly into some lower fixture. Fortunately safes are now seldom required since all fixtures are left open and if any water leaks onto the floor it may be easily seen and mopped up. The conclusion of rule 3 is somewhat indefinite, viz: "All joints shall be constructed so as to prevent gas escaping through them." The section of the Toronto plumbing by-law governing this matter is much more practical and is as follows: "Every connection between lead and iron pipes shall be made with brass thimbles or ferrules, having properly wiped joints, and the ferrules shall be properly gasketted, leaded and caulked into the said pipe. Ferrules for four-inch pipe shall weigh not less than two and a half pounds; for three inch pipes not less than one and three quarter pounds, and for two inch pipes not less than one and a half pounds; each ferrule to be not less than four inches in length. All lead pipes shall have properly wiped joints. When the trap to closets is above the floor, the connection of the same with the soil-pipe shall be made of brass and rubber, said brass flange to be not less than three sixteenths of an inch thick and cast."

Rule 4 is a good general rule, but, in spite of it, the writer has recently found in one of our Ontario towns a new plumbing job with the universally condemned pan closet fitted up. The water closet is perhaps the most important plumbing fixture in a house and the styles made are innumerable, although but two types of closets are now generally used. The older of these is the "hopper" closet, consisting of a straight hopper discharging into an S trap, and forming a good closet from a sanitary point of view, although objected to by the fastidious as its walls are not easily kept clean without almost daily attention. In an attempt to remove this objection, the wash out closet was designed, being in reality a distorted hopper discharging into the same form of trap. This arrangement does not remove the filth, but puts it out of sight and where it is more difficult to get at. The true solution of the problem was the construction of a hopper closet in one piece with the walls more nearly perpendicular, and a larger and deeper pool of water in the trap. This forms what has been termed the "wash-down" closet now coming into general use. The remaining type of closet is used in more expensive work and is composed of the various forms of "syphon" closets. These have deep pools of water and have various devices to start syphonic action to remove the contents rapidly.

Tinned copper baths are now the most frequently used, and when "steel-clad," require no work around them and are just as good from the sanitary standpoint as enameled cast iron or the expensive porcelain baths. The ordinary porcelain basin is de-

fective because there is no means of cleaning the overflow pipe. A removable strainer on the overflow is much more desirable. Kitchen sinks of cast iron, steel and porcelain are in common use. The waste pipe from an ordinary kitchen sink should not be more than 1½ in. in diameter and have an ordinary lead trap properly vented to prevent the seal being syphoned out when the rush of water goes down the soil pipe from the closet.

Rule 5 is a wise one, as no refrigerator waste should be connected direct with the plumbing system. During the winter no ice is placed in the box and the water seal of the trap would soon be lost. There is no objection, however, to have the waste water from the refrigerator discharged openly into the kitchen sink or into any plumbing fixture in the basement below, or it may discharge into the trap on the cellar drain. No mention seems to be made in the rules of how cellar drainage should be arranged where it is required.

Rule 6 is intended to prevent contamination of the drinking water in case the water should be turned off in the street main and a partial vacuum thus caused.

Section 16, requiring owners of houses to file in the county registry office plans of the drainage and plumbing of same as executed, seems to be entirely ignored. House plumbing should be constructed so that every detail may be easily examined without a plan, but of course a plan of the outside drainage should be on record somewhere, and if every town had a registry office no better place could be found.

From the foregoing comments the conclusion may be drawn that when the statutes are revised in 1897 some changes and additions are required to bring this portion of the Public Health Act up to date.

ILLUSTRATIONS.

RESIDENCE AT SWAN LAKE, OKANAGAN, B. C., FOR JUDGE SPINKS—R. MACKAY FRIPP, F.R.I.B.A., ARCHITECT.

ST. JOHN'S CHURCH, NORWAY—CHAS. J. GIBSON, ARCHITECT, TORONTO.

RESIDENCE FOR ARTHUR THOMPSON, ESQ., GLEN ROAD, ROSEDALE—J. FRANCIS BROWN, ARCHITECT.

A COUNTRY CHURCH—C. J. GIBSON, ARCHITECT, TORONTO.

TORONTO'S MUNICIPAL BUILDING.

In a report submitted to the Property Committee of the Toronto City Council a few days ago, Mr. Lennox, architect of the new court house, strongly urged that an iron roof be substituted for the wooden roof shown on the original plan. He pointed out that the building was substantially fire proof, and that a fire could only spread by means of the roof, and that in the event of the timbers becoming ignited, the flames would be uncontrollable at such a height. The character of the neighborhood was, he thought, a great element of danger. He pointed out that iron and fire proof material was fifty per cent. cheaper than when the estimates for the building were prepared.

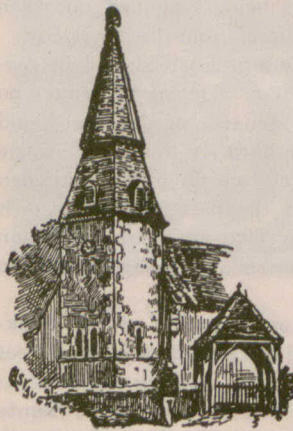
As to cost, while several plans were proposed, he strongly advised one with steel principals, and beams, and steel rafters, riveted together, and porous terra cotta protection. This, allowing for the reduction in carpenter work by the change, would increase the cost \$27,702. An alternative plan was mentioned, to have the roof of slowly burning construction, by having 3½ inch plank protection instead of terra cotta. This would cost \$18,202.

When the report came up in the committee for consideration it was determined not to make the change, but Mr. Lennox was instructed to report on the cost of a covering of asbestos under the tiles, and also on the cost of iron beams and marble floors in the corridors instead of wood beams and oak floors.

These further facts came out in the discussion: The stone work will cost about \$100,000 over Elliott & Neelon's contract. The plumbing contract, including heating, is the only one not let. Mr. Lennox says he has an offer from one of the largest firms in the city to do it for \$78,000 or \$79,000. All the stone is now on the ground except about \$10,000 worth. About \$200,000 more is required for the work to carry it to completion. According to present estimates the total cost will be \$1,850,000. Mr. Lennox says there will be no extras.

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 and tracing cloth. On one sheet is required an elevation and plans of ground and first floors of the building, drawn to $\frac{1}{8}$ scale; on another sheet, working details of ground floor, drawn to $\frac{3}{4}$ 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 these conditions will not be considered.

THE REQUIREMENTS OF AN ARCHITECT'S EDUCATION.

THE President of the Architectural Association, in his address at the opening meeting of the Association in London last month, gave the following as the prevailing consensus of opinion regarding the main need of an architect's education: 1. That the system of pupilage or apprenticeship is good as far as it goes, but it does not go far enough. 2. That it should be supplemented by systematic training by skilled instructors. 3. That that training should be directed to stimulate the artistic faculty—to order the imagination, to give the necessary practical as well as theoretical knowledge in all the accessories of the craft; in short, should consist of work in studio, lectures, classrooms, and in workshop.

THE ORIGIN OF FINGER PLATES.

A CURIOUS custom introduced by our forefathers is that of finger plates for doors. It is a custom that is gradually disappearing, but one that dies hard. I have seen (says Ashby Sterry in the Graphic) superb old solid Spanish mahogany doors disfigured by a modern garish finger plate. As far as my experience goes, if one wishes to open or shut a door, one always takes hold of the handle. Probably everyone who happened to be sane or sober would take a similar course. I have been endeavoring for some time to trace the origin of the aforesaid finger plates, and have come to the conclusion that they must have arisen from the intemperate habits of our ancestors. Probably when they were so disguised in liquor that they were unable to see the handle of a door, they usually laid hold of the edge at any part where they could conveniently clutch it. In that case the finger plate was doubtless of some service, and those made of corrugated brass, and very popular in days gone by, probably gave a very firm hold when people in general were glad to find something to cling to. But in the present mild days of lemon squash and sobriety, the finger plate is altogether an absurdity, and the sooner it is disestablished the better.

BUILDING MATERIALS SEVERELY TESTED.

IN a series of glass cases in the room of the Public Buildings Commission, at the city hall, Philadelphia, says the Philadelphia Record, are preserved a number of specimens of materials used in the construction of the building which have been subjected to a pressure test by the government machine at Watertown, Mass. A sample brick from those used in the construction of the tower still retains its shape, although compressed into powder by a pressure of 500,000 pounds to the square inch. Its mate, rather dilapidated, did not succumb until 600,000 pounds pressure was reached.

Specimens of the white marble which forms the imposing exterior of the hall showed remarkable staying power. One cube successfully resisted a pressure of 800,000 pounds, and a portion of a similar specimen is preserved which cracked only under the enormous pressure of over 1,000,000 pounds. A report like a cannon shot was heard when it finally gave way, and the commissioners maintain that if a block of marble near the foundation of the city hall should crack, the report could be heard in Kensington.

USEFUL HINTS.

AN English writer gives the following as the best way to finish exterior hardwood: First, give the work a coat of clear raw oil, with the addition of a good paste drier. Let this stand several days to harden. Then thoroughly fill it with good filler, let dry, and then apply three coats of shellac, thoroughly rubbing down in oil on each coat, and you will have a job which will last for years.

THE objectionable dark coating which most bronze statues soon acquire, with the look of cast iron, does not consist, according to Herr Buhl, of sulphuride of copper, as commonly supposed, but of a mixture of coal dust, sand, etc., with oxides of the bronze metals. It is not removable, either mechanically or by treatment with dilute sulphuric acid; but on the other hand, it may be very quickly and completely washed off by means of a concentrated solution of carbonate of ammonia, applied with brushes. Thereupon a layer of patina is formed, which guards the statue against fresh formation of the dark coat.

IT is very noticeable, says Edward Hurst Brown in Painting and Decorating, that the rich red shades are again coming into favor for certain sorts of interior decorations, more especially in halls and dining-rooms. Some very handsome papers are shown entirely in reds, in which the designs are self-colored, after the manner of brocades or damasks. Other old fashions that are again coming into use are the papers in imitation of old tapestries, with curious landscapes or pictorial effects, or quaintly colored flowers, highly naturalistic in their coloring, yet on the whole somewhat subdued and sombre, because the general color tone is dark rather than light. In another direction an old fashion is revived when we find papers on the market this season that very closely resemble the old gilts, with a powdering of single or double leaves, in shaded gold, on a plain tint background. There is a certain sweet simplicity about these that cannot fail to make them popular with a great many people who are tired of a great deal of the over-decoration that has been done of recent years. The trouble too often has been that our houses have been decorated to death, and there has been no living in peace with our walls.



CHAS. GIBSON ARCHITECT
TORONTO

A Country Church.

HALIFAX SANITARY REGULATIONS.

THE Royal Gazette, the official paper of Nova Scotia, contains the rules and regulations of the Board of Health, for the city of Halifax, for the guidance of architects, plumbers, householders and others using the water supply, to secure the sanitary condition of buildings. For purposes of comparison we reproduce them.

1. It shall not be lawful to construct or extend any drain for the reception of sewerage or waste water under or into any building, or to connect the same with any public or other sewer or drain, unless the said drain shall in its plan and construction conform to the following requirements:

(a) An effectual hand-hole cleaning trap, of approved description and make, shall be placed in line of drain or soil pipe just before it leaves the premises.

(b) Between the said trap and the foot of the soil pipe (to be situated as remote as possible from any opening into the house) there shall be connected with the main house drain an inlet pipe for the admission of fresh air, four inches in diameter, the mouth of which shall be left open and have a cap, giving an area of one-fourth more than the diameter of the inlet pipe;

(c) All soil pipes within the walls of any building shall be of cast iron, and continue to at least three feet above any opening in the roof which may be within fifteen feet of same, and three feet above any opening into any adjoining building or extension, when such building or extension is within fifteen feet of such pipe, and be left open so that the whole of the inside drainage may be thoroughly and constantly ventilated. All soil or vent pipes, when they pass through the roof, must be properly flashed with 5 lb. sheet lead, and made water-tight.

(d) Whenever in the opinion of the plumbing inspector and the city engineer the trap provided for in section (a) would be liable to freeze, it may be dispensed with, and the fresh air inlet provided for in section (b) will not be required;

(e) The soil pipe shall have two cleaning out screws, one to be about twelve inches above and in front of the bend of the basement floor, and the other between the said bend and the outer wall of the house;

(f) All drains and plumbing fixtures of any house or other building shall be provided with sufficient traps and vents to prevent gas from the sewer, drain or waste pipes from escaping into any apartment, and each such fixture shall have its own trap, with sufficient vent; said trap to be placed directly under and as close as possible to fixture;

(g) No fixture shall drain through more than one trap (main trap excepted); the vent to be not less than one size smaller than trap, and no vent of less than one and one-quarter inches in diameter; all traps must be protected from syphonage by special vent pipe;

(h) No trap vent pipe shall be less than three inches in diameter where it passes through the roof, and all vent pipes must continue to rise after leaving the trap, and pass out through the roof or connect with the soil pipe;

(i) The rule for soil pipe terminus, as hereinbefore mentioned, shall govern said vent pipe;

(j) Vents of water-closet traps shall be two inches for a length of twenty feet and for a greater length three inches in diameter;

(k) No safe-waste, range boiler, refrigerator waste or cistern overflow shall be allowed to connect direct with any drain; the end of such wastes shall be covered by flap valves;

(l) Waste from bath and basin will not be allowed to connect to water closet bend, but must have a separate fitting or connection to receive the same, except where the bend is iron and situated below the ceiling;

(m) The waste pipe of bath, basin or any fixture shall not be connected with the trap of a water closet or any other fixture. Exit pipes of all fixtures, except water closets, shall be furnished with suitable attached strainers. Overflow pipes from fixtures must in each case be connected on the inlet side of the trap.

(n) The overflow pipe from the water closet cistern shall not be directly connected with the soil pipe of any fixture;

(o) No pan closet shall be fitted up in any building, and no closet or other convenience which allows the escape into the house of air or gas which has been confined in any part of it, or from the drain or soil pipe, or which allows the accumulation of filth in or about it, shall be fitted up or used;

(p) Sinks in all hotels, restaurants, boarding houses, laundries, or other places where the engineer or inspector of plumbing or other officer approved by the Board may direct, shall be provided with suitable grease traps.

2. Each house or building must have its own separate soil pipe and drain, and such soil pipe or drain shall be so placed as to be always readily inspected without destruction to walls, and the plumber shall be responsible for the proper connection of his work with the system of drainage, which connection shall be made by a cast iron bend and five feet of pipe extending horizontally from the vertical soil pipe, and no two or more houses or buildings shall have a drain in common until such separate drain passes outside the walls of the house or building which it serves. Where buildings are constructed flush with the line of the street two buildings may be connected with one six-inch or larger street drain with a Y junction placed immediately in front of wall. All drains must be properly connected with the private drain, and not covered until inspected. In no case shall the drains between the walls of the house and the street line be laid until the private drain from the street line to the public sewer has first been laid and completed. Changes in direction of soil pipes shall be made with curved pipes, and connections with horizontal pipes shall be made with Y branches.

3. No iron pipe shall weigh less than the following per length of five feet:

6-inch diameter,	100 lbs.
5-inch "	85 "
4-inch "	45 "
3-inch "	30 "
2-inch "	20 "

All pipes, traps, bends or fittings shall be of good quality, and shall be

free from flaws or defects, and shall be of uniform thickness. No inverted joints of any kind will be allowed below any fixture.

4. Every connection between lead and iron pipes shall be made with brass thimbles or ferrules, having properly wiped joints, and the ferrules shall be properly gasketted, leaded and caulked into the said pipe. Ferrules for four-inch pipes shall weigh not less than 2½ lbs.; for three-inch pipe, not less than 1¾ lbs., and for two-inch pipe, not less than 1 1-2 lbs., each ferrule not to be less than four inches in length. All lead pipes to have properly wiped joints. Where the trap to closet is above the floor the connection of the same to the soil pipe shall be made of brass and rubber, said brass flange to be not less than three-sixteenths of an inch thick and cast.

5. No lead waste or vent pipe shall weigh less than the following:

1 inch in diameter,	6 lbs. per yard.
1 1-4 " "	7 " "
1 1-2 " "	8 " "
2 " "	10 1-2 " "
2 1-2 " "	13 1-2 " "
3 " "	16 1-2 " "
4 " "	24 " "

Trap vent pipes may be standard iron, with steam fittings: sheet metal will not be allowed. All traps and fittings shall be equal in quality and thickness to the pipe to which they are attached.

FOR WATER SUPPLY PLUMBING.

6. Hereafter it shall be unlawful for any person (except the officers and servants of the city in the discharge of their duties) to attach, put in, lay or re-lay, introduce, extend or alter any water pipe, tap, fitting, apparatus or appliance, by or through which city water may be supplied, drawn, distributed or used, unless such person or his employer holds a license from the city as a duly authorised plumber for that purpose.

7. Application for laying of service pipes shall be made in writing at the city engineer's office and upon the required forms.

8. Every house or building separately assessed on the line of street is entitled to one-half inch service pipe. Where pipe is supplied larger than half-inch an extra charge will be made.

9. No two premises supplied with water from the water works shall be dependent upon one service pipe beyond the street line, but each separate and distinct tenement or premises shall be supplied through a separate pipe provided with proper stopcocks or other means of cutting off the water.

10. All service pipes upon the premises of water takers shall be laid at a depth of not less than five feet below the surrounding ground, and must not be turned up or laid at a less depth where they pass through or under a cellar wall or into or through any private premises, and where they cross or are near any other excavation, they must be properly protected against settlement.

11. In all cases the water taker must show that the pipe laid within his premises is laid in accordance with the requirements of the city, and unless the same is shown to the satisfaction of the city engineer, connection shall not be made with the street pipe.

12. When a service pipe has once been put into a house or premises by the city, the owner or occupant of the premises consenting, or not objecting, to the position of such service pipe, then no subsequent removal of such service pipe shall be made except at the expense of the owner, agent or occupant of the said premises.

13. For water works pressure no lead pipes shall weigh less than the following:

¾-inch internal diam.,	4 lbs. per lineal yard.
½-inch " "	6 lbs. " "
⅜-inch " "	8 lbs. " "
¼-inch " "	10 lbs. " "
1-inch " "	13 lbs. " "

14. All water supply pipes shall be laid with due regard to danger from freezing, and be properly laid and graded, with a fall to a stop, and wastcock placed in the cellar or other convenient point where they can be entirely drained off.

15. All pipes in buildings must be so laid and placed as to be easily accessible.

16. Water pipes or fittings on private premises must never be laid, carried along or put near any external wall, doorway or window opening, or in any exposed position or other position where they would be liable to freeze, without being thoroughly boxed in, encased or protected to the satisfaction of the city engineer, or his authorized officer, so as to prevent the action of frost.

17. If necessary to prevent freezing, the pipes must be carried at a sufficient depth underground below the cellar to some convenient point in the interior of the building, from thence the pipes must be properly encased in suitable boxing of ample size, stuffed with some suitable approved non-conducting material, the pipe being carefully placed and secured in the centre of the box.

18. In case of leaky or improper pipes or fixtures on any premises, the city engineer shall have authority to cut off the supply of water by shutting off the stopcock or by detaching the service pipe from the main, and before the water is again turned on the pipes and fixtures shall be repaired or altered as required, and the cost of detaching and re-attaching or of turning off and on the water shall be paid by the person owning or occupying the premises, and no person supplied from such service shall have any claim against the city by reason of such cutting off of the water.

19. Whenever any water taker has reason to fear that the water may freeze in any of the pipes or fittings on his premises, in spite of all precautions taken to prevent the same, he must be careful to see that the water is shut off from the premises at the stop and waste cock, and the pipes emptied of water, except when actually needed for use.

20. The fact of water being found running to waste from any pipe, tap or other water fitting will be held to be sufficient notice from the city engineer that the water is to be at once shut off from the premises as required by law. Water takers are cautioned that as a rule any noise heard in a pipe, even though no defects are visible, is an indication of

leakage and waste of water somewhere on the premises, and calls for immediate investigation and stoppage.

21. All persons shall keep their service pipes, stop-cocks and other fixtures on their own premises and from the line of the street in good order and repair, and protect from frost, at their own risk and expense.

22. Stop and waste cocks must on no account be covered up with coals, vegetables, or anything which will prevent the inmates of the house or the water inspector from getting access to them at once. And whenever any licensed plumber is called into any premises, his first care shall be to see that this rule is attended to, also to see that the stop and waste cock is in good order and easily turned.

23. Taps, faucets, cocks or fittings in porches or sheds, or outside of buildings are strictly prohibited. Any such supply required must either be by means of a suitable approved hydrant or by special written sanction of the city engineer.

24. The water supply to stables, barns, outbuildings or any other description of buildings or property must come under the operation of Rules 10, 11, 15, 16, 17, 21, 22, and 23, and must conform in all other respects with the requirements of these rules and regulations. If after every practicable precaution has been taken the pipes or fittings cannot be wholly and effectually protected against the action of frost in the severest weather they must be cut off and removed, or an approved hydrant with valve well below the reach of frost may be substituted in order to procure the required supply.

25. All urinals, except those which are especially sanctioned by the city engineer, and rated by the works department, shall either be supplied through a meter or shall have some approved valve or apparatus attached thereto, or in connection therewith, by which the same can be flushed, with not more than two gallons of water, at intervals not exceeding thirty minutes, or with not more than one gallon at each time of use.

26. After the 31st day of December, 1896, it shall be unlawful for any person whomsoever to have upon his premises, and connected with the city water supply pipes, any water closet which is not provided with a suitable and effective valve and cistern, or other substantial arrangement, approved by the city engineer, by which the water supply may be cut off automatically after flushing the closet with a quantity of water not exceeding three gallons each time it is used.

The remaining rules provide for permits, inspection, licensing of plumbers, appointment of inspectors and their duties, penalties, etc.

NEW PATENTS.

THE last issue of the Patent Record contains notice of the granting of a number of patents relating to architecture and building. Like so many of the patents taken out, some of them are of little practical utility, but we give a list, with some notes, so that if any of our readers wish to look further into them they may have the opportunity of doing so.

Water Closet—P. H. Howard, assignee of Wm. T. Fox, Rochester, N. Y.

Roofing Tile and Machinery for manufacture of same—Abraham Weil, Steinheim, Prussia. The claim in this case consists mainly in a packing consisting of a metal plate, which is slit and bent back, bringing about an intimate connection of the tiles and augmenting the durability of the roof.

Combined Screen and Storm Door—Chas. C. Wheeler, Holland, Michigan. This door is so made that wire screen can be used in summer and panels in winter on the same frame.

System of Heating Buildings—John D. McEachren, Galt, Ont. All the hot water is conveyed, by this system, from the heater to an expansion tank in the upper part of the building, whence it is distributed to the radiators.

Means of Applying Paints and Varnishes—H. C. Cleaver, London, England. This is a plan by which paint is sprayed from a tank by means of an air pump or compressor. It is substantially the plan adopted at the World's Columbian Exhibition buildings.

Window Screen—Chas. C. Wheeler, Holland, Michigan. This screen is so constructed as to permit of its extension to fit windows of different size.

Ladder—Thos. J. Quinn, assignee of Mark A. Walker, Detroit, Mich. Simply an extension ladder.

Hot Water Heating Apparatus—The Phoenix Hot Water Heater Co., assignee of S. N. Murgittroyd, Phoenix, N. Y. A new form of construction of hot water heater.

Machine for Bending and Trimming Metal Shingles—The Metallic Roofing Co. of Canada, assignee of C. W. Conner, of Montreal.

Cornice Mould Embracing Frame—Henry Burbidge, Kentville, Nova Scotia.

Hot Air Heating Apparatus—C. P. Shindler, Vancouver, B.C. This is a combination of a fire frame with an angular shaped coil.

Artificial Stone—Wm. Owen, London, England.

Sewer Pipe—Moise Courtemanche, Montreal. Means of securing opening in the side of sewer pipes.

Paving and Roofing Composition and method of making the same—The Asphaltina Co. of America, assignee of J. A. Just, Syracuse, N.Y. (3 patents). The first is for a composition made by adding resin and sulphur to petroleum sediment. The second is for a composition made of a calcium resinate, a heavy hydrocarbon, tar and sulphur. The third is for a composition made by treating tar with sulphur.

Method of Manufacturing Cement—Jasper Whiting, Chicago, Ill. Molten slag is chilled, dried and ground, and caustic soda or lime added to form this cement.

Warm Air Register—Charles H. Foster, Omaha, Nebraska. This register combines a frame, with guard, valve panel, foot rest and dust receptacle.

Sash Lift, Balance and Lock—F. H. Peters, Montreal. A sash lift, balance and lock in combination.

Metallic Shingle—Frederick Crawford, Toronto. A new form of metal shingle.

A NEW CANADIAN PAVING MATERIAL.

AN experiment has been made at Cleveland, Ohio, in the use of trap rock as a paving material, and it promises to result very satisfactorily. A foundation of crushed limestone, ten inches thick, is laid; above this is placed the trap rock, eight inches thick, arranged in three layers—coarse screenings, fine screenings and dust. The trap is obtained from quarries near St. Joseph's Island, St. Mary's River, at the north of Lake Huron. The rock can be had for little more than the cost of quarrying and transportation, and the pavement as laid down cost \$3.10, \$3.19 and \$3.65 according to grade. Two miles have been laid in Cleveland and it promises well. Trap is used extensively in Germany for road making.

ARCHITECTS AND BUILDERS IN CONVENTION.

The American Institute of Architects held its twenty-ninth annual convention at St. Louis, during the third week of October. One of the matters considered was a classification of the membership into four grades, which was determined upon. The questions of education and the licensing of architects received much consideration. This we shall have occasion to refer to more fully at a future time. A permanent home for the Association is proposed, probably at the national capital, and a committee was appointed to deal with it. Fire protection was also considered, but the association seemed disposed not to take the initiative, and it was left in the hands of a committee. A number of interesting papers were read. The next convention will be at Nashville, Tenn.

The National Association of Builders met at Baltimore the same week. The greater part of the time was spent in re-arranging the constitution, provision being made for state associations. Next year's convention will be held at Buffalo.

A WORKMAN'S SUIT FOR DAMAGES.

While working at the new court house in Toronto, on the 20th of September, 1893, Samuel Garland met with an accident, through a four ton stone falling from a derrick, whereby his foot was crushed. He sued the city for \$3,000 damages, the case being tried before Judge Street in April, 1894. It resulted in a non-suit, but on appeal a new trial was ordered, and the case came up again recently before Judge Meredith. The jury was chosen entirely from the country, and the verdict was again in favour of the city. The plaintiff's foot had only one small bone broken, but it was so badly bruised that it will always be disabled.

One of the points involved was as to the method of lifting large stones at the building. It was the custom to raise them by means of chains placed around them, but in this instance the stone was lifted by dogs, which tore out and allowed it to fall. The evidence established, however, that the plaintiff and a man who was working with him, who was not a foreman or anyone he was bound to obey, were wholly responsible for the accident, and that therefore the city could not be held for damages.

The Toronto Radiator Mfg. Co. have recently erected extensive additions to their buildings on Dufferin street. The ground floor of the new buildings is conveniently fitted up as offices and show rooms, the upper floors being used for manufacturing purposes.

PAGES

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