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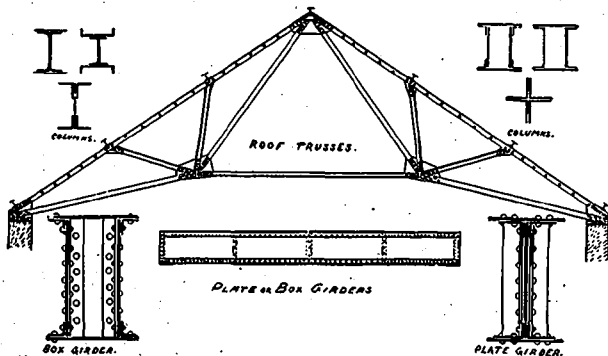
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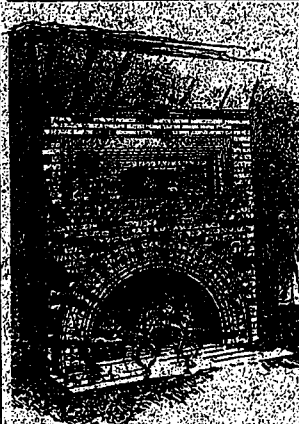
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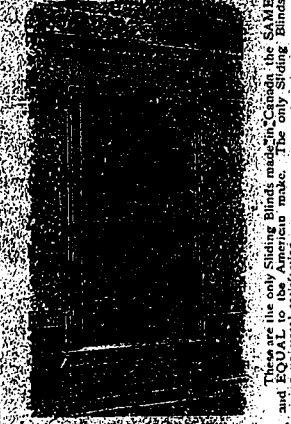
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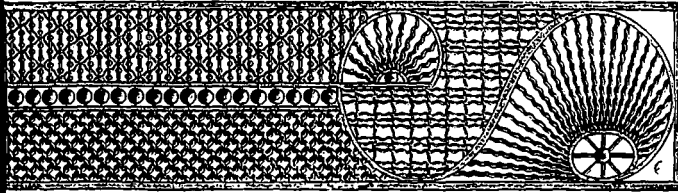
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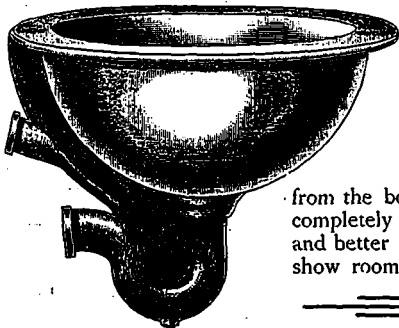
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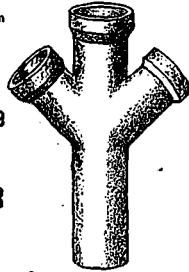
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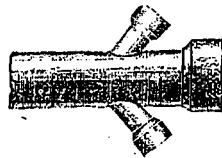
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<i>Thorold was the Only Canadian Natural Cement used in this Work.</i>	Test with 1 per cent. salt in water for tensile strain.	30 days.	177.10	180.90	104.40	<i>2000 Barrels Thorold Cement used in Kingston Graving Dock.</i>
		60 days.	270.40	240.10	187.	
		90 days.	297.50	248.80	103.10	
	Test with 8 per cent. salt in water for tensile strain.	30 days.	189.00	172.40	110.80	
		60 days.	201.60	183.10	115.50	
		90 days.	243.60	224.40	130.00	
	Test with 2 per cent. salt in water for tensile strain.	30 days.	396.90	160.20	126.80	
		60 days.	208.50	183.50	138.	
		90 days.	217.10	230.80	152.40	
	Test with 12 per cent. salt in water for tensile strain.	30 days.	323.10	164.40	197.60	
		60 days.	331.70	175.80	207.30	
		90 days.	344.30	189.30	218.50	

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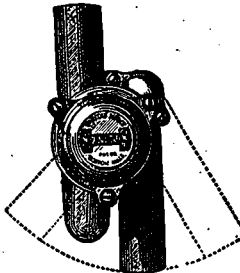
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Another City changes its Plumbing Laws

— AND ADMITS THE —

**Sanitas Traps without Back Venting**

ON Thursday, March 10th, 1892, a test of the leading Traps of the country was made before a Committee of the Board of Health of the City of Rochester, N.Y., for the purpose of ascertaining their merits as anti-siphonic fixtures. The Traps tested were the S-Trap with the McClellan Vent, the Delehanty, the Sanitas, the Puro, the Bower and the Bennor traps. The first three traps were represented by their manufacturers. The last three were not so represented, but were tested under precisely the same conditions. The Committee made its report to the Board of Health, March 21st, and the following is an extract from their report:



**TO THE BOARD OF HEALTH:**—Your Committee begs leave to present to the Board the following report on the result of the test in relation to Trap Siphonage: The traps selected for the test were the BENNOR, the BOWER, the PURO, the common S-Trap with McClellan vent, the DELEHANTY and the SANITAS trap. These traps were all easily siphoned with the single exception of the SANITAS, which alone successfully resisted siphonage. In view, therefore, of the results of the experiments, your Committee respectfully recommends that Section 26 of the Rules and Regulations of the Board of Health of the City of Rochester, relating to Drainage and Plumbing, be revised to read as follows: All traps shall be protected from Loss of Seal, through evaporation, siphonage or air-pressure. . . . The SANITAS Traps may be used without venting. In case other Traps are used in connection with the fixtures above enumerated in this Section, they shall be connected with Vent pipes, in the manner hereinafter prescribed in these Regulations.

The above report and the revised rules were adopted by the Board of Health. The SANITAS is the only Trap allowed by the City of Rochester, without venting. As Architects in other cities are interested in saving their clients the needless expense and the dangerous complications of back venting, we invite their co-operation in getting the Anti-Siphon Traps allowed in their respective cities, without venting.

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# Heating Season

## 1893-94

TO ARCHITECTS AND THE TRADE:

OUR MOTTO:

"Best Goods at Honest Prices; Something for Nothing we don't keep."

• • •  
- - ANNUAL GREETINGS - -

In wishing all Architects and Heating Engineers a very Merry Christmas and a Happy and most Prosperous New Year, we hope that the season just closing will have been satisfactory, making due allowance for the stringency of the money markets and consequent stagnation of trade in many cities. We have to report a most successful season's trade, much in advance of 1892, and the future bids fair to be a golden one.

We have striven to lead and are still working to hold our position as the leading manufacturers of Radiators in the Dominion. We make no idle boast when we claim to manufacture fully 80 per cent. of all the Radiators used in Canada.

Our plant has been enlarged in many respects, and before many months we will have such extensions made as will enable us to lay claim to owning one of the largest (if not the largest) foundry plants in the world.

We shall be doing business at the old stand in 1894, and ask your support as in the past. Again wishing you the Season's Compliments, we are,

Yours sincerely,

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"Truth is Mighty and Must Prevail."

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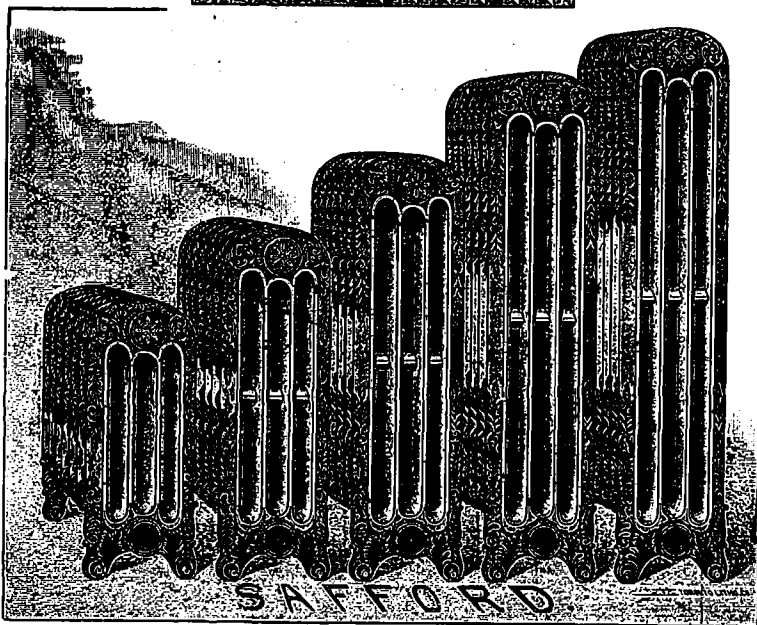
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Vol. VI.—No. XII.

DECEMBER, 1893

(PRICE 20 CENTS  
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*A Monthly Journal of Modern Constructive Methods.*

(With a Weekly Intermediary Edition—The Canadian Contract Record.)

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Contributions of technical value to the persons in whose interests this journal is published, are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

The "Canadian Architect and Builder" is the official paper of the Architectural Associations of Ontario and Quebec.

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MUCH interest is felt in the competition for a new City Hall for the City of New York. The competition closed on the first of September. The number of designs submitted was 137, the competitors representing the United States, England, and we understand, Canada also. The proposed cost of the buildings is \$7,000,000. It is estimated that the architect's commissions will amount to about \$800,000. Much regret is expressed that owing to ill health Mr. Richard M. Hunt is unable to serve on the architectural committee selected to aid the building commissioners in deciding the competition.

AT the annual meeting of the Canadian Society of Civil Engineers, to be held in January, action will be taken on the report of the Committee on Professional Status. The report recommends that land surveyors should be prevented from practising as civil engineers, unless they belong to the Canadian Society of Civil Engineers; that an appeal should be made in each province to have members of the Canadian Society of Civil Engineers recognized as professional men, with right to collect fees; that no practitioner shall be entitled to designate himself as a civil engineer unless he belongs to the Canadian Society of Civil Engineers.

AS a means of making the meetings more instructive and entertaining the Chairman of the Builders' and Contractors' Association of Victoria, N. S. W., recently invited the reading of papers by the members of that body. Who should know, he said, more about the structural portion of edifices than the men who built them, and who were better fitted to expound the laws and regulations affecting them? Even if the papers were merely reminiscent, they would provide better subjects for discussion than the payment of fees and various irrelevant topics. The attention of the officers of the Toronto Builders' Exchange was recently called in these columns to this subject. Papers and discussions on topics connected with building would tend to enliven the meetings of the Exchange throughout the winter; the interchange of experiences and opinions would be mutually helpful, and in giving expression to their views the members would derive intellectual advantage. We hope an attempt will be made to put the suggestion into practice.

THE manufacturers of Canadian cement are complaining of the action of the Dominion Government in using imported cement in the construction of the Soulanges canal. This is the first instance so far as we are aware in which imported cement has been used in Canadian public works of this character. In the construction of the Welland and Sault Ste. Marie canals Canadian cement was employed, and the durability of the material in the case of the Welland canal at least has been amply demonstrated. No reason has been given by the Government for the use of imported cement in the Soulanges canal except that they felt bound to act on the advice of their engineer. It is due, we think, to the manufacturers of Canadian cement that they should know the reasons which prompted the engineer to advise the Government to purchase foreign material, more especially in view of the fact that the native material has undergone such satisfactory tests, and that the cement manufacturing industry in Canada affords employment to a considerable number of persons. In addition to this, the purchasing abroad of what can be obtained at home, is contrary to the policy of encouraging native industries which has been a prominent feature of the Government's platform.

IN response to representations made for several years past by the architects of Toronto, the Fire and Light Committee of the City Council have decided that hereafter on residential streets within the brick limit, Elizabethan architecture will be permitted, so that above the first storey, which must, as before, be of solid brick, timber framing, filled in with Portland cement or stucco, may be used. Several specimens of this style of architecture have been erected under special permit, and the new regulation will, probably, lead to the erection of many houses in the old English style, thus widening the scope of architects for the decorative treatment of their designs, and greatly enhancing the artistic appearance of residence streets. It was decided also, to place the new front, between Yonge, Simcoe, Esplanade and Lake streets, in the brick limit. South of Lake, wooden structures, covered with corrugated iron, galvanized iron and metallic shingles may be erected. On all wooden buildings hereafter galvanized iron and metallic shingles may be used.

THE owners of the building occupied by the Toronto Technical School have notified the management that in future the rental will be \$600 per year instead of \$300 as heretofore. This notice was not given until after the School had entered upon its winter work, and when removal to other premises could not be attempted. To a letter previously addressed by the Secretary of the School to the owners of the building requesting to know what rental would in future be charged, no reply was given. In view of this, the action of the owners in doubling the rental so late in the year bears the appearance of deliberate sharp practice. In a reference to the successful working of the school in a previous issue, the need of a new building adapted to its present and future requirements was mentioned. The large increase in rental now imposed should determine the erection of a new Technical School building if possible next year. The amount of the present yearly rental is sufficient to pay 5 per cent interest on \$12,000, and this sum would form a considerable proportion of the cost of a new building.

THE building permits issued by the City Commissioner for the City of Toronto, for the year 1893, fall short of those of the preceding year by more than \$1,000,000. This is partially accounted for by the fact that the permit for the new City and County buildings, amounting to \$1,000,000, was included in last year's record. It is yet too early to speak with any degree of authority regarding the outlook for 1894. The opinion prevails, however, that the lowest point has been reached in the depression which has prevailed in Toronto for some years past, and that the tendency will be upward in the future. It seems clear that no building of a speculative character will be done in Toronto for some years to come, and this is regarded by reputable builders and others who have at heart the welfare of the city as something to be thankful for. It is believed that a fair amount of building will be done next year in the business portion of the city. Improvements to buildings used for business purposes have not kept pace with those for residence, and there now seems to be a disposition to even matters up in this direction.

THE sentence of one year's imprisonment which has fallen upon Messrs. McGreevy and Connolly should have a salutary effect upon the propensity for boodling which has prevailed to so great an extent of late in connection with public contracts in Canada, and more especially in the Province of Quebec. The petitions which are being circulated on behalf of the prisoners by persons whose sympathy appears to have overcome their judgment, will have a tendency to destroy the good influence which might otherwise be expected to result from the decision in this case. It is perhaps true that the men upon whom punishment has fallen are not the greatest wrong-doers in the case, but the fact that it is not possible to bring under the power of the law the chief conspirators is no reason for allowing the sinners of lesser degree to escape. It is high time that a check was put on crooked practices in connection with the awarding of public contracts. The system of securing contracts by means of bribery is practiced to such an extent that it has become impossible for firms who are unwilling to resort to this method to obtain any business in certain quarters. The influence of the system upon officials in the public service, and indeed upon the

community at large, is pernicious and harmful in the extreme. Furthermore it leads to a great waste of public money, as contracts which are thus purchased are given at figures greatly above what would be obtained if honest competition prevailed. Viewing the subject in these aspects, it should be a matter of congratulation that punishment has overtaken some of those who have been engaged in crooked dealing, and the hope should be entertained that the Government and public corporations of all kinds would set themselves with determination to stamp out boodling.

THE improvement of the public highways is a subject which for several years has occupied a considerable measure of public attention in the United States, and we are pleased to notice is now being considered in Canada also. Mr. Andrew Pattullo, of Woodstock, Ont., has been largely instrumental in calling public attention to the subject in Ontario, and a convention to consider the question is shortly to be held. A little consideration is all that is needed to show that if the principal thoroughfares of the country were improved in such a way as to present a smooth solid surface on an unyielding foundation, greater loads than at present could be transported over them, and there would be a great saving in horses and wear and tear of vehicles. At the foundation of the present unsatisfactory and in many instances disgraceful condition of our public highways, is the system of carrying out repairs by statute labor. Under this system men are appointed to supervise and to build roads who have had no experience whatever to fit them for the work, but are in this way allowed to pay their taxes in labor. Under such circumstances it would indeed be surprising if the work were done in anything like a proper or scientific manner. Payment of taxes in rural municipalities should be made in cash, and such portion of the taxes as is to be spent in the improvement of the roads should be expended under the direction of an engineer or other experienced person. In this way more work would be done for the amount now expended, and what is of more importance, it would be done in a proper manner and would not require re-doing year after year. The subject of road improvement is one of primary importance to the farming community. The putting of our main highways in a condition approximating in some degree to that in which the roads are maintained in European countries, would vastly increase the farmer's profits and the value of farm property, and result also in benefitting largely the business community. Engineers and skilled roadmakers as well as manufacturers of road-making materials should be interested in this subject.

AN effort is being made to develop trade relations between Canada and Australia, the Hon. Mr. Bowell, Canadian Minister of Customs, having just returned from a visit to Australia with this object. Dr. Benwick, who acted as commissioner for New South Wales at the World's Fair, expresses the hope that a market can be developed in America for Australian woods, which are a complete contrast in character to those of this continent. They are mostly hardwoods, and are especially adapted for railway ties, block roadways and interior house decoration. The *Australasian Builder and Contractors' News* has a lengthy article on this subject, and cites the fact, mentioned in the *CANADIAN ARCHITECT AND BUILDER*, that the City Engineer of Toronto had recommended the paving of the streets of that city with vitrified brick, as proof that there exists an opening in Canada for the use of Australian wood for paving purposes. We have no doubt from the fact that certain Australian woods are being thus employed to a considerable extent in the streets of London, that the material is well adapted for the purpose, but are inclined to question whether it could be transported to Eastern Canada and sold at a price which would enable it to be used in competition with vitrified brick and asphalt. It might be possible to find a market here for certain kinds of interior finishing woods, which might be partially manufactured in Australia and shipped so as not to occupy much space on steamers and cars. This could not very well be done in the case of paving material, hence we fear that its bulk, and the great distance over which it would have to be transported, would forbid its introduction and use in this country. There seems a probability that an exchange of materials can profitably be carried on between Australia and the Province of

British Columbia, and that a market could be found in Canada for certain Australian timbers which are specially adapted for railway ties. While the average life of a railway tie on the C. P. R. is from six to nine years the grey gum-wood, it is said that of Australia will endure for forty years for this purpose. There is also a demand in British Columbia for timber for piling purposes for use in wharves, breakwaters, etc., which will resist the destructive attacks of the *teredo* or sea spider. The native woods at present used for this purpose are protected with creosote and other preparations at a cost of 25 to 30 cents per running foot, and even after having been subjected to these expensive processes the life of piles averages less than ten years. It will readily be seen that the cost of renewing work of this kind at such frequent intervals is very great. It is said that the turpentine tree of New South Wales, when the bark is left on the wood, is absolutely proof against the attacks of the *teredo*. If this can be shown to be the case, and there exists an ample supply of this class of wood, there should be quite an extensive market found for it on the Pacific Coast. On the other hand there has been some export of British Columbia lumber to Australia, and inquiries are being received for British Columbia shingles. Galvanized iron appears to be at present largely used for roofing purposes in Australia, and it is believed that the British Columbia sawn shingle would be much better adapted for the purpose and would afford a more pleasing architectural effect.

#### THE O. A. A. CONVENTION.

The dullness of business which has given architects leisure to think will perhaps produce fruit in increasing the interest of the Convention which is to be held next January. We understand that invitations have been issued to several members to read a short paper at the Convention. These with the discussion that is likely to follow should make the proceedings lively and instructive. It is better that many should take part in the proceedings of a meeting of that kind than a few; and though a long paper is a serious undertaking, a short one, which does not attempt to treat of a whole subject but only one point, is within the powers of most men and does not require the expenditure of too much time. Paper reading is a valuable exercise for the reader himself. It enables him to "marshall his thoughts more orderly." When he has carried his subject about with him for a few days he finds his ideas about it much clearer and further reaching than they were when he began to write the paper.

#### ILLUSTRATIONS.

RESIDENCE ON LUTHER AVENUE, TORONTO.—EDMUND BURKE, ARCHITECT.

MORTUARY CONSERVATORY AT MOUNT PLEASANT CEMETERY, TORONTO.—EDMUND BURKE, ARCHITECT.

The new mortuary has been built upon the foundations of the old vaulted structure, and no changes whatever were made to old front, facing Yonge street. The old building was covered with two semi-circular arches, above which was a single elliptic arch covered with earth. Dampness and decay had so affected the structure that it became unsafe, necessitating the entire removal of the arches to the level of the springing, about 4 feet above the floor of the mortuary.

The new walls were built on the old from this point up to the level of the roadway to the east, a total height of about 22 feet. A very heavy pressure of earth had to be provided for, necessitating large buttresses, thick walls with benches or steps on the outside, and the building of the whole in cement. The interior is faced with white brick.

The ceiling of the mortuary, forming the floor of the conservatory and forcing houses, is formed with 12" I beams at about 5 feet centres, with porous terra cotta arching plastered with Portland cement in the underside and covered with concrete above, forming a foundation for a granolith floor in the forcing houses and tile in the conservatory and mortuary chapel.

The walls of the conservatory and potting houses to the height of about 4 feet are of pressed brick, both inside and out; above they are of wood and glass, as are also the roofs. The chapel and potting house are roofed with red tiles. The conservatory and chapel may be turned practically into one room, the enclosure of the chapel being formed with sliding glazed sashes. The bier is made to descend by means of a hand power lift, and

the opening in the floor of chapel is immediately closed by a pair of light folding doors. A low brass rail appropriately hung with curtains surrounds this opening, and a brass lectern is mounted at one end for the use of the officiating clergyman. A fan driven by an electric motor is provided for the ventilation of the mortuary chamber, so arranged that the air is drawn away from the vicinity of the opening for the bier. The heating is by hot water, the pipes, under the benches being 4" diameter and valved in sections for the control of varying temperature.

PAIR OF SEMI-DETACHED RESIDENCES, JARVIS ST., TORONTO, FOR MR. JAMES HEWLETT.—F. H. HERBERT, ARCHT.

Each of these houses contains a large reception hall divided from staircase hall by carved and fluted columns; drawing and dining rooms, the latter with handsome open pressed brick fireplace; kitchen, laundry and accessories, and bedroom, billiard room, 2 bath rooms, hot water heating, etc.

#### DESIGN FOR A SMALL STABLE,

with accommodation for two horses and two or three vehicles. Foundations to be of stone, first story of frame construction and clap-boarded, gables and roof to be shingled, and chimney built of brick. Estimated cost, \$300 to \$400.

#### ROAD REFORM.

Editor CANADIAN ARCHITECT AND BUILDER.

I am pleased to notice a decided step has been taken in the long discussed subject of road improvement. The Canadian Institute has done wisely in determining to call a convention for this purpose. It will be practically impossible for a great convention of this nature to be held, at which there will be a great gathering of those who are most directly interested in road reform, without practical benefit arising therefrom. The province is undoubtedly ripe for such an undertaking. Good roads mean more prosperity to farmers than railways, if they could only be made to believe it; the system of farming has made such great advances that farming of to-day is quite different to what it was 20 years ago. If the farmer then could afford to wait for two or three weeks for sleighing or until the frost was out of the ground he cannot do so now. Under the provisions of the municipal drainage, ditches and water courses and many other acts of parliament, municipal improvements of greater or less extent can be effected by means of assessments spread over a period of years. A similar system no doubt can be made applicable to road improvement; the assessment will be so light compared to the advantages obtained from improved roads the ratepayer will not feel it. I hope soon to witness great progress being made in this direction.

PROGRESS.

#### QUESTIONS AND ANSWERS.

[Readers are invited to ask through this department for any information which they may require, and to list consistent with the objects of the paper. Every effort will be made to furnish satisfactory answers to all such inquiries. Readers are requested to supply information which will assist us in our replies. The names and addresses of correspondents must accompany their communications, but not necessarily for publication.]

W. A. S., Tweed, Ont., writes: I understand that a person holding a School of Practical Science diploma in Architecture is required to serve under articles of apprenticeship for three years, under a member of the Association of Architects. Please let me know through the Question Department of your paper, the terms under which an apprentice serves. Has he to pay, or does he receive anything during his apprenticeship.

ANSWER.—The Ontario Association of Architects has made no rule as to money arrangements between apprentices and principals and we believe there is no rule in the practice of the members of the Association in the matter. The premium seems to be seldom if ever exacted. Some firms have no money consideration either way; some give a small salary, increasing each year.

#### PERSONAL.

Announcement is made of the intended marriage on the 15th of January, of Mr. Emile Dubé, a well-known contractor of Rivière du Loup, Quebec, to Miss Isabella Lemieux, of the same place.

In painting wood that has been long exposed to the weather, it is economical to add whiting to the oil paint for the first coat, and if the subsequent coats are of lead, or lead and zinc, the job will be thoroughly durable. About a quart of whiting paste to the gallon of oil paint will be about the proportion required, and as much more oil and turpentine may be added as may be necessary.

## OTTAWA.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

Attention is again being directed by the repairs now being made to the Geological Museum in this city, to the need of a new building which should be better adapted for the purpose. Efforts have been made on more than one occasion by the Royal Society as well as the civic authorities to induce the government to undertake the erection of a new building, but the great cost of a fire-proof structure such as would be required has deterred the government from moving in the matter. It is much to be regretted that the proposal made soon after the death of Sir John Macdonald to erect a building as a memorial to his memory and to serve as a National Museum and Art Gallery, was not carried into execution.

The new R. C. church of St. Joseph, an illustration of which appeared in the CANADIAN ARCHITECT AND BUILDER for October, was dedicated a fortnight ago. The building, which stands on the corner of Willbrod and Cumberland streets, is constructed of stone, in the Romanesque style, and is surmounted by a lofty octagonal tower. The exterior, with the exception of the main entrances, which show some elaborate stone carving, is devoid of ornamentation. The interior, on the contrary is most elaborately decorated, as is the rule in Roman Catholic Church edifices. The cost of the building was in the neighborhood of \$70,000. Mr. W. E. Doran, of Montreal, was the architect.

## MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

The statues of Wolfe and Montcalm designed by Hebert for the facade of the Parliament Buildings at Quebec, will shortly be placed in position.

Prof. Harry Bamford, M. S. C., late of Victoria University, Manchester, England, has received the appointment of lecturer in the Engineering Department of McGill University, Montreal.

The sum of \$11,391.69 has been received and an almost equal amount disbursed by the treasurer of the Missionneuve Monument to be erected in this city. The work of canvassing for the additional \$15,000 required is to be at once proceeded with. Mr. Hebert is the sculptor.

St. George's Anglican church on St. Joseph street, is about to celebrate its jubilee. It is proposed to mark the occasion by the erection of a tower and additions necessary to complete the building at a cost of some \$16,000. The church, which occupies a commanding position, is a good example of Gothic architecture. It was the third Anglican church erected in Montreal, the corner stone having been laid by Bishop Mountain on the 6th July, 1842.

In reply to an enquiry, the Hon. Mr. Nantel, Minister of Public Works, stated in the Quebec Legislature recently, that the total amount expended on the enlargement of the Montreal Court House, since 1887, was \$649,946.25. This does not include a heavy bill for extras for which the contractor has brought suit. The opinion prevails that the work has been far more profitable for a few individuals than for the people who will have to provide the funds to meet the cost.

The first monthly meeting and dinner of the Province of Quebec Association of Architects was held on November 23rd. The dinner took place at the City Club and was followed by a meeting in the Association rooms. Mr. A. C. Hutcheson gave a lecture, illustrated with lime-light views, on the Architecture of the World's Fair. There was a good attendance of members and students. The second dinner and meeting will take place on Thursday, the 14th inst., when there will be a discussion on the advisability of admitting honorary members, and on other subjects of interest to the Association. The students are invited to attend.

Your remarks concerning the necessity for ample provision being made by architects in their calculations for the increasing wind pressures to which apparently buildings in this country are to be subjected, prompts me to remark that in this locality at least, it would seem wise on the part of architects, in the light of recent experience, to make provision against earthquakes also. Solidity is a characteristic of most of our buildings, and to this no doubt is due the fact that so little damage resulted from the recent earth disturbances in this city. In the general alarm which seized upon all classes of our citizens this fact appears to have been overlooked, for there was an effort on the part of everybody to get into the open air.

The new addition, recently completed, to the Art Museum was formally opened by His Excellency, the Governor-General, a fortnight ago. The new building is designed to afford improved class rooms and an additional gallery for exhibition purposes. The Art Association of Montreal was organized in 1879, art classes being formed shortly afterwards. Besides the annual exhibitions there have been held sixteen loan exhibitions. There has also been accumulated a valuable permanent collection of paintings, the nucleus for which was donated by the late Mr. J. Tempest. In connection with the opening ceremony, the hope was expressed that something would be done for the development of art in conjunction with industrial education, in order that the knowledge of art might be employed for the purpose of beautifying manufactures. Mr. A. T. Taylor was the architect of the new building.

An interesting test was recently made at McGill University of the strength of a beam of British Columbia spruce furnished for the purpose by Messrs. T. J. and F. J. Claxton. The beam, which was 25 feet 5 inches in length, 8½ inches in width, and 17½ inches in depth, was cut from a tree felled about 700 miles north of Victoria a year ago. It was subjected to a transverse test on supports 24 ft. apart on centres, the centre load being applied by increments of 500 lbs., and the deflection noted for each increase

The beam failed under a maximum load of 38,250 lbs., and not, as is usual, by the rupture of the fibres on the tension side, but by the crippling of the side in compression. The skin stress developed was also unusually high, being a little over 6,000 lbs. per square inch, while the coefficient of elasticity was 1,670,000. The strength of the British Columbia spruce is, therefore, double that of ordinary spruce or pine.

It is somewhat difficult to understand the recent agitation for the removal from its present site of the Nelson monument in this city, in the light of the fact that the monument was erected by the joint efforts of the French and English residents of the city, the first steps being taken towards its erection at a social assembly at which the news of Nelson's death was announced. Seeing that both nationalities contributed to its erection, and that it has remained in its present position for so many years without objection of any kind being made, it must be assumed that the recent agitation was due to the articles of an inflammatory nature which were published in certain of the papers, and to this cause no doubt must also be attributed the action of the youths who were recently discovered in an attempt to destroy the monument by means of dynamite. The entire agitation has been frowned upon by the more influential class of citizens of both nationalities, whose desire is that the harmony which has prevailed to so large an extent in recent years should continue. While punishment should be meted out to the young men engaged in the attempt to destroy the monument, the fact will no doubt be borne in mind that the papers referred to were the real cause of the unfortunate occurrence, and the severity of their sentence mitigated accordingly.

## WINNIPEG.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

If the large number of buildings erected here during the past season is any criterion, Winnipeg has seen the last of the depression which followed her unfortunate boom, and architects and builders may now look forward in pleasant anticipation of "seven years of plenty."

The spell of cold weather which we have been enjoying, or otherwise, during the last few days, has interfered somewhat with the completion of work started late in the season, and the proprietors and contractors interested are watching anxiously for the thaw foretold by the "oldest inhabitants."

A good sign of the times is the excellent business blocks that are being erected in the country towns of Manitoba and the North-West. In many cases the walls are built entirely of stone, or with stone foundation and brick superstructure, and in every case the ground floor is provided with plate glass windows, and would be no discredit to longer established communities.

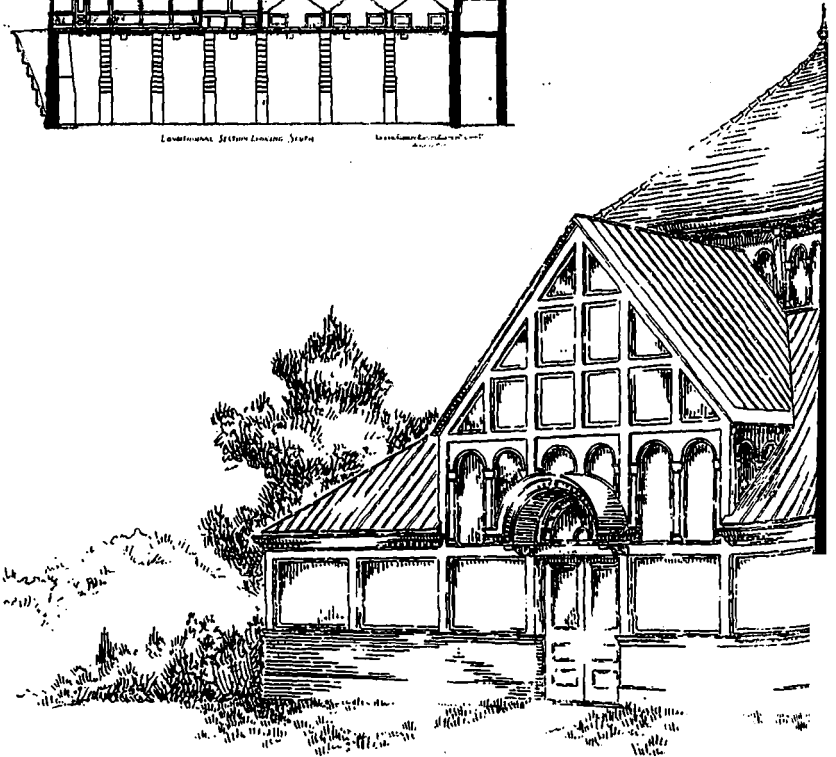
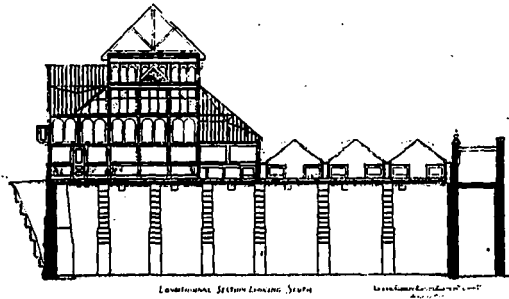
Plans for the Wesley College which the Methodists propose to erect on Porling Avenue next year, are now being prepared, and the design promises a model educational building. It is to be of stone, four stories in height, and basement. The work throughout to be most substantial. The cost will be about \$80,000. This building will add another monument to the energy and enterprise of the above denomination in this country.

The Bank of Ottawa is the most important building erected on Main street this year, and is a good substantial edifice, four stories high. The design might do for a local man, but when one considers that it was prepared by an architect of Toronto, the "Athens" of Ontario, it is certainly disappointing, for it was expected that this enterprising Bank would have provided for the edification of the western rustic a higher type of architecture than he has been accustomed to.

The result of the bye-election which has just taken place here, may materially affect the building trades, and assist the prosperity of Winnipeg. If Mr. Martin, our newly elected member, is successful in persuading the Dominion Government to remove the rapids in the Red River so that firewood, lumber, stone, etc., may be brought here by water from Lake Winnipeg, thus lessening the expense of building by supplying the principal materials used, at a reduced cost. This matter has been under the consideration of the Dominion Government for years, and though fully convinced of its importance, they have allowed procrastination to reign supreme, and like Felix, of old, put off for a more convenient season.

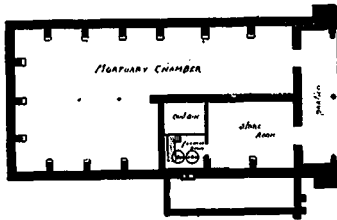
The architecture of Winnipeg is now in a transition state, and the wood, brick veneer and galvanized iron age, is passing away, and is being succeeded by the stone, brick and copper age. In former years the buildings here, with few exceptions, were entirely frame, or frame and brick veneer, with wood sills for foundations resting on the sod, or supported on wood posts or piles; but the public are beginning to realize that it is poor economy not to build for the future as well as for the present, and while they cannot afford to immortalize themselves in blocks of marble, they can build in a substantial and durable manner, with less costly materials, which will not only give them a permanent investment, but will add materially to their comfort, especially during our winter months.

The school board is just completing two very fine 8 room school buildings, one in the south end of the city, and the other in the north end. They are constructed of stone and brick, two stories high with basement, and large hall in roof, which is well lighted by a large skylight. The school board is composed of some of the best men of the city, and deserve credit for the wisdom and foresight they have displayed in the performance of their duties as School Trustees, in purchasing, when increase of population demands more school accommodation, large blocks of land in desirable locations, which will give for all time ample play grounds for the children, and breathing places for the public when the city becomes closely built. On

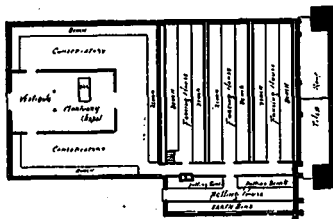


MORTUARY CHAPEL AND CONSERVATORY

EDW

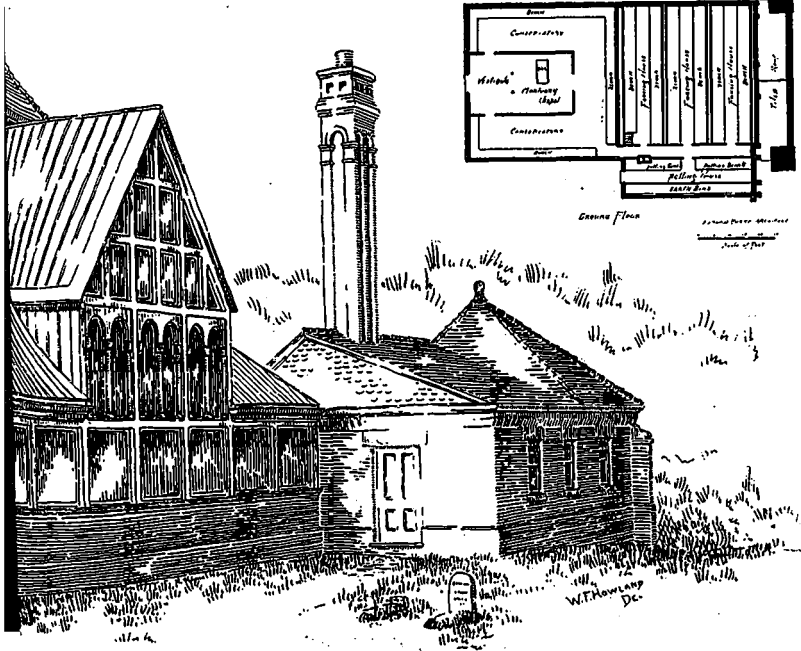


Plan of Footbath Chamber.



Bathroom Floor

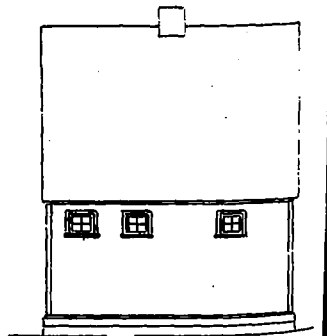
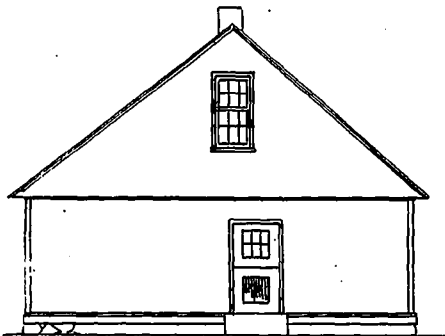
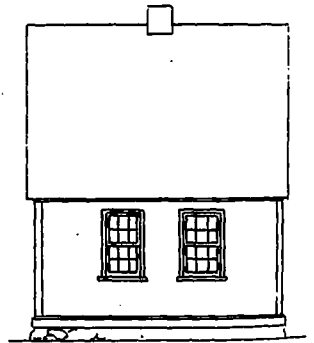
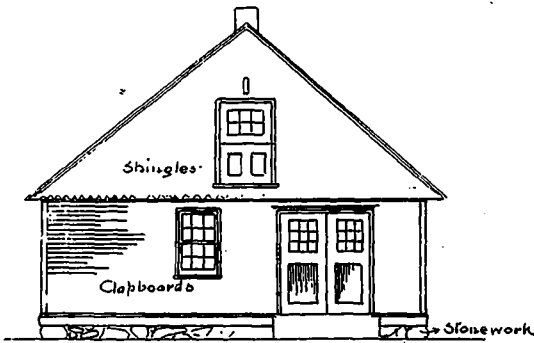
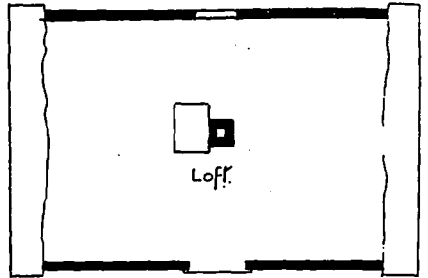
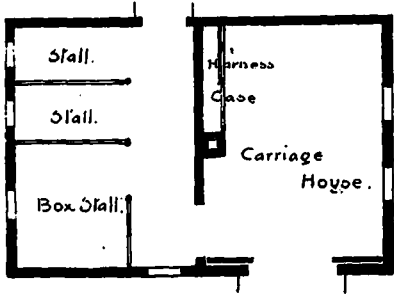
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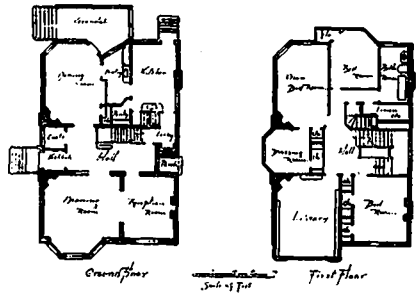
PLEASANT CEMETERY, TORONTO.



### DESIGN for a SMALL STABLE.

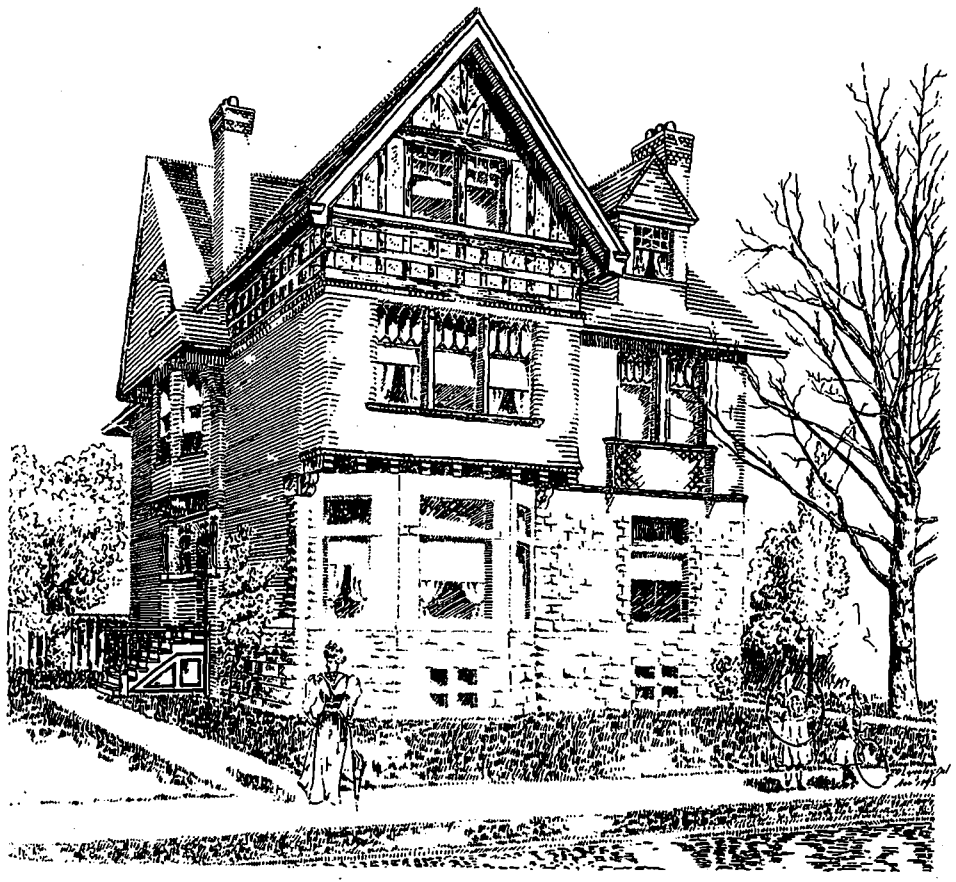


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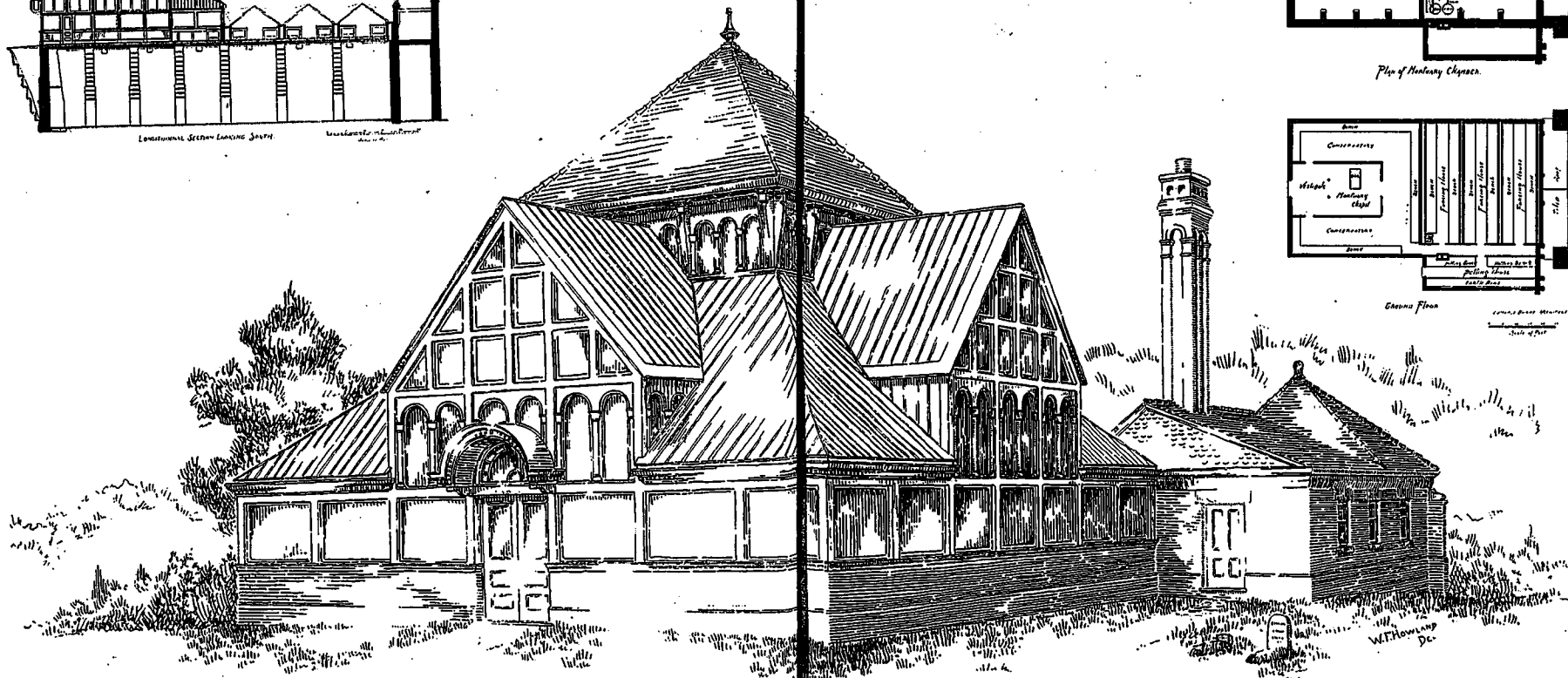
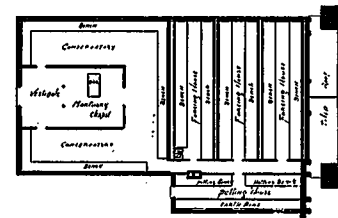
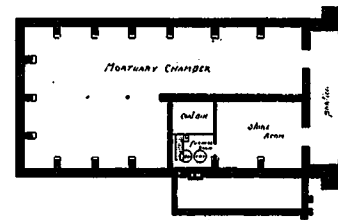
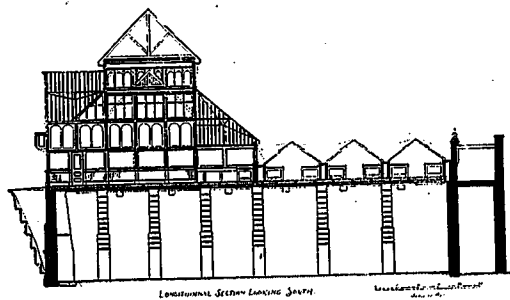
RESIDENCE ON LAWTHOR AVE  
TORONTO, CANADA.

EDMUND DUKE, ARCHITECT.





SEMI-DETACHED RESIDENCES, JARVIS STREET, TORONTO.  
F. H. HERBERT, ARCHITECT.



MORTUARY CHAPEL AND CONSERVATORY AT MOUNT PLEASANT CEMETERY, TORONTO.

EDMUND BURNETT ARCHITECT.

these sites are erected substantial buildings, planned and furnished after the most improved types, and to meet the advanced ideas of the present day.

Among the many legacies inherited from the boom is the saying "good enough," which is frequently made use of by workmen, when their work is objected to. They learned it in the days when houses were rushed up in a week, and the motto was to build honestly if you can, but build, and when a load of timber would be followed to the site of a proposed dwelling by parties anxious to rent or buy in order to secure a dwelling place. The result of the above, and of contractors taking work too cheap, is that to-day an architect has to be very watchful of his buildings in progress in order to obtain a fairly satisfactory job. However, the workmanship is improving and the materials are of a better quality than formerly, for the public are growing more fastidious and require a higher class of work. If contractors would refrain from taking work too low in order to obtain a job, and insist on receiving a proper price, so that there would be no necessity for them to scamp their work in order to obtain a profit, the architect's lot would not be such an unhappy one.

PERSONAL.

Fowler & Bowe, architects, Montreal, have dissolved partnership.

Mr. A. L. Husbands, Architect and Civil Engineer, of Cookshire, Que., has recently been elected a member of the Canadian Society of Civil Engineers.

Ald. J. C. Waine, a prominent builder and contractor, of Sydney, New South Wales, accompanied by his wife, spent a short time in Toronto recently, en route to the World's Fair.

In a recent issue of the *Australasian Builder and Contractors' News*, appears the following:—Mr. W. H. Wheeler, late Assistant Hon. Secretary of the Architectural and Engineering Association of Victoria, and winner of last year's Prize for the best Design for a Mechanics' Institute to cost £8,000, offered by the Royal Victorian Institute of Architects in connection with the Classes of the above-named Association, sailed on Thursday by the new Canadian liner, Warrimoo, for Vancouver, British Columbia. Mr. Wheeler has been residing for some months in Sidney and its vicinity; but with so great a dearth of architectural business in that city, as in every other portion of these colonies, he has wisely decided to seek "fresh fields and pastures new" in the great northern Dominion, where we trust his undoubted abilities and steady industry will find employment. Mr. Wheeler carries with him the good wishes of his many old friends in Melbourne, and of not a few, more recently made, in Sydney.

CONTEMPORARY ARCHITECTURE.\*

In a previous portion of this address I defended—I hope, in your judgment, successfully—the works of contemporary architects from the reproach of want of originality. It does not, however, follow that the perception of the beautiful displayed in such works is commensurate with the originality of their design. I have, indeed, on a previous occasion recorded my conviction that the craze for novelty in the present day—not alone in art—is excessive, and not infrequently results in the grotesque. Is novelty the goal of our attainment? Is it not rather Beauty? When the Greeks produced what is the purest form of art, so far as we know, that the world has seen, it was not the outcome of a rage for novelty, but of the effort to crystallize in a beautiful form the requirements and conditions of life. It was in the days of their decadence that an intelligent observer recorded of them that "they spent their time in nothing else but either to tell or to hear some new thing." Can it be that such decadence is overtaking us? Judging by some modern works, their authors might not inappropriately be referred to in terms similar to those applied to the late Athenians; for their desire appears to have been, not so much to produce what is beautiful, as to evolve "some new thing." A column was originally designed to support the superincumbent weight known as the entablature, and in such juxtaposition is dignified and consistent; but divorced from such relationship, and applied to the face of a building with nothing to support, it is degraded to the position of an incongruous feature of ornamentation. An Order, again, is composed of certain parts, which, in the relationship they were designed to occupy, produce admittedly proportions that are dignified and beautiful; but when applied—one can scarcely say designed—in a ridiculously attenuated form, with parts misplaced or omitted, the result is grotesque. The conglomeration of familiar forms and features, divorced from the conditions they were designed to fulfil, and thrown together regardless, apparently, of any consideration but the attainment of novelty, produces the incongruous and silly effect that might have been foreseen. Yet by critics who ought to know better this sort of architectural quackery is lauded as original design, and its authors are praised as men of exceptional ability. Whatever it may be, it is certainly not the original work in the true sense of the words, but the parody that passes muster for it with the ignorant. The impress of original power is stamped on features not necessarily new, and imparts to them distinctive life and character, instead of rendering them ridiculous by divorcing them from their proper purpose. Contrast with such grotesque productions the works of the late Sir Charles Barry, and tell me in which you find the truer originality or the purer taste. In Barry's classical work there are dignity, repose, proportion, ample undisturbed wall-space, every feature and moulding adapted to its position, and in all

the stamp of individuality without any appearance of straining after novelty. In the hotch-potch work I refer to, there is neither dignity nor repose; features and mouldings are indiscriminately applied, instead of being designed as inherent elements in the composition; and the deplorable absence of purity is in no way compensated by fulsome profusion of ornamentation. This practice of covering every bit of wall-space with ornamentation, composed of details pretty and original in design, but applicable from their very scale, to cabinet-work and not to buildings, is the curse of our modern street architecture, and demonstrates an absence of grasp and appreciation of breadth which it is sometimes painful to observe. In walks about London one longs to apply the scalping-knife in stripping off meretricious ornament, in order that the eye may find repose on some bit of undisturbed and undisfigured wall-space.

It is not often I have found myself in sympathy with the utterances of the venerable statesman who now occupies the position of Prime Minister, and it is consequently agreeable to be able to concur in views which he expressed a few months since when speaking of Industry and Art. "There is a circumstance in architecture," Mr. Gladstone said, "which terrifies me, and that is the tendency which appears to prevail in modern domestic architecture. I am speaking of their exteriors, and I refer to their redundant ornamentation. There are a great number of new buildings in London with regard to which, if you look at them, you will find that the architect had either a horror or a dread of leaving bare a single square foot of wall, as if there were something indecent in leaving bare a square foot of wall. . . . Excess of ornamentation is, of all things, the most hostile to a due appreciation of proportion, because it is in proportion to the preception of breadth and beauty and line, and in the adjustment of lines to one another that the essence of the art lies, and in that you will find the hope of attaining high excellence in great works." Not in great works only, I would add, but in all works, great or small.

But while I deplore this meretricious tendency for redundant ornamentation, and while I decry the craze for novelty, which together are responsible for disfiguring many of our modern domestic buildings, I yet desire to record my conviction that there is much that is hopeful and promising in contemporary architecture. Even the rage for educating some new things, exaggerated as it is, demonstrates that men prefer to think for themselves rather than to reproduce the works of others. If only the remarkable ability which is displayed in the designs of many recent buildings were directed less to the production of novelty and more to the study of proportion, less to the elaboration of ornament and more to the aspiration for simplicity; if only architects were to lead the taste of the day by impregnating their designs with "the perception of breadth and beauty and line," instead of pandering to the false and meretricious taste of a luxurious age; we should be able to congratulate ourselves—and perhaps at no distant date—on having reached the attainment of an architecture, pure, simple, dignified, and beautiful.

PEMBROKE WATER WORKS.

On November 22nd, 23rd and 24th, the system of waterworks at Pembroke, which has been under construction during this year, was tested by the Chief Engineer, Willis Chipman, of Toronto.

All the water is taken from Lake Allumette through an intake pipe half a mile in length and pumped by Duplex pumps to a Water Tower placed at such elevation as to give an efficient fire service over the business portion of the town. If a serious fire should occur in any of the high residential portions, a check valve at the Tower can be closed from the pump house by an electric switch.

The system consists of about 5 miles of piping with 52 fire hydrants, and the cost will be about \$50,000. The pump-house is a very neat structure.

ROOF AND-ROOF COVERING.

In actual execution the roof, of course, precedes the roof covering; but in working out the design it is frequently the covering which decides the shape of the roof. When once settled, it fixes at least the lower limit for the pitch, and it may even have an influence on the question of hips or gables. In olden times this influence was marked. In many districts hip tiles were scarcely to be had; and lead hips were too costly for common use, and hips made up with slates and mortar were both unsightly and insecure. This difficulty has long since vanished. Facilities for transit are, from one point of view, even too great. Materials can be so readily taken from place to place that local peculiarities in building are tending to die out. The country and one might almost say the world, is getting too much alike all over it, and amongst other things we now find tile hips and ridges everywhere. They have, however, usefulness at least to recommend them. They supply a practical want; but this is more than can be said of all the materials which are nowadays becoming fashionable in localities to which they do not belong. Travelling has become easy; but when all places becomes pretty much alike, what will there be to travel for? It is time that all architects set themselves, as some have done, to fight against this impending uniformity, and it is worth noting how many roofing materials, and how many ways of using those materials, may still be found within the boundaries of England alone.—*Manufacturer and Builder.*

\*From the annual address of the President of the Royal Institute of British Architects.

### THE VALUE OF TECHNICAL EDUCATION TO ARTISANS IN THE BUILDING TRADES.\*

If there be room for difference of opinion in regard to the value of technical education in other industries, there can scarcely be any in regard to this. Undoubtedly of late years, and in the colonies especially, the standard of quality in building work is much lower than that of thirty years ago in the Old Country—the difference being very noticeable to those who come fresh to it from Europe. The reasons for this are several. No doubt the rough and ready style of work in pioneer days, however necessary and valuable in its day, set, quite naturally, a low standard which it has been difficult to raise above. The influence of adventurers and speculators (a race not unknown in Australia) has had also a prejudicial effect on the quality of work, and further, the relative expensiveness of labor in comparison with the cost of material has made cheapness of production the end aimed at, rather than quality of product. It will be admitted, I think, that the building trade is second to none in importance. Not only are the numbers of workmen very large, and all trades of an honorable and manly type, but, unlike the cotton-spinner of Manchester, or the cutler of Sheffield, the building artisan finds his trade wherever human beings congregate. He is limited by no locality, or time, or climate. If technical education, as applied to these trades, had no further effect than the raising of their intelligence and status, it would be a powerful factor in the well-being of the community. But apart from the number of artisans directly interested, the welfare of the community is largely bound up with that of the building trade. Next to the supply of food and water, I suppose the provision of healthy, comfortable, well-built houses takes a first place. We all need shelter, and the importance of the kind of dwellings we occupy is evident to all. As for the moral effect on a community it is not easy to estimate the strength of the sentiment which fills the breast of the true born Briton, whose house is his castle (in spite of it being sometimes "in pawn") and to whom the roof and the hearth are still the types (next to the marriage tie) of security, content and permanence.

An experience of over twenty years of active practice as an architect, and the conduct of large classes in technical subjects, bringing me into close touch with some hundreds of young artisans engaged in the various trades, have strongly impressed me with the sense of the value of technical education to the trades in question. I believe it to be the universal experience of architects that an all-round intelligent workman is the exception. A man who can read a plan with readiness, grasp general instruction, and enter fully into the meaning and spirit of a design is rarely to be found. Such a simple elementary work of construction as a king-post truss is seldom understood, and in problems of setting out work, and so on, the most obsolete of rule-of-thumb methods which a knowledge of elementary geometry could suggest. What frequent complaints are made of the ignoring of any necessity for an abutment to resist the thrust of a flat arch, the broken curves of plaster work, the defective construction which manifests itself in huge settlements and cracks, the inability to avoid or detect or remedy most painful blunders in design, decoration and workmanship. How often may one see in local Exhibitions and the like some piece of work designed and executed by an intelligent artisan—a work reflecting credit on a man's industry—and that is all. Yet he will stand by it with a glow of satisfaction on his honest face, amid an admiring group of his friends and neighbors. It may be a dovecot having a flimsy front in  $\frac{1}{2}$  in. pine, in imitation of the facade of Milan Cathedral, or an aviary of similar construction with Roman pilasters, Early English arches, and a Greek pediment, with Egyptian ornament and pinnacles of 15th Century French Gothic. Turning then to the specific advantages which technical education should render to artisans, undoubtedly the art of drawing takes a first place. There is no branch of industry in which the ability to use the pencil with freedom is not of great value, and the helpless manner in which the ordinary workman attempts to express his ideas by drawing is notorious. Drawing is a splendid education of both eye and hand; the young student is taught to draw out and improve the natural powers of his hand before it has become stiff and inflexible and habituated by custom to certain set motions. It trains both the eye and the hand to be more efficient instruments of the mind, and is an excellent discipline for the mind itself. I would rather have every young artisan instructed in the use of scales, the art of reading a plan with readiness, the practice of projection, and obtain such a general insight into the art of building construction that all branches of the trades may be seen in their true relation with each other. He should also have some teaching in the art of physical science—some real knowledge, however limited in extent, of the ordinary laws of nature—useful not only for the grasp of facts but as a training in the scientific spirit and way of looking at things.

Passing, now, to the various trades, let me briefly enumerate some of the salient points in which a knowledge of the principles of Art and Science will be of direct value to the workman. Take first the mason, a man who, in my opinion, is second to none in intelligence and ability. The geological history of the stones which he has to work will guide him in selecting, working and setting of them. Geometry is required to set out his working

lines and moulds and patterns, and a knowledge of the laws of mechanics and of general design will also be of service. The bricklayer will find a knowledge of applied mechanics and statics of great advantage; also such a knowledge of chemistry as will guide him in the use of limes and cements, the proportions of mortar, concretes, &c. Geometry will of course be of service in setting out his work, though this is generally done by the carpenter—a usage which has tended, I fear, to render the bricklayer less interested in such matters than is for his advantage as an intelligent artisan. The carpenter requires such a knowledge of the proportions of timber that he may select and wisely use them. Geometry, projection, the nature of strains and stresses, and the nature, application, and characteristics of building materials, are as serviceable to him as to any workman on the building. The plumber should have an acquaintance with chemistry and metallurgy, the properties of solids, liquids and gases, and metals and alloys, construction of joints, principles of traps and other sanitary details and general principles of sanitation. The plasterer needs a similar knowledge of chemistry of limes and cements as is found useful to the bricklayer. He needs further a training in practical geometry, in modelling and the principles of Classic and Gothic ornament, in addition to the power of sketching, which all artisans require. The smith and founder should be well grounded in metallurgy, statics and applied mechanics, mechanical drawing and elementary geometry.

The slater, in the work of ordinary plain slating, works mechanically, and only needs a knowledge of geometry in the event of carrying out elaborate patterns. The painter and glazier requires a scientific acquaintance with the materials he uses, some knowledge of geometry and the laws of the color, as well as a training in decorative design and principles of Art.

I can understand the question arising, why has the technical education of the past twenty-five years effected so little improvement in the personnel and work of the artisan? There are, I believe, several reasons for the slow progress which has been made. In the first instance, primary education in the Old Country twenty-five years ago was very different from that which is now equipping the young for the battle of life. Technical instructors were also men who very largely needed themselves to be trained—a band of efficient teachers could scarcely be expected to spring from the earth with full equipment. A heavy mass of inertness had also to be set moving, and the beginnings were necessarily slow, difficult and tentative in their nature. I think further, that it must be admitted that the instructors were generally of the wrong class—as a rule, they were free-hand drawing masters, excellent men in their way, but with only just sufficient knowledge of technical branches of study to pass examinations for which they were required to coach their students, and with practically no acquaintance with trades and callings for which the students were being trained. The methods of teaching were, in consequence, often defective and the aims also were by no means above reproach. The tendency at any rate was to draw students away from their handicrafts to become draughtsmen. The temptation for young artisans to do this is unfortunately very strong, and when in the actual training of a man his handicraft was ignored it materially resulted in spoiling many a good mechanic and added to that large and shiftless body, the army of ill-equipped draughtsmen, architects and engineers. Admitting all this, however, I maintain that much has been done by technical education to maintain the status of the workman and, if not to improve, to arrest the decline in the standard of work. Dealing now with a matter within my own knowledge, I can point to young men who, having received a training in the principles of Art and Science affecting their trades, are of distinctly greater value to their employers, have risen to the position of foremen and overseers, and have a better prospect of permanent employment when work is scarce. It must be conceded that technical education is not a failure, when it imparts such a stimulus to young men that they desire to enter callings where manual skill, combined with dexterity and trained intelligence and eye, are essential conditions of success. It does excellent work if it helps beginners in life to take part in some work requiring special skill, instead of drifting into that vague profession of clerkship, which is too often taken to because a youth has no training or talent that would fit him for the more honorable calling of a producer.

Chrome green is made from a precipitate of chrome yellow mixed with a precipitate of Prussian blue.

CLAY EMBANKMENTS.—The support of embankments, where clay forms a considerable part of the material, is a kind of mystery to the unskilled owner and builder of such embankments. In Marine Country, opposite the city, for example, there are clay strata all over the slopes, and slides thus caused can be seen on every hand, so the conclusion is that clay will not stand as an embankment unless held by bulkheads of masonry or wood. The fact is, however, that clay stands very well at an angle of 45 degrees, or to 1, if saturated. It is all a question of water. No other material is so much affected by saturation. It is at the same time the best and worst material for an embankment. A range of 16 to 45 degrees between drained and undrained embankments is phenomenal. Clay embankments require drains to be placed at frequent intervals, and should have laths of wood, straw or other substance laid in, to form leading channels or perforations connecting to the drains.—*Industry.*

\*Abstract of paper presented to the Australian Association for the Advancement of Science by Mr. Hillson Beasley, A. R. S. V. A., Lecturer on Architecture at the Working Men's College, Melbourne, &c., &c.

## CANADIAN LIME FOR THE AMERICAN MARKET.

The report comes from Boston that a syndicate of American capitalists, among whom is Mr. Frank Jones, who is interested in kilns at Sherbrooke, Que., is about to purchase the lime-kilns of Bras d'Or, on the island of Cape Breton, Nova Scotia, and at St. John, N. B. This action is to be taken in view of the probable reduction of the duty on lime under the amended American tariff.

The Boston despatch referring to this matter says that it is believed that under a low rate of duty a very large market for Canadian lime would be found in the New England States. Before the McKinley bill went into effect Canadian lime was admitted under a trifling tariff of about three cents a barrel. It overran the market in Boston, and practically had control of the trade. Despite the fact that Bras d'Or lime is not of as good a quality as Rockland lime, the difference in price incident upon the low tariff and the cheaper labor of Canada compelled the builders to use this lime. The McKinley bill put a duty of about 13 cents a barrel on Canadian lime and this had the effect of evening up the prices. The new tariff bill practically puts Canadian lime back to where it was. It is quite probable that again the builders will have to take notice of the big difference in price and fall back to the use of Canadian lime. Though wages are higher in Maine than in Canada, under a tariff the price of lime has actually fallen, so that it is selling cheaper now than at any other time in its history.

## WIND PRESSURE.\*

A paper on the above subject was read at the recent meeting of the Australian Association for the Advancement of Science, at Adelaide, by Professor Kermot, of the Melbourne University. The paper, which was of considerable length, commenced by referring to the great inconsistencies appearing in engineering and architectural practice, with regard to wind bracing of chimneys, roofs, bridges, etc., and to the great variation in the anemometric results given by the meteorological observatories; some observatories, such as Bidstone, near Liverpool (England) and Sydney recording pressures, or velocities corresponding to pressures of 90 lbs. or 100 lbs. per square foot, while others, such as Greenwich and Edinburgh, Melbourne and Adelaide, give results only one-third as great; and it was pointed out that these latter results correspond fairly well with usual experience with railway carriages and chimneys, great numbers of which would overturn with pressures of not more than 30 lbs. per square foot, and yet as a matter of fact do not overturn, and are regarded by the public as perfectly safe. Reference was next made to the experiments tried by Sir B. Baker at the Forth Bridge, which showed that the average pressure on surfaces as large as railway carriages, houses or bridges, never exceeded two-thirds of that upon small surfaces of one or two square feet such as have been used at observatories, and also that an inertia effect which is frequently overlooked may cause some forms of anemometer to give false results enormously exceeding the correct indication. The very elaborate experiments of Mr. O. T. Crosby, detailed in *Engineering* of 13th June, 1890, were next dealt with. These experiments showed that the pressure varied directly as the velocity, whereas all the early investigators, from the time of Smeaton onwards, made it vary as the square of the velocity. Experiments made by the author of the paper, at speeds varying from 2 to 15 miles per hour, were described, which agreed with the earlier authorities, and tended to negative Crosby's results. It was pointed out, however, that further tests on a greatly extended range of velocities were needed. The paper next described an apparatus devised by the author for determining the relative pressure of the wind on flat plates, cubes, cylinders, spheres and other geometrical forms. This apparatus consists of a screw propeller similar to that used on steamers, 28 inches diameter and 48 inches pitch on a 30-inch tube. This propeller is caused to revolve at speeds varying from 400 to 800 revolutions per minute by means of a gas engine. The helical currents of air proceeding from the propeller are gathered up and discharged in one approximately steady jet of 12 inches by 10 inches section, by means of a radial diaphragm and a conical mouthpiece, having its axis tangential to the helical direction of the air. In front of this jet was placed the object to be tested, supported upon a very delicately made carriage running on an accurately levelled surface plate, the force exerted being measured by a delicate spring balance, the accuracy of which has been verified by means of standard weights. A large number of experiments were made with this apparatus, and many interesting and valuable facts elucidated. The ratio existing between the normal pressure on a sloping surface, such as a roof, and that upon a vertical plane was found to agree with the table given in Stoney on Stresser, p. 524, but it was found that this result applied only to roofs supported on thin columns under which the wind could blow freely. When the

roof was placed upon a wall, as in an ordinary building, the wall deflected the current of air upwards, and greatly reduced the pressure on the roof. If the wall was provided with a parapet of ordinary proportions this effect was still more marked, the pressure being reduced to one third of what it would otherwise have been. In the case of a roof of 30 deg. pitch the pressure was actually reversed the roof having a slight tendency to lift. In these experiments the parapet was made only one-sixth the height of the roof measured from the level of the eaves to the ridge. Experiments were also tried as to the effect of a wind blowing in at the open end of a building having the sides and other end completely closed, and it was found that the internal pressure tending to lift the roof was equal to the pressure of the wind on a flat vertical surface. The pressure upon one side of a cube, or of a block proportioned like an ordinary carriage, was found to be 9 of that upon a thin plate of the same area. The same result was obtained for a square tower. If the cube or tower was placed so that the wind blew in the direction of a diagonal, the total pressure was just the same as when one side was presented. A square pyramid whose height was three times its base and which represented a common form of church spire experienced 8 of the pressure upon a thin plate equal to one of its sides, but if an angle was turned to the wind the pressure was increased by fully 20 per cent., a curious contrast to the action on a cube or square tower. A bridge consisting of two plate girders connected by a deck at the top was found to experience 9 of the pressure on a thin plate equal in size to one girder, when the distance between the girders was equal to their depth, and this was increased by one-fifth when the distance between the girders was double the depth. A lattice work in which the area of the openings was 55 per cent. of the whole area experienced a pressure of 80 per cent. of that upon a plate of the same area. The pressure upon cylinders and cones was proved to be equal to half that upon the diametral planes, and that upon an octagonal prism to be 20 per cent. greater than upon the circumscribing cylinder. A sphere was subject to a pressure of 36 of that upon a thin circular plate of equal diameter. A hemispherical cup gave the same result as the sphere; when its convexity was turned to the wind the pressure was 1 1/5 of that on a flat plate of equal diameter. When a plain surface parallel to the direction of the wind was brought nearly into contact with a cylinder or sphere, the pressure on the latter bodies was augmented by about 20 per cent., owing to the lateral escape of the air being checked. Thus it is possible for the security of a tower or chimney to be impaired by the erection of a building nearly touching it on one side. A number of interesting experiments were made upon the shelter which one surface affords to another. This shelter was found to extend in front to a distance about equal to the breadth of the sheltering surface, and behind to several times that distance. For example, a 9-inch disc being used as the sheltering surface, and a 6-inch disc being placed two inches in front of it, the latter received only two thirds of the pressure it endured if the larger disc was removed, and this reduction in pressure was perceptible, though to a less extent, at all distances up to 9-inches. Behind flat surfaces eddies were found to exist, which caused other surfaces placed behind to be urged forward with considerable force. For example, a 7-inch disc placed behind a 6-inch disc, and 4 inches from it was urged forward with one fifth of the pressure with which it was urged backward when the 9-inch disc was removed. In conclusion it was recommended that 30 lb. per square foot be taken as the maximum wind pressure upon areas of not less than 300 square feet, and 30 lb. for smaller areas in positions of full exposure in the southern and south-eastern parts of Australia; that in more or less sheltered positions these values might be reduced according to judgment, the minimum for extremely sheltered positions being taken as one half the above figures; that the pressure on chimneys, towers, spires, roofs, and other objects be deduced from those on thin plates of equal area by means of the results previously given; and that a factor of safety of two for cases of simple stability, and three where the question is one of strength should be employed.

## PUBLICATIONS.

The R. I. B. A. Kalendar for 1893-94, containing as usual some 300 pages of information concerning the Royal Institute of British Architects, is received.

A SPLENDID CEMENT FOR CELLAR FLOORS.—Numerous methods for making cement floors have been presented; among them the following is said to be the most desirable, producing the best results: Take of coarse gravel or broken stone and sand, 4 parts, and 1 part each of lime and cement. Mix in a shallow box, shovelling over, from end to end, till thoroughly mixed. The sand, gravel and cement, are mixed together dry. The lime is slaked separately and mixed with just enough mortar to cement it well together. Six or eight inches of the mixture is then put on the bottom, and when well set, another coating put on, consisting of 1 part of cement and 2 of sand. The same process will serve for building a cistern where no brick is intended to be used in bottom or side walls. A cement of 1 part sand, 2 parts ashes and 3 parts clay, mixed with linseed oil, spread over a base of concrete just described, makes a surface very hard and durable and smooth, and said to resist the weather, almost, if not quite as well, as marble.

\*Abridgement of paper by Prof. Kermot, Professor of Engineering at the Melbourne University, and published in the *Australian Builder and Contractors' News*.



## SCHEMING CONTRACTORS.

EDITOR CANADIAN ARCHITECT AND BUILDER.

SIR,—As manufacturers of heating apparatus in Canada, we have found for some time past that a considerable difference exists between many contractors throughout the country in the figures that are given for installation of heating plant. We have frequently given the subject considerable thought and have tried to ascertain how it was that such a difference existed between tenders when the architect's specifications stated in detail exactly what quantity of surface was required, and the class of work that was to be done. During the past year in working very quietly to get at the bottom of the matter, we have found that much blame must be laid at the door of the architects, inasmuch as they call for certain goods in their specifications, ask for the work to be done upon a certain line, and then allow the contractors to skip the work and put in only 75 feet of radiation where 100 feet was originally specified, and the result of this is that Jones who figured on a certain job at \$1,000 is left out in the cold because Smith takes the same contract for \$750.

We have before our notice to-day a case in which a steam job has been figured on. The architect's specification was handed out to the contractors A and B. A figures on the job and specifies 1724 square feet of radiating surface, and B 1256 square feet of radiating surface. Still the architect lets the contract to B who is short 468 feet of surface on a small job, and A loses the contract feeling that his friend B buys goods considerably less than he does.

We think that it is nearly time that the architects of this Dominion should insist upon the proper quantity of heating surface being put in buildings; as there are to-day in our estimation a very great number of heating engineers who skip their work at every opportunity. We could give volumes of reports of work of this kind that has come before our notice, but think that this may be sufficient to direct the attention of architects to the practice and bring about more equitable conditions in the heating trade.

"ZERO."

## A METHOD OF CELLAR VENTILATION.

A plan by which a cellar may be thoroughly ventilated has recently been worked out by a heating engineer in an American city. The design was made for a billiard saloon in a large cellar situated beneath a restaurant. In this scheme air is taken in through areas in the rear of the cellar, and is to be forced through galvanized iron ducts extending entirely around the bottom of the basement room under a row of chairs provided for spectators, which are ranged round the apartment.

The lower part of this duct—that is to say, that part which lies on the floor of the basement—is provided with openings that deliver the air forced in through corresponding openings through the floor into the cellar below, where, in winter, it is moderately warmed by passing it through box coils, whence it passes through distributing ducts arranged under the floor to numerous registers, arranged around the room, and opening just above the platform for chairs that entirely conceal the main duct. The plenum is obtained by the use of a blower driven by a gas engine placed in the cellar below; but this may possibly be supplanted by an electric engine when the instalment is erected.

## SHAVINGS.

New buildings to the value of \$140,000 were erected during the past year at Regina, N. W. T.

Much regret is expressed at the failure of Mr. Samuel Swanton, who has been in business in Toronto as a contractor for a quarter of a century.

Among the new books recently added to the Toronto Public Library collection, is one by W. A. S. Benson, on "Elements of Handicraft and Design."

The Manchester ship canal is to be opened for traffic on the first of the New Year, and it is said that a Nova Scotia vessel laden with lumber will be the first to pass through.

One of the oldest and most handsome houses in the city of St. John, N. B., erected on Waterloo street by the late Mr. Carvell in 1864, at a cost of \$45,000, was totally destroyed by fire a fortnight ago.

In a recent test case, the validity of the by-law passed by the City Council of Toronto making it compulsory on contractors for city works to pay their employes a minimum wage of 15 cents per hour, was upheld.

The jubilee of the erection on John street, Toronto, of St. George's Church, was celebrated a few days ago, on which occasion there were exhibited the church seal, the original subscription book, a manuscript history of the church, and the silver trowel used by Bishop Simchan in consecrating the church on the 19th of August, 1844.

The General Hospital Board of the City of Kingston has accepted at the hands of Archbishop Cleary, a statue in memory of the Irish emigrants who died at Kingston during the plague of 1847. The statue, which represents a life size figure of an angel, was cut in Italy from Carrara marble. The pedestal will be of Sutherland Falls marble.



## THE SELECTION OF WALL PAPER.

In the selection of wall paper the first thing to be taken into consideration is, of course, the purpose for which the papered room is to be used. The selection of paper in that regard depends says *Painting and Decorating*, mainly on the taste of the buyer. But there is another consideration which does not altogether depend on taste, but has to follow certain rules and laws, and this is the amount of light which a room receives. With a room which receives only a moderate amount of light it will be necessary to paper the walls with a light wallpaper, while a room which receives a strong light should be papered the reverse. The next thing to be taken into consideration is the combination of colors, when all the doors of the connecting apartments are opened. It is a main point to have such a combination of different wallpapers, that a whole line of rooms make a harmonious and artistic appearance. The following will make pleasing combinations: Brown-red and olive green, red and green, blue and grey or brown, violet and yellow, but poor and displeasing effects will result if such combinations are used as yellow next to green, violet next to blue, or green next to blue. The same law applies to the selection of furniture stuff, and also in curtains and hangings. Harmony in form and color should not only rule in the single apartment, but the different rooms should form an artistic combination, and this can be effected even with the plainest of finishing.

Now, it is too frequently a fact, and one which practical paper-hangers and decorators will sustain, that in many of the finest houses, where, in regard to furniture and other decorations, the greatest luxury is to be found, hardly any attention is paid to an artistic and harmonious papering and decorating of the walls. There is missing the interest and right understanding of the decorative art. Therefore it is best to employ an experienced decorator and paperhanger and trust to his ability and integrity, until one is enabled through study of decorations and the decorative art to make all needed arrangements personally. It must never be forgotten that it is mainly through the decorations of the walls that the room derives its particular character, be this harmonious, enlivening, sombre or peaceful. It is through the decorations of the walls that the visitor is enabled to form an opinion as to the good or bad taste of the owner.

## WROUGHT IRON WORK.

*SPEAKING* of art work in wrought iron the *Trefoil* remarks: Wrought iron for every purpose is now becoming very popular. It is used for grilles over the door, in the vestibule, for railings and balconies, etc., and wherever found seems to carry with it a recommendation of its own appropriateness.

The dull and yet lustrous color given to iron by the Bower-Barff process is peculiarly quiet and effective, and harmonizes particularly well with both wood and stone.

That the iron is practically rustless, and does not have to be cleaned with that scrupulous and constant care that brass work requires, recommends its use the more, while the artistic merit of grilles now made speaks highly for the taste of the market that requires such work, and stand in strange contrast to the barren lack of even an attempt at any effect whatever in the cast iron models of the past.

The annual Exhibition of the Toronto Art Students' League will open on the 18th inst., and continue until the 23rd inst., in the League rooms, Imperial Bank Building. A souvenir calendar containing poems by Canadian writers and illustrated by members of the League, is to be issued as was done last year.

Mr. Sandford Fleming, C.M.G., is endeavoring to bring about the establishment of a National Gallery of Historic Pictures, and has offered to subscribe a liberal amount annually for ten years for this object, provided there is the prospect that by similar contributions the sum required can be raised within that period.

Mr. Joseph Powell, architect, of Hamilton, is being mentioned as likely to be chosen as a candidate in the approaching election in Haldimand to represent the McCarthy party.

The report of a novel incident comes to us from Ridgeway, Ont. A resident of that town, Mr. Andrew Benner, recently purchased a farm in the locality, and proceeded to make alterations and repairs in the old farm house. Instead of handing the work over to a contractor, he engaged carpenters and acted in the capacity of superintendent of works. While thus engaged he discovered securely hidden away behind the plaster, two well filled canvas bags, containing some \$7,000 in gold. The existence of this large amount of money in such an unexpected place is accounted for by the fact that a former owner of the house had thus secreted his wealth with the purpose of keeping it out of the hands of a spendthrift son, and being one day suddenly stricken with apoplexy, passed away without making known the location of the money. Since then the farm is said to have passed through the hands of several owners before being purchased by Mr. Benner, the lucky discoverer of the money.



## THE ART OF SUCCESSFUL ADVERTISING.

BY ERNEST H. HEINRICHS.

Advertising has become generally recognized as a necessary and important adjunct to every business, trade, profession or mercantile commercial enterprise. The cobler advertises his handiwork on the window-ledge; the grocer puts his best stock of vegetables on the sidewalk; the clothier, the dry-goods man and the furniture dealer fill the pages of the newspapers; the actor seeks to attract the attention of the public in flaming posters, and the manufacturer advertises his specialties in the trade papers and magazines. The time-worn axiom that good goods do not need advertising is now relegated into the deepest recesses of the business man's vault containing memories of the past, and is brought out only to serve as a dampener upon a too persevering advertising solicitor. In this age of keen competition, it is not likely that any man will have a purchaser for his goods simply because they have the characteristic of excellence. He must promulgate their distinctive advantages or their superiority.

To do this successfully, he must advertise. There are as many ways of advertising as there are roads leading to Rome, and the question is how to find the right one.

To the writer it seems that the first point to be considered is, how much money will the capital of the business to be advertised permit to be used for this purpose? The point once disposed of will immediately suggest another one,—how may this sum be expended to the best advantage; or, how can the business be advertised most efficaciously with this stipulated sum.

The thorough study of these points is of the utmost importance. There must be method pursued in the manner of advertising, if it is to be profitable, else there will be absolute failure. One who decides to embark in any enterprise involving advertising, should first consider how much advertising will cost him to make a start. The same principle applies to advertising. It is a business in itself, the management of which requires the greatest care and attention.

Some people say that they give the papers an advertisement occasionally just to get on the good side of them; others, that they give some man from the papers an advertisement, because he is a "jolly, good fellow." In fact, one gentleman remarked to the writer some time ago that "there is a good deal of sentiment connected with advertising!" Now there is much truth in what this gentleman said, and more is the pity. It is this kind of advertising which is dangerous, inasmuch as it reflects upon advertising as a legitimate business, because it deteriorates to a form of bribery, and it dishonors as well as disgusts both the reputable publisher and the honest advertiser.

Having decided how much money may be spent in advertising, the next question is, how and where is it to be done? To settle this question is very difficult, for the reason that the mediums for advertising are legion. Many old advertisers believe that advertising by circular letter affords the surest and best way to reach a customer. They argue that if they send out a "straight" circular, which is set forth in general and in detail, the recipient will surely read these pages. Then there are others, who are not particular about having the matter even type-written; they are satisfied to get up an elegant advertisement, have a printer strike off as many copies as they have customers on their books, and then they send these circulars to their customers. Again, there are those who now and again get up a catalogue, in which are set forth descriptions in general and in detail of everything they sell, and they send these catalogues wherever they hope to catch a probable purchaser. Then there are firms who rely entirely upon their agents and representatives to advertise their goods by word of mouth. Most advertisers, however, consider all these methods auxiliary; they help a little, but they do not do much good alone. It may be safely asserted that newspapers, magazines, and trade papers, are now recognized as the standard advertising mediums.

The object of advertising is to make certain statements known to the public at large. Hence the more people see the advertisement the more thoroughly does it fulfill its mission. Of course this opinion may be questioned by the advertiser of specialties, who desires to reach a certain class of people only, but this statement is true in general and in detail, although it would require merely a slight modification to apply to all cases. Nevertheless, one fact, borne out by the most successful advertisers in America and in Europe, is that what is broadly understood by newspaper advertising is the best and cheapest advertising that can be had. "The term 'newspaper' includes of course periodicals of every class.

In choosing a publication some people have very peculiar ideas; if they see a paper with a large number of advertising pages, they take it for granted that an advertisement in such a paper means money thrown away, because the advertisement will be crowded out of sight. This is a mistake. The best papers, as a rule, have the largest amount of advertising; hence they must be the best advertising mediums. The best papers are apt to be the most widely read, so that advertisements in them must of necessity become widely circulated, which is the great object of advertising. To this reasoning it may be replied that it does not follow that because an advertisement is circulated among ten thousand people, ten thousand people will read it. Certainly not, but an advertisement circulated among ten thousand people stands a better chance of being read ten thousand times than an advertisement circulated among only five thousand people. Apart from this deduction of simple logic it must not be forgotten that advertisements are read with an interest as they appear in the newspapers. This may not always have been so, but it is nevertheless true to-day. It may be that the busy man will carelessly pass over the advertising columns of the daily newspaper, but the housewife will read them twice and thus make up for his neglect. But take the popular magazines of to-day, the advertising pages of which are truly remarkable, not alone in their appearance, but also as regards their contents. Does any one dare assert that an advertisement placed anywhere in those pages is a lost investment? The advertising pages of these periodicals represent from month to month the most striking reflection of the commercial, the industrial, and the financial, as well as the intellectual, progress of this country, and the intelligent readers of these publications are just as much interested in the perusal of the advertising pages as of the essays, stories or other features.

A business man, having decided to advertise, and having set apart a certain sum for this purpose, should go to that publication which is read by the largest number of people interested in his business, which most probably will be that publication which has the most advertisements and pays the most attention to the manner of setting up and arranging the advertising pages.

The advertising rates in the best publications are very low. Many people, and even some advertisers of experience, will doubt this statement, but that does not detract from its correctness. The trouble is we expect too much from an advertisement. It must not be supposed that a single advertisement, for which perhaps \$50 has been paid, is going to fill a store with customers for a year to come, thus bringing a profit on the investment of probably ten hundred per cent. Most people are satisfied, if they make one hundred per cent. on their invested capital, and everybody should commend them for their modesty. Why, then, should a larger profit be expected from an advertisement than from any other investment?

Advertising once commenced, must be kept up, and if conducted with the same thoughtfulness, the same care, and the same business methods exercised in any other enterprise, an advertisement will always prove a profitable investment.

There is one other feature connected with the business of advertising, which, although the writer has so far not made mention of, is nevertheless of no less importance than the others. This is the manner of composing an advertisement. It is impossible to form any set of standard rules as a guide for the composition of advertisements, except in so far as that they should in all cases be so worded that they will at once attract attention and be read. To be brief, concise, clear, and to the point in writing an advertisement is undoubtedly commendable, and a plain statement is always more liable to carry weight with the reader than a long string of ambiguous phrases, which have no defined meaning when analyzed.—*Engineering Magazine.*

## HOW TO USE CEMENT.

The following general rules referring to the practical use of cement are reprinted from the *National Building Register*:

**QUALITY OF SAND**—The sand should be clean, sharp and coarse. When the sand is mixed with loam the mortar will set comparatively slow, and the work will be comparatively weak. Fine sand, and especially water-worn sand, delays the setting of the cement, and deteriorates strength. Damp sand should be mixed thoroughly and uniformly together, when both are dry, and no water should be applied until immediately before the mortar is wanted for use.

**PROPORTION OF SAND**—The larger the proportion of cement the stronger the work. One part of good cement to two parts sand is allowable for ordinary work; but for cisterns, cellars, and work requiring special care, half and half is the better proportion. For floors, the cement should be increased toward the surface.

**WATER IN CONCRETE**—Use no more water in cement than absolutely necessary. Cement requires but a very small quantity of water in crystallizing. Merely dampening the material gives the best results. Any water in excess necessarily evaporates and leaves the hardened cement comparatively weak and porous.

**CONCRETE IN WATER**—Whenever concrete is used under water, care must be taken that the water is still. So say all English and American authorities. In laying cellar floors, or constructing cisterns or similar work, care must be taken to avoid pressure of exterior water. Cement will not crystallize when disturbed by the force of currents, or pressure of water, but will resist currents and pressure after hardening only. In still water good cement will harden quicker than in air, and when kept in water will be stronger than when kept in air. Cements which harden especially quick in air are usually slow or worthless in water.

**HOW TO PUT DOWN CONCRETE**—When strong work is wanted, for cellar floors and all similar work, the concrete should be dampened and tamped down to place, with the back of a spade, or better, with the end of a plank or rammer; then finished off with a trowel, thus levelling and compacting the work. Only persons ignorant of the business will lay a floor or walk with soft cement mortar. All artificial stone is made in a similar way to that described, and, when set, is strong and hard as stone.

**DELAY IN USE**—Do not permit the mortar to exhaust its setting properties by delaying its use when ready. Inferior cements only will remain standing in the mortar-bed any length of time without serious injury.

**STONE AND BRICK WORK**—In buildings constructed of stone or brick, the best protection from dampness and decay, and also from the danger of cyclones, is a mortar of cement and coarse sand. The extra cost is inconsiderable, and the increased value of the structure very great. Chimneys laid in this manner never blow down, and cellars whose foundations are thus laid are always free from atmospheric moisture. Cement may also be mixed with lime mortar for plastering and other purposes, to great advantage.

**EFFECT OF FROST AND COLD**—At a temperature less than 60 degrees Fahrenheit, all good cement sets slowly, though surely, but if allowed to freeze its value is seriously impaired. In cold weather or cold water do not fear to wait for your concrete to crystallize.

**DAMAGE FROM MOISTURE**—Good cement is not injured by age, if carefully preserved from moisture. Lumps in bags or barrels of cement are caused by exposure to moisture. They prove the originally good quality of the cement.

## LEGAL DECISIONS.

Mr. Justice Ouimet, of Montreal, in the case of Beaulieu vs. Brouillet, decided a point of much interest to architects. The action was taken to recover an amount alleged to be due under a written building contract for certain work done, and an additional sum for extras. The plaintiff had endeavored to produce evidence to establish the value of these extras; but the defendant objected, and the objection has been maintained. It is held that an architect can only claim for work done under a written contract, and in the absence of a written agreement or an admission under oath by the person for whom the work was done as to the value of the extra work, a claim can be entertained. In the present case the plaintiff had neglected to have a written agreement drawn up before commencing the extra work.

UNIFORM FORM OF PROPOSAL.

As the result of joint deliberation on the part of a Committee of the Builders' and Traders' Exchange of Milwaukee, and the Architects of that city, the use in future of the following uniform form of proposal is recommended:

Milwaukee, Wis. 189.
NOTICE.

THIS BID IS GIVEN UPON THE FOLLOWING EXPRESS CONDITIONS, VIZ:

- 1. All bids are to be made known upon the awarding of contract or within five (5) days of the opening of bids.
2. It is expressly agreed by the bidder that he will make contract for the price named within ten (10) days from the specified time set for receiving bids.
3. Where the owner or agent demands a bond from the contractor, the contractor shall be entitled to a bond from the owner or agent for the prompt payment of the sums named in the contract, and for the faithful performance of such other conditions and terms as may be set forth in said contract.
4. The contractor shall be entitled to 5 per cent. on all materials furnished by the architect, owner or agent upon which materials the undersigned has bid and contracted for.

To.....Architects:

The undersigned propose to furnish all the material and to perform all the labor required for the.....work of a.....to be built for Mr.....in accordance with the plans and specifications for the sum of.....

Dollars (\$)
Dollars (\$)
Dollars (\$)
Remarks

Name.....
Address.....

USEFUL HINTS.

A yellowish-brown luminous paint is obtained from 48 parts auripigment and 34 parts luminous calcium sulphide.

One-fifth more siding and flooring is needed than the number of square feet of surface to be covered, because of the lap in the siding and machinery.

The ends of all timbers, and especially of large beams should be free (for it is through the ends that moisture chiefly evaporates). They should on no account be embedded in mortar. Beams may appear sound externally and be rotten within, for the outside, being in contact with the air, becomes dryer than the interior. It is well, therefore, to saw and reverse all large scantling.

PLASTER USED FOR FLOORING.—It is stated by an exchange that French builders, who have carried the art of hardening plaster to where it is used for flooring, either in place of wood or tile, employ for this purpose six parts of good quality of plaster intimately mixed with one part of freshly slacked white lime finely sifted. The mixture as thus composed is laid down in as quick time as possible, care being taken that the trowel is not used upon the surface for too long a time; after this the floor is allowed to become very dry, and is subsequently saturated in the most thorough manner with sulphate of iron or zinc, the iron giving the strongest surface, its resistance to breaking being found to be 20 times the strength of ordinary plaster. It appears that with sulphate of zinc the floors remain white, while when iron is used it becomes the color of rusted iron; but if linseed oil, boiled with litharge, be applied to the surface, it becomes of an attractive mahogany color, this being especially the case if a coat of copal varnish is added.

To test the purity of white lead is not a difficult matter, and does not necessitate a knowledge of chemistry. The simplest way is to crush a small quantity of dry lead on a sheet of paper, fold it, and holding it over a plate or saucer, set fire to it. The heat will change the white lead, if pure, into metallic lead, which will drop in the form of shining grains; if it is adulterated, no indications of metal will be apparent. Another method is to spread a thick layer of the lead over a very thin pine board. On burning it, the metallic particles will be visible only when the lead is pure. A more accurate method than either is that of using charcoal and blow-pipe. Take a flat piece of charcoal about three inches long, one inch wide, and one-fourth of an inch thick, hollow out a small cavity and place within it a piece of the suspected lead about the size of a pea. Then take a blow-pipe and a spirit lamp, and direct the flame on the lead; keep up a continual and steady blowing, and allow the blue part of the flame to reach the lead. In a couple of minutes the lead, if pure, will be reduced to a small shining piece of pure metallic lead; if it be adulterated, no amount of blowing will produce the same result. A tobacco pipe (common clay), having a small stem, may, at a pinch, be used as a blow-pipe.

The work of rebuilding the St. Johns Stone Chinaware Company's factory at St. Johns, Que., is actively progressing.

At Guelph, during 1893, buildings were erected to the value of \$100,000, and on other improvements there was expended \$10,000.

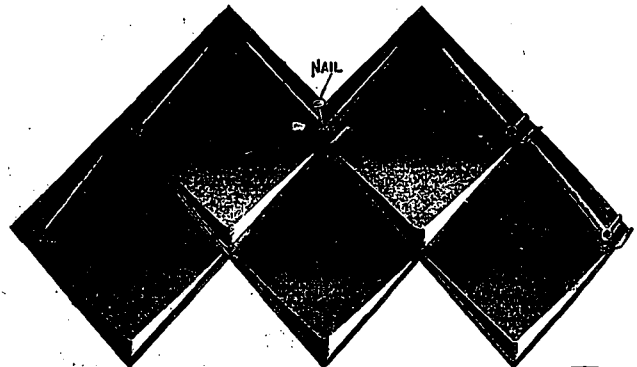
Resin is utilized for making the varnish used by Venetian blind manufacturers for painting their blinds. This varnish is mixed with the desired color, mostly green, and when painted gives a hard gloss enamel surface.

Room Mouldings

New goods just opened. Rich and effective designs specially coloured to match our WALL PAPERS and Ingrains; also CHAIR RAILS, CEILING and PANEL BEADS, COVES, etc., in GOLD and shaded effects, Natural OAKS, etc.

We colour mouldings to match any paper.

M. STAUNTON & CO. 6 KING STREET WEST.



DIAMOND TILES



CORRUGATED IRON.

V CRIMPED AND PRESSED STANDING SEAM ROOFING for all classes of buildings.

Hayes' Patent Steel Lath

WRITE FOR PRICES.

"Empire" Patent Shingles

METALLIC ROOFING CO., LIMITED.

MANUFACTURERS

706 Craig Street, MONTREAL. 82 Yonge Street, TORONTO.

Eastlake Patent Shingles

**USEFUL HINTS.**

A glue which will resist the action of water is made by boiling one pound of common glue in two parts of skimmed milk.

To darken the natural hue of wood use a solution composed of equal parts of manganate of soda and crystallized Epsom salts, dissolved in twenty to thirty times the amount of water at about 114 degs. The less water employed the darker will be the hue.

In selecting colours in which to paint the wood work of a room, the rule is to take the prevailing tint of the wall paper, but it is sometimes difficult to know exactly what this is. If the contrast is not too great, a good plan is to use the ground colour of the wallpaper for the styles and rails of the doors and corresponding parts, and the colour of the pattern for the panels.

It is in all cases desirable to keep the colours light, as the extent of surface prevents dark colours being used.

**TO MAKE POSITIVE COPIES OF DRAWINGS.**—The paper to receive the impression is coated with a 2 per cent. solution of bichromate of ammonium to which a little grape sugar has been added, and then dried in the dark. The sheet containing the drawing is laid upon the prepared paper and exposed to the light until the paper has assumed a grey color. It is now dipped into a 1 per cent. solution of nitrate of silver, one-tenth of the volume of which consists of acetic acid. The positive image developed thereby becomes dark brown on drying.

The feasibility of the use of tin plates as an exterior covering felt or other insulating materials for steam and hot-water pipes seems worthy of consideration, says *Heating and Ventilation*. The amount of heat that can radiate from a polished and tinned surface is very much less than the radiation from canvas and many other substances which ordinarily form the outer surfaces of pipe coverings. The cost of the tin and its application would not be materially more than that of canvas; and as it could be left bright, while canvas is usually painted, and as inferior sorts of tin would answer well for this purpose, the difference in cost, if any, would be trifling. We have seen a very neat job done in this way with apparently excellent results, the insulating material used being mineral wool.

**PREPARED MORTAR FOR USE IN VERY COLD WEATHER.**—In France, attention has been called recently by Mons. Rabut to the extraordinary results obtained during the long frost of 1892-93 on the Caen and Vive Saint Lo railway lines by the use of soda with the mortar; and it is well, says the *British Clay Worker*, that we should call the attention of builders to these results. Mortars were made in the following way:—Anhydrous carbonate of soda was dissolved in boilers of water, at the rate of 2 lbs. per gallon, the temperature being maintained at 30° C. This was served out to the workmen, who mixed with it an equal quantity of water, and used the solution instead of water for making the mortar. It required 25% more of this solution to make mortar than if plain water were used. The masons had to use india-rubber gloves. The extra cost was computed to be in English money 1s. 6d. per cubic yard of masonry. The addition of the soda not only permitted building to be carried on at a low temperature, but accelerated the setting of the mortar; in short, mortar mixed with it set at 5° of frost twice as quickly as plain mortar at 10° above freezing point.

**A NEW USE FOR BRICK-DUST.**—A sort of terra-cotta is being made rather largely in Austria, and is finding considerable favor amongst architects and builders. The material consists of a mixture of gypsum (sulphate of lime), brick-dust and slaked lime, these constituents being finely ground before being incorporated together and pressed into the mould. It is chiefly used for ornamental relief-work, cornices, &c., and does not require firing. Some tests of this material were recently carried out by Bohme, and are published in the *Mitt. Konig. Tech. Versuchst.*, No. IV., pp. 183-185. When saturated with water the values obtained were respectively 8.68 and 35.5; when saturated with water and frozen, the values obtained by test experiments were 10.60 and 38.8 for tensile and compressive strengths respectively. The specific gravity was 1.21, and the abrasion test gave 52.8. All these figures prove that imitation terra-cotta possesses properties which compare favorably with those of real terra-cotta, and it is stated that it can be made at considerable less cost. This utilization of brick-dust reminds us that Hauenschild, a German expert, has recently produced tiles, showing a satisfactory resistance of frost, from a mixture of two measures of sawdust and one of Portland cement.

**CREDIT VALLEY BROWN STONE**  
From Carroll & Vick's No. 6 Quarry,  
Credit Forks, Ont.

**14,905** pounds is the average crushing strength per square inch of our Credit Valley Brown Stone.

The highest standard of test attained by any pure Sandstone in America.

**SANDSTONE**, fine grained, reddish-brown. Contains quartz, and a little felspar and mica. The stone is in beds of four feet and under, and can be handled in pieces up to five tons. Quarry 300 yards from Railway.

In confirmation of the facts above stated, we have pleasure in directing your attention to the accompanying table, showing the result of the test of our stone, in connection with the series of tests of building stones conducted in 1892 at the School of Practical Science, Toronto, under the direction of a committee of the Ontario Association of Architects.

By referring to the results of the tests above mentioned, it will be seen that the average crushing stress of the majority of Canadian and American sandstones is far below that of ours, the difference in our favor ranging from 75 to 50 per cent.

The Credit Valley Brown Stone, owing to its most delicate tone, harmonizes beautifully with red or cream colored brick.

It has been reported that there is difficulty in obtaining Credit Valley Brown Stone. To correct this mistaken notion, we wish to state to architects and the public that we have 40,000 cubic feet of stone ready to ship on the shortest notice, which can be followed up with an unlimited supply. Last year we made extensive additions to our plant and opened up new quarries and mines, and will supply promptly all orders given to us or our agents.

Specimen.	Section under Pressure		Height.	Crushing Load.	Crushing Stress per sq. in.		Average Crushing Stress per Square Inch
	Ins.	Ins.			Pds.	Pds.	
A	2 3/4	3	2 3/4	131,000	15,188		
B	2 1/2	3	2 3/4	130,000	14,751		
C	2 1/2	3	2 3/4	133,000	14,777		14,905

**CARROLL, VICK & CO.**

Quarries: Credit Forks, Ont. Office: 84 Adelaide St. West, TORONTO.

Montreal Agents: T. A. MORRISON & CO., 118 St. Peter Street.

**Don Valley Pressed Bricks**

**TWO HIGHEST AWARDS AT CHICAGO.**

**Gold Medal for Bricks -- Gold Medal for Terra Cotta**

EXTRACT FROM THE REPORT OF JUDGES ON WHICH THE AWARDS WERE GIVEN:

"In our estimation there are no bricks on the Exhibition Grounds to be compared to those manufactured by the Don Valley Brick Works."

OFFICE AND SHOW-ROOMS:

60 Adelaide Street East

**TORONTO**

**The Port Credit Pressed Brick and Terra Cotta Co.**

(Successors to the Thomas Nightingale Pressed Brick Co.)

... MANUFACTURERS OF ...

Plain, Moulded and Ornamental

**PRESSED BRICKS**

Farm-Drain Tile, Roofing and Floor Tile, Paving Brick, &c.

Works: Port Credit, Ont.

Office: 52 Colborne St., Toronto  
Telephone 298.

The Rathbun Company's exhibit of cement at the World's Fair was awarded a first prize.

The Wrought Iron Range Company which for a year or two past have been in business in Toronto Junction, have recently removed their works to Pearl street, Toronto.

The plaster manufacturing business of Mr. James Bennett a Windsor, Ont., has been purchased by the Windsor Plaster Co. The intention of the purchasers is to extend the business.



should be true in color, brilliant in tone, reliable in color, brilliant in tone, reliable in color, of unvarying uniformity, and lasting. HIGGINS' AMERICAN DRAWING INKS are known the world over for these and other good qualities. Always ask for HIGGINS' DRAWING INKS whether you want Black or Colors, for brush or pen work. Twenty-five cents per bottle AT ALL DEALERS; thirty-five cents by mail, prepaid, from the manufacturers. Sample card showing actual inks sent free.

**CHAS. M. HIGGINS & CO., Mfrs.,**  
168-170 English St., BROOKLYN, N. Y.  
English Depot, 7 & 9 St. Bride St., LONDON, E. C., ENG.

Works: ST. HELENS, ENGLAND.

## PILKINGTON BROTHERS

MANUFACTURERS OF

### POLISHED PLATE

Rolled and Rough Cast Plate,



**FANCY CATHEDRAL  
ENAMELLED, GROUND  
and all kinds of ornamental  
WINDOW GLASS**

Depot: BUSBY STREET, MONTREAL.

## WE

know many people who think it wise to buy an article because it is cheap. That is poor policy. We

## SELL

the highest grade of mortar known in the trade, and anyone who has used Adamant will back up this statement. Use Adamant and get full value for your

## MONEY.

**ADAMANT MFG. CO. OF AMERICA,**

100 ESPLANADE EAST,

Telephone 2180. - TORONTO.

**WM. J. HYNES,**  
Contractor and Plasterer.

Relief Decorations in Plaster, Gypsum or Papier-Mache.  
97 Winchester St. Shop, 126 Adelaide St. W.  
Telephone 3414.

- J. D. BAKER -

*Plaster and Cement,*

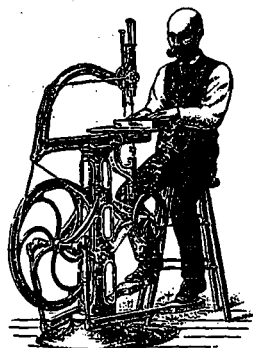
*Architectural Ornaments,*

*Centre Flowers, etc.*

RESIDENCE: SHOP:  
38 CATHART ST. REAR 22 UNIVERSITY ST.  
MONTREAL.

## PATENT FOOT AND HAND POWER MACHINERY

COMPLETE OUTFITS.



CARPENTERS, CABINET-MAKERS and other WOODWORKERS without steam power, can successfully compete with the large shops by using our

**LABOR SAVING MACHINERY.**

latest and most improved for practical shop use. Many of our machines will pay for themselves on a single job.

Machines sold on trial, if desired. Send for Catalogue and Price List, giving full Descriptions, Testimonials, &c.

**The Seneca Falls Mfg. Co.**

316 Water St., Seneca Falls, N. Y.

## WAGNER, ZEIDLER & CO.

DOMINION EMPORIUM

... FOR ...

**INTERIOR**

**ART**

**WOODWORK**

... AND ...

Architectural Wood-Carving.



Estimates given for Constructive Carpentry where Interior Woodwork and Carpentry are let together.

Separate estimates given for Carving if desired.

TORONTO JUNCTION.

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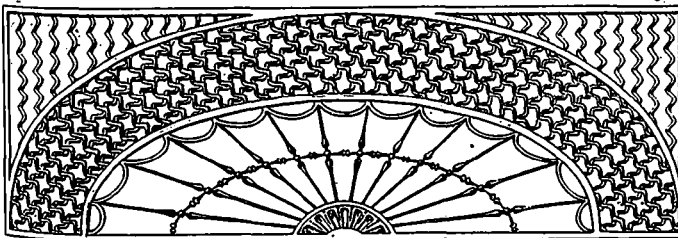
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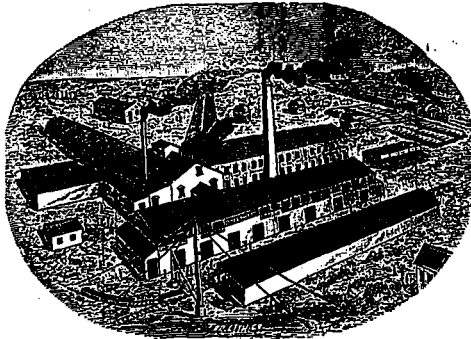
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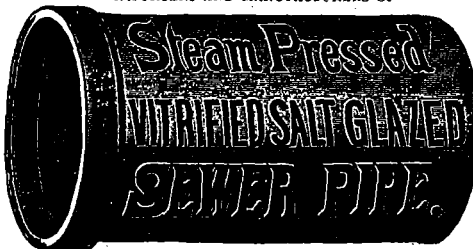
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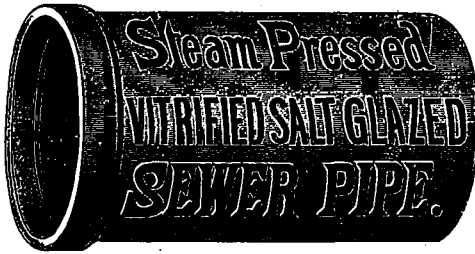


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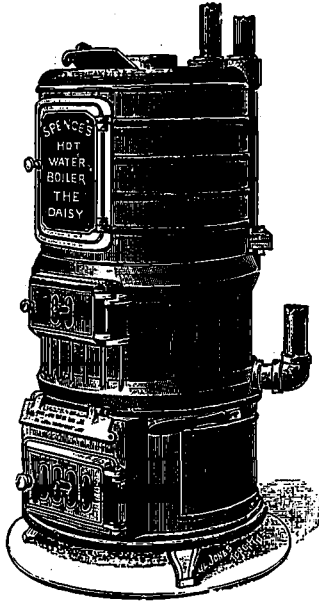
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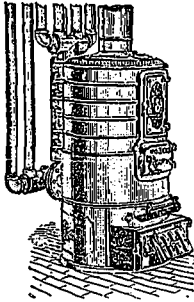
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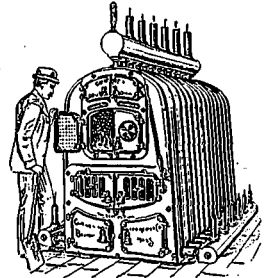
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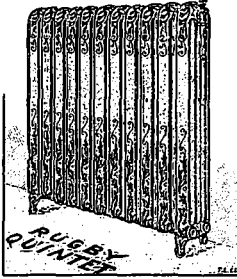
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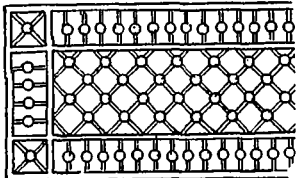
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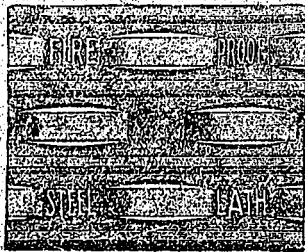
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