

PAGES

MISSING

CANADIAN ARCHITECT AND BUILDER.

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

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ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS,
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IN connection with the illustration of the Art Institute at Sackville, N. B., which appeared in our April number, the cost of the building was given as \$54,000 instead of \$24,000.

THE Executive Committee of the American Institute of Architects has unanimously approved of the course of their President, Mr. D. H. Burnham, in conducting his recent correspondence with the U. S. Treasury department, to which we referred in our last issue.

WE congratulate the Toronto Public School Board and the citizens generally on the action of the City Council in passing an appropriation of fifty thousand dollars for new school buildings to be erected this year. The Council could very properly have granted the total amount—seventy-six thousand dollars—asked for by the Board for building purposes, but considering the financial policy of this year, they did well by the Public School Board.

A DEPUTATION representing the labor societies waited on the Minister of Public Works at Ottawa recently and requested among numerous other things that the contract system in the construction of public works should be abolished. The report of the Commission in the Curran Bridge investigation and the experience of Toronto and other cities which have attempted to substitute day labor for contract work, should be a sufficient answer to the deputation in question.

THE Dominion Government in their latest revision of the tariff have reduced the duty on wire nails from 1½ to 1 cent per pound. Rolled iron or steel angles, channels, structural shapes and special sections, weighing less than 35 pounds per lineal yard, not otherwise specified, are to be charged 35 per cent. ad valorem, but not less than \$10 per ton. On iron bridges and structural iron work the duty is made 30 per cent. ad valorem, but not less than one cent per pound.

IN our next issue we shall lay before our readers one of a series of articles prepared for the purpose of presenting some special subjects in a manner to make them of interest from the contractor's point of view. We expected to be able to publish the first of these in this number but found our space would not permit. These articles will be illustrated, and will deal with such subjects as the handling of large contracts, shoring for reconstruction of heavy buildings, modern appliances pertaining to contractors' plant, etc.

IT is to be regretted that no arrangement has yet been arrived at between the Ontario Government and the City of Toronto for the improvement of the avenue from Queen Street to the new Parliament buildings. From the city's standpoint there is no place where an equal expenditure would add more to its attractiveness. For the interests of the province it may be said that the opportunity for beautiful parliament buildings has been lost, but the situation of the buildings is one of great natural advantage, and careful treatment of the surroundings and approaches would add to their attractiveness. This work should not be delayed. The authorities should also consider in this connection the advisability of continuing the avenue directly south from Queen street through to Front street opposite the new Union Station. There are none but very cheap buildings in the way of such an extension and the new street frontages would be worth the whole cost. This would make the entrance to Toronto by way of the Union Station one such as few cities could boast.

THE commissioners appointed to investigate the management of the Lachine Canal and Curran Bridge affairs have reported that the whole business has been conducted with looseness, extravagance and questionable methods generally. This work has been carried on by day labor instead of being contracted for, and the Government is thereby loser of about two hundred thousand dollars. The responsibility is charged by each upon the other as between the Department of Railways and Canals and the local officers. The lesson to be learned from this affair is that no government, corporation or individual can have work of any kind done so economically by day labor as by contract; and when works of considerable magnitude are undertaken without the safeguard of a contract, the door is thrown open and invitation given for loss and scandal to enter.

A PERUSAL of the new building by-law of the City of Hamilton, an abstract of which appears in our Hamilton correspondence, shows the newly appointed Building Inspector's duties to be multiform in character. In addition to seeing that in future construction work shall be done in the manner prescribed by the by-law, he is also assigned the duties which ordinarily belong to Plumbing and Health Inspectors. We take it therefore that the proposal for the appointment of a plumbing or sanitary inspector which has several times occupied the attention of the Council, will now be abandoned, and the salary of such an official saved. The clauses of the by-law forbidding the construction of eave troughs and down pipes in such a manner as to admit of water dripping upon the heads of persons passing along the streets and flowing across the pavement beneath their feet, is commendable, and might well be made to apply to building construction on the business streets of Montreal and other cities. The clause compelling the placing of snow guards on roofs is one the necessity for which was made mention of in these columns recently. The by-law seems in most particulars to be well adapted to the requirements. It will be the duty of the Building Inspector to see that it is not allowed to become a dead letter.

THE building season is now sufficiently advanced to make it clear that the volume of work for the year will be only moderate, and that it will be fairly distributed over the country. There is a good demand for work in the line of alterations and repairs outside of the mason's and bricklayer's trades, but the trades mentioned derive the least benefit from this class of work. There seems to be a peculiar combination of circumstances operating to retard increasing business activity pending further developments in some of the factors in the situation. Among the influences compelling great caution may be cited, the unsettled tariff discussions at Ottawa and Washington, the question of England's embargo on Canadian cattle being removed, the near approach of elections, etc. The wonder is that business of all kinds in Canada has not been more seriously disturbed during the past few months. Such improvement in the conditions as may reasonably be expected cannot much affect the volume of business in the building trades for this year. Therefore, while it is necessary for us all to give the best possible attention to the work in hand and to the immediate future, we would suggest that the greater interests of all connected with the building trades lie beyond the months remaining of 1894, and that the true basis for future development is to be found in the question of immigration. Canada's greatest need is a much larger agricultural population, always having regard to kind as well as numbers. Only as agriculture is developed can building industries be maintained. Although without any immigration there will be a certain amount of growth and demand for building work we should be very stupid to lose sight of the opportunities plainly before us. Canada has all the manufacturing, mercantile, and transportation facilities for conducting the business of a much larger population than she at present possesses. In fact, these very facilities have been developed largely in anticipation of increased immigration. With such an immigration the building industries would be taxed to keep up with the requirements. No other class of business would receive equal benefit from this source. The government is making strong efforts to induce immigration, but the results so far this season are disappointing. We must not be discouraged if

the returns seem slow, but rather let us be determined to devise the necessary means to accomplish the desired object. If those engaged in the various branches of the building industries were thoroughly alive to their own welfare and prepared to unite on this question they would find themselves possessed of brains and influence sufficient to materially assist in the solution of the problem.

IT is to be feared that the building contractors of Canada are dropping behind the business men in nearly every other line of equal importance, in their lack of organization for the advancement and protection of their common interests. We have plenty of contractors who as individuals are good and live business men, but as a body they are not known except in a comparatively small way. The existing organizations among builders are few, but are deserving of commendation for their good work and are examples worthy to be followed. The Toronto Builders' Exchange is no doubt the leader, and is destined to steadily increase its usefulness so long as its affairs continue to be guided by capable hands. If contractors have not yet thought it worth while to organize more extensively from the standpoint of general progressiveness, it is about time that they should combine for purposes of common defence. We notice that the trades unions are working aggressively in season and out of season to secure recognition, and there is no doubt that they gain ground in this way. Among their latest successes is the securing of municipal legislation making it compulsory that in civic work contractors shall pay union wages. They are now seeking to have this stipulation inserted in all contracts for public works from those of School Boards up to those of the Dominion Government. We do not say nor do we think that trades union agitation is all conducted with wisdom, but the trades unions are alive, and they are gainers by their activity. There is legitimate work for them and for others to do through organization. The architects, too, are making progress by means of their associations, and they have interests that make it necessary for them to carry on and enlarge their association work. The work and business of contractors is hedged about with many protections for other people. In the first place there are the contract drawings and specifications; next the superintendence of the architect or clerk of works; then trades union rules, municipal building regulations and the Employers' Liability Act, with penalties of all sorts to protect everybody from the contractors. These things are all quite proper up to a certain limit, but there exists no doubt a contractor's side to the business. Doubtless there are instances in which a contractor may suffer an injustice simply because single handed he is unable to put up the costs in expensive law suits. Suppose that such a contractor had the assistance of an organization in testing his case in a manner similar to the method followed by the architects of France. In that way wrongs would be righted, and every such test case would help to remove friction and to stop bad practice all around. This is only one way in which contractors can work together to advantage. In the arbitration method for the settlement of labor troubles or their adjustment by Government Commission, contractors cannot afford to take their chances single handed any more than in suits at law. There is work to be done on behalf of the contractors that none but themselves can do, and we would urge them to greater activity in this direction. Wherever union labor is found there should united contractors be found also. By this means alone can all interests be properly counterbalanced.

ILLUSTRATIONS.

BANCO DI SAN SPIRITO, ROME.—DRAWN FROM PHOTO, BY
J. C. B. HORWOOD.

C. A. & B. COMPETITION FOR DRUG STORE.—DESIGN SUBMITTED BY "ITALIA" (MR. MELVILLE MILLAR), AWARDED
FIRST POSITION.

DESIGN FOR COTTAGE TO COST \$1,000.—SUBMITTED BY
"DEMOS."

This cottage, to cost about \$1,000, contains seven rooms and bath room, and is designed to face the east. To be of frame construction on stone foundation. Walls to be clapboarded, as shown, or hung with shingles. Roof to be shingled.

THE LATE COLONEL STEWART.

It has become our painful duty to chronicle the death of Col. John Stewart, of Ottawa, the contractor for the new Toronto Drill Hall. His death, which occurred at his son's residence in Toronto, on the night of the 4th of May, was totally unexpected, being due to heart disease with which deceased had for some time been afflicted.

The subject of this notice was born at Dungiven, Londonderry County, Ireland, on the 11th January, 1835. After leaving school he learned the joiner's trade. In 1857 he emigrated to Canada, and settled in Ottawa, which, during the remainder of his life, was his home. After working at his trade for several years, he received in 1862 his first contract, which was to build a residence for the Governor-General's secretary. In 1868 he formed a partnership with Mr. Stockand, which was dissolved in 1874.

Deceased rapidly achieved a prominent position as a contractor of more than ordinary skill and integrity, and was entrusted with the carrying out of many important undertakings.

Amongst these may be mentioned the extension of the Western block of the Dominion Parliament Buildings, the construction of the Mackenzie tower, the Supreme Court buildings, alterations on the Grenville canal, experimental farm buildings at Brandon, Mounted Police riding school at Regina, the new Drill Hall at Toronto. Upon the latter building, now nearing completion, he was engaged, when death so suddenly closed his career.

The late Col. Stewart filled with credit to himself and advantage to the community, a number of public positions. In 1878-9 he occupied a seat as alderman in the Ottawa City Council, and was a member of the Board of Works and other important committees. He was an ardent military man, having risen from the ranks to the position of Colonel of the Ottawa Field Battery.

Deceased was twice married, his second wife and eight children being his survivors.

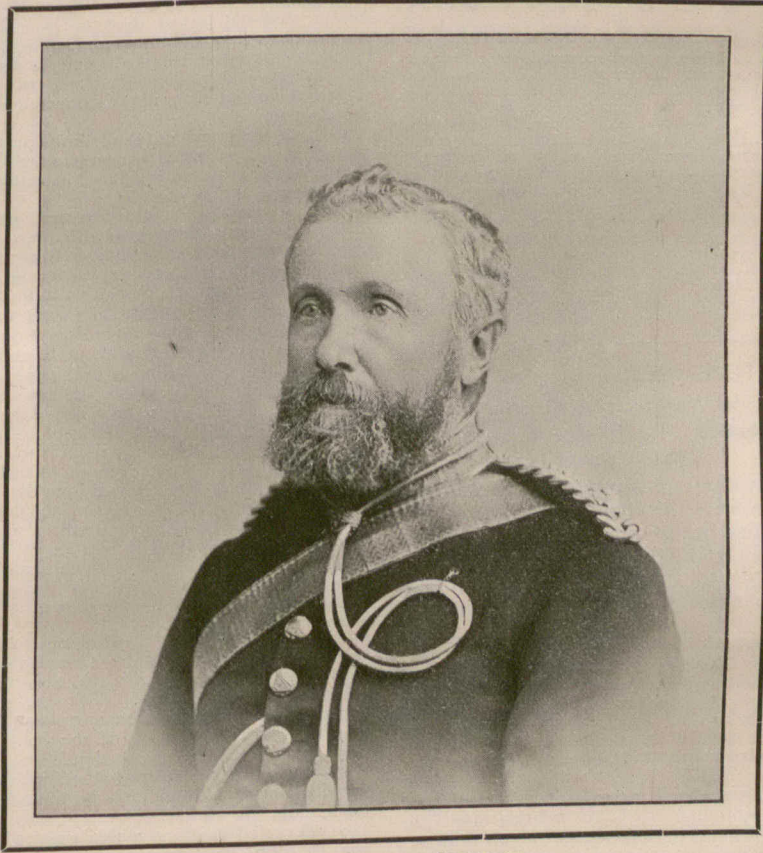
The obsequies, which took place at Ottawa, were of a military character, and were also marked by many tokens, floral and otherwise, of the high esteem in which the deceased was held throughout the country. His portrait in the uniform of a Colonel of the Ottawa Field Battery, is herewith presented to our readers.

RAISING.

There is no part of the construction of a frame building which requires more care or accuracy, says Owen B. Maginnis, than the raising of the frame. I therefore trust that my remarks on this subject will be carefully read as they will be found very applicable in practice. Placing cellar girders: These will require to be lifted into the place on top of the piers built for them in the cellar, or set perfectly level and straight from end to end. Some prefer to give their girders a slight crown of say $\frac{1}{2}$ inch in the entire length, and it is a wise plan, because the piers generally settle more than the outside walls. When there are posts instead of brick piers used to support the girder, the best method is to temporarily sustain the girder by uprights made of 2×4 joists resting on blocks on the ground below. When the super-

structure is raised these can be knocked out and the permanent posts placed, resting their bottom ends on a broad flat stone, to form a base or foundation footing. If the supporting posts or piers be not placed or built until after the building is erected, then carpenters should exercise good judgment when jacking the girders up, to place them under it and not raise them so much as to strain the building, and it is always desirable to obtain the crown mentioned before. The practice of temporarily shoring the girders, and not placing the permanent supports until after the superstructure is finished, is favored by good builders, and it would be well for carpenters to know just how it should be done. Setting the sill: After the guide is in position the sills are placed on top of the cellar walls, rounding side up and hollow side out, and are very carefully fitted together at the joints and levelled throughout. The last operation can either be done by a sight level or by following the simple method I am now about to describe: Place $\frac{3}{8}$ -inch blocks at intervening distances on the length of each side, also one at either end, and set a long parallel straight edge on them, also set a true level on the upper

jointed edge of the straight edge. The sill must be wedged up, or lowered down until the air bubble in the level tube is exactly in the centre, and each piece must also be wedged up or lowered till the blocks all touch the bottom edge of the straight edge. In all cases the whole length of the sill should bear solidly on the stone work, and it should either be bedded in mortar or made solid with chip pieces of slate, stone wedges or furrings, and these should not be inserted less than two feet apart. Sills are generally kept back $\frac{3}{8}$ or one inch from the face of the stone-work, to make the sheathing come flush with it, and allow the water table to project the thickness of itself (usually $1\frac{1}{8}$ or $1\frac{3}{8}$ inch) to keep the water off the stone. Sills must be taken out



THE LATE COLONEL STEWART.

of wind, that is to say, they must be level all around, so that when the carpenter sights them with his eye (the other being closed) the surfaces will show as one line. All sill joists will require to be toenailed or spiked to draw them closer together, and the running joists should be nailed dovetail fashion. When sills are made up of two thicknesses of plank, as they sometimes are, they will need to be solidly spiked together, to form one with dovetailed nails. As some of my readers may not clearly understand what is meant by "dove-tailing" nails I will here state that a carpenter dovetails nails when he drives two with the points inclining to or from each other, so that they form, as it were, a "dovetail."

WATERPROOF CELLARS.

A cellar can be so constructed as to be waterproof if the bottom or the floor is first covered with cement, the walls built thereon laid in cement and the exterior of the walls covered with cement.

This makes practically a watertight basin. The cement used must be the best Portland cement, one part; clean sharp sand, one part. After a cellar is built it is not so easy to make it waterproof. Still it can be done. Cover the exterior of the wall with the above cement, ditto the bottom, and work the cement in under the bottom of the wall.

If these directions are followed, you will succeed. But if cheap materials are used, and the work badly done, you will be sure to fail.

BRITISH COLUMBIA.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THERE is very little in the way of building news to report at present as architects and builders in this province in common with those in other countries are feeling the effects of the world-wide commercial depression.

The only piece of news I can think of at present is in connection with the new post office and customs house in Victoria. Things being so quiet, the Council of the British Columbia Institute of Architects thought it would be beneficial to the provincial architects if the new public buildings were open to competition among them, and therefore on the 19th February of this year wrote to the Minister of Public Works—Hon. Y. A. Ouimet—pointing out the advantages, etc., to be gained by such a course; reminding him of the fact that for the Victoria Legislative Buildings, for which 65 plans were submitted, we had two in the first five in the Province, and it is now being carried out by a local man. This letter, by an oversight, I suppose, was never acknowledged, although it was backed by our two senators and four of the local members. The only intimation that the request has been refused is contained in the enclosed cutting which appeared in the Ottawa Correspondence of the Victoria Colonist on 1st April. The paragraph speaks for itself:—

"Col. Prior and Mr. Earle have been busily engaged in the departments during this week. Both are anxious to push the officials of the Public Works department, so that a start may be made on the new public buildings at Victoria as soon as the next fiscal year commences. The architects of the department are busily at work on the plans, the application of the B.C. architects to be allowed to compete amongst themselves for the preparation of the plans and specifications having been summarily refused, as was to be expected. While, doubtless, professional men in your Province would have been glad to have had the opportunity to have made the drawings of the new buildings, when it is considered what a precedent would have been created if the request had been granted, little wonder that the Government refused it. A staff of architects, under the charge of Mr. Fuller, is kept at the department for the purpose of carrying out this kind of work. Mr. Fuller himself is one of the most competent men on the continent of America. Against a large field of competitors he won the first premium with his plans of the present Parliament Buildings in this city, and after that beautiful building was completed Mr. Fuller was successful in gaining the first prize for his plans of the present capitol at Albany. The fact that he was successful in securing these important prizes in his profession is conclusive proof as to his ability. Mr. Fuller has made a rough sketch of the proposed building at Victoria, which it is expected will cost from \$200,000 to \$250,000, but when I spoke to him a little while ago he was then inspecting the grades of the street in the vicinity of the site before getting down to real work. The two members from your city are satisfied that the Government will put up a building which will be as much a credit to the Dominion as it will be to the city."

HAMILTON, ONT.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

The City Council have appointed Mr. John Anderson City Building Inspector, at a salary of \$650 per year.

I forward to you for publication as a matter of interest to your readers in this and other cities the clauses affecting architects and contractors contained in the new Building By-Law which has recently been adopted by the City Council of Hamilton.

2. The Council shall from time to time appoint a competent, practical and discreet man to be inspector of buildings and of fire limits and private drains.

3. The duties of the Building Inspector shall be as follows:

(a) He shall receive and take good due care of all plans and descriptions of buildings deposited with him under the provisions of this By-Law and record the same in a book to be kept in his office for that purpose, and shall keep such book properly indexed and open for inspection and reference, and issue permits in accordance with the terms of this By-Law, and he shall also record in a book to be kept by him all reports and complaints made to him as Building Inspector.

(b) He shall inspect all buildings while being erected, altered or enlarged within the City, and all scaffolding put up or used in connection therewith, and also the erections placed by the builder or contractor upon any street, lane or alley adjacent to any such building or any obstruction or want of repair in any such street, lane or alley caused by the deposit of building material or by the carrying on of the works.

(c) He shall inspect the drains of all buildings in the course of erection, and also all drains made or re-laid from any buildings already erected and see that such draining is done in a thorough manner, and shall keep a record, of every inspection, and of his decision and action thereon in a book to be provided by the Corporation for that purpose, and shall make in such book a small diagram showing the location of each drain therein referred to.

(d) He shall inspect the drains connected with or leading from or situate in any building or premises in the City of Hamilton when requested by the Medical Health Officer, or by the Sewer Committee, or the chairman thereof, to do so, and if he finds the same to be out of repair or not properly constructed, or otherwise defective, or the drains not properly trapped or ventilated, he shall notify the owner or owners thereof in writing, calling their attention thereto and calling on them to re-construct, alter or repair the same.

4. It shall also be the duty of the Building Inspector to enforce the provisions of this by-law, and that he may be able to do so in all respects, the Street Commissioner shall notify him of the intended construction or reconstruction of any pavement where conductors or gutter pipes are to be connected with the sewers under section 35 of this by-law, and also of any violation which may come under his notice of the provisions of this by-law affecting the streets, sidewalks, pavements or sewers of the city.

5. All that part of the City of Hamilton embraced in the following limits or boundaries shall hereafter constitute and be known as the fire limits of the City of Hamilton: Commencing on the westerly limit of Wentworth street at its intersection with the lands of the Grand Trunk Railway Company, thence southerly along Wentworth street to the lands of the said Company, formerly belonging to the Hamilton & Lake Erie Railway Company, in a northwesterly direction along the northerly limit of said lands to Young street, thence westerly along Young to Ferguson avenue, thence southerly westerly direction along said road to the point where that road is intersected by the short road leading up the mountain in a southwesterly direction from the head of John street, thence in a straight line in a northwesterly direction to Aberdeen avenue at its intersection with the James street mountain road, thence westerly along Aberdeen avenue to Locke street,

thence northerly along Locke street to King street, thence westerly along to Dundurn street, thence northerly along Dundurn street and in continuation of the line of that street to the lands of the Grand Trunk Railway Company, thence in a straight line in a southeasterly direction to Barton street at its intersection with the east side of Oxford street, thence easterly along Barton street to Queen street, thence southerly along Queen street to Clarence street, thence easterly along Clarence street to Hess street, thence easterly on Cannon street to Railroad street, thence northerly on Railroad street to Mulberry street, thence easterly on Mulberry street to Bay street; thence northerly on Bay street to the southern limit of the lands of the Grand Trunk Railway Company, thence easterly along the southerly limit of the lands of the said Company to the place of beginning.

6. No person shall commence the erection of any building or part of a building, of the cost of more than \$100, within the City until he shall have deposited with the Building Inspector a ground or block plan showing the level of the cellar and basement thereof with reference to the grade line of the adjoining street or streets as laid down or recorded in the office of the City Engineer, and also a description showing the materials with which the walls of the building are to be constructed, and has obtained a permit from the Building Inspector to proceed therewith. Every contractor or builder shall produce to the Building Inspector for inspection whenever required by him, the plans of any building which such contractor or builder may be erecting within the City Limits.

7. Every building, or part of a building made, constructed or placed within the said fire limits, shall be built with outer walls of iron, stone or brick, and when such building or part of a building is built with outer walls of iron, such walls shall not be less than one eighth of an inch of iron in thickness; when the outer walls are built of stone or brick, and such building or part of a building is more than one-and-a-half and less than three storeys in height, the outer walls shall be at least eight and one half inches in thickness, and when three storeys in height, the outer walls of the first and second storeys shall not be less than twelve inches in thickness and of the third storey not less than eight and one-half inches in thickness, and when more than three storeys in height the outer walls of the first storey shall not be less than sixteen inches in thickness and of the second storeys not less than twelve inches and of the upper storey not less than eight and one-half inches in thickness.

(a) Every mansard roof shall for the purposes of this by-law be considered as a story, and such story must be divided by brick or stone partition walls as hereinafter provided when such partition walls are extended to the story next below it.

(b) Every building within such fire limits which is to be divided into two or more stores, tenements or dwellings, and whether the same is being newly constructed or is being altered or rebuilt, shall be so divided by brick or stone partition walls running from the front to the rear of such building and extending from the foundation to the full height of each partition, such partition walls to be not less than eight and one-half inches in thickness, if not extending more than three storeys in height, but if extending beyond that height, such partition walls up to and inclusive of the third storey shall be not less than twelve inches in thickness and the partition walls above the third storey shall not be less than eight and one-half inches in thickness, and all such partition walls where they divide the top storey of a building shall be continued and built up to a height of twelve inches above the roof.

(c) Where any hall or large room is to be constructed on an upper storey, and is to extend over two or more of such stories, tenements or dwellings, the party walls shall be carried from the foundation to the top of the floor joist of such a hall or room, and the flooring of said hall or room where passing over the tops of such partition walls shall be solidly bedded upon a half inch coating of asbestos mortar.

(d) In all cases the ends of any and all joists resting in or upon any wall or partition shall be at least four inches apart in each direction and any space intervening between the ends of such joists shall be filled with brick and mortar.

(e) No wall or part of a wall of any tower within the City Limits shall be built upon any wooden beam or wooden girder or support.

(f) Every elevator shaft shall be constructed with brick walls not less than eight and one-half inches in thickness, with iron doors to each opening, commencing at the lowest point reached by such elevator and extending at least five feet above the roof of the building, and the roof of each elevator shaft shall be formed by a skylight.

8. Any one or two storey frame building already erected may be bricked up with four-inch brick walls within said fire limits, if placed on a stone foundation.

9. All roofed buildings within the fire limits shall be finished externally with tin, iron, zinc, copper, slate, tile or felt and gravel, or with shingles laid in hair mortar, not less than one quarter of an inch in thickness, or with shingles laid on fire-proof felt or with some other material of an incombustible nature, and no roof of any building already erected in the said fire limits shall be re-laid or re-covered except with materials hereinbefore enumerated.

10. Nothing herein contained shall be so construed as to prevent the erection within the said fire limits of any building constructed of material other than with walls of iron, stone or brick, not exceeding 216 square feet in area and 16 feet in height at the highest part of the roof thereof, or to require such building to be roofed in the manner hereinbefore directed, provided such building shall not front upon any street; nor shall more than one such frame building be erected on the same lot or premises. No building with outer walls other than of iron, stone or brick, shall be built within the area bounded by Ferguson avenue on the east, Hunter street on the south, Bay street on the west, and Cannon street on the north; or within the area bounded by Ferguson avenue on the west, Main street on the south, Wellington street on the east, and King William street on the north.

11. No building or part of a building within the fire limits, other than with main walls of brick, stone or iron shall be raised, enlarged or removed to any other place within the same, nor shall any such building be removed into the fire limits; nor shall any wooden building within said limits which may hereafter be damaged to the extent of fifty per cent. of the value thereof be repaired or rebuilt, nor shall such building, where the damages are less than fifty per cent. of its value, be so repaired as to be raised an additional storey, or so as to occupy a greater space than before the damage thereto, but nothing herein contained shall prevent any one from putting a stone or other substantial foundation under any existing wooden building, such foundation not to be more than four feet above the established grade of the adjoining street, nor shall it prevent any one from removing a wooden building towards the rear of the lot on which it stands, provided it is not placed within two feet of the land of any adjoining owner, or of any other wooden building on the same lot or premises.

12. Any owner or contractor who shall build or aid in the erection of any building or any part of a building within the fire limits, or shall remove or assist in removing any such building, or shall repair or assist in repairing any damaged building contrary to any provisions of this By-law, shall be subjected to the penalties hereinafter imposed.

13. Any building or erection which may be constructed or placed in contravention of this By-law may be pulled down or removed, at the expense of

the owner thereof, by or under the direction of the Building Inspector, but it shall be the duty of the inspector, before pulling down or removing such building or erection, to obtain the consent of the Market Fire and Police Committee or of the Mayor to his so doing, and to give two days' notice to the owner or builder requiring him to pull down or remove such building or erection.

14. All public buildings, hotels, halls, theatres, factories and schools more than two storeys in height shall be provided with two or more fire escapes, securely fastened to the outer walls of such building, hotels, halls, theatres, factories or schools, and connected with one or more windows in each storey except the first.

16. Every chimney within the limits shall be carried to a height of not less than six inches above the ridge or deck of any roof carried by or connected with or abutting upon the walls to which said chimney is attached, and where a chimney is used to carry away smoke or noxious vapors from any manufactory where an engine and boiler of more than twenty-horse power are used, such chimney shall not be less than seventy-five feet in height above the level of the street adjoining such manufactory, and shall be built entirely of brick, laid with good mortar.

17. No timber shall be placed within one foot of the inside of any oven, copper still, boiler or furnace, nor within four and a half inches of the inside of any flue.

18. No person shall hereafter place any furnace or stove in any house or building in the city, without leaving twelve inches clear from any wood-work immediately above such furnace or stove, and nine inches from any wood-work opposite the sides of the same, and no person shall place, or maintain or use any furnace upon or over a wooden floor unless there is immediately underneath the furnace and extending a distance of four inches on each side beyond the outer walls of such furnace a bed of concrete not less than six inches laid in mortar, and there is also an air space of at least three inches between the furnace and such bed.

(a) All open fireplaces or grates shall have the hearth laid upon trimmer arches of brick or upon iron girders.

19. No pipe or funnel conveying steam or hot air shall be fixed next any public street or highway on the front of any building, nor shall any exhaust steam pipes be allowed to enter any sewer, nor shall any funnel, pipe or flue for conveying fire or smoke be fixed on the inside of any building nearer than twelve inches to the face of any timbers or roofs, ceilings or partitions; nor shall any such funnel, pipe or flue pass through any timber framing, or partition of wood, or wood or lime, or through any wooden floor, in any house, outhouse, fence or building whatever, within the said City, unless there shall be a space of at least six inches clear between the said funnel, pipe or flue and such framing, partition or floor, and unless the same shall pass through a chimney of stone, or brick or mortar, not less than three inches wide, by a rim of solid stone, or brick or metal, not less than three inches wide, and equal in thickness to the full finished thickness of the framing through which such pipe shall pass.

24. When any building, buildings or scaffolding in course of erection within the City limits shall be considered unsafe by the Building Inspector, he shall at once notify the owner, contractor or agent to make the same safe and secure, and every person notified, who fails within twenty-four hours to comply with such notice, shall be subjected to all the penalties of this By-law.

27. No person shall deposit or place in any public street, land or alley in the city any material to be used in the erection of any new building, or the repair or alteration of any old building, at a cost of over \$100, until a plan and description in accordance with the requirements of section 6 of this By-law have been deposited with the Building Inspector, and such person has obtained from the inspector a permit in writing in the form appended to this by-law for the placing of such material in such street, lane or alley, and in all cases where such plan and description have been so deposited, and it is necessary to use any portion of such public street, lane or alley, for the placing of such material, the Building Inspector shall give a permit in the form appended to this By-law.

28. No person shall, either personally or through any one acting for him or with his authority, deposit or place any building material in or upon any public street, lane or alley within the limits of the city, except for the purpose of building or repairing, and in every case such building material shall be so placed as not obstruct the surface drainage of such public street, lane or alley, or the free use of any public hydrants, or to occupy more than is necessary of such public street, lane or alley, and in no case more than one-third the width thereof in that portion of the city bounded by Catharine, Hunter, Bay, and Cannon streets, and in that part of King street between Catharine and Wellington streets, no more than one-half thereof in any other part of the city, the space so occupied not to extend along such street, lane or alley, further than the frontage or depth of the lot so being built upon except that it may extend in front of the lot on either side, so long as the occupant of such adjoining lot may consent thereto; provided always that if the owner or tenant of the real estate on the opposite side of the street, lane or alley shall require at the same time to use any portion of the street, lane or alley for the deposit of building material, then, in such case each party shall be restricted to use one-fourth of such street, lane or alley instead of one-third as aforesaid in that portion of the city bounded by Catharine, Hunter, Bay and Cannon streets, and in that part of one-third of such street between Catharine and Wellington streets, and to the use of one-third of such street instead of one-half thereof in any other part of the city, but every lane or alley must be kept open for traffic to a width of not less than eight feet, and such material shall not in any case be allowed to remain in any public street, lane or alley, for any longer time than may be reasonably necessary for the completion of the work for which such building material is being used.

29. Every person who shall deposit or place any building material upon any public street for any of the purposes hereinafter mentioned in that part of the city bounded by Catherine, Hunter, Bay and Cannon streets, or in that part of King street between Catherine and Wellington streets, shall, while any part of the material remains upon such street, enclose and keep enclosed the ground thereby occupied with a close board fence of a uniform height of not less than six feet, the public sidewalk to be left clear in all cases where it is not necessary to occupy it, and to be roofed over, wherever necessary, at a height of not less than eight feet above the level of the sidewalk with two thicknesses of one inch boards, and where it is necessary to occupy the sidewalk with building material, a plank sidewalk three feet wide shall be made by the person depositing the building material, such sidewalk to be made immediately outside of the said fence, and the ground covered thereby shall be reckoned as part of the space which the person depositing the building material is allowed to occupy.

30. Every person who shall deposit or place any building material upon any public street for any of the purposes hereinafter mentioned in any part of the city other than that portion thereof bounded by Catherine, Hunter, Bay and Cannon streets, or that part of King street between Catherine and Wellington streets, shall, while any part of the material remains upon such

street, enclose and keep enclosed the ground occupied thereby with a board fence at each end of sufficient height and strength to fully protect the public from injury or danger therefrom, and if the public sidewalk shall be enclosed within such fences, he shall make a sidewalk three feet wide immediately outside of said enclosure, and the ground covered by such sidewalk shall be reckoned as part of the space which the person depositing the building material is allowed to occupy.

31. The fence, roof and sidewalk mentioned in the preceding paragraphs of this section shall be removed by the person by or for whom they were erected as soon as the building material enclosed thereby has been used or removed, and he shall also thereupon put the street and sidewalk where such material has been deposited in as good repair as it was before such material was placed thereon.

32. Whenever any person or persons, whether contractors or proprietors, shall be engaged in the erection or repairing of any building or other structure whatever within this city, and shall cause or permit any building material to be placed on any public street, lane or alley in the said city, and whenever any person or persons who shall be engaged in constructing any sewer or laying any gas, water or other pipes or conductors, in or through any of the streets, lanes, alleys, highways, sidewalks or other public places in said city where persons pass and repass, whether by appointment of the city or its agents, or its contractors, or otherwise, it shall be the duty of all such persons to protect the public from injury therefrom by placing a sufficient number of red lights upon such materials, rubbish, goods, wares and merchandise, heaps, piles, excavations or any other thing so caused or permitted by them to be or remain in or at any of the places above mentioned, and in such manner as to enable the same to be distinctly seen by all passers-by and to continue such lights from dusk till daylight, during every night in which any such obstructions are allowed to remain in or at such place, and if such materials or obstructions are enclosed by a fence such lights shall be put on or above the fence, and no person shall, without the consent of the person or persons placing such lights, put out, remove or obstruct the same, or any of them, between dusk and daylight.

33. No person shall allow building material of any kind under his control to remain in any public street, lane or alley after dark without being closely piled, and being also sufficiently lighted in the manner hereinbefore required, or to remain in any public street, lane or alley, in any other manner or for any other purpose, or for any longer time than is permitted by this by-law, nor shall any person put any fence or obstruction or allow any fence or obstruction under his control to remain in any public street, lane or alley, in any other manner or for any other purpose, or for any longer time than is permitted by the provisions of this by-law.

35. No owner or occupant of any building shall place or construct, or authorize the placing or construction of any eavetrough, conductor, water-pipe or gutter pipe so as to permit or cause the water from the roof of such building to escape upon, flow over or run across or upon any public sidewalk, and the owners of buildings hereafter erected or built shall connect all conductors or gutter pipes upon that part of the building abutting upon any street with the sewer upon such street, if any there be, and whenever the pavement upon any street, not being a wooden sidewalk, is being constructed or reconstructed, the owners of all buildings abutting upon the street shall connect with the sewer, if any, upon such street every conductor, water pipe or gutter pipe, the water from which would otherwise flow over or upon such pavement.

36. No porch, or bay window, or steps, or other structure shall encroach upon or extend over the line of any street or alleyway.

38. Before any part of a private drain or sewer laid or constructed in or from any building or buildings in the City of Hamilton shall be covered up, or enclosed, or hidden from view, it shall be the duty of the drain layer, or other person or persons having charge of the laying or construction of such drain or sewer, to give notice in writing to the Building Inspector, or at his office, that such drain or sewer is ready for inspection by him, and he shall thereupon, without delay, inspect the same, and it shall be unlawful for any drain layer or other person or persons to cover up, or enclose, or hide from view any part of such drain or sewer until the Building Inspector has approved of the same, except in cases where from the presence of quicksand or from the nature of the soil it is impossible to keep the drain or sewer open for inspection.

(a) No brick or wooden drain shall be allowed within any building, but all drains within any building shall be of heavy cast iron pipe or of salt-glazed vitrified sewer pipe. Cast iron pipe when used within any building shall be oil finished inside and outside, with joints caulked with oakum and molten lead. All cast iron pipe when laid beneath the surface within any building, shall be not less than one-third of an inch thick. Vitrified sewer pipes when laid within any building shall be of the make known as *double strength*, and shall be of a thickness of not less than one-tenth the diameter of the pipe; the flange shall be not less than one and three-quarter inches deep; all flanges shall be carefully filled with the best Portland cement. The upper surface of any sewer pipe shall be not less than four inches below the foundation of any wall under which it passes.

39. If on examination of any private drain or sewer it is found that the same is out of repair, or is not properly trapped or ventilated, or is in a condition that is likely to be dangerous to health, the Building Inspector shall give notice in writing to that effect to the owner of the premises with which such drain or sewer is connected, and if for thirty days after receipt of such notice such owner or owners shall have refused or neglected to make all proper repairs or alterations he or they shall be liable to the penalty imposed by this by-law, and such penalty may be imposed for every day after the expiration of thirty days that such refusal or neglect shall continue.

41. Any person or persons guilty of a breach of any of the provisions of this by-law shall, for every such breach be subject to the penalties imposed by chapter seventy-one of the Consolidated By-laws of this City.

The management of the Toronto Technical School have decided that the drawings made by the students of that institution should be exhibited at the Toronto Industrial Exhibition.

The Grand Trunk Railway Company against whom the courts recently gave a verdict for \$3,500 in a suit brought by Mrs. Dr. Oldright, for injuries sustained by falling into an excavation at the new Union Station, will now fight the matter out with the contractor, Mr. McDermid. Mr. Justice Street in the previous case expressed the opinion that the contractor was not liable for the accident.

The Engineering Society of the School of Practical Science, Toronto, have elected officers for the ensuing year as follows:—President, A. E. Blackwood; Vice-President, J. Armstrong; Recording Secretary, J. C. King; Librarian, F. H. Guernsey; Corresponding Secretary, F. J. Robinson; Treasurer, T. D. Wright; Fourth Year Representative, R. H. Angus; Third Year Representative, R. J. Campbell; Second Year Representative, E. P. Lea; Representatives on Varsity staff, Editor, J. E. Moore; Business Manager, E. W. Macpherson.

WINNIPEG.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

As the remarks made by your correspondent in his letter for March, re New Court House Addition, Winnipeg, together with Mr. Wheeler's letter, which appeared last month, have aroused public interest in the matter, no doubt the following paragraph, with which the Free Press, April 5th, 1893, closed a long article on the subject, will prove interesting reading to your western subscribers:

"Some interest is felt by the legal profession in the plans of the new court house, as well as the site. Of the plans submitted that of Geo. Browne is generally regarded as the most suitable, and it is said, should be the one selected. Influences are at work, however, in Government circles, so the Free Press is informed, that give the loudest Government shouters the inside track. But it is regrettable that in a large and permanent addition to the architecture of the city, business methods should not prevail, and the best man and best plan be selected."

The wet weather we have been enjoying, or otherwise, has delayed building operations, which is most unfortunate for the working men, who have been looking forward to the spring work to enable them to earn something for themselves and families, after their enforced idleness during the winter months.

After much discussion the Winnipeg School Board passed a resolution last night, authorizing the Building Committee to obtain plans for an eight room school building, to be erected on the site of the present Argyle school, the latter having been found too small to accommodate the increasing number of scholars. It is an encouraging sign of the times—the way the "infant industry" flourishes—notwithstanding high tariff, low price of wheat, and questionable freight rates. No matter where one goes, children seem to be increasing and multiplying, and the everlasting cry for "more school accommodation" is joyfully heard by all connected with the building trades, though other taxpayers are inclined to think the industry should be restricted.

The Portage la Prairie School Board have instructed Mr. Browne to prepare plans for three schools, one frame building, to contain one room; two brick buildings, one to contain two rooms, another to contain four rooms, arranged with hat and coat rooms, and heated with hot air; cost \$15,000.

MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

The new building for the Bank of Toronto, at the corner of St. James' and McGill streets, has just been completed, and the owners have gone into occupation. The building occupies one of the most advantageous sites in the city, and Messrs. Taylor & Gordon, the architects, are to be congratulated on having made good use of the opportunity offered by the location for the erection of an imposing and pleasing structure. The building is designed in the Romanesque style and is built of imported red sandstone. The exterior is enriched with a large amount of carving, the credit for the execution of which belongs to Messrs. Holbrook & Mollington, Toronto. The banking room is large, airy, and exceedingly well lighted. The floor is laid with mosaic. The walls, to a height of eight feet, are lined with colored marble, with which the decoration of the upper portion and ceiling is made to harmonize. A very handsome semi-circular counter, in which marble, antique brass, plate glass and grille work have been judiciously employed, is a striking feature. The wood-work is in mahogany. The upper portion of the building has been suitably fitted up for office purposes.

Enquiry amongst architects, real estate dealers, etc., indicates that while the number of buildings to be erected this year will probably fall short of 1893, the amount of money to be expended is likely to equal, at least, that of former years. The new lien act will operate to check speculative building and operations by small contractors, which is not, generally speaking, regarded a misfortune. On this point Mr. Lacroix, the city building inspector, says: "This enactment will result in eliminating a certain number of these contractors, who, without any care as to how they will attain their object, begin a building, not knowing if they will be able to finish it. These contractors cause endless annoyance to the proprietors, the architects, the workmen and the dealers in building materials. If this law causes them to disappear, it will assuredly be so much to its credit." Building for residence purposes will be less in extent than usual, but in character will show improvement, and will be largely confined to the west end of the city.

Some of our local architects have done very little architectural work for several years past, their services having been in demand as valuers in the case of property required to be expropriated by the city for street widening purposes. This work is said to have proved very remunerative, particularly in the case of the city's valuers. One firm of architects are said to have received in fees in one year for work of this kind not less than \$20,000.

Among the important buildings to be put under construction the present season are the new Canada Life offices, a French opera house, Laval University, residence for Mr. Hugh Graham, academy at Cote St. Antoine, school building for St. Bridget's parish, and new market buildings.

The union carpenters of this city have gone on strike because of the refusal of the contractors to accede to their demand for a nine hour day at 20 cents per hour. Some of the employers have granted the demand, but the larger proportion have not. The feeling on the part of contractors to whom I have spoken on the subject is that they have less objection to paying the rate of wages asked for than to being subjected to the dictation of the unions as to what men they shall employ. In a word, they object to hand over to the unions the control of their business in this respect. As yet no serious injury has resulted from the strike, but should the difficulty continue much longer, the bricklayers will be forced to stop work. Meanwhile, the contractors are beginning to advertise for non-union workmen. If an understanding is to be arrived at, the present is therefore the most favorable opportunity, as once the places of the strikers become filled, the contractors will be in a less favorable mood to enter into negotiations for this object.

QUEBEC.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

The report of Mr. Chas. Baillairgé, City Engineer, covering the past two years, which has recently been published, contains some information concerning the number and cost of buildings and other improvements constructed during that period, and points to the necessity for the carrying out of other works of like character in the near future.

The number of houses erected during the two years covered by the report is stated to have been not less than three hundred. The total cost of new buildings is placed at \$1,841,944. The more important buildings included in this estimate of cost were referred to in detail by Mr. Baillairgé in his article in your New Year Number. This estimate of cost does not include many buildings erected by builders without the supervision of an architect. The value of these is placed at \$400,000 additional. As to future improvements the Council are recommended to borrow half a million dollars to be expended on street paving. The use of granite on a concrete foundation is recommended for this purpose.

THE MARITIME PROVINCES.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

For some time the manufacturing committee of the St. John Board of Trade have been endeavoring to induce some gentleman, or company of gentlemen, to erect a pulp mill within convenient proximity to the city. On behalf of the city they offer good inducements in the way of exemption from taxes for a certain period, etc. A few months ago a French gentleman, a manufacturer of pulp machinery, was in St. John. With a number of the leading citizens he visited what were considered to be the best sites for such a mill. He expressed himself as satisfied with the inducements offered him. Since then considerable correspondence has been carried on between the Frenchman and the committee. The former is still willing to expend some \$80,000 in a mill, providing the people of this city take a certain amount of stock. The matter is pending now. There would be no difficulty in obtaining a site where a sufficient quantity of wood could be procured to last for many years.

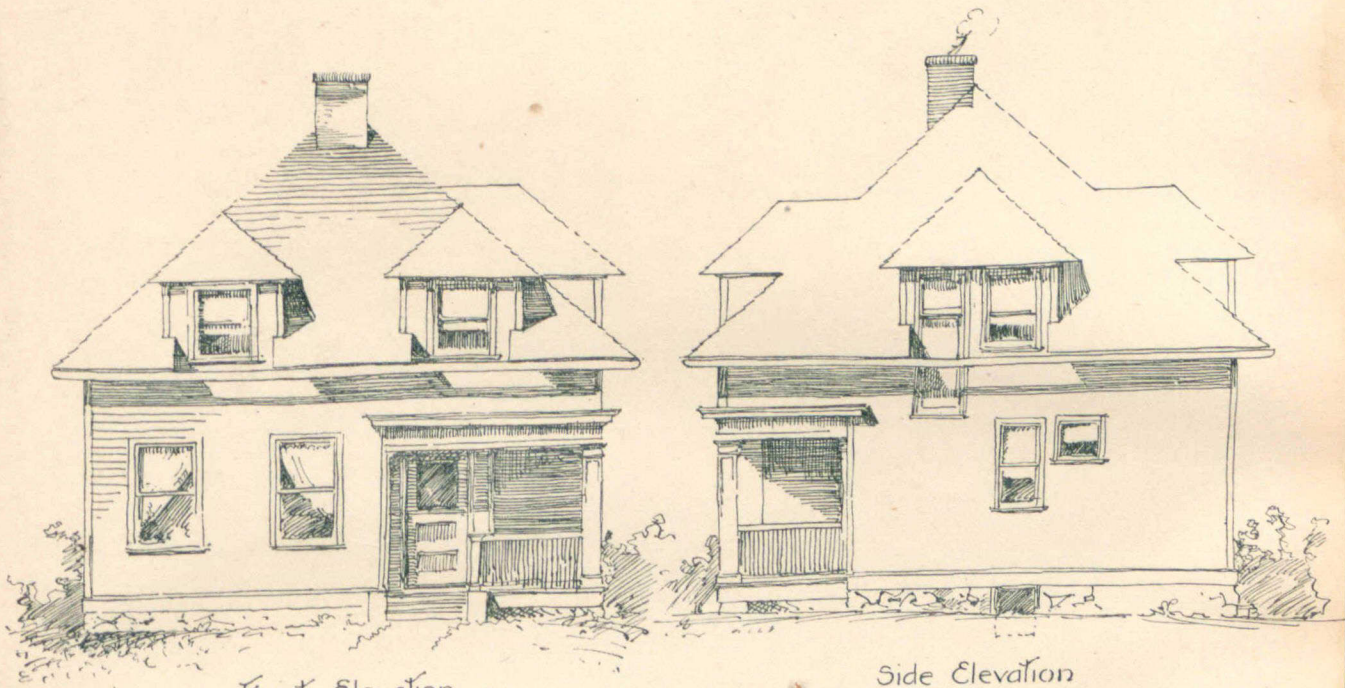
Last summer, and, in fact, the summer before as well, the business portion of Fairville, a suburb of St. John, was destroyed by fire. The citizens are again at work erecting shops, dwellings, etc. Quite a boom is expected there this summer.

When W. C. Van Horne, president of the Canadian Pacific Railway, was in the city a few weeks ago, he was led to consider the advisability of erecting a summer hotel here. He was interviewed on the matter and expressed himself as strongly in favor of the project. He thought an hotel, if erected on very much the same plan as the C.P.R. hotel at Quebec, would not only prove a valuable acquisition to St. John, but that it would be a paying investment to all who should take stock in it. In fact, so favorable was Mr. Van Horne to the proposed scheme, that a number of sites were picked out and the probable cost computed. It was the opinion of the C.P.R. president that a building such as he should wish to see erected for the purpose would not cost less than \$500,000. In the first place the hotel would occupy one of the most valuable sites in the city. Its capacity would be sufficient to accommodate one hundred guests. It would be thoroughly furnished and everything in connection carried on in modern and up-to-date principles. A number of the leading business men of the city have volunteered to take stock in the hotel to a considerable extent, and from what has recently come to hand there is every reason to believe that the scheme will not end in talk.

The numerous and expensive buildings which are being run up in Sackville, N.B., this summer has caused quite a boom.

Two new stone quarries have been opened at Westcock, near Sackville, this spring. It is said that those who are interested in the quarries at Woodpoint and vicinity are also at Westcock and endeavoring to get a branch line built to connect with the I.C.R. at Sackville. The present method of shipping the stone on scows to Sackville and from there by rail is very unsatisfactory and the new branch will meet with encouragement.

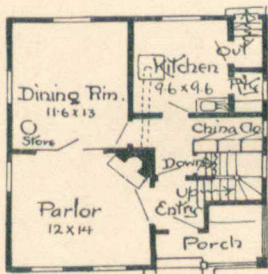
A. H. MCC.



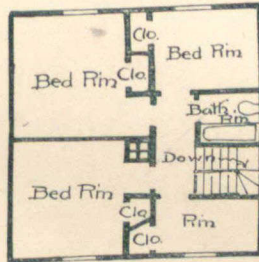
Front Elevation

Side Elevation

Scale for Elevations

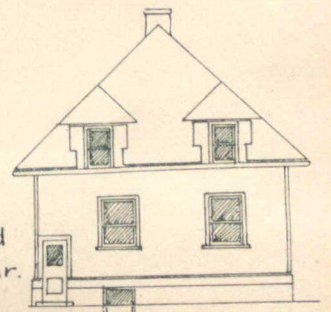


First Floor.



Second Floor.

Note:— Fuel bins, and larder in cellar.

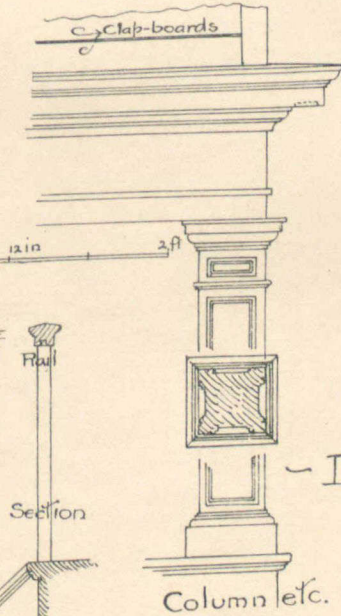
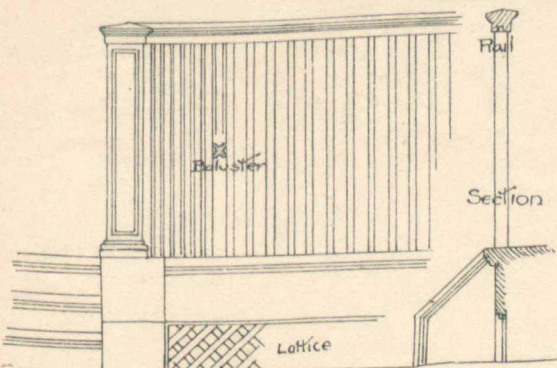


Rear Elevation

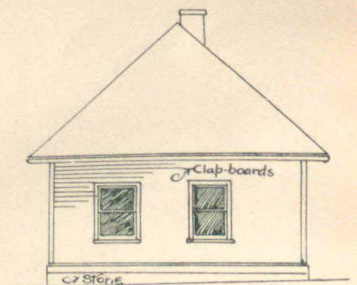
Scale for plans etc

Details of Entrance

Scale



Column etc.

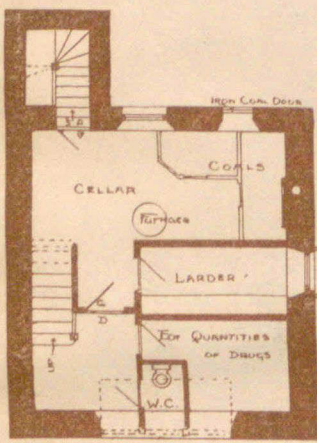
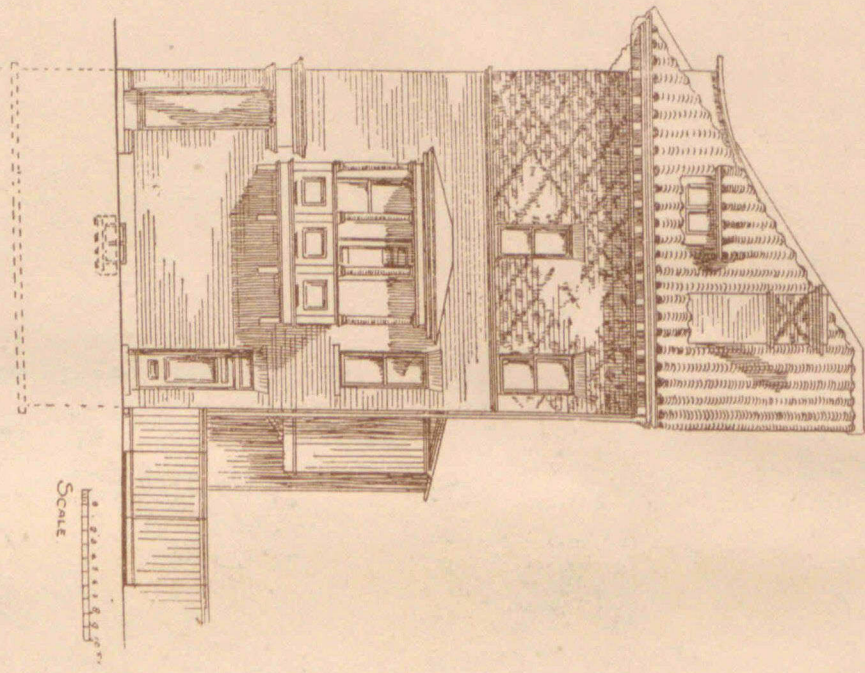


Side Elevation

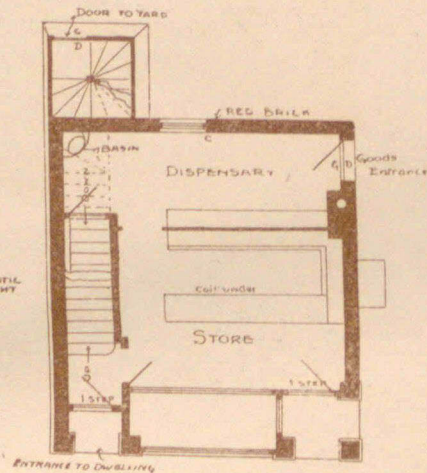
- Design for Cottage -
to cost about \$1000.

"Demos"

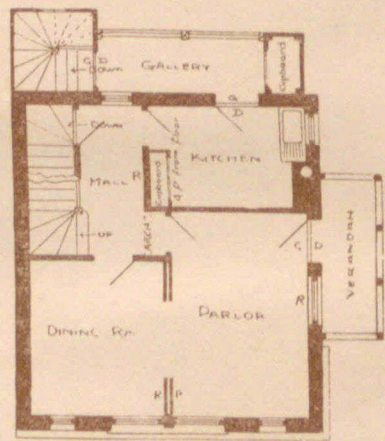
SIDE ELEVATION
 Competition for "A DRUG STORE"
 Design submitted by "Italia"



BASEMENT PLAN



GROUND FLOOR PLAN

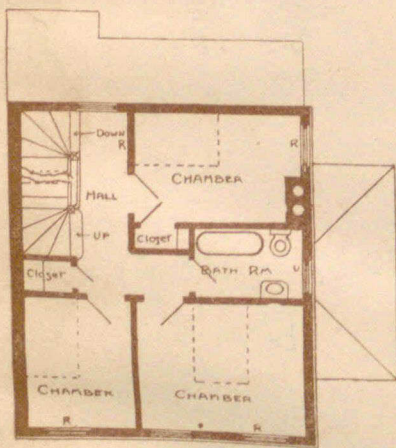


FIRST FLOOR PLAN

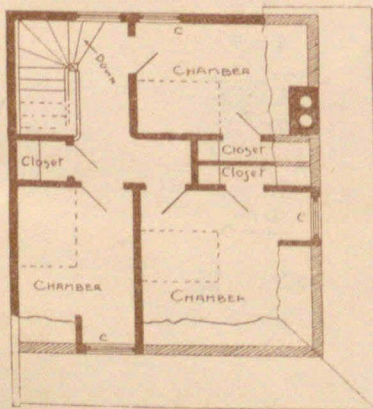
Competition for "A DRUG STORE"

Design submitted by "Italia"

SCALE FOR PLANS



SECOND FLOOR PLAN



ATTIC FLOOR PLAN

- Note R = radiator
 C = coil
 G.D. = glass door

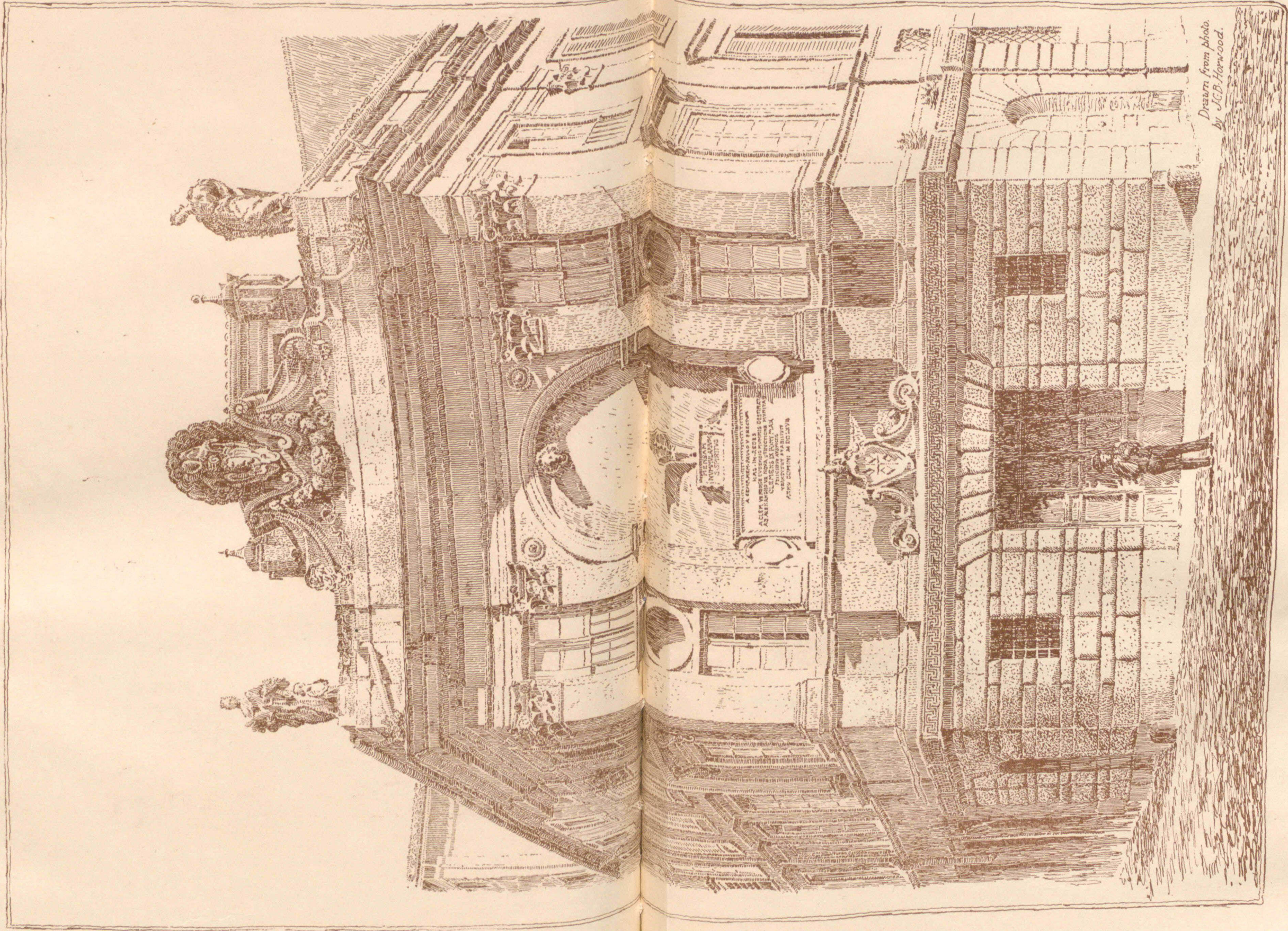
Competition for "A DRUG STORE"

Design submitted by "Italia"

- Description -

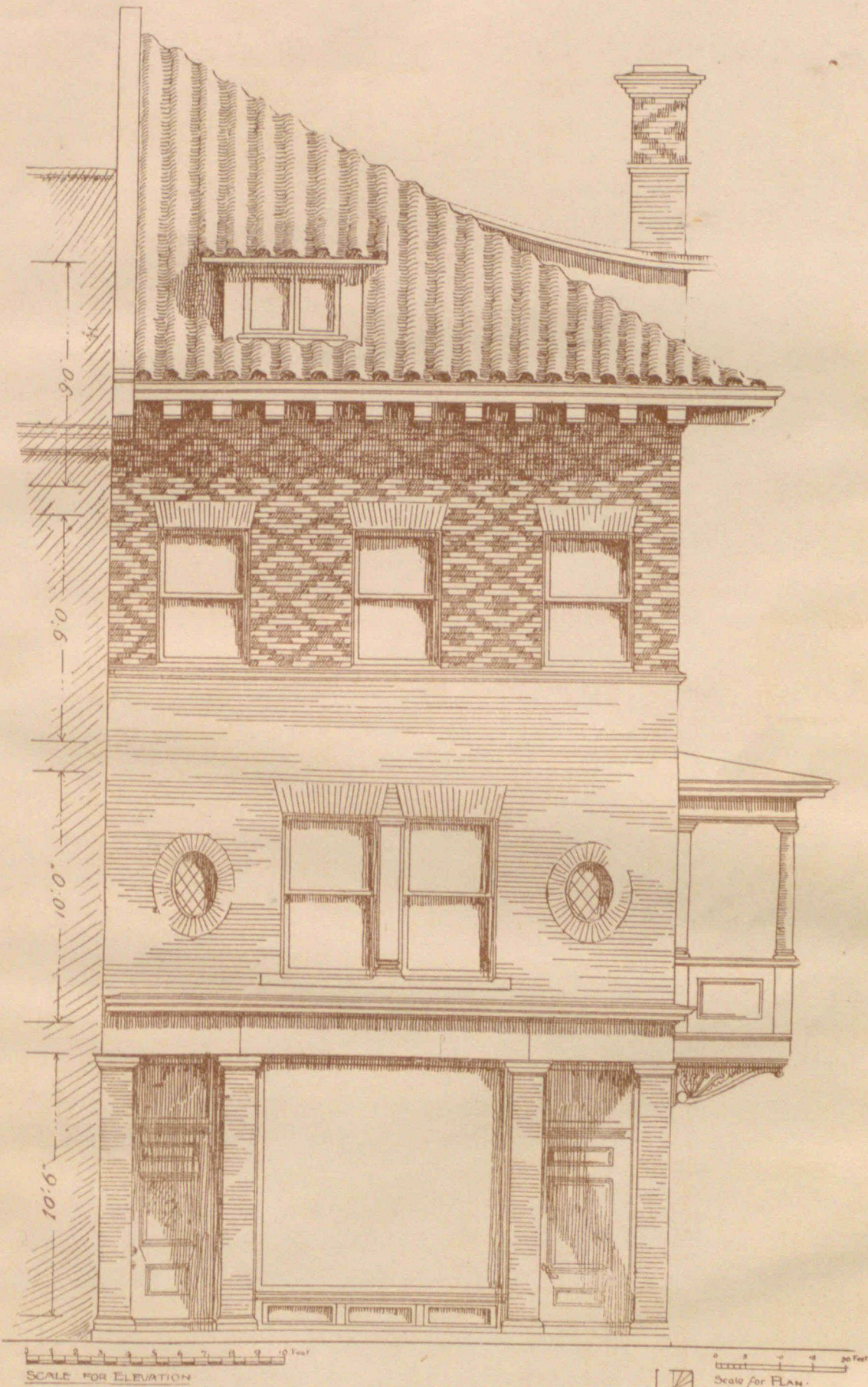
Basement walls to be built in Rubble Masonry in Ground and above Ground 6" course in front and 12" course at sides to be picked Limestone. Duty of Building to be of ordinary white {yellowish} brick, with caps and bases of piers, entablature over store, string course at second floor, all other sills in front and side, pilaster in front window, first floor and console, to be made of Mont red sandstone, and pattern in brickwork to be ordinary red (river brick). All interior woodwork of dwelling to be of pine for painting. Front Door and woodwork to store to be of white wood for varnishing. Roof to be covered with cheapest description of Merchants Spanish tiles. A double 12" steel girder to support front over shop window, with stone set in flanges

SCALE FOR PLANS



Drawn from photo.
by J.C.B. Hayward.

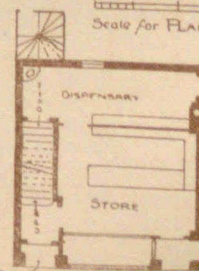
BANCO DI SAN SPIRITO. ROME



• FRONT ELEVATION •

Competition for A Drug Store

Design submitted by "Italia"



• Plan •

STUDENTS' DEPARTMENT.

C. A. & B. COMPETITION FOR A DRUG STORE.

This is not a very satisfactory competition. The competitors have interpreted the conditions liberally in various directions and have not in spite of this presented as good designs as might have been expected.

"Italia" is without doubt the first. Considering the limited space at his disposal, too much has been made of the dispensary. The space left for customers between the counter and the show window is barely five feet. The second step at the shop door is a serious mistake, and the shop entrance door is too small. The arrangement of the dwelling place and its separation from the shop so as to secure without awkwardness the independence of each, is well managed, and the free communication from kitchen to cellar an excellent idea. But the sizes of the rooms in the dwelling house will not bear too close inspection. An extremely small kitchen is not impossible for use and has even a point in its favour, but an extremely small dining room has nothing that can be said for it, particularly when it is on the wrong side of the house. The dining room should have taken the place of the parlour and been brought out to the hall line. It would then have been sufficiently wide, though still only 11 feet, and would get the eastern instead of the western sun. The parlour would then be the smaller room and we may suppose it a reception room and the dining room to be the family living room. At the bottom of this difficulty is the external centralization of the front windows on the first floor which was quite unnecessary either for an Italian effect or to relieve the beam over the shop window, which latter end indeed is not achieved. The fenestration of first floor should be arranged to suit the rooms inside and then there would be no need of the elliptical windows in which the designer has taken refuge. Had the chimney been placed on the north wall instead of on the east it might have been used to give a better finish to the north wall. "Italia's" design, though it requires a good deal of criticism, is worth criticism. The others are not only less worth criticism but from the scantiness of the drawings furnished with the best of them give less opportunity for it.

Between "Toledo," "Eros" and "Pill Box" it has been necessary to discriminate by a careful comparison of points. As a result it seems best to give the second place to "Toledo" and the third to "Eros."

"Toledo" has placed a good example before him, and though his efforts between the lintel of the shop window and the cornice storey are misdirected the result though defective in design is not offensive to the taste.

"Eros" has managed to reduce the apparent height of his shop window without reducing the light or opportunity of display. In general taste and design he has a slight advantage over "Pill Box" and is therefore placed third.

"Pillbox" makes a neat drawing though in this as well as in his design he is perhaps not following the best examples. His design is at the bottom common enough and he can only get away from it by enrichments which are inappropriate and only land him in bad taste.

"H₂SO₄" also deserves mention rather from the neatness of his drawing than from any solid merit in his somewhat showy design.

"Windsor" is strictly commonplace and apparently makes no effort after a truer kind of design.

"Builder" and "Canadian" are too fantastic both in plan and elevation.

The author of the design signed "Italia" which has been awarded first position, is Mr. J. Melville Millar, Montreal. The design signed "Toledo" awarded second position, is by Mr. Walter Siddall, Toronto. "Eros," who has been placed third would oblige by forwarding his name and address to the editor, as it has seemingly been mislaid.—Ed. C. A. & B.]

STUDENTS' NEGLIGENCE.

It has been remarked in connection with the training of our rising architects, and very truly too, that they have not the advantages that their confederates in England have. By these "advantages," generally speaking, is meant, ancient buildings, the use of libraries and a general higher tone of art in all their surroundings, than is possible in a young country. But there is one particular advantage, that by most students, themselves, here, would be regarded as a disadvantage, but which in after years they may come to regret very much they were without in their younger years. It is simply this, that students of professions in England must pay for their education, instead of, as here, being paid while they acquire it.

Let us for a moment compare the ways in which the two systems work. The principal who takes a pupil in England receives a premium, in return for which he gives a portion of his time to the youth and puts within his reach such practical information as he may gather for himself from visits to the works in progress, and again the pupil desires to make the most of his time and to profit by the opportunities put in his way. He does not hesitate to ask for information, because it is his right to receive it, and he is paying for it, and the more questions asked, the

more there are to ask, because in no way does the eye of the mind become more effectually opened than by questions.

Here, the principal, who has to pay his pupils while he is trying to make them worth their pay, is placed at an immense and unfair disadvantage. The student, in general, thinks more about his pay than acquiring knowledge, and as has been shown over and over again by our students, do what you will to help them in their studies, not ten per cent. of them show any desire to profit by your actions on their behalf outside their office hours.

Students' Architectural Clubs have been started over and over again by the real, bona fide students; every one has died an untimely death, and the cause of the decease has not been entirely owing to the departure of their worthy fellows for wider spheres of work and experience. It has been because there were none to take their places, and keep up the weekly meetings—none who would, for their sole advantage, respond to the efforts of the many practising architects who took the trouble to prepare lectures and to go down and deliver them at no small sacrifice to themselves, to the two or three earnest young men bound on progressing, and the empty chairs of a couple of dozen who ought to have been there. Many a time has it been said to these students, "Why do you not ask questions?" It is not possible, in a lecture, that the subject should be fully explained to every quality of mind in the hearers; some part or other must require further elucidation to make it clearer to this or that one," and so on, but from our experience, despite all the opportunities given, we might say that at least half of the students who have had these advantages, never asked a single question. Had they had the advantage of paying good round sums for their professional training, we would guarantee they would be more eager to help themselves; and as to those in the past, so with those in the present, a time will come when they will one and all say, "How unfortunate it is that I was not forced to make more of my time as a student:—daily I neglected opportunities because I did not see the advantages, and was not forced in any way to use them."

The results of the annual examinations bear out the same facts. The majority of the students who present themselves come up utterly unprepared, and instead of the majority passing, it is the minority only who are successful. We would warn students that these are days in which only the thoroughly proficient can make even a living out of his profession; the competition is overwhelming; he who starts on the battle of life unqualified must succumb, and if he does, he has only himself to thank or to blame. It is to be feared that few of the present generation of students will make any mark in the world when they go out from us, and as long as they work only for their pay, there will be little improvement in the race.

INTERCOMMUNICATION COLUMN.

This column is intended to afford a means of correspondence for students, builders and all our readers desiring information they cannot otherwise obtain. Questions for which an immediate reply is required should be marked "Urgent." Names and addresses of correspondents must be sent with their communications, but these may be signed with initials or otherwise for publication.

QUESTIONS.

[19]. I should be obliged if you could tell me the strength of wire ropes as compared with ordinary hemp ropes. I notice that contractors in town use wire ropes a great deal in large buildings for guys and such purposes.—"Country Builder."

REPLIES.

[14]. "Aspirant,"—You might carry up your column to a height of 700 ft. with perfect safety. Average sandstone weighs about 145 lbs. per cubic foot and would require a vertical column of 4158 ft. high to crush the base stones, but they might crack under a column about half that height. It is safer not to trust to more than 700 ft., or from one-sixth to one-tenth the crushing height.—"Science."

[16]. "Frosty,"—The weight of snow, fresh fallen, is from 5 to 12 lbs. per cubic foot. A cubic foot of water weighs a little over 64 lbs. "Frosty" can therefore see, that if his snow will lie until it thaws, and his roof has to support water, he must allow for an increase of weight of from 50 lbs. to 57 lbs., according to the depth of the snow water likely to stand on the roof. For ordinary purposes, for snow moistened and compact by rain, allow from 15 to 20 lbs. per cubic foot.

[17].—"J. L. T."—Trautwine (Edit. of 1886) p 397, gives a description of the making of a sun-dial. It is too long to give here, but if you cannot get hold of the book we will endeavor at some future time to publish it.—ED. INT. COL.]

[18] "Predicament."—We should require further particulars before we could answer your question. Your site is unusual, therefore a general answer would not suit your case. Let us know the kind of building you intend to erect, and also give a more detailed statement of the nature of the clay.—"M. P."

The following students were granted certificates of proficiency in architectural drawing at the recent examinations of the Toronto Technical school:—W. Bell, J. Michael, C. McPherson, W. R. Bale, E. Stanton.

THE HARMONY AND FUNCTIONS OF COLOUR
IN ART.*

BY ANDREW T. TAYLOR, F.R.I.B.A.

(Continued.)

These results would be somewhat minimized and modified if you divided the colours from each other by broad lines of black or white or colours. You will find also that if your colour is put on a white ground the colour will be stronger than if you put it on a black ground, because in the case of the white ground it tends to overpower the extra white rays given out by the colour, and in the case of the black ground the extra white rays given out by the colour are increased by those reflected from the black ground.

All this is but the alphabet of colouring. You will find that there are numberless gradations of hue and tint and shade of colour, and on your perception of these and skill in using them will depend your refinement of colour. Many never get beyond the use of the primaries and secondaries and perhaps one or two tints of the tertiaries, while between white and any of the primaries a skilful colorist might make a hundred different shades.

In nature the colours of shadows are always in contrast to their lights, and of positive hues with negative shades; accordingly you find that coloured back-grounds shew out white sculpture best; of these blue is one of the best colours from its affinity with shade, and we know that the Greeks used this a good deal in their back grounds for sculpture, etc. So gold, being in close relation to light, is good for dividing up colours and very useful in decoration, and will go with any colour. This is the reason it is used so much for frames for pictures.

The subject of colour blindness is worthy of attention; and many more persons are either colour-blind or have imperfect colour vision than is generally supposed. This is a very important matter in its bearing on railway officials and employees, as often the safety of carloads of passengers depends on the engineer's correct observation of the colored signals. In France it was found lately that over 9 per cent. of the railway officials were color blind.

The commonest defect is an imperfect impression of red, and many persons can see no difference of colour between a scarlet geranium and its green leaves, but only a slight difference in tone. You can see how this would affect an artist for example in the mixing and laying on of his colors, or a salesman in matching ribbons and silk, and other fabrics.

It will be useful to us to know something about the colours of which we have been speaking and which some of you may be indeed using.

A knowledge of his pigments is most important to an artist. Many of the failures of pictures and their grievous change for the worse in a few years after they were painted, are due to this want of knowledge. Both Sir Joshua Reynolds and Turner were great experimenters in colors, and sometimes sacrificed safety and permanence to attain brilliancy and a particular effect. There is no doubt that many oil paintings have altered very much from this cause, and others from successive coats of varnish laid on with intermediate layers of dirt, until what we see now as works of the great masters are often but caricatures of what they were originally. Also with water colours. Recently there was quite a journalistic war as to whether water colours were permanent or faded, and I think there is no doubt that it was conclusively proved that many water colours had undergone material change by exposure to light and especially to strong sunlight, and that certain colours were more evanescent than others.

In colours for the palette you should only use those which possess the following qualification—purity and brightness, body, or on the other hand, as the case may be, transparency, and above all, durability. There are very many beautiful colours, but the necessity of the above qualifications restricts the number to comparatively few. But this is not to be regretted; the tendency is to use too many colours. Many a fine picture has been painted with only three or four tints, and Hennen often paints pictures which are lovely in colour and feeling with but three colours. The more you mix colours the muddier you are apt to get them and the more difficult it is to keep purity of tone.

Although white is not properly speaking a colour, yet it is an important pigment, as it enters into nearly all the other colors and is much used in combination in oil painting and in tempera, as it gives light and vividness, as well as easy toning down. White lead is the base of most of the white, and has this defect that it is apt to turn black in time and injuriously affects some colours. Zinc white is durable, but wants the body and brightness of white lead.

For water colour Chinese white is mostly used. It is a preparation of white oxide of zinc mixed with gum arabic, glycerine, etc., and especially in body colour work, is most valuable.

The primary colour Red is, as we found, the most positive of colours. Being so, it is somewhat difficult to manage, and has to be used very sparingly. If you will notice, a touch of red here and there in a picture will brighten it up, and draw attention to itself in the most surprising manner. Nature uses red with very great reserve, and when used, takes great care to tone it down with green or other soothing colour.

Vermillion if of the genuine kind is a good durable colour, and has great body and weight, but for this reason you will find it will not readily mix with other colours.

Indian Red is brought from Bengal, and is an iron ore or peroxide of iron. It is permanent and very opaque.

Light Red is a brown ochre, burned, and is very useful for flesh tints and in landscape.

Lake is a very transparent pigment, and is of several kinds. The scarlet lake is obtained from cochineal, and washes well; it is, however, liable to fade in strong light.

The carmines are also obtained from the cochineal, and work well, but are liable to fade in strong light, and are not permanent with white lead.

Blue is the coldest and most retiring of the primaries, and cools and tones down all colours with which it is in combination.

Ultramarine is perhaps the most beautiful blue that we have, and is prepared from the lapis lazuli, a precious stone found in Persia, etc. It is very transparent and pure, and has great brilliancy and permanency. It is largely used for skies. Unfortunately it is often adulterated, its costliness being a strong temptation.

Cobalt is prepared with metallic cobalt or its oxides, and is next to ultramarine in its brilliancy, and in water colour, works even better than the other. It is permanent so far, but is affected by time.

Prussian Blue is formed from prussic acid, iron and alumina, and is a deep and strong blue of great body and transparency.

Indigo is got from plants in the East and West Indies; it is also very powerful and of great body and is transparent. In mixture with white lead it is fugitive and is not so reliable as Prussian blue.

Yellow is the remaining primary, and is the nearest to light; in varying tones it is much used in nature. It is akin to gold, and was often so used in old manuscript.

Chromes are a modern discovery, and are mostly chromates of lead. They are brilliant and beautiful, but are not safe colours, as after a time

they lose their purity and become dull and heavy. They are also injurious to some blues when mixed.

Naples Yellow is a compound of oxides of lead and antimony, and was originally prepared at Naples, hence its name. It is a pleasant warm tint, is opaque and covers well, and in an oil medium is permanent and good, but will ultimately change its colour, in water colours, and must not come in contact with oxides of iron of any kind.

Yellow ochre is a native pigment found in most countries. The ochres are very useful and practically permanent.

Raw Sienna is an iron ore, but it is very useful and is transparent, and best of all, is permanent.

Cadmium Yellow is prepared in different shades and is a strong, light, pure useful colour; it is prepared from the metal cadmium, by precipitation with solution of sulphuretted hydrogen. It is permanent and good.

Gamboge is obtained from certain trees in India, and is of a gummy resinous nature. It is a bright, transparent, delicate yellow, and is exceedingly useful, not being affected much by sunlight or impure air, but it does not show in gaslight.

Indian Yellow has been long used in India, and is a beautiful, pure yellow, but it is not lasting, and in oils is very fugitive; it has a very strong unpleasant smell, and is not a safe colour.

We will not for the present take up the secondary and tertiary colours, as they are in large measure products of the primaries, and the subject is too large to treat properly just now, but rather go on to look at color as illustrated in painting, architecture and sculpture, and first of painting.

All painting was originally a hand-maid to architecture, that is, was employed to beautify parts of a building, and was incorporated as part of the same in fresco and tempora work, and therefore, being painted for, and actually at a particular spot, its colour was made to harmonize with its position. The modern pictures, or, as we would say, easel pictures, are much more recent, and being intended to hang anywhere, are governed by no such restrictions, but have each their own key of colour, independent of everything else. It is this that makes a modern picture gallery so confusing and tiring. Every picture is out of sympathy and tone with its neighbor, and if by very skilful hanging this is in any way modified, it can never be wholly got rid of. This is also true to a certain extent in our houses; pictures are bought and hung on our wall which are out of touch and tone with their surroundings—whether it be the furniture, the hangings, or the other pictures—and consequently there must be a certain amount of incongruity. What we call oil painting was practically not known, at least in its modern form, until the beginning of the 15th century. When the brothers, Van Eyck, the Flemish painters, may be said to have discovered it. Nearly all the work done previously to that time was in distemper, and therefore more suited to permanent positions on the walls of churches and other buildings.

Vasari tells us that Jan Van Eyck, who delighted in alchemy, set himself to try various kinds of colours and oils to make varnishes, as artists at that time knew of no way in which pictures on panels could be made durable, and could be washed without losing colour. He made many experiments and at last found that oil of linseed and oil of nuts were the best for drying.

He also saw that when the colours were mixed with these oils, not only were they safe from injury by water, but the colours also had more lustre, and the colours blended better than in tempora. The fame of this invention soon spread in Flanders. Even the Flemish artists endeavored to keep the secret of oil painting, and it was not until later that it was known in Italy, and stories are told of Venetian painters disguising themselves and going to Belgium to try to learn this secret.

One Antonello, of Messina, was so struck by a picture in oils that had been sent from Bruges to the king of Naples, that he set off for Belgium, and by dint of giving Jan Van Eyck numerous presents and flattering him, he got the secret, and returning to Italy, settled in Venice and painted many pictures in this new method, which could be kept secret no longer, and was rapidly adopted by other artists.

Painting upon the walls had certain advantages; it could not be carried off so readily as an easel picture, nor without risk of ruining it. It is said that the king of France tried hard to get the "Last Supper" of Leonardo da Vinci, which he painted for the friars of San Maria delle Grazie at Milan, transferred to France, but the risk was too great, and it has remained in position ever since, although now but a wreck of its former self. It is pleasant to find the estimation in which great art was held at that time, for we are told that another picture that Leonardo painted about this time, at Florence, was so good that his rooms were filled for days with crowds of people going to see his works as to a solemn festival. And the story of Cimabue's Madonna is well known, how it was considered such a marvelous thing that it was carried through the streets in joyful procession to the Church of S. Maria Novello, where it still is, and when King Charles of Anjou was entertained at Florence, a sight of this picture was considered a very important part of the programme. Would that this love and appreciation for art was as general now as then—Art would need no other stimulus.

As soon as painting in the medium of oil became known, a great change came over the character of the works; the scope of subjects became greatly enlarged; mythology, ancient and current history, classical story were drawn upon, and a great impetus was given to painting generally. Greater richness of colour was attained than was before possible with tempora.

In landscape painting, as in all painting, it is of the first importance that we preserve the clearness of our colour, as has been said by a living artist: "Good painting is like beautiful language, it must express briefly, clearly, forcibly, our meaning; each finishing touch in a picture should be considered like one word in a sentence; to put a number of touches where one ought to suffice is like stammering in painting."

We come now to colour in Architecture, and here the same laws of harmony govern as in painting, but being on so much larger a scale, and viewed in connection with the surroundings of nature, the scheme of colour must necessarily be on a much broader and simpler key. Under the sunny skies of Italy they revel in the most beautiful colours on the outside of their buildings, which present a continual feast for the eye of the beholder. The Duomo at Florence and the older Baptistry are glorious in colored marbles, and not a little of the indescribable beauty and loveliness of Giotto's Tower there, is due to its color as seen under soft Italian skies. St. Mark's at Venice, both inside and out, is rich in coloured marble and gold mosaics, mellowed by time into beautiful hues.

It is interesting to know that in all ages, and amongst all peoples, polychromy has had an important place in architecture. Hittoroph, in his investigations in Sicily and the Acropolis Selinas and other temples, and recent investigation in Greece, has abundantly proved the liberal use the Greeks made of colour on the exterior of their temples, etc. The custom also prevailed extensively all over France in the middle ages and during the Renaissance, but gradually declined in the reign of Louis XIV. Viollet le Duc, the late eminent architect and antiquarian, made a careful examination of Notre Dame Cathedral at Paris, and found unmistakable evidence that a large portion of the facade had been radiant with colour, and even in England many of our cathedrals there show also remains of colour, but the climate has dealt too rigorously with them to leave much evidence. Somehow when we took to borrowing Roman Orders and Architecture, both in

* Paper read at a meeting of resident members of the Province of Quebec Association of Architects, at Montreal.

England and France, the forms only were reproduced, and the original glittering roofs and mosaic and marble work were forgotten. Increased knowledge on this matter has led of late to colour being much more extensively used, especially in Paris, as in the Opera House, the Hemicycle, the Beaux Arts, and many modern buildings.

Somehow, in northern countries, under dull gray skies and lowering clouds, form was developed largely to the exclusion of colour, and that in the very face of nature's example, for we have only got to leave a building alone and time will soon beautify it with pearly and emerald lichens and mosses, and touch the stones and roofs and timbers with harmonious tints, such as the ruins of castles in Britain and Europe everywhere show. Even here nature will do her best if we will but let her. The monotony and dullness of the average streets of cities are very depressing, especially in manufacturing cities, where we find rows on rows of dirty soot and smoke begrimed houses.

Some years ago, in London, the average fashionable house had a dingy colored compo-cement front, and the back was too dreadful to think of; then there came a revulsion, and armies of painters appeared, and lo! the fronts of the houses blossomed out in claret color, and sage greens, and blood red, and mustard yellow, and other colors hard to give a name to, and although in some cases presenting a somewhat incongruous and piebald appearance, were yet infinitely better than the old. The next stage was better still, that of using honest material of natural pleasing colour, which would withstand the smoky atmosphere. So terra cotta and tile work and warm colour tone were and are used.

Surface applied painted work will not do, but the use of coloured materials themselves seems to be the line on which we shall achieve greatest success.

In New York there was a brown stone period, when a man could not shew himself in society unless he lived in a brown stone house, and so streets and terrace of brown stone still chill our sympathies. New York had also its white marble period, when to live in a white marble house was considered the acme of bliss, and so leprosy looking erections took courage and reared their heads in the streets. Now more pleasing arrangements of material and colour are in vogue—red brick and red stone and warm cream colored stone meet the eye in all the newer quarters, and in combination with the green of the trees and grass, present very pleasing pictures. And to come nearer home, a cut gray limestone house was considered amongst ourselves as the sign of eminent respectability, but fortunately of recent years, red brick and terra cotta and red and buff stone, have been largely employed, alone or in combination, and I cannot but think to the beautifying of the city and the advantageous breaking up of the monotony of our streets.

In more genial and equable climates, where the houses are ugly and commonplace, they are often redeemed and made even beautiful by a veil of green ivy growing up to the top, or by Virginian creepers, or by balconies and window sills full of plants and flowers. It is surprising how a few bright flowers on an outside window sill will brighten up a whole front of a house, and give pleasure to every passer-by. Here it is only in summer that we can attempt such a thing, and alas, the ivy is not available to cover the ugliness of some of our houses. We do not want the exterior of our houses to be like harlequins, but neither do we want them to be like quakers or Gray nuns. We should take a lesson from nature, who never is in monotone, and even where you fancy she is, on closer inspection you will find it made up of a large variety of hues, but all in perfect harmony.

Oriental art differs essentially from ours in its bright melody of colour; they use colours externally of a richness and brightness that would make our hair stand on end, yet always with harmony, congruity and beauty. We cannot, in our climate, use these in such richness or wealth, yet we can and ought to use the softer shades, which have depth of colour without garishness.

So far so good, but possibly some of you may say, "Now coming to sculpture. You surely do not advocate colour in sculpture." And yet if you think, why should one important branch of art be robbed of the charm of colour, and have to depend entirely on beauty of form? It is largely a matter of habit that we have come to expect sculpture in white marble, or else in bronze, which speedily turns black. It seems to suit our matter-of-fact minds, and this matter-of-fact age, that we must have even our sculpture in "black and white," reduced, as it were, to legal exactness.

It was long thought that ancient sculpture was not coloured, but it has been placed beyond all controversy that the Greeks, who were the best sculptors that the world ever saw and will possibly ever see, employed colour to heighten the effects of their sculpture, and never hesitated to cover even the most precious white marble with gold and blue and other colours. Careful examination of many of the sculptures of the Greek temples conclusively proves this, as the remains of the colour is very plain. There is no doubt that the famous Parthenon frieze was colored, and quite recently several sarcophagi were found at Sidon, three of which are Phoenician in character and seven of Greek design of the purest type, without a trace of Roman influence, richly sculptured, and bearing close resemblance to the Parthenon frieze in the horses and beauty of the figures. These show large remains of colored decoration, and leave no doubt whatever as to great development of Greek polychromy in their sculpture, as well as in their architecture. So also the Christian sculpture and Gothic art. There are numberless examples in our cathedrals and old mediaeval buildings of sculpture, both of the figure and of natural forms, with more or less remains of rich colour upon them, on the portions less exposed to the weather than the others. And where we find Greek sculptors and the best Gothic sculptors employing colour in their sculpture, the abstract theoretical use of it cannot be condemned. It is in the application of it that we are apt to go wrong. Here very great caution and artistic sense has to be exercised, and limits tinted Venus stands as a warning that there are defined bounds and limits to its application. There are certainly great objections to the use of natural colour in isolated figures, subjects either wholly or partially draped, in that the colour takes away from its ideal and abstract character, and it becomes at once an imitation of a living person, and as such, influences us in quite a different way.

The modern fashion of placing busts about the middle of a room is hardly in the best taste, and is taking sculpture out of its proper sphere, but where it is rightfully employed to heighten the effect of a building and such like, then the necessity for the use of some material of such a colour as to harmonize with the building arises. More especially where isolated statues are placed in our streets to commemorate some noble life or deeds; if they are of white marble they get grimy and streaky and dirty, and the light and shade is crude and hard. If they are of bronze, they speedily become black as a negro, obliterating all the finer lines of expression and fold of garment, and presenting little more than a silhouette against the sky. In one notable case, that of the statue of the Prince Consort in the Albert memorial, in Kensington Gardens, London, a bold departure was made and the statue was gilded all over, but the result was no better than before, and indeed, rather worse, and was christened the "God of Mammon."

I would just mention the beautiful majolica or faience work of Lucca della Robbia, which glows from so many of the facades of the Italian churches. They were chiefly figure work of a religious nature—Holy Families, Virgin

and Child, Saints, etc.—but so beautifully modelled, and such rich colors burnt in and glazed so as to be almost imperishable—a very suitable material for smoky atmosphere when they could be washed and always keep their brightness and beauty. The secret was so well kept by the Robbia family that it died with them, and we have been unable to get the full brilliancy of all the colours, but a resuscitation of this in some such form would seem to fulfil the conditions of modern times.

I had intended to speak of colour in interior decoration, but it is so large and important a subject that it is worthy of a better place than the close of a paper, and I will conclude in a word by respectfully urging you all to assiduously cultivate your colour sense in the conviction that it will minister to your susceptibility to refined and beautiful impressions, and afford an abiding source of joy and pleasure.

USEFUL HINTS.

To clean marble mix up a quantity of the strongest soap lees, with quicklime, to the consistence of milk. Lay the mixture on the marble for twenty-four hours, then wash it off with soap and water, and repolish if necessary.

TO PRESERVE SCAFFOLD ROPES, ETC.—Ropes used for scaffolding may be preserved by dipping, when dry, in a bath containing three-fourths of an ounce of sulphate of copper to a quart of water, and kept in for four days; then hung up and dried.

All main steam pipes and steam risers says the Heating Engineer, should be connected at their lowest levels by relief pipes run to or connected with the main return pipes, or to the return risers below the water line in the boiler, to take from them any condensation that may be formed. These relief pipes also serve to equalize the pressure throughout the apparatus, or the return lines may all run below the water line of the boiler, in which case the connecting lines spoken of are unnecessary.

TO REMOVE CREASES IN DRAWINGS, ETC.—Fasten the engraving or drawing by drawing pins on a board face downward on a sheet of paper. On the back place another sheet of paper which retains a very slight quantity of moisture. Over this place flannel or blotting paper, and taking a hot iron pass it carefully over the part where the creases have been made until they disappear, and then submit the drawing or engraving to pressure between glazed boards.

Mr. Thos. Potter in a letter to the Builder, states that the better concrete is the more readily it conveys sound, and that an actual trial lately proved that ordinary conversation could be distinctly heard through a six inch concrete wall plastered on both sides, and the same applies to concrete floors. Such floors should never be constructed solid throughout, says this writer, if required to be sound-proof, and where wood in the form of joints, bears directly on the concrete, sound is very readily transmitted from one to the other.

TO GILD ON PLASTER OF PARIS.—To satisfy the absorbent nature of the plaster, brush it over with linseed oil, at intervals of twenty-four hours, till it will absorb no more. Then go over it with oil gold size, ground with yellow ochre into a paste. If this size does not work freely, thin it with linseed oil. When this is so far dried as to be just tacky, gild in the ordinary way with gold leaf, using a tip. Press the gold gently but firmly down with a bob of cotton, covered with soft washing leather; then rub off superfluous gold, and smooth the surface with a second bob of cotton not covered.

One of the latest things in the way of so-called fire-proof material for building purposes is "metal plated lumber," the invention of a Baltimorean. The method pursued is to take a piece of lumber of any desired shape or length, together with a strip of thin sheet metal to correspond, and run them through a simple machine, formed mostly of rollers, which folds the metal skin tightly around the lumber. Thus prepared, it is claimed that the lumber is specially adapted for use in the construction of doors, flooring, partitions, stairways, freight and passenger cars, granaries, refrigerators, &c., &c.

The following weights for brickwork in mortar, 100lb. per cubic foot; brickwork in cement, 112lb. per cubic foot; masonry, rubble, 140lb. per cubic foot; masonry, ashlar, limestone, 150lb. per cubic foot; masonry, granite, 160lb. per cubic foot, are after Rankine. The following weights for timber are due to Haswell:—

	Weight of cubic foot.			
	Green.		Seasoned.	
	lb.	oz.	lb.	oz.
American pine	44	02	30	0
Ash...	58	3	50	0
Beech	60	0	53	6
Cedar	32	0	28	4
English oak	71	10	43	8
Riga fir	48	12	35	8

But no definite rule for correctly calculating weights from the measurement of timber can be given, for Rankine, in "Civil Engineering" (Griffin, 1870), states that the timbers given below have the percentage of loss of weight in seasoning set against them. The correct weight per cubic foot depends then to a great measure upon the condition of the timber: Red pine loses in seasoning twelve to twenty-five per cent. in weight; American yellow pine loses in seasoning eighteen to twenty-seven per cent. in weight; larch loses in seasoning sixteen to twenty-five per cent. in weight; British oak loses in seasoning sixteen to thirty per cent. in weight; elm loses in seasoning about forty per cent. in weight; mahogany loses in weight sixteen to twenty-five per cent. in weight.

CORRESPONDENCE.

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

THE NECESSITY FOR A CANADIAN SCHOOL OF ARCHITECTURE.

MONTREAL, May 3, 1894.

Editor CANADIAN ARCHITECT AND BUILDER.

The Province of Quebec Association of Architects and the Ontario Association are endeavoring to do good work in the face of the craze for Americanism that has been the rage in Canada for a few years back. They have formed associations for the culture of artistic architecture, and especially aim at courses for the students, and only wait the munificence of some of Montreal's benefactors, who have been so liberal to the other arts. We understand that space is available in the applied science department at McGill, and only requires the appointment of competent professors to start a school of architecture equal to Cornell or the Boston school. If this could be accomplished, our young men need not seek architectural training in the United States. This, I contend, is the root of all the evil. How can it be otherwise, as is rightly argued by wealthy capitalists, who seek the latest and most advanced ideas in art and architecture. A school of architecture would place all the exalted ideas, present and past, before the student's mind. His eye would be trained to the beautiful in art, his mind would be stored with the best of all the ancient examples, the theory, the styles, the proportion, the strength, construction, designing, and correct and artistic principles would be instilled as the alphabet is in a child—never to be forgotten. Everything that is pure and noble in architecture would become a part of every student of ability, and in obtaining his diploma the public would be assured that he at least knew something about architecture, and that it would be unnecessary to go to foreign countries for taste and ability. The case is now deplorable. All our large and expensive buildings are given to Americans, and to some without this special training. And what has been the result? In our own city we have examples of the failures in design and construction. The Y.M.C.A. is in a deplorable state, and in a few years may become a complete wreck. Other examples in Toronto are fully as bad, and in the face of this, still our Canadian people will persist in employing this foreign talent. The latest insult our Canadian architects have had to submit to is from the Canada Life Assurance Co., a purely Canadian company! making its revenue out of Canadians, its chiefs Canadians, and yet it employs an American, and gives him carte blanche as to expense—some \$400,000—to spend on a comparatively small building. A Canadian would have been asked to build this palace with \$150,000, at most, and comparisons would be made with American buildings costing half a million.

This is not all. This new building is to be erected alongside the Temple Building, and on a mean technicality the Trustees of the latter building are asked to take down the rear portion of the party wall, the claim being that it was not according to law, while they acknowledge that if it was, it would still be insufficient for this new fire proof building, which is to be three stories higher than the Temple.

They appear to be using all the smart dodges they can invent to misrepresent the actual thickness and strength of the wall, and try to induce the City Inspector to condemn said wall, but thanks to the City Inspector's practical and extended knowledge, he refused to do this, and states that the wall is good and sufficient for the Temple, it having stood without a hair's breadth of settlement, and remains just as it was built, five years ago.

For a wealthy Canadian company to allow itself to be placed in such a doubtful position is not to its credit. The City Inspector, when he granted his certificate to the Trustees of the Temple building, knew what he was doing, as is amply proved by the stability of the wall. He knew full well that the lower part, 2 ft. thick for two stories and sixteen and then 1 ft. of an old wall, thoroughly well built, with the best $1\frac{1}{2}$ thick brick and good mortar, equal to cement, was as good as a new wall 4 in. thicker, and so would any practical architect decide, with the exception of an autocrat American, in whose hands our Canadian companies appear as so many puppets.

If, as I said before, our young men were thoroughly trained, our Canadian public would have the guarantee that all receiving the diploma would at least be men of knowledge in the profession, and would attain as high a standing before all the world as do our doctors and lawyers.

CANADIAN.

LEGAL.

The Supreme Court of the United States has decided that where carpenters are employed in a building and no notification of the fact is given by the owner to the insurance companies holding risks on the building, as provided for in the conditions of the policy, the validity of the policy is thereby rendered void.

Mr. C. R. S. Dinnick has lately added to his brick making plant at Toronto Junction a wire cutting brick machine with table and die. A similar machine has been purchased by the Burlington Pressed Brick Co., Freeman, Ont.

ARCHITECTURE AT THE MONTREAL ART GALLERY.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—The annual spring exhibition of oil and water colors with the usual adjunct of a few architectural drawings is now the chief attraction at the art gallery, and it may be said that the exhibition as a whole, compares favorably with those of former years.

To an architect an exhibition of this character should prove particularly interesting, and the idea of combining an exhibition of architectural drawings in one which includes other works of art, is about the only way at present to advance the cause of good architecture in a city like Montreal, for the chances are that an exhibition that was purely architectural in its character, would very likely prove a failure, for the reason that the public for the most part does not as yet regard architecture as an art, and what is worse, thinks that an architect's calling is one that can be equally well filled by a novice, as by an educated practitioner.

It is not the intention of this article to enter upon a detailed criticism of the drawings on exhibition, but it is my firm belief that an exhibition of architectural drawings is valueless as a means of educating the public to know what is good and what is bad without fair and just criticism. Our architects as well as the public should be willing to invite the criticism of their work by those who are competent to judge, as such criticism not only points out to us our errors which we ourselves are only too apt to overlook, but it tends to broaden our ideas and incite us to make still greater efforts to improve the quality of our works, which ought to be the great object of every architect who has the cause of good architecture at heart. Any one who has read the comments in our daily papers on the exhibition will find that the works of our local artists for the most part have received their fair share of criticism, but scarcely a passing notice is given to the architectural drawings. Why is this? Is it because our local art critics think that an architectural design is something outside the sphere of art, or is it because they are afraid to take up the matter owing to lack of knowledge? If it is owing to the latter, what a lamentable state of affairs then exists, and which only can be rectified by time and proper training.

A knowledge of art is a very excellent and a most desirable acquisition to one's education, and good art has always exercised an elevating and refining influence upon individuals as well as nations, and as we are a very ambitious people, and wish to be considered a refined and cultured people as well, it is only natural and proper that we should patronize art. But in order to become an artistic people in the fullest sense of the word we must be educated in art, for, unfortunately, although we are lovers of the beautiful, we are not naturally an artistic people; we look altogether too much at the utilitarian side of things, thinking that as long as anything answers its purpose it does not matter whether it pleases the eye or not. It is this state of affairs that must be remedied, and the only way to bring about the much desired reform is by educating the public. Of all the arts that we should know something about, it would seem only natural that architecture, that art above all others, is the one where we should make the starting point, for the reason that it is an art that had its beginning before all other arts, and one that administers most largely to our comforts.

Buildings that are well designed and beautiful in proportion and detail are the surest evidence of a nation's wealth and culture, and have been so from time immemorial.

How this much desired change is to be brought about is an important question, but one way of doing it would be to have architecture taught in our public schools, and perhaps some day in the near future some of our wealthy citizens may see their way clear to establish a school of architecture in connection with one of our great collegiate institutions where those who wish to practice the architectural profession can receive the proper training. Then, and not until then, will architectural art assume the position among the arts that it should, and greater inducements will be given members of the profession to exhibit their work when they feel that their efforts will be appreciated by the public.

ARCHITECT.

RECENT CANADIAN PATENTS.

A patent has been granted to Mr. A. Wilford, Tod morden Ont., for a brick kiln, comprising in a continuous kiln, a series of independent adjacent chambers with horizontal walls between and the chambers connected to each other by horizontal passages, and each chamber being provided with draft openings to supply a current of atmospheric air to the fire within, means for supplying fuel to the fire, a flue for conveying the heated air from one chamber to another, etc.

H. Johnas Johanson and Bertrand Harris Short, of Vancouver, have patented a paint for iron, etc., composed of tar, salt, carbon bi-sulphur, benzine refined and paraffine cake.

John Geo. Heilig, Hamilton, Ont., has patented a ladder shelf scaffolding.

A patent for a sash fastener has been granted to Mr. L. Evesland and Alonzo Herrick, of Port Stanley, Ont.

Robt. Sampson, Quebec, has secured a patent for a plumber's test pump.

ROUGH-CASTING IN CANADA.

ROUGH-CASTING, or as it is sometimes called, slap-dashing—both words of which are synonymous with the French *hourdage*, rough work, and *ravalement*, having a similar meaning, writes Mr. Fred. T. Hodgson in *Architecture and Building*—is a method of plastering the outside of buildings much used in the northern part of Canada, because of its being durable, cheap and well adapted to keep out cold winds during our long winters. The methods of applying rough-cast and the mixing thereof do not materially differ from the methods adopted in Northern Europe or even in the North-Western States, but it is these minor differences, perhaps, that make the rough-casting done in Canada superior, so far as durability is concerned, to much that is done in other parts of the world.

There are frame cottages near the city of Toronto and along the northern shores of Lake Ontario that were plastered and rough-casted exteriorly over forty years ago, and the mortar to-day is as good and sound as when first put on, and it looks as though it was good for many years yet if the timbers of the building it preserves remain good. Rough-cast buildings are plentiful in every province in the Dominion from Halifax to Vancouver and from Lake Erie to Hudson Bay, and when well built, and the rough-cast properly mixed and properly applied, the result is always satisfactory. It is quite a common occurrence in Manitoba and the North-west territories in the winter to find the mercury frozen, yet the intensity of frost does not seem to affect the rough-casting in the least, though it will chip bricks, contract and expand timber and render stone as brittle as glass in many cases, and the effect on iron and steel is such as may prove dangerous if exposed to sudden and unexpected strain.

In preparing a frame or log building for rough-casting, care must be taken in putting down the foundation. A good stone or brick foundation is, of course, the best, but where rough-casting is intended, stone or brick foundations are seldom used because of their cost, and the builder is compelled to use posts of wood. Here the posts are generally made of white cedar, which has a lasting quality of thirty-five or forty years, if sound when used. The posts are put in the ground from 3 to 5 feet, the deeper the better, as they should be deep enough in any case to prevent the frost from forcing them upward. When a sufficient number of posts have been properly placed a line is struck on them the proper height from the ground and the tops levelled off. The sills are then placed—all joints being broken on top of posts—and the whole made level. These sills and all the other timber, scantlings and lumber, should be well seasoned, if possible, for the greatest enemy to the plasterer is unseasoned timber; shrinkage of joists, posts and scantling, not only breaks the bond of the mortar, but causes great cracks in corners and angles, that no amount of pointing or patching can ever make good.

When the frame is up and the rafters on and well secured, the whole of the outside should be covered with good, sound, common inch stock pine, hemlock, spruce or other suitable lumber, dressed to a thickness. If put on diagonally so much the better, but this is not absolutely necessary if the rough-casting is to be of the best quality, as will appear hereafter.

When it can be done it is best to get all partitions set in place and lathed, the roof on and all necessary outside finish or grounds put in place and made ready to receive the lath. The carpenter must prepare his finish or grounds for finish to accommodate the extra lath, as the walls will be thickened accordingly.

For the cheaper sort of rough-casting in one or two coats, the following method of lathing is employed:—Nail laths on the boarding—over paper or felt, if paper or felt is used—perpendicularly 16 inches from centre to centre if 4-foot laths are used, or 18 inches or 1 foot from centre to centre if 3-foot laths are used. The whole surface to be rough-casted will require lathing this way. When done lath as is ordinarily done with No. 1 pine lath, breaking joints every 15 inches. Put five nails in each lath, driving each nail home solid, coat over with mortar, well haired, and that has been made four or more days, smooth and straighten as well as possible with a darby. When done and while yet soft the rough-cast is thrown on it with such force as to drive the pebbles or small stones deep into it. The mixture or dash, as it is called, is composed of fine gravel, clean washed from all earthy particles and mixed with pure lime and water till the whole is of a semi-fluid consistency. This is mixed in a shallow tub or pail and is thrown upon the plastered wall with a wooden float about 5 or 6 inches long and as many wide, made of half-inch pine and fitted with a wooden handle. While with this tool the plasterer throws on the rough-cast with his right hand he holds in his left a common whitewash brush, which he dips into the rough-cast and then brushes over the mortar and rough-cast, which gives them when finished a regular uniform colour and appearance.

For this sort of work the following proportions will answer: To one barrel of prepared gravel use a quarter barrel of lime putty; mix well before using. This may be coloured to suit the taste by using the proper materials, as given further on. It must be understood that the foregoing is the cheapest sort of rough-casting, and is not recommended where more durable but more expensive work is required.

The best mode of doing this work, as practiced in the lake district of Ontario, is about as follows:—Have the frame of

building prepared as indicated in the foregoing, with partitions all put in and well braced throughout and well secured. Lath diagonally with No. 1 pine lath, keeping 1½ inches space between the lath. Nail each lath with five nails and break joints every 18 inches. Over this lath again diagonally in the opposite direction, keeping the same space between the lath and breaking joints as before. Careful and solid nailing is required for this layer of lathing, as the permanency of the work depends to some extent on this portion of it being honestly done. The mortar used for the first coat should have a goodly supply of cow's hair mixed in with it, and should be made at least four days before using. The operator must see to it that the mortar be well pressed into the key or interstices of the lathing to make it hold good. The face of the work must be well scratched to form a key for the second coat, which must not be put on before the first or scratch coat is dry. The mortar for the second coat is made in the same way as that required for the first coat, and is applied in a similar manner, with the exception that the scratch coat must be well damped before the second coat is put on, in order to keep the second coat moist and soft until the dash or rough-cast is thrown on. The rough-casting is done exactly in the same manner as described for the cheaper sort of rough-cast work.

A building finished in this manner, if the work is well done, possesses many advantages over the ordinary wood-covered structure. It is much warmer, being almost air-tight so far as the walls are concerned. It is safer, as fire will not eat its way through work of that kind for a long time. It is cleaner, as it will not prove such a harbour for insects. It may be made as handsome as desired, for, before the rough-cast is dashed, it may be laid off in panels of any shape by having strips or battens tacked over the soft mortar, which may be removed after the rough-casting is done and the coloring finished. It is much superior to the so-called brick veneered house, as it is much warmer, more exempt from fire and cheaper.

For 100 yards of rough-casting in the manner described the following quantities will be required:—1,800 lath, 12 bushels of lime, 1½ barrels best cowhair, ¾ yards of sand, ¾ yard of prepared gravel and 16 pounds of hot cut lath nails, 1¼ inches long. The gravel should be sifted through a half-inch mesh screen, and should be washed before mixing with the lime putty.

To color 100 yards in any of the tints named herewith use the following quantities of ingredients:—For a blue-black mix 5 lbs. of lamp-black in the dash. For buff use 2 lbs. of green copperas, to which add 1 lb. of fresh cow manure, strain all and mix well with the dash. A fine terra-cotta is made by using 15 lbs. of metallic oxide mixed with 5 lbs. of green copperas. A dark green color is made by using 5 lbs. of green copperas and 4 lbs. of lamp-black. Many tints of these colors may be obtained by varying the quantities given. The colors obtained by these methods are permanent; they do not fade or change with time or atmospheric variations. Many other colors are used, but few stand like the ones named. A brick color may be obtained by the use of Venetian red and umber mixed in whisky first and then poured into the dash until the proper tint is obtained.

The following are the officers elect for the ensuing year of the Ontario Society of Artists:—Hon. President, Hon. G. W. Allan; President, M. Matthews; Vice-President, W. Revell; Secretary, Robert F. Gagen; Auditor, James Smith. Executive Council—C. M. Manly, W. D. Blatchly, Miss G. E. Spurr, W. E. Atkinson, A. C. Williamson, R. J. Hovenden, F. M. Bell-Smith. Industrial Exhibition Committee—T. M. Martin, F. M. Bell-Smith.

In Germany the liability of employers for accidents to work men rests chiefly on the law of insurance, which dates from 1884. All employers are obliged to insure their work-people and clerical staff, even when the employment is temporary and unpaid. There are special associations for different industries, and the statutes must be approved by the Imperial Insurance Office. Injuries include those which are internal as well as external. Injuries include those which are internal as well as external. Injuries include those which are internal as well as external. When compensation is loss of intellect, memory or nerve. When compensation is loss of intellect, memory or nerve. When compensation is loss of intellect, memory or nerve. Generally the person who is to gain or lose most by the undertaking is held to be the employer. Thus, in building contracts, it is not the capitalist who advances the funds, but the master builders, carpenters, &c., who are responsible. Employers' contributions to the associations are proportionate to their annual expenditure in wages. The amount of compensation is based on the wages received by the workman during a year. So long as he is completely incapacitated, he is to be allowed two-thirds of his wages. For partial disablement he obtains a fraction of that maximum proportionate to the extent of the injury. In case of death, twenty days' payment (in no case less than 30 marks) are to be granted towards funeral expenses. The widow, until her remarriage, is allowed about 20 per cent. of her husband's wages, while 15 per cent. is allowed for every child under fifteen who has lost one parent, and 20 per cent. if it has lost both. The total compensation to widow and children must not exceed 60 per cent. of the deceased's wages. In case of remarriage she receives as composition three times the amount of her annual allowance. If the deceased was the sole support of parents or grand-parents, they may receive 20 per cent. of his wages during their lifetime.

SHAVINGS.

The City Council of Toronto has resolved that in future none but Canadians shall be given employment in the city service.

John W. Long, a prominent contractor, residing near St. Catharines, Ont., committed suicide by shooting himself on the 29th of April. Ill-health and loss of money on several large contracts in Buffalo and Tonawanda, are assigned as the cause.

The contract has been let for the erection of an opera house at St. Thomas, Ont., to cost \$20,000. The building will be three stories, built of red pressed brick, and will have a seating capacity of 1,200, and a gallery, with a stage 32 x 50 feet, and four boxes.

Wm. Herod, a tuck pointer employed on the new drill shed at Toronto, was killed by falling from a scaffold on April 23rd. The coroner's jury found a verdict of accidental death, adding a rider to the effect that a by-law should be enacted compelling better safeguards to be placed on scaffolds.

Mr. Coatsworth gives notice in the Dominion Parliament of a resolution:—"That it is expedient to insert in every contract for any public work made hereafter a clause requiring the contractor to pay the workmen engaged upon such work a rate of wages at least equal to the current rate of wages paid in the locality where such work is being done, and during the time such contract is being done."

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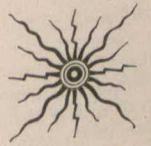
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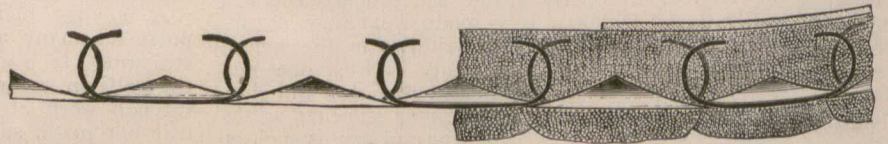
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PIERS IN ARCHITECTURE.

Although the bulk or breadth and thickness of piers must depend in a great measure upon the solidity required for the building and the weight they have to support, yet in order to secure architectural effect the breadth of the piers should never be much less than one-third of that of the arches, supporting the latter to be open ones, otherwise, says the London Builder, the effect will be meagre and deficient in solidity of appearance. And in architecture, excess of solidity, even approaching to heaviness, is generally a lesser defect than the contrary one. Much also depends not merely upon the width, but the proportions of the arches themselves; for if very wide, or less than twice their width in height, greater breadth is required in the piers than when the openings between them are of lofty or narrow proportion. In some external arcades or piazzas the piers are exceedingly narrow or slender compared with the arches, so much so as to be little more than square or insulated pilasters with arches springing from them. It would be better, therefore, in similar cases to treat them altogether as such, converting their impost into pilaster or antæ caps. Piers are frequently decorated with either pilaster or engaged columns, in which case their breadth must be such that the archivolt moldings of the arches will fill up the space between the openings and the columns. In many instances columns are substituted for piers, placed either

singly or in pairs, and the arches spring either immediately from their capitals or from an entablature over them. There are again many examples in which both piers and a lesser Order or Sub-order of columns are employed, the latter being insulated on each side of the pier, and their entablature forming the impost from which the arches spring. Palladio's Basilica, or Pallazzo di Ragione, at Vicenza, affords an example of the kind, in which the faces of the piers themselves consist of a larger Order in half columns, so that the whole composition resembles a series of what are termed arched Venetian windows, entirely filling up the spaces between the large columns. Besides these and other modes of decoration, niches are occasionally introduced as ornaments to piers.

Never use iron dowels with marble; they will rust and injure the marble. Galvanized iron is better, but copper is best of all. It is more expensive, but the work will stand. A very good dowel may be made by using lead or copper pipe, and filling it with melted sulphur.

In lettering or working granite you will find that your tools will hold an edge better if you dip the cutting edge into turpentine occasionally. Keep a dish with some turpentine in it in a handy position, so that you can dip your tools in after every few blows. You will find this plan will enable you to do better work.

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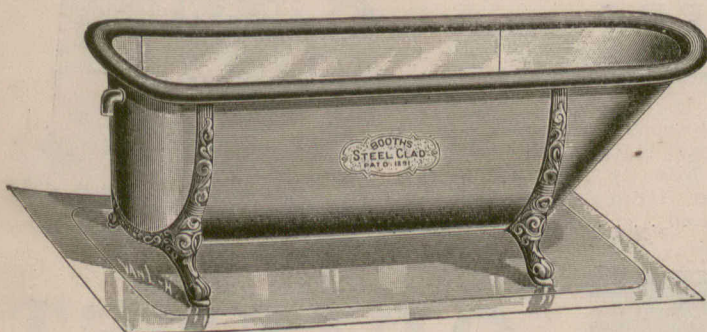
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PUBLICATIONS.

Mr. Barr Ferree, of 231 Broadway, New York, has published in pamphlet form a chronological summary of the history of all the cathedral churches of France. The author states that so far as he is aware, his is the first attempt to bring together in one general view all these churches, and he invites archaeologists and others to whom this pamphlet has been sent, to send corrections of any errors which may be found in the published data.

"Progress in Flying Machines" is the title of a book of 300 pages, by O. Chanute, C.E. This book gives an historical review of the effects and experiments of inventors to accomplish flight with apparatus, which by reason of its rapid movement will be supported by the air as birds are. The author has gathered all the records of such experiments, which are accessible, and has endeavored to show the reasons for their failure, and to explain the principles which govern flight, and to satisfy himself, and his readers, whether we may reasonably hope eventually to fly

through the air. His conclusion is that this question may now be answered in the affirmative. A full account is given of the recent experiments of scientists like Maxim, Lilienthal, Hargraves and Langley, which have so greatly added to our knowledge of this subject. The book is illustrated by nearly 100 engravings, and is written in a style which will be read with as much interest by the general as by the non-technical reader. Price \$2.50, Published by The American Engineer and Railroad Journal, 47 Cedar Street, New York.

The Hamilton Bridge Company is to be closed down, whether permanently or not, is yet to be decided. The impossibility of securing sufficient business, due in part to the competition of other companies, is given as the reason for the present step on the part of the management.

In tests recently conducted by a sub-committee of the Board of Works of Toronto of the quality of the cement used in concrete foundations for permanent pavements, it was reported in four out of six tests that the imported cement used in the work was not up to the proper standard.

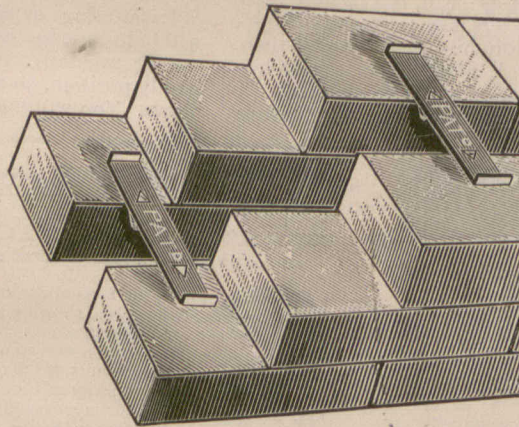
THE DIFFERENCE BETWEEN ROSENDALE AND PORTLAND CEMENT.

It is not commonly known that the difference between the two well-known varieties of cement, the Rosendale and the Portland, lies in the fact that the first named is a natural product and the latter an artificial. The former is made by burning a shaly limestone in kilns and grinding the clinker produced with burr stones to a very fine powder, which, when mixed with water, soon sets and forms an artificial stone nearly as hard as the original rock. Portland cement, on the other hand, is made by combining chalk, or some other form of limestone free from magnesia, with silicious clay, these materials being intimately mixed and made into bricks, which are burned in kilns with coke fuel at a very intense heat; the resulting clinker is ground in the same manner as natural cement, and is much stronger and sets more quickly than the other.

Incorporation has been granted the Otterville, Ont., Brick and Tile Manufacturing Co. The capital stock is \$5,000.

It is reported to be the intention of Mr. William Gibson, of Boston, to undertake at once the development of the black granite quarries at Bocabec, N. B.

The last car-load of machinery for the La Prairie Pressed Brick Co's. plant has arrived at the works. The company now have five dry pans, each with their elevator and screen, and three four-mould dry press brick machines, making one of the most complete brick making plants in Canada.



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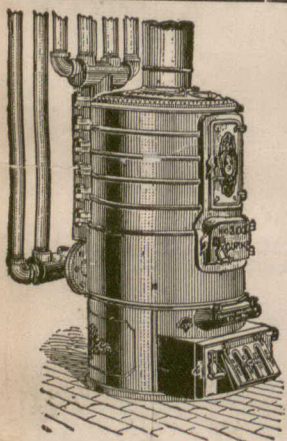
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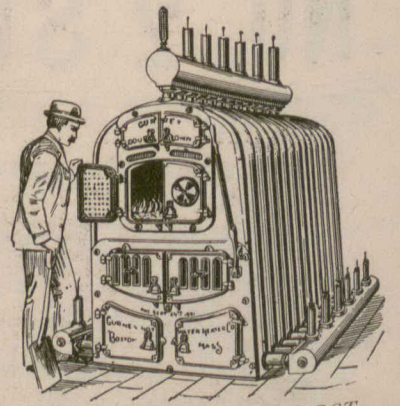
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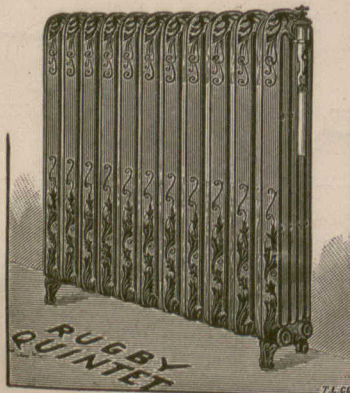


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