



PUBLISHED MONTHLY IN THE INTERESTS OF

Architects, Civil and Sanitary Engineers, Plumbers, Decorators, Builders, Contractors, and Manufacturers of and Dealers in Building Materials and Appliances.

VOL. I.—No. IV.

TORONTO, CANADA, APRIL, 1888.

PRICE, 20 CENTS
\$2.00 PER YEAR.

Canadian Architect and Builder

A JOURNAL OF MODERN CONSTRUCTION METHODS,

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

C. H. MORTIMER, *Publisher,*

31 King Street West, - TORONTO, CANADA.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for \$2.00 per year. The price to subscribers in foreign countries, is \$2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

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Fees for advertising sent promptly on application. Orders for advertising should reach the office of publication not later than the 12th day of the month, and changes of advertisements not later than the 5th day of the month.

EDITORS' ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

THE advertising pages of the CANADIAN ARCHITECT AND BUILDER this month include the names of many reputable firms whose announcements appear for the first time in this number. We commend them and their goods to architects and builders for whose use they are designed.

THE danger arising from the exposure of electric light wires, was illustrated the other day at Welland, where during a thunder storm the electric light wires, highly charged with electricity, set fire to the wood work of a building. The proper place for electric light wires is underground, where doubtless they would be now were it not for the expense connected with placing them there.

IT is a pleasure to learn that it has been decided to replace the unsightly fence which surrounds the Horticultural Gardens in this city by a low iron fence of pleasing design. The high board fence has too long marred the beauty of our residence streets, but there is at last abundant evidence that it will be forced to make way for something more in keeping with nineteenth century progress.

READERS of this journal who may desire to be enlightened regarding any matter connected with their calling about which they may be in doubt, are invited to send their enquiries to this office, and every effort will be made to supply to them the required information. The desire of the publisher is to make this journal a medium of practical information. The answering of difficult questions involves time and trouble. Notwithstanding, we will endeavor to supply the information needed if our readers are sufficiently interested to write us briefly and clearly what they desire to know.

IN the Bill introduced into Parliament to regulate the conduct of railway companies in their relations to the public, it is recommended that the granting of free passes be abolished, excepting members of the Federal or Provincial Government. Wherefore this

exception? It is members of Parliament who travel most on free passes, and who can scarcely be expected to champion the rights of the people as against the railways so long as they are the recipients of such favors. If there are to be any exceptions to the rule abolishing free passes, they should not include members of Parliament, whose efforts should be given free handed in the public interest.

THE recent action of the Toronto Trades and Labor Council on the subject of technical education is surprising and amusing. Having heard that it was the intention to establish courses of instruction in carpentry and devote some time to instructing children in the public schools in the use of tools, the Council have appointed a committee to investigate the matter, with "instructions to interview the Board of School Trustees, and suggest to them that the two hours proposed to be devoted to learning the use of carpenters' tools be devoted to the learning of law and medicine." The reason given for this action is that "there are already too many who know how to handle tools, but nothing more," and that what is wanted are schools for technical education. We are surprised that a professedly democratic body like the Trades and Labor Council should object to any attempt to impart to the rising generation technical instruction. We are still more surprised that they should desire to substitute for such instruction the study of subjects like law and medicine. If a little knowledge of the way to use carpenters' tools is a dangerous thing, how much more dangerous and useless an imperfect knowledge of law or medicine? If there are already too many people who know how to handle tools, are there not vastly too many in the ranks of the lawyers and doctors? It is doubtless true that technical instruction can be imparted more thoroughly in technical schools than in the public schools, but, on the principle that half a loaf of bread is better than none at all, should it not be a matter for satisfaction rather than for objection, that until technical schools shall have been established in Canada, some measure of technical instruction is to be undertaken in the public schools.

THE contractors of Hamilton have locked out all their union men, and seem determined that some solution must be arrived at to settle how far trade unions shall interfere in their personal affairs. The lock-out was brought about through union men refusing to lay stone quarried by non-union labor. If these men do not desire to lay such material, they have the right to drop work if it so pleases them. Likewise the contractors have the right to refuse to employ union men. There is as usual a great cry about the arbitrary conduct of the contractors in locking out men who are not personally directly interested, but who are nevertheless interested as union men. There is nothing said about the tyrannical and harsh methods of the unions which will not allow their members to work alongside non-union men. If a man wishes to exercise his right to act as it may please him, and refuses to join a union, the supposed champions of liberty step in and say: "If you wish to exercise your right to free action and will not join our union, we will see that you and your family are brought as near starvation as possible. We will not allow you to procure work. Wherever there are union men employed, the employers must choose whether they shall employ union men or non-union men, for we will not work alongside of you. You may starve in consequence, but that is nothing to us. We care not for your sufferings

so long as we gain our objects." This is practically the attitude of the unions towards employers and non-union men. The contractors of Hamilton have accepted this challenge by discharging all union men and employing such workmen as they may deem fit in their own interests.

The building trade in Toronto has been very much injured by injudicious strikes. There are some eighteen or twenty different trades or divisions employed in the erection of buildings. Any one of these divisions may retard building by striking, and as they generally strike when work is plentiful in their particular line, they seriously interfere with the progress of the season's building. Of late years we have not had many months peace from strikes. Some one or other of these divisions have had grievances which apparently could not be remedied without a strike, and no sooner is one strike over than there is another. Those out on strike are supported by those at work in the other divisions. The parties building are the principal sufferers, and it is almost time that they took some interest in seeing that they are not made to stand the full loss. Contractors can stand the strikes very well now, as a clause in their contracts relieves them of all penalty for delay through strikes. If they suffered as in the past they would long be for this have had a remedy. The ratio of wages of all the divisions in the building trades does not fluctuate to any extent, and if such ratio as between the different parties interested were definitely settled, it would be possible to have one grand strike instead of some twenty. We would then have a strike for an advance of five or ten per cent. all round, and all would win or lose together, and not one-tenth of the time would be lost in the settlement of disputes that there is now. It is a matter for surprise that the contractors have not made use of their central organization, and forced this matter to a head. Every time there is a strike they must lose through their plant lying idle, and in many other ways. If they could bring about a settlement of all questions in the building trade by one effort, it would improve matters very much. The first time they have trouble with any of their men, if they would lock out all the men engaged in the building trade and inform them that they would not take them on again until they had arrived at a settlement among themselves as to the ratio of wages, and that in future a strike must be for an advance all round or not at all, they would very soon stop this continual interference with a season's building by some small section of dissatisfied union men. These small strikes have become a most serious nuisance, and must be put down in some manner.

We will attempt to explain what is meant by a ratio of wages. Suppose the wages of a mason is \$3 per day; carpenter, \$2.50; painter, \$2.25; tinsmith, \$2; laborer, \$1.80, etc. The difference in these amounts remain at about the same ratio, so that if the mason strikes for \$3.30 per day and gets it, we are likely to have a strike before long with the carpenters for \$2.75, the painters for \$2.50, the tinsmiths for \$2.20, and the laborers for \$2. The advance has been general, and is about ten per cent. all round. Well, what we would like to see would be an agreement as to this ratio of wages, and thus have the fight all along the line for a general advance or reduction. The contractors would not lose nearly so much, and the men would be benefited by losing much less time, as every strike that we now have throws nine or ten more of the other branches out of employment. The

business interests of the community would not suffer nearly so much, and we would have less destitution during the winter and early spring months. It is possible that if the building trades were consolidated, so that one strike would answer instead of twenty, we would not be troubled with any. The interests would be so great, and the result of a strike of such consequence, that there would be more desire shown to arrive at a settlement before resorting to the last alternative. It would certainly be much easier to bring outside influence to bear in the settlement, and arbitration could more easily be used to secure a quiet and satisfactory adjustment of all disputes.

THE rebuke administered to the Montreal City Council by leading citizens, who turned out with picks and shovels to put the streets in a passable condition, was a cutting one indeed. A great deal of apathy is displayed by the taxpayers in towns and cities regarding the management of civic affairs, yet we are pleased to see that there is a limit beyond which neglect and incompetency will not be tolerated. The streets of Montreal of late would certainly disgrace a city of much less pretensions, and unless an improvement takes place now, the position of the gentlemen composing the Board of Works will be anything but pleasant when election time comes round again.

THE Royal Canadian Academy Exhibition and Art Fair will be held in the Granite Rink, Toronto, in the second week in May. The building, which is very large, being the new northern rink building of the Granite Club, will be divided into two parts. The smaller portion will be used for the exhibition of paintings, sculpture and architectural drawings. The larger portion will be used as an Art Fair and for the purpose of giving scenic representations of art, commencing with the Egyptian period, and coming down through the Grecian, Roman and middle ages to the present time. This will be done by tableaux, accompanied with singing and dancing. Canadian art will be represented by winter and summer scenes of forests, rivers, lakes, water falls, etc., in which will be introduced Indians, tobogganers, skaters, snow shoers and lacrosse players. On alternate evenings will be given representations of old English customs, cheap-jacks, Punch and Judy shows, etc. There will also be stereoscopic views of all the important buildings and statuary in the world. The Art Fair will be held throughout the week. Bric-a-brac, china, beautiful fans, rare races, etchings, engravings, etc., will be disposed of at stalls representing those in use in the middle ages. There will also be stalls for the sale of flowers, candies, cigars, etc., and which will no doubt be liberally patronized. Refreshments may also be had in rooms specially arranged for the purpose. The musical department has been placed in charge of most capable masters. The exhibition will be opened by Lord and Lady Lansdowne on the evening of the annual assembly, Monday, May 7th. Sir John and Lady Macdonald and many other distinguished persons will be present. It is expected that the Exhibition will be the best so far held. A number of the members of the Academy spent the summer among the Rockies, and we may expect a number of works picturing the grand scenery of those regions. Many valuable works from Great Britain and the United States are expected to be exhibited. We hope that this Exhibition will result in a financial success, and that the benefits from the artistic side may also be very great. There are people who require to be taught that while they themselves may be very deficient in artistic knowledge, there are some living amongst them who, while they are not Michael Angelos, are able to do good artistic work if their clients would but furnish sufficient funds.

THE new plumbing by-law passed by the Toronto City Council at its last meeting is in some respects a loosely constructed ordinance, and the wisdom of some of its provisions is open to question. It cannot be said to be as evident an improvement on the former by-law as persons interested in its provisions had a right to expect. Time is required to perfect a measure of this kind, and perhaps if more time had been given to consideration of some of the clauses of this new by-law, its meaning and the justice of certain of its provisions could be more easily discovered.

A very objectionable feature of the by-law in our opinion, is the refusal of a license to any plumber who is not a Canadian by birth or naturalization. This clause was inserted we understand because some cities in the United States have a provision of that kind in force. This, however, is no reason why such a regulation should

be adopted here. If our American neighbors choose to exhibit their narrow-mindedness, that is no reason why we should follow their example. To exclude any man who has the means and the ability from engaging in a legitimate business is unjust, unworthy of this enlightened age, and detrimental to the progress of the city and country. Why make this discrimination in regard to plumbers? Why not include manufacturers, storekeepers, bakers, butchers and all other lines of business?

The by-law provides that within three days after notification has been given that work is ready for inspection the City Engineer "shall call for either the peppermint, water or smoke test, and record the result of such inspection in the City Engineer's office." Who is to make this test? The by-law does not say. Shall the City Engineer "call for" the plumber who does the work to make the test? In that case what guarantee is there that his report will be a correct one? Again, if the plumber is to make the test, he should be told definitely which method of testing will be required, as the difference in the cost of the several kinds of tests varies considerably—the water test, for example, being much more expensive than the peppermint test. This clause is altogether too indefinite.

Another clause which is open to objection is the one compelling the plumber to stamp his name upon every water-cock, bibb, tap, etc., which he connects to the water service. The plumber should not be held responsible for the proper construction of a cock or tap of which he is not the maker. Why not put the responsibility upon the manufacturer, where it belongs? The water works department should do the inspecting and stamping of plumbers' goods, and should charge the manufacturers a fee to cover the cost of the work. This is the system which is in successful operation in Manchester and other large cities, in England and it is certainly preferable to the one embodied in the new Toronto by-law.

In rule 2 of section X it is stated that "no lead, waste or vent pipes shall weigh less than the following," etc. This may be very clear to the framers of this by-law, but we think that it had been worded "that no waste or vent pipes constructed of lead shall weigh less than the following" it would have been very much clearer to those who will have to interpret it. Just below the above clause is another which states that "air pipes may be constructed of wrought iron pipe, but not of sheet iron." Now, we would like to know what are air pipes? Are they the pipes venting taps, or are they the ventilating pipes from the closet space or from the rooms. Let us have a definition, for we confess we are very much in doubt, notwithstanding we thought we knew something about such matters.

The Examining Board is to consist of the City Engineer, Assistant City Engineer, Superintendent of Water Works, two practical master plumbers to be chosen by the Master Plumbers' Association, one practical plumber to be chosen by the Journeymen Plumbers' Association, and one architect or sanitary engineer practising in Toronto. This Board is unnecessarily large. The work would be better performed by three men whose ability and integrity were above question. The by-law, while making provision for the appointment of all the other examiners, does not say by whom the architect or sanitary engineer shall be appointed. The appointment of the examiners, who, above all others, should be chosen for his knowledge of sanitary science, is thus left to the City Council. Those who know how appointments by the Council are made, will not hesitate to declare that some more satisfactory method should have been provided.

We have neither time nor space this month to go fully into the consideration of all the provisions of the new by-law. We have simply tried to point out a few of its defects. In a future article we may revert to the subject again. In the meantime there is cause for congratulation in the fact that although the by-law is open to improvement in many particulars, the importance of sanitary regulations is apparently receiving a considerable amount of attention at the hands of the aldermen.

A new pneumatic stone dressing machine consists of a gun metal cylinder in which works a loose piston, one end of the cylinder being provided with a nozzle in which bits and chisels may be inserted. The stem is pressed inward and receives blows from the piston, which is shot backward by air at a pressure of 40 pounds per square inch, and makes, in the smallest machines, 15,000 strokes per minute. The stones thus treated are much superior to those dressed by hand, the surface being beautifully smooth and even.

THE LINTEL.

John Ruskin, in discussing the lintel in architecture, says: "The principal distinctions between existing styles of architecture depend on their methods of roofing any space, as a window or door for instance, or a space between pillars—that is to say, that the character of Greek architecture, and of all there is derived from it, depend upon its roofing a space with a single stone laid from side to side; the character of Roman architecture, and of all derived from it, depends on its roofing spaces with round arches; and the character of the Gothic architecture depends on its roofing spaces with pointed arches or gables. I need not, of course, in any way follow out for you the mode in which the Greek system of architecture is derived from the horizontal lintel; but I ought perhaps to explain that by Roman architecture I do not mean that spurious condition of temple form which was nothing more than a luscious imitation of the Greek, but I mean that architecture in which the Roman spirit truly manifested itself, the magnificent vaultings of the aqueduct and the bath, and the colossal heaping of the rough stones in the arches of the amphitheatre; an architecture full of expression, of gigantic power and strength of will, and from which are directly derived all our most impressive early-buildings, called, as you know, by various antiquaries, Saxon, Norman, or Romanesque. Now, the first point I wish to insist upon is that the Greek system, considered merely as a piece of construction, is weak and barbarous compared with the two others. For instance, in the case of a large window or door, if you have at your disposal a single large and long stone you may indeed roof it in the Greek manner, as you have done here, with comparative security; but it is always expensive to obtain and to raise to their place stones of this large size, and in many places nearly impossible to obtain them at all, and if you have not such stones, and still insist upon roofing the space in the Greek way—that is to say, upon having a square window, you must do it by a miserable feeble adjustment of bricks. You are all aware of course, that this latter is the usual way in which such windows are now built in England; you are fortunate enough here in the north to be able to obtain shingle stones, and this circumstance alone gives a considerable degree of grandeur to your buildings. But in all cases, and however built you cannot but see in a moment that this cross-bar is weak and imperfect. It may be strong enough for all immediate intents and purposes, but it is not so strong as it might be; however well the house is built, it will not stand so long as it had been better constructed, and there is hardly a day passes but you may see some rent or flaw in bad buildings of this kind."

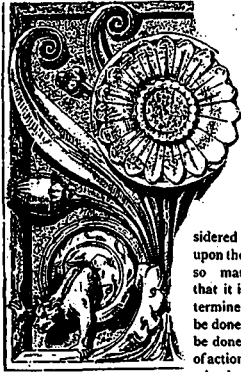
MORTAR.

Lime or cement paste, says C. H. Haswell, is the cementing substance in mortar and its proportion should be determined by the rule that the volume of the cementing substance should be somewhat in excess of the volume of voids or spaces in the sand or coarse material to be united, the excess being added to meet imperfect manipulation of the mass. Hydraulic mortar, if re-pulverized and formed into a paste after having once set, immediately loses a great portion of its hydraulicity, and descends to the level of the moderate hydraulic limes. A great destruction of the hydraulic principle, therefore, results from any disturbance of the molecular arrangement of the mortar after crystallization has commenced. This is what occurs with the intermediate limes, which take initial set promptly and firmly, but which are subsequently thrown down by the slaking of the impure caustic lime which they contain. All mortars are much improved by being worked or manipulated, and as rich limes gain somewhat by exposure to the air, it is advisable to work mortar in large quantities, and then render it fit for use by a second manipulation. White lime will take a larger proportion of sand than brown lime. The use of sak water in the composition of mortar injures the adhesion of it. When a small quantity of water is mixed with slaked lime a stiff paste is made, upon becoming dry or hard has but very little tenacity; but, by being mixed with sand or like substances, it acquires the properties of a cement or mortar. The proportion of sand that can be incorporated with mortar depends partly upon the degree of fineness of the sand itself, and partly upon the character of the lime. For the rich limes the resistance is increased if the sand be in proportions varying from 50 to 140 per centum of the paste in volume; beyond this proportion the resistance decreases. Stone mortar—325 pounds cement, 120 lime and 24.67 cubic feet of sand. Brick mortar—326 pounds cement 120 pounds lime and 12 cubic feet of sand. Brown mortar—Lime one part, sand two and a small quantity of hair.



CANADIAN ARCHITECTS.

By "OUTLOOKER."



PANEL DESIGN.

THAT the profession of architecture in Canada requires to be raised to a higher level all will admit. How it may be done is not a question to be readily solved. The men who are now considered architects look upon the profession from so many standpoints, that it is difficult to determine what is best to be done, or how it should be done if once the line of action should be determined. From the men who are architects be-

cause they love their profession and take delight in their work, little need be feared. They will immediately do all in their power to help along any movement which will raise the profession which they love to a higher sphere. But from the men who only practice as a means of gaining a subsistence, little can be expected except the improvement will return them a good dividend. There are men who lie between these extremes who are perfectly indifferent either way. They will assist if it does not require too much exertion on their part or take up time which could be employed in the earning of a small increase to their present income, otherwise they are passive.

A short description of the different classes of men who are now practising as architects in Canada, would not be out of place. There is first the man of aesthetic temperament—all his inclinations are to the strictly artistic side of the profession. Problems in construction, or the methods of carrying out the work, and matters of detail, either as to money or the many other questions involved, are to him exceedingly irksome. Secondly, we have the man whose inclinations are decidedly artistic, but not to the complete shutting out of the many practical questions that must be solved. Thirdly, the man whose inclinations are more mathematical, whose delight is to solve difficult questions in construction or planning, and who is able to acquire a correct knowledge of the artistic portion of his work. Fourthly, those men whose inclinations are to the mathematical side of all questions, and whose unable to acquire correct artistic knowledge—in fact, men who should have been engineers. From men having all these various qualifications we have everything to hope. They, one and all, have been drawn into the profession through preference for some portion of the work, and where men have entered the profession which they follow on account of natural qualification, they can be depended on to work in its interest. Besides these men, there is another class which cannot very well be divided into divisions, although divisions really do exist. Many of these men have become architects as they would have become almost anything else they might have drifted into—and which, if the current had been in another direction, would have made of them lawyers, brokers, estate agents, bookkeepers, or anything else. A living had to be made, and they came to the conclusion it might as well be made making plans. The amount of work did not seem great, and it was rather a nice, genteel sort of way to make a livelihood. Their success very seldom lies in their ability to do good work, but often in their doubtful methods. Their object is to gain money, and so long as they obtain what they most want they are not over particular how they get it. Some men become architects through following some one of the building trades. They have had more than usual intelligence, or ambition, or conceit, and have entered on a more ambitious plane. From these men little help can be obtained towards elevating the position of the profession.

There is one thing of which we may be assured, and that is that there cannot be much hope until the great majority of the members are educated men. An archi-

tect cannot have too good an education, and the more liberal it has been the better for the man. It is a prevalent idea that any man of intelligence, provided he has practical knowledge of the simplest building construction, can be a successful architect. Successful he may be from the point of getting work, but not in the higher degree of doing good work. It is difficult to determine what constitutes success in architecture in this country. The people have such little knowledge of what is good, that they are unable to distinguish between good and bad. The majority will decide that the work is good if it has cost a sufficiently large amount of money to impress them with its costliness, or if the work is sufficiently large to impress them with its size. A small, plain building of faultless design will be passed unnoticed by those who will go into ecstasies of delight over a building impressive by its size and costliness of material, and yet devoid of the slightest artistic feeling, in fact, a building the embodiment of all that is vulgar and hideous to the cultivated mind. If the public are to be educated up to a love of true art, it should be done by men who have received a thorough training, and whose very nature has become imbued with love of the artistic. We cannot have an artistic people if the men to whom they look as teachers are themselves ignorant and uncultured. The architect of the future must have as liberal an education for a foundation to commence the work of his life upon as the member of any other profession. He is to follow a profession which is the equal of any, and requires the highest culture obtainable of its members if they are to be truly successful.

How can this higher education of architects be brought about? It may be assisted by judicious judgment on the part of architects now practising in the selection of pupils. If an architect discovers that the pupil who has offered himself is deficient in education, he should be rejected. He should also be rejected if he is intending to enter the architectural profession in much the same manner as he might enter another pursuit, and without any natural ability or partiality for it, more than of earning a living in a decent sort of way. The young man who chooses architecture believing he will not require to work hard, will be very much disappointed, for there is no profession which requires so much patient study and hard work from its members. By careful attention to the selection of proper pupils on the part of those who are now architects, the architects of the future may become a much superior body of men, taken as a body, to those now practising.

THE ARCHITECTURAL GUILD.

THE Architectural Guild held its usual monthly dinner on Thursday evening, April 12th. After dinner the members adjourned to the public library, where a very pleasant evening was spent looking over the many valuable architectural works. Mr. Bain, with his usual thoughtfulness and desire to bring before the public the benefits of such an institution, had made careful preparations for the entertainment of his visitors. The principal attraction was the work on the Basilica of St. Mark's at Venice. It consists of several large portfolios of large colored plates and twelve volumes of smaller plates. The Toronto Public Library is to be congratulated on the acquisition of this most valuable work. We understand that duty had to be paid on it, which seems to us a most short-sighted policy on the part of the Federal Government. While the Governments of other countries value art and technical education so highly that they tax the people that they may be able to give them this education, our Government tax our people to prevent them acquiring it. To our way of thinking it is most disgraceful that there should be levied on works of art, or in fact, on anything which will tend to educate our people, a direct tax which can be of no earthly service, except to increase the revenue of the country, but which does most seriously interfere with its advancement along lines which are of the greatest importance to our people. We must believe that duty has been placed on works of art, etc., through a lack of knowledge of the consequences. It could never have been imposed with the hope that by placing duty on the Basilica of St. Mark's they might be manufactured by some of our enterprising manufacturers of sewing, reaping or mowing machines. We hope to learn that this duty has been removed from all works which will educate our people to a higher appreciation of art. The members of the Guild were surprised beyond measure at the number and value of the works on architectural and kindred subjects. Mr. Bain must have worked most energetically, and have been loyally supported by the Library Board, to have been able to acquire so many rare and valuable works on art. We will not at the present time attempt to give a list of those works, but

hope to be able before long to do so, along with a short description of the subjects on which they treat. It was nearly eleven o'clock when the last of the visitors departed well satisfied with the pleasure and profit of the evening. Many of the members of the Guild signified their intention to avail themselves of the opportunities which the library has placed within their reach for study.

OUR ILLUSTRATIONS.

GATE LODGES AT "GLEN EDITH."

THIS double lodge was erected in 1884 for S. Nordheimer, Esq., at the Davenport Road entrance to his beautiful grounds. The perspective sketches show the north and south views towards the grounds and road respectively. The driveway passes through between the two houses with the gate itself (which is a simple wrought iron one), in the middle under cover. Each lodge provides accommodation for one of the married men servants and his family. The room over the gateway is accessible from both houses, and can be allotted to one or the other as occasion may require. The ground storey walls are of white brick on a stone foundation, and the upper storey is half timbered and plastered. The roof is shingled. White brick was preferred to red in order to harmonize with the mansion itself. The total cost was under \$3,100. The architect was Mr. David B. Dick.

VILLA DESIGN.

The villa shown on another page was designed by Edward A. Kent, Architect, and has been erected on the lake shore near Bay View, Buffalo, N. Y., for Mr. Carleton Sprague. The house is 34 by 72 feet in dimensions, has two stories and basement, and contains seventeen rooms. The outer material of the wall is shingle, which has been stained to give the house an ancient appearance. A great hall, 20 by 30 feet in size, is a noble feature of the interior, which, indeed, in every respect, is what a country house should be. The total cost was \$3,500.

REREDOS ST. PETER'S CHURCH, COBOURG, ONT.—
LECTERN TRINITY COLLEGE CHAPEL, PORT HOPE, ONT.—DARLING & CURRY, ARCHITECTS.

DESIGN FOR CITY SCHOOL HOUSE.

A movement is on foot among the architects in the United States to increase architects fees from 5 to 7 per cent. on residence work.

On the evening of Tuesday, the 24th inst, a paper will be read before the Toronto Architectural Draughtsmen's Association on "Construction of Roofs."

The new Roman Catholic church at Belleville, Ont., which will be dedicated during the summer, will be a magnificent building when completed. It is built of limestone, the walls being supported by massive red granite pillars, with richly carved sandstone caps.

The Archaeological Committee of the Historical and Scientific Society have requested the Winnipeg City Council to take steps to preserve the old stone gateway which is the sole remnant of Fort Garry. The City Council has promised to deal with the matter at an early day.

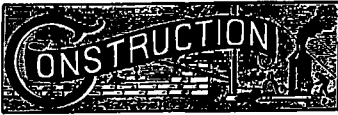
We have received from the publisher, architect Frank S. Smith, 22 School St., Boston, an interesting book entitled "Homes of To-day, or Modern Examples of Moderate Cost Houses." The work is illustrated with designs of buildings, accompanied by a list of materials to be used in their construction and estimates of cost.

THE CALCULATION OF BRICK-WORK.

ORDINARY bricks are about 8 inches in length, and with the mortar joint, about half that in width. So that each brick on the flat will give a horizontal surface of about 32 square inches, or 4 1/2 bricks will cover a square foot. All ordinary laid, says the *Engineering and Building Record*, there are 20 courses to every 24 inches, or 4 1/2 to the foot. Four and a half courses with 4 1/2 bricks to the course gives 20 1/2 bricks to the cubic foot. Waste, cutting, and closer joints will easily require an allowance of 12 bricks per cubic foot, which will be found a very convenient figure for estimating the number of bricks required for a wall of a given size and thickness, as it thus becomes unnecessary to find the cubic contents of the wall, but merely to multiply its face area or the product of its length and height in feet by seven-fourths of its thickness in inches, which, as the thickness is always some multiple of four inches, is a very simple process.

For instance a 20-inch wall 40 feet long by 30 feet high has a face area of 1,200 square feet, and as it is 5 times 4 inches in thickness it will require 5 times 7, or 35 bricks per square foot of face, 42,000 bricks altogether.

Messrs. Rhodes, Cory & Co., Amherst, N. S., are filling an order for Newfoundland for cherry and ash doors, and one from London, Eng., for a lot of mahogany doors.



Architects, Engineers, Builders, Contractors and others are invited to contribute to this department of their experience regarding methods of construction. All particulars—such as location, character, cost, name of owner, etc.—of any works of construction in progress.

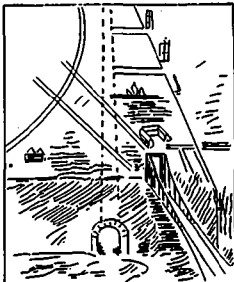
NIAGARA RIVER POWER.

ALL lovers of the sublime and beautiful in nature have rejoiced that the State of New York at last took control of Niagara Falls, laid out a reservation including and preserving the adjacent beauty, and to some extent regulating the cost of a visit to the great waterfall. At the same time, all who have seriously thought of the immense water-power there literally "running to waste" have had their utilitarian instincts grieved by the confident statement that there was no way to utilize the force without marring the beauty. How to make Niagara useful without making it less beautiful has been the question; and it is now confidently announced that the problem is solved.

Niagara, say the engineers can be made to yield 119,000 horse power and not a foot of the reservation be encroached upon any building erected near the falls. Mr. Thomas Evershed, Division Engineer of the New York State Canals, has presented the perfect plan and estimates; Mr. Elmanth Sweet, New York State Engineer and Surveyor, has cordially approved them, and a company has been formed to carry them into execution. This company proposes to furnish 500 horse power each to 238 mills, which shall be located from one mile to two and a half miles up the river from the falls in no way interfering with the view, yet easily accessible by the river and railroad, and all this they propose to accomplish by one great tunnel underneath the town and side tunnels from the river, each with its wheel pit for turbine water-wheels—the whole series drawing through the main tunnel to the level of the river below the falls. Thus they will secure, at a cost of \$3,000,000 or less, a power exceeding the combined water power of Holyoke, Lowell, Minneapolis, Cohoes, Lewiston, and Lawrence and unlike theirs, subject to no vicissitudes of drouth or danger of overflow or destruction of dams, but from sources exhaustless as the great lakes and in tunnels as enduring as the solid rock.

The conception is sublime. The complete work would seem to undo any of the wonders of the ancient world. It exalts one's views of the dignity of the human intellect. Yet the plan is so simple that the most ignorant can comprehend it.

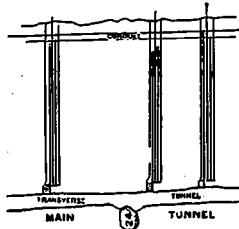
The conditions are these: From the head of the rapids to the cataracts the fall is sixty-five feet, height of cataract 165 feet, total fall 230 feet. The average flow



of the river is 275,000 cubic feet per second; j total water power, therefore, 7,000,000 horse power, from which the company proposes to take only 190,000 horse power. At the foot of the falls the river turns almost square to the right; thus a straight line from the rapids to the edge of the water just below them is the hypotenuse of a right-angled triangle. The tunnel, therefore, is to begin at a point just above high water level, but 200 feet below the top of the bluff, below the falls; thence it is to run at an up-grade of one foot in 100 through the solid

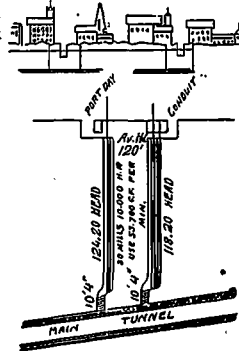
rock to a point a mile above the falls; thence it is to continue one and a half miles parallel with the river, 400 feet distant from it and 100 feet below it, and to be connected with it by lateral tunnels. Of these each is to have its wheel-pit for turbine water-wheel, and the slope of the lateral tunnel or conduit such as to secure a rapid discharge of the water. The main tunnel is to be twenty-four feet in diameter, amply sufficient to discharge all water the side tunnels may pour into it; and these with heads ranging from twenty-four to eighty feet, for turbine wheels of the latest pattern, will amply secure the promised 119,000 horse power, or, 500 horse power each for the 238 factories, for which sites can be provided in the space secured.

It is proposed to lay out the mill sites of sizes from 75x200 to 200x400 feet; to leave ample space between



for railroad tracks to the main line and for streets; to build wharves and secure landings for lake and canal vessels, and secure ample rail connections with the railroads centering at the falls. And finally the company propose a charge of but \$10 per year for each horse power of water supplied—less than a third of the average cost at other places—yet when all the sites are utilized the income will be 40 per cent. on the total cost. These are the immediate returns looked for; but beyond lie vast possibilities of storing and transporting the power by electricity to neighboring cities.

Considering the fact that the available water power of the country is diminishing as the forests are cleared, and that in many manufacturing centers summer drouth and winter floods are serious menaces, one can but wonder that the exhaustless power of Niagara has not already been utilized. Manufacturers would hardly ask us to credit them with sentimental reasons for withholding their hands. No doubt the principle obstacle has been the enormous initial cost of making the improvements, as it presented itself to most who examined the subject. No one company could probably utilize such a power; and it was not easy to form a sufficient combination of companies. The fact that Niagara is on the Canada frontier had something to do with it no doubt; and still more, that it was on the western frontier when the factories of New England and Eastern New York were established. Some small raceways were made several years ago, involving not 1,000 horse power in all; but they all come within the fixed bounds of the park reserved by the state, and are, of course, discontinued. In



1855 the hydraulic canal was begun, outside the limits of the reservation—that is, across the peninsula on which the village of Niagara Falls is built, and after a long dispute it was reopened in 1878, and now supplies power to a few manufacturers. Since July 4, 1879, a Brush dynamo, supplied with power by the rapids, has been run in Prospect Park for the illumination of the falls and grounds, and other small uses have been made of the power. But all appear trifling compared with the plan proposed by the new company.

Another scheme for the utilization of Niagara's power has been set on foot by certain gentlemen of Lockport,

N. Y. Their purpose is to supply water for the city of Tonawanda and vicinity, for manufacturing and other purposes, by taking it from the Niagara river at Tonawanda, or some point between Tonawanda and Niagara Falls, and discharging the current into Lake Ontario near the village of Olcott. The watchwords of this organization are, taking. They are: Lake Erie, the mill-pond, Niagara river, the head-race. Lake Ontario the tail-race. No floods. No drouths. No broken dams. No idle mills.

The land at Tonawanda is but little higher than the river. From there northward is a gradual rise for about ten miles to a ridge running in an east and west direction, Lockport being situated on the ridge, whose crest there is lower than farther west, and is cut by two ravines or depressions. The work will be all cutting, and little or no embankment will be required. From Lockport to the mouth of Eighteen Mile Creek the country falls and the distance is comparatively trifling.

The Niagara river has a fall of 333 feet. It is proposed to run a canal from a point opposite Grand Island, near Tonawanda, where the current is not rapid, to Lockport, discharging the water which shall pass through it into Eighteen Mile Creek, which empties into Lake Ontario and will form a conduit for about one-third of the distance. The utilization of the power is first practicable at Lockport. Between Lockport and the lake twenty dams are practicable, at each of which the full power of the water of the canal with a considerable head can be effective. Of course the size of the canal and the fall obtained will determine the amount of power that can be made available. It is claimed that 363,636 horse power can be obtained at Lockport, where a 220 feet fall can be had if the canal be twenty feet deep and 200 feet wide.—Chicago Tribune.

MONTREAL TECHNICAL SCHOOLS.

By D. J. CAMERON.

TO all who feel interested in the material progress and national advancement of our own country it is satisfactory to know that the Council of Arts and Manufacturers of the Province of Quebec, is making steady forward steps in the direction of industrial education. The establishment of free evening drawing classes in the Province of Quebec for instruction of practical nature schools whilst in session, promptly dispels the notion which many people entertain, that drawing is a merely ornamental study, for there is no mechanical industry requiring construction which does not to some extent employ the principle of drawing, and in these evening classes which are conducted by competent practical teachers, the pupils are not only instructed in the principles and methods of construction, but are required to develop their conclusions in a practical manner with their own hands. The stair builder, after having made his plans, proceeds to lay off his material, and develops his reasoning faculties by erecting from his own plans the actual stairs.

THE SCHOOLS.

There are eleven distinct classes in the Montreal evening school, each class meeting twice a week from 7.30 to 9.30 p.m. By kind permission of Mr. S. C. Stevenson, the Secretary of the Council of Arts, the writer was permitted to inspect each class at work.

The first class visited was the

FREEHAND DRAWING (ELEMENTARY)

conducted by Mr. Frank S. Cleverly, assisted by Mr. E. Dregent. This class has an average attendance of 98 pupils, two-thirds having daily employment as engineers, architects' pupils, carpenters, engine fitters, mechanical draughtsmen, etc., and the remainder are attending day school. The method of construction pursued in this class is similar to that recommended by the South Kensington School of Art. Junior pupils having no idea of drawing, are first given two points on their drawing paper, between which points they are taught to make a straight line. When this task—to the beginner a difficult one—is mastered, they are taught to draw a gate, a box or some other simple subject. From straight to curved lines is the next step, and the pupil is given some outline object, such as ten cap and screw, to work upon, and by graduated studies he is trained to a proper knowledge of form and proportion, and in this manner is prepared for the higher classes. The pupils being in all stages of advancement, a hard task is imposed upon the two teachers to give proper attention to each of the ninety-eight. This class should be divided, and one formed for boys attending school, and the other for young men in mechanical pursuits or offices during the day.

FREEHAND DRAWING (ADVANCED.)

This class is conducted by Mr. A. Boisseau, A. R. C. A. It is intended for pupils more advanced than those attending the former class, being more comprehensive. It includes applied designs and drawing from the human figure or ornament. The majority of the pupils are engaged in industrial pursuits.

MECHANICAL DRAWING.

The teachers in this department are Mr. J. S. Gardham and Mr. S. C. Wilkinson. The instruction is of a very practical nature and is designed chiefly for mechanics. The ages of the members range from 14 to 35, and the occupations represented are: mechanics, 44; pattern makers, 8; moulders, 3; brass finishers, 2; plumbers, 2; insulators, 2; engineers, 1; clerks, 1; students, 3. The fact of these pupils working for the most part, ten hours during the day and coming from all parts of the city to devote two hours to study, shows an ardent desire for advancement. Having provided themselves with necessary tools and materials, the pupils are first instructed in their proper use, and then proceed to do

copy work of the simplest nature both in pencil and ink. Having become a lay copyist, the pupil is given a sketch of some detailed piece of machinery, with dimensions, or a wooden model. The different views of the piece represented he is required to "lay down to scale and finish up" according to workshop practice.

ARCHITECTURAL DRAWING.

This class is under the direction of Mr. J. E. Vanier, C.E., and Mr. E. Belanger, and is intended for carpenters, builders and cabinet makers. The instruction consists of exercises in plane geometry and projection, and the pupils are also instructed in the details of framing plans and elevations of buildings and of working drawings. The majority of pupils are engaged as carpenters, cabinet makers and ironmiths, and as the use of the compass and architectural decoration is of late extending so largely into building and construction, the opportunity for knowledge in this direction is duly appreciated.

MODELLING AND WOOD CARVING.

This class was formed for the instruction of marble and stone cutters, wood carvers, and for all those occupations require a knowledge of the chisel. The necessary tools are provided free, and although the number of pupils in attendance is not large, the work that they have completed bears evidence of their industry and application. Plaster casts are chiefly used as models, the pupils commencing with simple forms and proceeding by degrees to more difficult subjects. The benches and lights are very conveniently arranged, and every facility is provided for the convenience of those at work.

LITHOGRAPHIC CLASS.

The object of this class is to afford apprentices and workmen engaged in lithographic establishments an opportunity to study and practice work, which they are not enabled to do in the places where they are regularly employed. The course of construction commences with the preparation of the lithographic stone, and proceeds by regular steps until the pupil is able to finish a drawing on the stone with pen, pencil or brush, ready for the press, thus gaining a knowledge of the whole process from the "graining" of the stone to the production of finished copies from the press. This class is attended by 18 pupils, who, under the able teaching of Mr. J. Labelle, have produced a number of creditable studies.

PLUMBING CLASS.

This class is open only to plumbers' apprentices and those employed in plumbers' and steam fitting establishments. The workshop is fitted with benches, melting pots, tool chests and all necessary appliances to accommodate thirty-two working pupils. These places are all filled, and there were many applicants who could not be admitted for want of room. The instruction is given under the immediate direction of the Master Plumbers' Association, and consists of a course of practical work on seams, overcast joints, cup joints, traps, horizontal or upright pipe joints and branch joints, wiping on a stop-cock, wiping a flange and wiping on a ferrule. Short lectures or "shop talks" follow each evening's work, on the subjects of "Soil Pipes," "Trapping and Ventilation," "Supply Pipes," "Solders," "Solder and Mixtures," and other subjects of useful knowledge to every plumber. It is most pleasing to notice the close attention of the young workers, who are kept at one subject until they have thoroughly mastered it, and they exhibit with evident pride the results of their study and practice. The progress in this class is highly satisfactory both to the pupils and their masters, and the interest the latter are taking in the class is an example which employers in other industries would do well to follow.

DECORATIVE PAINTING.

This class is taught by Mr. F. E. Macdoe. Pupils before entering must have a good knowledge of drawing. The object of this class is to assist those who wish to have a thorough knowledge of decorative painting according to the rules of art.

PLASTER WORK AND SCAGLIOLA.

Mr. R. Rogers is the teacher of the above subjects. This most interesting class was instituted for the purpose of teaching plasterers, house decorators and others, the higher grades of plaster cornice work, casing, ornaments, etc., and for the instruction of pupils in the art of making scagliola. Scagliola is a species of coloured plaster or stucco made in imitation of marble, the manufacture of which is not commonly known in Canada. Scagliola is quite equal to marble for interior decoration, and is produced at a fraction of the cost of the latter.

The last class organized, but by no means the least in importance, is the

PATTERN MAKING CLASS FOR BOOT AND SHOE MAKERS,

under the direction of Mr. Joseph Godin. The course of lessons is intended for shoemakers generally, and particularly for those who wish to have instruction in the study and practice of pattern cutting as applied to the manufacture of boots and shoes. The studies are of a very practical character, the pupils first making, reducing and enlarging patterns of all kinds, and afterwards fitting them to the cast.

CANADIAN SOCIETY CIVIL ENGINEERS.

A PAPER on two bridges over the River Ottawa at Vaudeville and St. Anne's Locks was read at the meeting on the 9th inst, by Mr. C. E. Dowdell. At the meeting on the 16th inst, a paper on "Cedar Block Carriage Ways" will be read by Mr. Alan Macdougall.

The contractors of S. Thomas, Ont., have granted the request of the Carpenters and Joiners Union, that nine hours be considered a day's work on Saturday, and that the men be given the last hour of that day.

The Toronto Master Plasterers' Association has elected the following officers: President, B. Lockwood; treasurer, John Boyce; financial secretary, J. W. Kennedy; secretary, John Knox; delegates to the Toronto Builders' and Contractors' Association, F. B. Lockwood, R. Dancy, J. W. Hynes, J. W. Kennedy and George Redden.

APPRENTICESHIP.

At the recent convention of the National Association of Cincinnati, a special committee appointed (in consideration of Builders of the United States held recently at the question of apprenticeship presented the following valuable report:

Your committee, in whose charge was left that important question known as the apprenticeship system, have thoroughly reviewed past methods in their relation to past conditions; have visited manual training schools existing as adjuncts to school of technology, or as departments of the public school system; have inspected the so-called mechanical trade schools, established and maintained in the city of New York by the philanthropy and liberality of Col. Richard T. Auchmuty; have had the privilege of a lengthy interview with the generous founder, and make the following report:

We find that the old system of apprenticeship, under which the boy who wished to learn a trade was "indentured," or "bound out" to an employer for a term of years, has been gradually falling into disuse from natural causes, until scarcely a vestige of it remains.

In our opinion there is no encouragement for a revival of this old system, for the following reasons: Fifty, and perhaps even twenty-five years ago, the employer in the building trades worked with his own hands, and being continually present, could give proper instruction to the apprentice. He knew the boy from the cradle, and he could see that the apprentice had an oversight of his habits, and could control his general conduct to the end that a good mechanic should be the result.

The situation to-day is widely different. Employers seldom work with their hands, or even make tools, and the result is that the volume of business, and because new and quicker methods of work have become so desirable and necessary that the time of the employer is fully occupied in attending to business details and in general direction, he cannot devote time or several weeks into the hands or remains long enough upon actual work to instruct in that practical way which was possible formerly.

The apprentice is therefore, largely in the charge of the workman or Foreman or other employees give such general instruction as may result from their good nature, or sense of duty to the boy or to their employer.

It is a fact which cannot be disputed that there is at present no such thing as regular or systematic teaching, the apprentice is left to "pick up" his trade instead of having it taught to him.

We are strongly of the opinion that the tendency of modern methods of conducting work will always be away from those general conditions which made possible the "old apprenticeship system;" and this opinion, together with the fact that under broader opportunities for education there is, undoubtedly, a much higher grade of intelligence to-day than in the past, and the fact also that trades are subdivided much more than formerly, so that greater proficiency is required in the various branches, leads us to the conclusion that apprentices must be taught and mechanics trained in the future, by entirely different methods from those in vogue under the system referred to.

These new methods may be briefly described as a combination of schooling pure and simple, and practice pure and simple; or, in other words, of a course of study under regular instructors (the school part to be paid for the same as any technical course is paid for in other professions) and a course of practice, under employers, on natural work, which practice or service shall receive appropriate wages.

These two courses will form a comprehensive and complete system, which, when fully understood and thoroughly operated, will produce a better class of mechanics than the present no-system, or the past lap-lizard system, and will leave as little to chance as possible.

The first step will be the establishment of mechanical trade schools, whose definite purpose shall be to give preparatory instruction in the sciences or technique of industry to young men who intend to follow mechanical pursuits for a livelihood, this preparation to be supplemented and followed, and the education completed by a term of service on practical work under actual employers, which term shall be shorter duration than upon an account of need by virtue of the preparatory course in the trade school.

While we admit that "Elementary Manual Instruction" as already introduced to some extent in the public schools, is valuable to the ordinary scholar (inasmuch as it may cultivate a certain amount of manual dexterity and create a taste for mechanical pursuits), we are still strongly of the opinion that for the practical training of young men who intend to be mechanics, special instruction must be had in mechanical trade schools as an introductory course between the public school and that actual work with the employer where his education will be completed and from which he may graduate as a journeyman.

We believe that these practical mechanical trade schools should not be a part of the public school system, but should be established and maintained by private enterprise.

We also believe that these schools should not be established or maintained exclusively by any distinct association of builders, but are emphatically of the opinion that such associations should cooperate with them, and undertake such cooperative measures as to insure their success as the first stage in the education of the mechanic, as well as to establish the fact that builders recognize the school as part and parcel of the new system.

The legitimate and proper method of cooperation in this system, so far as associations of builders is concerned, should be by encouraging private enterprise to establish these schools; offering to assist pecuniarily until they become self-supporting; agreeing to give preference to employers who graduate from the schools; joining in the management by appointing committees to approve methods, and examine students in establishing their proficiency, which shall entitle them to certificates of graduation.

We are convinced that there is abundance of capital that will quite be invested in enterprises of this kind as soon as satisfactory conditions of builders demonstrate a belief in their practical value by lending aid in the way suggested.

We recommend that the National Association of Builders approve of the following details of method to take the place of the old apprenticeship system and secure its approval and adoption by all similar associations as rapidly as possible, to the end that mechanics may be taught upon our own soil and American boys given the best opportunity possible to become proficient in the building trade.

Method approved by the National Association of Builders to establish the right of any person to be known as a regular journeyman in the building trade.

1. The serving of a regular course of instruction in a mechanical trade school and graduation therefrom with a certificate of proficiency granted by the same, under rules and regulations approved by a committee of master mechanics, who may unite in the management of the said school.

2. Service for a term of practice with an employer on actual work, this term to be at least one year less than the usual term of apprenticeship by virtue of the holding of a certificate of proficiency granted by a mechanical trade school. During the term of service the young man shall be known as a "journeyman."

3. The completion of the education of the mechanic to be acknowledged on the part of the employer by the issuance of a certificate from the association of builders to which the employer may belong, which shall state that the holder has passed through the prescribed course at the trade school, and the term of practice with an employer (name and location given) with satisfaction and credit, and is entitled to be received by all builders as a journeyman.

LONDON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.) THE contractors for the new medical school have been let as follows:—Carpentry, J. C. Dodd & Son; brick work, Jas. Luney; painting, A. Corp.

The contract for stands and fencing for the base ball grounds has been awarded to Messrs. Fawcible & Jones. The architects held out for some time against signing the revised contract conditions, but finally yielded.

James Johnston, brick merchant, is building a double house to cost \$25,000. Wm. Thornton is going to build a double house to cost about \$3,500.

Plans are prepared for a sanitarium to be built at the foot of Dundas Street three stories and basement with large swimming pool attached, the probable cost of which will be \$25,000 or \$30,000.

MONTEAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.) NOW that the last of the frost is disappearing, the building boom is getting well under way. The winter coverings are being removed from the foundations of the New York Life building, and the derricks are placed ready for work.

Messrs. William Davis & Son have completed the derrick station for the new C. P. R. Depot, and the bricklayers are already at work. Fifty stone cutters are engaged preparing the way for the masons, who commence work on the 12th. The brick work of the G. T. R. depot is completed, and the handsome roof is nearly finished.

The large stone building recently completed by Gustave Fabre, which was destroyed by fire, will be replaced by two fine stores at a cost of \$25,000.

The Imperial Fire Insurance Co. have let the contract for their building—Mason work, Peter Lyal; carpenter work, Simpson & Peel; iron work, H. R. Ives; steam heating and plumbing, R. Mitchell & Co.

OTTAWA.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THERE is an unusually large amount of building to be done in Ottawa this year, and already operations have been commenced on many buildings of importance. It is expected that the departmental buildings on Wellington street, will be completed this year, and the new printing bureau for the Government has been commenced and will be pushed forward rapidly. The Bank Note Co.'s building has been contracted for during the winter months, but the under haste is likely to delay matters, as two of the walls have shown signs of weakness, and have tilted to themselves somewhat grotesque shapes. Tenders have already been taken for a number of residences, three school buildings, a large stock of stores, and a few alterations to existing buildings. The builders are at work with the Y. M. C. A. block, and architects and builders are looking forward to a brisk summer. A considerable amount of interest has been taken in the decision of the City Council to appoint a Building Inspector. It is generally felt that the appointment of such an officer is absolutely necessary.

A WORD OF ENCOURAGEMENT.

EDITOR CANADIAN ARCHITECT AND BUILDER.

SIR,—You have made such a noble start as a pioneer in the path of Canadian architectural journalism, that with this third and best number before me, as one of the profession, I feel that I cannot do less than offer you a word of praise and encouragement until enabled to give you some more substantial assistance.

I am especially pleased that the extracts from Mr. Simpson's paper have been given a wider circulation than by its first reading, and trust that not only draughtsmen but mechanics generally have become subscribers and benefited accordingly.

I will add to Mr. Simpson's hints that as well as furring beams, &c., the studding at stairs and other openings in floors should be continuous from storey to storey with no joists or other horizontal timbers between to shrink and settle, and wherever possible partitions should stand on beams, walls or partition heads below joists rather than on top of joists and floors.

In studding also the internal angles should be returned solid, allowing no lath to run behind and through to other rooms. This can be done by a strip of inch board or the strapping at brick walls, and will prevent a crack in plaster.

For the height of handmoulding I would suggest say a foot to six, perpendicular above centre of step and on landing, as more constant than measuring from nosing.

To avoid warping, which is so great a disadvantage in oak door sills, window sills, steps, saddle boards, casings, etc., the heart side of the board or plank should be dressed or exposed. This is not by any means known or understood, and the sap side is generally dressed because more free from knots, &c.

I am sorry to believe that less interest is taken in these and other self-improving studies by mechanics than formerly, and would earnestly recommend such methods of getting higher pay as far preferable to those apparently now taught by the unions.

The present employers have been workmen themselves, and now by care and industry, occupy improved positions which strikes and boycotts would never have given them.

With sincere wishes for the success of your undertaking, I am, yours,

M. D. AYLSWORTH.

The Canadian Government is contemplating the construction of a pier, fog alarm and lighthouse in the River St. Lawrence at Lower Traverse. The cost of the proposed work will be 3100,000.

Mr. Manson Campbell, Chatham, Ont., has let the contract for his new residence as follows:—Contractors, G. McKee, for the wood-work; Jas. Oldershaw, masonry; Judson, painting; Watt & Son, plumbing. The cost will be about \$5,000.

MECHANICS AND APPRENTICES.

THE use of machinery for every purpose which it can be made available seems to have resulted in the lowering of the standard of workmanship among mechanics. When nearly all work was done by hand mechanics were most efficient men, careful to do their work properly, and taking a deep interest in its being kept in perfect condition. They learned their trade thoroughly and were too proud of their skill to slight their work. They were many incompetent and inefficient men, no doubt, but they found their level, and if not capable of doing good work, were given what did not require any high degree of skill. The great majority of the men were first-class workmen, and it was possible to get a man to finish a piece of work as it should be done without having to closely supervise its construction. These men were the result of an apprenticeship system which made a man a good mechanic if he had the natural qualifications. He was instructed in all the elementary principles of his trade, and was not allowed to attempt work requiring great skill until he had mastered what was less difficult. It may have been a hard system, but it was a thorough one, and produced mechanics worthy of the name—mechanics that we would be only too thankful to have at the present time.

There are many good workmen among our mechanics, but it is astonishing how few there are who can do first-class work. If there is anything to be made requiring average skill, it can only be entrusted to certain men, and if they are employed on other work it must wait until they are disengaged. We have become a race of specialists, so that even mechanics are proficient in but one or two branches of their trade. We have men who work only in hard wood, and those who work only in pine. There are those who are shop hands, and those who do the rough work about buildings. Many bricklayers are always employed on face work, others never lay a brick except in rough or inside walls. Employers of labor have found it necessary to keep certain men at one class of work, for if given work they were not accustomed to, they could not do their share. It is not possible for every man to be a first-class all round mechanic, but there is no reason why he should not be able to do any work in his trade in a reasonably good manner. There are men to-day who claim to be carpenters who cannot saw the end of a board true and square; bricklayers who cannot lay a brick level and true to the line, and stone-masons who have no conception of how a shaft should be laid in a wall. All these men claim to be good mechanics, and yet not one of them can do a decent piece of work, and all alike have great contempt for theory, and will affirm over and over that books are worthless, and that what they call practical knowledge is sufficient, in fact, much better, if not adulterated with a theoretical training. They would be nearer right if they were but fine representatives of what a thorough practical training can do for an intelligent man. What most astonishes an onlooker in the ordinary mechanic, is his entire indifference to becoming a first-class workman. If he receives journeyman's wages he is satisfied, and apparently better pleased working at what requires little skill and less brain, than to be employed on that which requires both to a large extent.

Once he becomes what is now called a journeyman and can earn the wages of an average mechanic, all necessity for improvement vanishes. He has gained his goal, and is satisfied, although he may often be inferior in every respect to the kind of his lack of skill and general incompetency. It is exceedingly refreshing to meet a man who is enthusiastic over his work; in him you will find a good mechanic. Why have we so few enthusiastic and consequently first-class workmen? Is it that the good workman does not meet with the reward that he deserves, and discovering that he is not appreciated, determines on being no better than the most indifferent man in his trade? He certainly has just cause of complaint that many employers of labor would rather pay low wages to indifferent men who spoil more work than the difference in wages amounts to twice over, than pay capable men good wages. The general public are also much too desirous of paying the lowest wages to a man irrespective of his capabilities. They want good work, but only at the price of bad, and consequently do not get what they profess to want, nor even value for their money. But there is another and possibly a greater influence which checks the ambitions of the young mechanic, and that is the tendency of trade unions to insist on all men, good and bad, being paid the same wages. It is true that they allow the employer to pay higher wages if he so chooses, but as he does not so choose and could not if he would, the capable man suffers, and before long has become as indifferent a mechanic as his natural ambition will allow. That some employers do not make any great difference in the wages paid their men, is the fault of the men themselves. If a workman is working more rapidly than his fellows he is very soon informed that it will not do. He is cutting out a pace which they cannot follow, and therefore he must work at a slower speed to suit the slowest man. An employer cannot be expected to pay higher wages to a man who can earn more than he is receiving, but who is not allowed to do so by his companions. What thinks does an employer get for increasing the wages of a first-class man beyond those of the average mechanic? The man is favoured, instead of thanking his employer and his good fortune and keeping the fact to himself, immediately informs some of his friends, or boasts of the fact to others. All the men hear of it, and to a certainty the employer is besieged by almost all his employes for a like increase, and the men who give the most trouble are the most inferior in his employ. His best men will not be one half so ready to demand an increase of wages as the man whose only first-class qualification is his incompetency. Two men may work equally hard for nine hours a day, and yet one may do 30 per cent. more work in the same time. The employer can see the difference, but the slow man cannot be convinced of the fact.

Every man should receive remuneration in proportion to his worth, and that can never be under the present system. Instead of driving a man down to a lower level he should be assisted to a higher. A uniform rate of wages furnishes no inducement to development, and while a man may try for a time to struggle to acquire skill and knowledge, the moment that his wages will soon be raised in the race and become indifferent. If the trade unions would only turn themselves to the work that lies before them and strive intelligently to improve the position of the workman by re-

couaging him to become a thorough and capable mechanic and refuse to class among their number the careless, ignorant and lazy, they would do a work which would benefit not only themselves, but the whole community. Instead of preventing young men learning trades, they should afford them every opportunity and take every care to see that they learned the trade of their choice most thoroughly. The sons of mechanics cannot all become professional men; must they therefore become laborers, vagrants or thieves? Who is better entitled to the privilege of learning a trade than the son of the mechanic? And yet, in these days by the order of irresponsible bodies, this privilege and right is most seriously interfered with. We are glad to see that a movement to solve this question of apprenticeship has been made by the National Association of Builders of the United States. The Legislative Committee on apprenticeship made a report, and in the appendix to this paper, at the annual convention held at Cincinnati. The Committee advised that young men desirous of learning a trade should attend a trade school, graduate with a certificate of proficiency, and then serve a term of actual work to obtain manual skill in his trade—the completion of the apprenticeship to be acknowledged by a certificate stating his qualifications, and which is to be received by employers as a voucher of his right to be considered a journeyman.

The above is not by any means a solution of the question, but it is a long step in advance. No great question has been solved in one effort, it has taken long and slow stages to arrive at a final solution. When arrived at the result may seem a very simple one and the method of solution very easy, but yet it may have required the thought and effort of many able and conscientious men for a long period to overcome the many obstacles. It is hoped that now an attempt has been made to solve this most difficult question of apprenticeship, it will receive the thoughtful attention of all interested parties.

PLASTERING.

BY JAMES WRIGHT.

THE following valuable hints formed the substance of an interesting address on the above subject, by Mr. James Wright, of this city, before the Architectural Draughtsmen's Association last month:

LATHS.—Laths should be only one inch wide for ceilings and one and a half inches wide for walls and partitions. The joints should be broken every 12 laths; a larger joint than this is likely to cause a crack in the plaster through the expansion of joist. The laths should be well nailed uniformly three-eighths of an inch apart. Greas are better than dry laths in all cases, but particularly when no artificial heat is used, as there is no expansion; dry laths expand, then contract, generally cutting the key. Laths having the bark adhered to them and black supply laths should always be discarded as they will certainly discolour the work, but as this class of laths is supposed to be only in No. 1 quality, No. 1 should always be used. In exterior work laths should never be employed, as they sometimes are, as a substitute for strapping. The strapping should be at least one inch thick, otherwise the key will be broken through the expansion of the boarding.

SAND.—Architects' specifications usually call for "clean, sharp sand." Sharp sand may not always make the best mortar. On Carlton street and that vicinity, in this city, there is a sharp sand which has not the quality of consuming a proper proportion of lime to make good mortar. It is what plasterers call "too fat." One fifth more of this sand than that of Bloor street could be used with the same quantity of lime. Soft and loam sands will not consume as much lime as the lake sands. Sand that contains small particles of clay should never be used. A good test of sand is to take a handful and work it well in the clean hand, if it leaves a deposit of color on the skin it contains clay or decomposed sand. A mortar has been made in England from crushed bricks and clay, and used with success in large coat factories, where the machinery causes a continual jar. It sets very hard with lime, a hammer having to be used to remove it. Sea sand cannot be used for plastering, as the salt which it contains causes dampness.

HAIR.—Hair should be long and dry, beaten with rods and separated properly, and not in its usual dense, soaked in a barrel and then thrown in the pit. In England the hair is not mixed with the lime until the latter has stood for about three weeks; this is not necessary in this country where the limes slake quickly.

MORTAR.—All reliable firms keep a mortar man, who from his experience is skillful in the art of slaking limes, and on him depends the class of mortar used in a building—provided he is given the best materials. The mode of slaking the lime and mixing the hair and sand is so well known that it need not be repeated.

PLASTERING.—In two coat plastering it is simply impossible to make the angles "straight, plumb and square," as usually called for in the specifications, unless the studding and strapping is plumb and square. Architects should always specify plastering to be done in three coat work to ensure a first-class job—the extra coat is only 3 to 4 cents per yard. A proper key is obtained for the first, or scratch coat, and all expansion or contraction is avoided, as only enough mortar is put on the laths to form a bond for the next coat, or what is called the "brownish" or "straightening" coat. This coat should not be carried up to the ceiling where a cornice is to be run. In the preparation of putty for finishing, great care should be taken in slaking the lime, so that it does not burn or "dry slake." It should be completely covered with water in a box prepared for that purpose. After it is properly slaked it is mixed to a proper consistency, then run through a fine sieve into a pail. All putty should stand at least two weeks before being used. If used before that time it is likely to blister. A blister is caused by the lime not being properly slaked, small particles going through the slaking process after the lime has been used. The scratch coat not being covered to the depth or projection of the cornice, forms a key to retain it; that is, if the cornice is not very heavy. If very heavy, pulls should be drawn in where there are no joints, and where there are no joints the key should be cleared out at intervals, and the gauged mortar pressed into it. Mortar is called gauged when plaster of paris is added to it. In heavy cornices the core is generally composed of brick, mortar and plaster of paris. For first-class work, at least one third of the core

should be plaster of paris. The limes have to be worked in by hand with mixing tools, no mould having been devised as yet that will run the cornice into the angles. The short returns or breaks are generally planted in, having been previously run out on a board. The running of cornices and mouldings of panelled ceiling, arches, &c., requires the judgment and skill of the best plasterers, to whose knowledge of plastering should be added an acquaintance with the mouldings of the various styles and classic orders and some knowledge of practical geometry. In finishing walls which are required to be done in a first-class manner, it is usual to finish one wall at a time, one wall being worked from top to bottom before proceeding with the other. The ordinary way of two coat work is to finish the ceiling and upper part of the walls first, then, after the scaffolding is removed, the lower part is finished. By the latter method it is very difficult to trowel down level the joining of the upper and lower parts of the wall, the upper part becoming hard and dry so quickly.

The material used in finishing walls is a mixture of lime, putty and about one-sixth plaster of paris gauged together. Water applied with a brush is freely used in polishing or "trowelling up," as it is called. After the finish is set and properly trowelled up, it is brushed over with water and finally with the dry brush to give it a fine polish.

ORNAMENTAL PLASTER WORK.—All centres should be put up to the lath—that is the mortar should be removed within a few inches of the circumference of the centre and the key of the lath entirely cleaned out; the centre should be properly secured and soaked in water if dry. Very little lime putty, nearly all plaster of paris, should be used in this work. If these precautions are taken a centre should remain in position as long as the joists. In putting up enrichments a little glue size added to the plaster prevents it from setting too quickly, allows more time for cleaning off the ornaments, and in the end, sets a great deal harder. When the use of wire is necessary for fixing bosses or large centres, copper or galvanized wire should always be used in preference to wire that would become rusted, as a collapse of work of this description might be a serious affair. A great deal of harm has been done this branch of the plastering trade through careless talking down. An architect or inspector should therefore be particularly watchful regarding the security of these ornaments.

PATCHING.—In patching, the loose, broken edge should be removed, the dry plaster edge thoroughly dampened and secured with all plaster of paris, making the edge firm. When this is not done, the old work springs from the new patch, and leaves a crack. A patch in plaster work, if properly done, should be, and can be done so as to leave the wall or ceiling as good as it was originally. This, however, is the exception, not the rule.

Menford, Ont., is providing additional school accommodation. Some of the contracts for the new Orange Hall at Ottawa have been awarded.

The contract for the new Lutheran church at Bridgport, Ont., has been let.

Mr. J. McCann, Windsor, Ont., has prepared plans for a new police station.

The contract for the new Episcopal church at New Hamburg, Ont., has been let.

There will be more building done in Whitby, Ont., this season than for some years past.

The Bowmanville, Ont., School Board has decided to build a twelve room building on the old site.

The contract for the erection of the new Temperance Hall at Sarnia, Ont., has been let to R. S. Oliver.

The school department by-law for the issuing of debentures for building a school house at Brantf was carried by 25 to nil.

Do not construct solid doors of two kinds of hardwood—the action of the atmosphere on one or the other will cause the door to warp.

The new hotel at Peterboro, Ont., erected by Mr. Henry Winch, is almost ready for opening. When completed it will cost \$55,000.

The Hamilton Board of Education have decided that the \$100,000 required for building purposes should be raised by debentures at once.

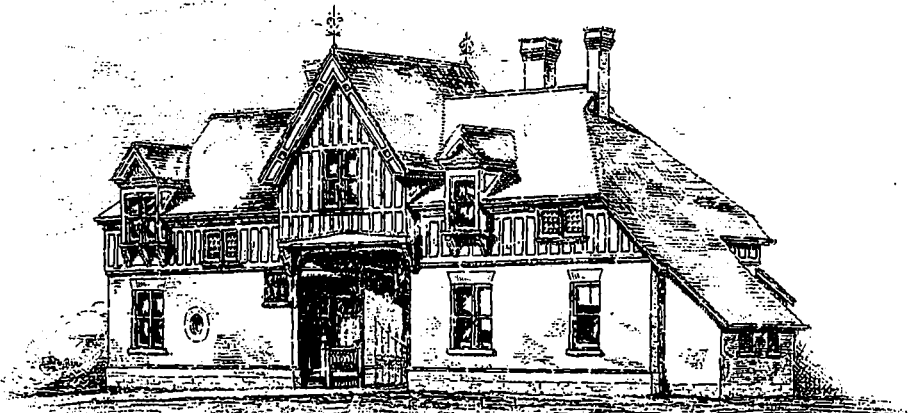
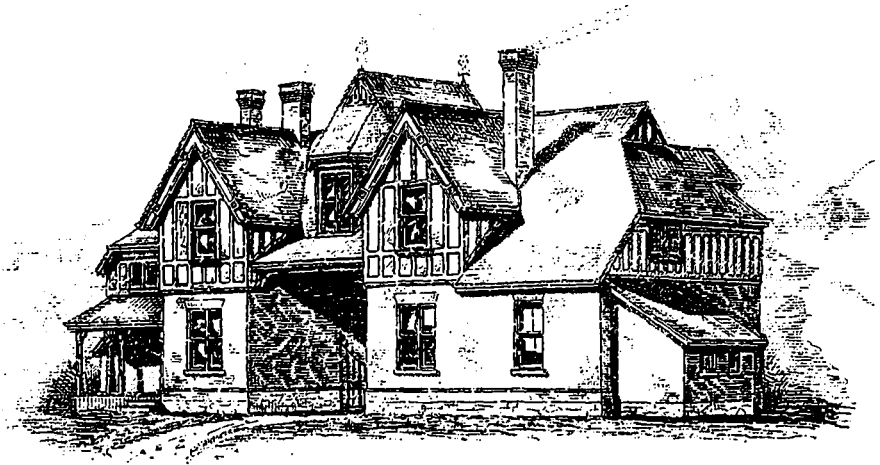
The Canada Southern Railway Company are asking for an Act authorizing the construction of a tunnel for railway purposes under the River St. Clair.

The mason in connection with the First Congregational Church, Kingston, Ont., will be brick two stories high, and heated with water. The cost will be about \$5,000.

The Engineering Society of the School of Practical Science, Toronto, has elected the following officers for the coming year: President, H. E. T. Haastla (reclamation); Vice-President, T. K. Rosebough (reclamation); Secretary-Treasurer, John Eames; Corresponding Secretary, F. X. Mill; Third Year Representative, T. Wickert; Second Year, C. E. Peterson.

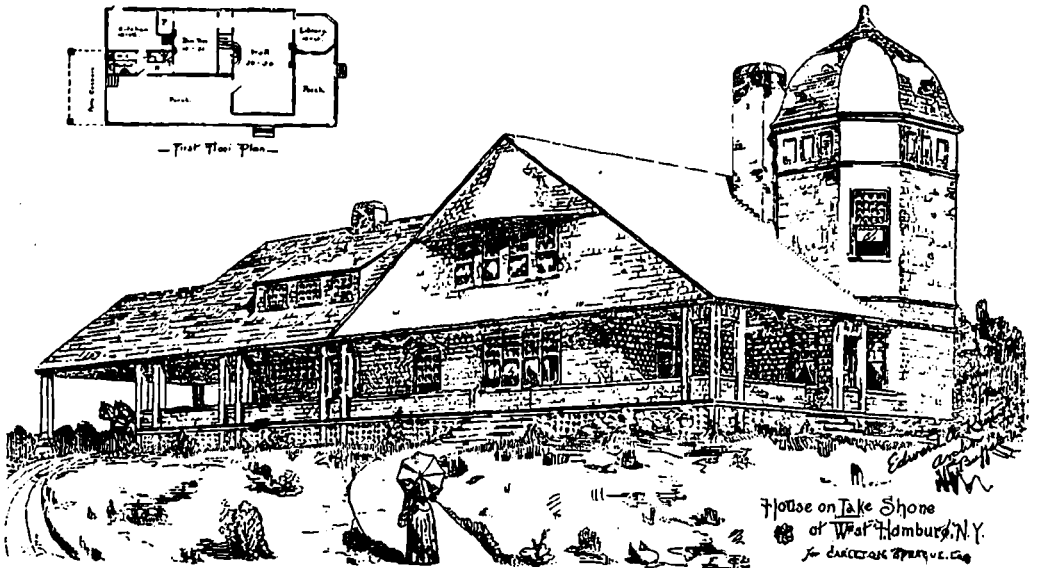
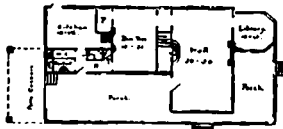
The Building Committee of the new Methodist church at Kirkton, Ont., has accepted the tenders of the following contractors: Evans & Heman, Exeter, for the mason, brick work and plastering; J. J. Dionen, of Lameley, for the carpentering and finishing; G. L. Mynce, of Kirkton, for the painting, glazing and decorating.

As a means of denoting floors General Loyal proposes instead of loading the floors with a sheet of plastering, to fill in the space between the floor-boarding and the plastering of the room below with shavings, which are first to be rendered incombustible by dipping them in a tub of rather thick whitewash. It is well-known that soft substances enclosing air-spaces, form the most efficient denaturing, and shavings treated in this way are so incombustible as to add considerably to the fire-resisting quality of the building in which they are used. In cases where it is desirable to disengage the space between floor and ceiling, the shavings may be saturated with chloride of zinc, or zinc, or zinc chloride may be added to the lime wash.



GATE LODGE OF "GLEN EDYTH," FOR S. NORDHEIMER, Esq., TORONTO.

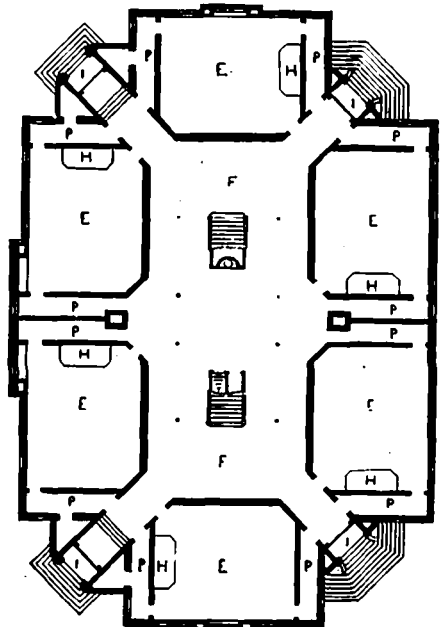
DAVID B. DICK, ARCHITECT, TORONTO.



DESIGN FOR VILLA COSTING \$3,500.



DESIGN FOR CITY SCHOOL HOUSE.



Ground Plan for City School House.



Architects, Engineers, Builders, Owners and others are invited to send particulars of all kinds of construction work, contracts, specifications, for publication in this department. Please state location, character and cost, and names of person or persons controlling the work.

WIARTON, ONT.—A Town Hall will be built this year.

AURORA, ONT.—The Mechanics' Institute will be enlarged.

COLUMBUS, ONT.—The Methodists will erect a new church.

DEARINGTON, ONT.—The G. T. R. will build a new station house.

NORTH BAY, ONT.—Another new hotel is to be erected to cost \$3,000.

WOOLSTOCK, ONT.—\$2,000 will be spent in High School extension.

MOKETOWN, ONT.—A new Methodist church will probably be built here.

MOUNT ALBERT, ONT.—An Episcopal church will be erected this summer.

GEORGETOWN, ONT.—Four acres have been purchased as a site for a new High School.

MILVERTON, ONT.—Mr. Peter Kock will erect a large brick block to cost about \$6,000.

SHELBURNE, ONT.—The Methodists propose erecting a \$5,000 brick church the coming summer.

LISTOWAY, ONT.—The Grand Trunk Railway Co. are being urged to erect a new passenger station here.

ST. GEORGE, ONT.—Mr. R. C. John Dunn, of St. John N. B., is preparing plans for a new school house at this place.

DEKLIK, ONT.—The congregation of St. Paul's Lutheran church will probably put up a new church this summer.

MOOSE JAW, N. W. T.—The School Board are selecting a site for a new school house, which they expect to build this year.

TOWNSHIP, ONT.—The Separate School Board will erect a two-story frame building in St. Marks Parish, the cost not to exceed \$1,000.

BROOKBRIDGE, ONT.—Mr. Crother is preparing plans for a brick church to be erected by the Brookbridge Methodists to cost about \$4,000.

ST. STEPHEN, N. B.—Messrs. Stewart & Co., manufacturers of candy, etc., will erect a new building on the site of their recently destroyed works.

LINDSAY, ONT.—A new post office and cus. tons building will be erected this spring; also a new Collegiate Institute, and a large passenger station.

GALT, ONT.—The Town Council has been requested to submit a by-law to the citizens authorizing the expenditure of \$10,000 for the erection of an hospital.

BRANTFORD, ONT.—Among other buildings to be erected in Brantford this summer are the Courtland works and the new shops of Messrs. Harris, Son & Co.

STRATFORD, ONT.—Mr. Fred W. White, Government Engineer, has been inspecting the drill shaft, and recommends about \$15,000 worth of improvements in the building.

MITCHELL, ONT.—Architect J. R. Kilburn, of Stratford, Ont., is making plans for a palatial residence for Mayor McClay, to be erected the coming summer. It will cost \$10,000 or upwards.

LONDON, ONT.—The Salvation Army will erect a barracks and training school to cost upwards of \$12,000.—The London School Board will ask the City Council for a grant of \$18,000 for school extension.

WINNIPEG, MAN.—The necessity of erecting a maternity hospital is being urged upon the Board of Directors of the Winnipeg General Hospital, and it is probable the work will shortly be undertaken.

CROSS HILL, ONT.—The Presbyterians will build a new brick church.—The Township Council propose making alterations in their hall.—The Episcopalians are going to make alterations in their church.

ST. THOMAS, ONT.—Mr. John Noble has offered a lot to the Mayor as a site for a city hospital, provided the city accept the offer recently made by a wealthy citizen to donate \$10,000 as an endowment fund.

ST. CATHARINES, ONT.—McLoy Bros. propose erecting a new hosiery factory on the site of the old paint mill.—The R. C. church will be extensively enlarged.—Captain Larkin's residence will be enlarged and improved.—An engine house for the Niagara Central railroad will be built, and also a station for the road on Welland Avenue.

KINGSTON, ONT.—The contracts for the remodelling of the First Methodist Church have not been awarded. There is a difference of \$700 in the figures of the tenders.—The congregation of St. James Church, who had decided to expend \$8,000 in enlarging and beautifying their building, have abandoned the scheme, as it was found the improvements would cost between \$9,500 and \$10,000. A committee has been appointed to solicit further subscriptions and there is a prospect of a new church being built to cost between \$12,000 and \$15,000.—The Dudding Committee of St. Andrews church, recently destroyed by fire, expect to secure \$10,000 from the insurance companies, which, with the \$8,000 already promised, is sufficient to guarantee a church to cost \$22,000 or \$30,000. Messrs. Gordon & Hellwell, architects, of Toronto have been consulted about the plans.

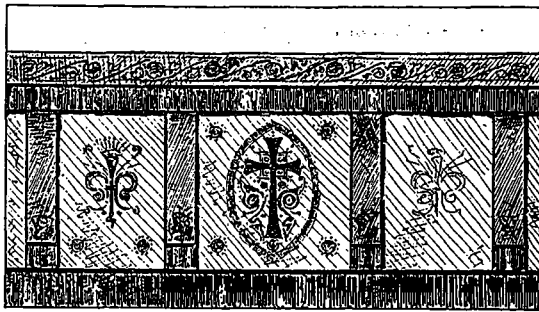


PAINTING.

M. R. R. J. HOVENDEN, of this city delivered a most interesting address on the above subject a fortnight ago before the members of the Architectural Draughtsmen's Association, of this city. A synopsis of his remarks is herewith presented:—

In house painting the priming or first coat of color is the foundation for the subsequent coats of color, and on the quality of the materials used in this priming coat, depends in a great measure the stability of the work when finished. All woodwork specified to be painted, after having been cleaned, dusted, etc., and the knots killed by the usual application of shellac knotting, should be primed with (what you invariably specify, but do not get in most cases) "best white lead" and "linseed oil." In this case, no matter what the shade of the finishing color may be, it is always desirable to use raw linseed oil, using either "patent dryer," "sugar-of-lead" or "litharge" as a dryer. It will be found that the color dries hard, even if a little slow in the winter time, and there is no danger of its cracking, honey-combing or peeling off, or, if used outside, blistering under the sun's rays.

After the priming coat has become thoroughly hard and dry, all nail holes and imperfections in the woodwork are stopped and faced up, and this also should be done with a putty that will harden sufficiently to resist the action of the sand-paper and brush when rubbing



DESIGN FOR ALTAIR CLOTH.

down and painting, and not leave the nail holes looking as though they were only half stopped, which, unfortunately, is too often the appearance presented when the work is finished.

The second and third coats of color should be composed of the same class of materials as the first, with the addition of the requisite quantity of turpentine added to each coat. Wood finished in this manner will wear well, and will not crack, honeycomb or blister, but remain as a monument to the credit of both architect and painter.

I have avoided recommending the use of boiled linseed oil in mixing color or brown Japan as a dryer, from the fact that nineteen out of every twenty barrels of boiled oil is what is known in the trade as "bung hole" boiled oil, viz., so many gallons of raw oil is taken out of a barrel, and a corresponding number of gallons of a cheap liquid dryer is put back in it; and the barrel is then bunged up and rolled around, and you have your boiled oil complete. The average brown japans are very little better as to quality, being made from a very small quantity of cheap varnish gum and a very large quantity of resin, (or North Carolina gum), with a little shellac. The use, therefore, of either, or both, in painting wood work inside or outside is somewhat dangerous, and when used the work is certain to crack, honeycomb and blister. Of such work there are thousands of specimens to be met with in this city to-day.

Another mode of procedure to be avoided, is that of priming woodwork with a color composed of all the odds and ends of a paint shop. It is usually "fat," and will not dry hard, no matter what pains are taken to make it do so, and the result is, in all classes where used, cracks, blisters, &c.

It is always well to give the stairway wall of the several stories a different decorative treatment; also to introduce horizontal lines, as giving greater breadth and stability of appearance.

SELECTION AND APPLICATION OF WALL PAPER.

IT is to be assumed that most persons when selecting a wall paper take into account the mode in which it will be affected by, and that which it will affect, colors of furniture, hangings, carpet and paintings, if these are to be introduced. Most praiseworthy efforts are made by our leading manufacturers, who spend princely sums each year on new patterns, to afford the widest possible range of choice. Nor do the pattern designers proceed arbitrarily. The tendency of taste and fashion in wall papers is as closely watched as those of dress goods, upholstery coverings and carpets, by manufacturers concerned in these lines, in which a constant exchange of ideas is going on, a textile pattern, for instance, often fructifying, in a modified form, on a wall paper. The wallpaper pattern maker, though individually inconspicuous, has risen to high importance in the art world, contributing in attractive productions to intellectual pleasure and social enjoyment. The happiest diversion in favor of wall paper has been the exchange of a narrow band at the junction of wall with ceiling for a deep frieze which allows for the play of inventive design, and the establishment of effective contrasts in form and color. It occupies the same relation to the pattern of the main portion of a wall that an lambrequin holds to a curtain, lessens monotony with enhancement of the general effect.

There is one point in the selection of light-tinted wall papers not to be overlooked. These, when in place on a wall, assume an intenser hue than when submitted to the inspection of the purchaser, owing to the surface of one wall reflecting itself on another, particularly under artificial light. It is best to choose light papers on a sunshiny day; with dark colors this is not so important, but these in their turn, are deepened in hue by reflection. The tints of light paper should always be sufficiently pronounced to be easily distinguished.

Gold, where used in arabesque, scroll or floriated designs, should present itself, if part of the pattern on ground, only in fine lines or occasional splashes, for the eye soon wearies of too much unrelieved brilliancy. Gold is best dispensed with in the wallpaper of dining-rooms, where we look for warm rather than bright effects.

Sugar-of-lead is a very satisfactory dryer for white color and varnish.

Orange tints are useful in many cases for interior decoration, as they are warm and pleasant.

A suitable color for recesses holding marble statuary is cerulean blue; whilst one of the best backgrounds for gold and green bronze is Indian red.

Before proceeding minutely to sketch a colored design, determine the color and relative proportions to be admitted. Remember that elaboration is not necessarily beauty.

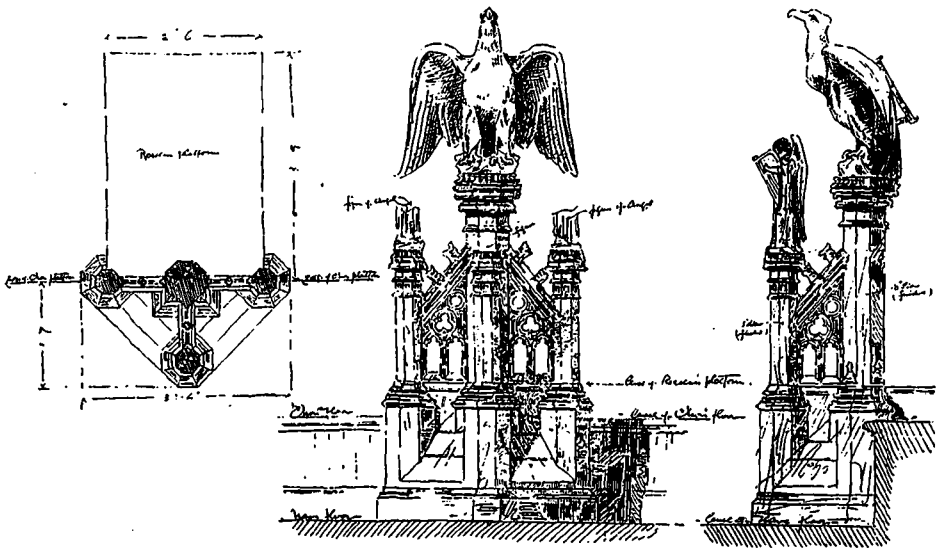
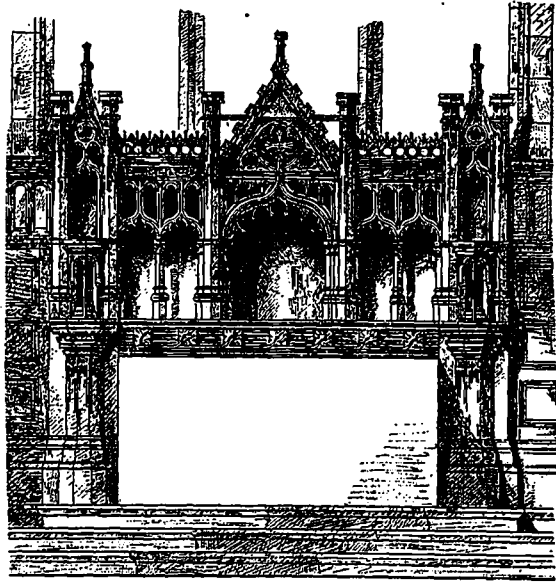
Naples yellow, of which the lightest hues are the best, should not be worked with a steel palette knife, or mingled with ochres, prussian blue, or other colors of which iron is the base, as these darken it. Colors blended from lead or antimony suit it.

A varied tone, productive of an extremely good effect, may be given to a stencil-pattern by working the brush afterwards slightly over portions, and introducing delicate gradations of tints, varying the manipulation throughout, so as to prevent formal repetition.

In viewing a facade of a house nothing is more pleasing than the sight of statues or of stately groups at the windows. These are occasionally introduced in marble, composition, terra-cotta or bisque, but are not as frequently seen as they should be. Flowers and curtains may decorate a window, but statuary completes the decorations.

A pretty, healthful and economical finish for ceilings and walls is made of pulverized soapstone. It can be readily washed, takes a high polish, is pearl-gray in tint, presents the best possible surface for painting, either in oil or water color, and will neither crack nor chip.

For the aspect of friezes in bold relief and the various mouldings of a room, much depends on the position of the jets of flame. If the light comes from wall brackets, the masses of the ornament are apt to be shown with chiaroscuro effects of light and shade rather than in separate details, and the same with table lights. Some people are pleased with one, some with the other effect, but in determining beforehand the position of lights in a room this should be taken into account. The chandelier will afford an equable general diffusion of light, but this is not always desirable.



REREDOS, ST. PETER'S CHURCH, COBOURG.

LECTERN, TRINITY COLLEGE SCHOOL CHAPEL, PORT HOPE.

DARLING & CURRY, ARCHITECTS, TORONTO.



AN ECONOMICAL METHOD OF HEATING AND VENTILATING.

THE following valuable paper on the above subject was recently read before the American Society of Mechanical Engineers, by Mr. Henry J. Snell, of Philadelphia.

Various methods have been devised and are in use for heating large rooms, manufactories and public buildings. Some of them take into consideration the ventilation of the buildings as well.

I will describe briefly a method I have had in use in my store at 135 North Third street, Philadelphia, Pa., for the past two winters, which has been very satisfactory. It has been very economical, and dependence could be placed upon its efficiency at all times, no matter what the condition of the weather might be.

A reference to the accompanying sketch will clearly give a correct understanding of the arrangement.

An exhaust fan driven direct by a small upright engine is connected with a "patent air-heater" placed in the basement at the front of the store by an 18-inch galvanized pipe.

An upright boiler in the basement furnishes steam to run the engine; the exhaust steam from the engine is delivered through the exhaust pipe into the base of the air-heater on one side, and the drip and condensed steam is conveyed away through a pipe at the other.

The exhaust steam of the engine furnishes all the heat usually used, but as a precaution, and for use early in the morning, in extremely cold weather, or for use in very moderate weather, in the middle of the day, when it is unnecessary to run the engine, a small live steam pipe is connected with the base of the heater. The fan runs at a very low speed, and is perfectly noiseless. In my case, no conducting pipes for the distribution of the air are necessary, and the variations of temperature in different parts of the store are not observable with the ordinary commercial thermometer. By examining the sketch, it will be seen the store itself becomes one large conducting tube—and the air is used over and over again, enough fresh air coming in through openings around the windows and through doors constantly being opened. An opening near the bottom of the heater has been provided, and three-fourths of the wall surface of the back end is composed of glass; the rest of brick.

The building is five stories and basement, and I only occupy and heat the first and second stories and basement, but I think I could easily heat the whole with my apparatus at a very little increase of cost in fuel.

The engine that drives the fan is three inches in diameter, and has three inches stroke. The wheel in the fan is 36 inches diameter, and 13 1/4 inches wide at the outlet of wheel; the area of discharge of blower 1.76 square feet and the inlet is same size. The heater is about three feet wide, 6 feet 6 inches high and 20 feet deep, and filled with 588 feet of one-inch steam pipe. I am so well satisfied with the results I get from this apparatus that I have not made any close and accurate experiments of what I can do with it. I know from the cost of my fuel that the expense of heating all I occupy is about the same as I formerly paid when I only heated the offices which were partitioned from floor to ceiling and heated with open grate. I might return the condensed water from the heater to the boiler and make a greater saving. This is not done at present.

Possibly before the meeting of the society we may have some cold weather, requiring the use of the apparatus, and if this paper produces any discussion by the members some careful experiments upon its performance may be laid before them; but at present I can give only the results of one imperfect and incomplete observation made during December, when the outside temperature was 45°.

*This floor I only heat occasionally, as it is used principally for the storage of machinery. When necessary to heat it, I open the damper shown directly over the blower, and sufficient heated air will be driven through the opening to heat it comfortably in a few minutes

Temperature of the air on its return and just before entering the heater, 59°.
 Temperature of air issuing from the blower after passing through the heater, 112°.
 Average temperature of air in room of main store, on first floor, 75°.
 Pressure of steam in the boiler by gauge, 40 pounds.

THE NEW TORONTO PLUMBING BY-LAW.

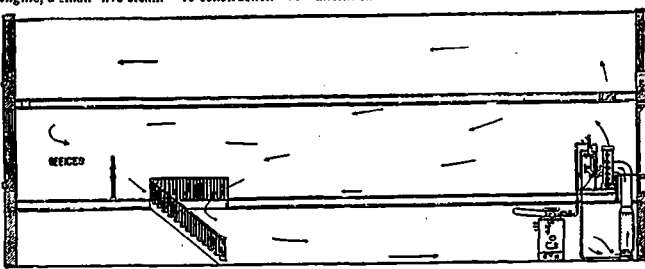
THE new plumbing by-law adopted by the Toronto City Council a week ago, differs in many particulars from the by-law which it is designed to supersede. Journeymen plumbers as well as master plumbers will hereafter be required to pass an examination and obtain a license. No person is entitled to a license who is not a Canadian by birth or naturalization. The fee to be paid for a license by master plumbers has been increased from one to ten dollars. The fee to be paid by journeymen plumbers is one dollar. The Superintendent of the Toronto Water Works takes the place of the Medical Health officer as judge of the fitness of applicants for licenses. If an applicant have not the necessary qualifications; he must agree to employ continuously a regular educated practical and experienced plumber. The amount of security required for compliance with the by-law on the part of master plumbers is reduced from \$1,000 to \$100. Such security is to be approved of by the City Treasurer instead of the Medical Health Officer as formerly. All private drains laid by the city are to be taken to the inside of the wall where buildings are on the street line. The time for approving or rejecting plans and specifications is six days instead of ten days from date of filing, and the certificate of the City Engineer or Assistant City Engineer and Superintendent of Water Works shall be valid for six months from date of issue. No alteration in or reconstruction of existing plumbing arrangements will be allowed until plans of same have been approved of, and a permit issued as in the case of new work, and of work of reconstruction or alteration must be inspected

THE TORONTO SANITARY ASSOCIATION.

"ARCHITECT" writes in the April number of *Medical Science* as follows: Some few years ago a Sanitary Association was organized in Toronto, and though we have not observed any notice of its meetings during this winter, we trust that this is not to be taken as an indication that members have become discouraged and allowed it to collapse. They did some good work during their first two sessions. A committee of the association gave valuable assistance in drafting the plumbing by-law, and a considerable number of papers were read and lectures delivered at their meetings, which were not only interesting, but valuable. Work of this kind has a double value, it not only benefits the members by putting into concrete form the result of their individual studies and enabling them to interchange ideas, but it affords a means of educating the general public on sanitary questions. There is no reason why a sufficient number of the general public should not be got to attend these meetings to fill a good size room. Indeed this was frequently the case during the first session. Has there been any falling off in the public interest in sanitary questions? If such is the fact there is surely no justification for it. We have not yet got a trunk sewer, the bay is a reeking cesspool; we have no garbage cremator; our water supply is insufficient in quantity and, at times, by no means above suspicion as to quality. Diphtheria and typhoid are much more frequent visitors in our homes than they should be were our sanitary arrangements—not to say perfect—but reasonably good. The condition of our streets is at all times a disgrace to the city and a blot upon its fair fame.

These are but a few of the more glaring abuses which such an association should work at unceasingly until they are wholly suppressed. When that work is done it will be found that the horizon of its field has only widened, and that other work scarcely less important lies ready to its hand. Everything that in any way affects the public health comes within its sphere. We merely indicate the

direction in which its efforts would naturally be turned: compulsory ventilation of manufactories and public buildings; the effects upon health of the gas supplied for our use; the providing of parks and recreation grounds; the proper placing and management of cattle markets; the provision of proper abattoirs; the prevention of adulteration of food and drink, the inspection of dairies; the question of public baths and wash-houses; teaching



AN ECONOMICAL METHOD OF HEATING AND VENTILATING.

and approved same as new work. Every water cock, bibb, tap or hydrant must have the name of the plumber attaching the same stamped thereon. One of the clauses added to the new by-law provides that every master plumber who shall himself, or by his apprentices, agents or employees, make any extensions of or alterations to, or shall remove any tap, pipe or any other fixture attached to the pipes of the water works shall, on the last day of the month in which such extension, alteration or removal is made, report the nature and extent of same in writing to the Superintendent of the Water Works Department upon printed forms to be supplied by said department, the correctness of which report shall be attested by statutory declaration to be made by the master plumber making such report.

Another clause provides that no plumber shall be allowed, without having first obtained a permit from the department, to open or shut off the street stop-cock connected with the service supplying any premises or buildings unless in case of urgent necessity to prevent loss or damage from flooding, or to make necessary repairs, or to test their work, and shall in every such case leave the stop-cock open or closed as they may find the same; provided always that any plumber who shall commit any damage or injury to said stop-cock or the service pipes of the department in so doing shall become responsible for the amount of such damage.

In future no pan closets will be allowed to be put into any building. Air pipes may be of standard wrought iron with steam fittings. Sheet metal will not be allowed. Plumbing work found on inspection to be satisfactory will be certified to at the expiration of 30 days from inspection, unless in the meantime it shall have become faulty or defective. Each member of the Board of Examiners who is not an official of the city will be paid a fee of five dollars for each session of the Board.

The above includes all the important changes in the new by-law as compared with the old.

the poor to cook; the dissemination of correct scientific ideas on the subject of vaccination, suitable dress, preventive medicine and the care of the body generally. The list might be enlarged indefinitely, but enough has been said to show that there is work enough in sight to keep a sanitary association busy for a long time to come, and we may be sure that while human nature remains what it is, careless and indifferent about many vital questions, it will never be able to say that its work is done.

CHICAGO PLUMBERS AND SANITATORS.

THE Sanitary Committee of the Chicago Master Plumbers' Association included in one of its recent reports the following resolutions:

Resolved, That the aim of the Master Plumbers' Association will be to provide appropriate furnishings and perfect workmanship for its patrons, since it is acknowledged that plumbing and sewerage are no longer considered luxuries but necessities, and the increased population of our city demands that they be well and properly done.

Resolved, That the old style of plumbing be supplanted by a new and perfect system which will require the latest improvements in sanitary fixtures, which, added to good workmanship, will prove that the members of this association use only the best materials and employ none but skilled artisans to perform work in this line of business.

Resolved, That owners of buildings, or those having the construction of buildings in prospect, be requested to discourage the cheap contract work now so universal since we can vouchsafe no protection while this system remains in vogue.

Resolved, That periodical inspection of plumbing is necessary, since constant use of sewer soil and waste pipes engenders the rapid decay of even the strongest and best of any of our sanitary appliances. Renovations, watchfulness and cleanliness are necessary re-

requirements, since neglect of such care jeopardizes the lives of the family and breaks up the serenity of the home.

Resolved, That we as an association lend every possible assistance to the health department of this city in enforcing strict sanitary laws, which will insure a diffusion of sanitary knowledge, and an active co-operation on the part of citizens to provide good sanitation.

The by-law authorizing the Kingston City Council to expend \$140,000 for improving the water works system was passed by a majority of 409 votes.

The sixth annual convention of the National Association of Master Plumbers of the United States will be held in Boston this year on June 26, 27, and 28.

The Toronto Board of Health has wisely recommended the Council to remove garbage daily during the summer months as suggested by the Medical Health Officer.

Plumbing inspector Benjamin Kirk, of this city, is ably contending for the superiority of wiped joints as against cup joints in the columns of the *Engineering and Building Record*.

From life's rich pudding may a plumb.
The ice man plucks in summer,
But in the winter time he knock-
Les down to one who's plumber.

—*Burlington Free Press.*

Mr. Mann, of Montreal, who has been erecting a garbage crematory in the city of Chicago, pointed out to the people there the danger to the public health of allowing barrels and boxes full of garbage to stand for hours and days in lanes and on the public streets. In Montreal persons are fined for placing refuse on the streets.

Mr. Henry Lamb, of Rochester, offers through the America Health Association two prizes of \$500 and \$200 respectively for the best essays on "Practical Sanitary and Economic Cooking Adapted to Persons of Moderate and Small Means." Competition is open to authors of any nationality, but papers must be written in the English language.

The London *Metal Worker* speaks approvingly of rust joints for iron pipes, the sole objection noted being their great permanency. A rough formula for making the joints is given as follows: Take clean iron fillings, mix them with a little sal ammoniac in a wet state and drive them into the joint over a gasket. Sometimes a little flour of sulphur is added.

Complaints are heard regarding the condition of some of the cow byres in the city of London, Ont. It is contended that the filthy condition of some of these places precludes the possibility of pure milk being supplied to the citizens. This is a matter that the Health Officers of London and other Canadian cities should enquire into. Pure milk is as necessary as pure water for the maintenance of the public health.

The *Sanitary News* objects to city authorities enforcing the use of water meters, on the ground that people in poor circumstances will endanger their health in attempting to economize in the use of water. Our contemporary says:—Increase your license, add to your taxes on land, if necessary, and on whisky and tobacco, but let the people have free water and the more they use, the better it will be for the community."

Mr. Frist, in the Dominion Parliament the other day, expressed the opinion that the Canadian guarantee regulations were inadequate for the protection of the country from the entrance of contagious diseases. The premier, in reply, stated that probably no system of quarantine existed which might not be improved. It is very necessary that everything possible should be done to protect the Canadian stem.

Messrs. Moffatt, Hodgins & Clarke, of Watertown, N. Y., have arranged with the Town Council of Cobourg, Ont., to put down between six and seven miles of mains and sixty-seven hydrants, certain of which may be used for street watering purposes. The town will thus be furnished with a complete system of waterworks without investing any money; they will pay an annual rental of \$3,000, with the privilege of purchasing should they at any time desire it.

eign competitors must have their work in by Jan. 1, 1893.

Gananoque, Ont., has by a majority of 66 decided against a five years' contract for electric lighting.

We have received from the American Public Health Association copies, in pamphlet form, of prize essays entitled "Healthy Homes and Foods for the Working Classes," by Victor C. Vaughan, M. D. Ph. D., professor in University of Michigan; "The Sanitary Conditions and Necessities of School Houses and School Life," by D. F. Lincoln, M. C., Boston, Mass.; "The Preventable Causes of Disease, Injury and Death in American Manufactories and Workshops, and the best Means and Appliances for Preventing and Avoiding Them," by Geo. H. Ireland, Springfield, Mass.; "Disinfection and Individual Prophylaxis against Infectious Diseases," by Geo. M. Sternberg, M.D. These valuable treatises may be obtained at ten and five cents each on application to Dr. Irving A. Walker, Secretary, Concord, N. B.

A contemporary remarks that in ceiling decoration all strong colors should be definitely separated from each other by light lines, fillets or small moldings. If the cornice presents any small flat surfaces, a simple conventional flower or geometrical pattern can often be used to great advantage, care being taken not to make it too prominent, and in no way to form a dark molded frame for a mass of light tinted ceiling. It is not a very costly matter to lay on to a ceiling having small wood moldings formed into panels, and painted, paper fitting the panels, and filled in with some very light diaper paper of stencil enrichment fitting the panels.

The following are combinations of colors in certain choice flowers, which may suggestively aid combination of hues in decorative work: Vermilion, suffused with scarlet, and penciled with dark tints; ground of deep crimson, shaded with bronze; lavender, with undulatory margin of white; white, with carmine feathered markings; brilliant pink, margined white, blotched with maroon; bronze red, with white margin and deep chocolate-colored spots; lilac color, blotched with maroon; bronze red with deep chocolate-colored spots; intense deep crimson, with black spots; deep rose purple, with maroon, feather-like splashes.

PERSONAL.

E. Rogers & Co., plumbers, London, are going out of business.

Messrs. Platam Bros., plumbers, of London, Ont., are reported to have made an addition.

Mr. E. O. Graydon has been appointed assistant city engineer by the London, Ont., City Council.

Hon. James McShane, Minister of Public Works in the Quebec Provincial Cabinet, has resigned.

Mr. Fred. Henry, late Assistant City Engineer, of London, Ont., has left that city to practice his profession in New York.

Mr. W. J. Gibson, who for fifteen years was connected with the water works department of this city, died a fortnight ago.

Mr. Wm. Lyons, contractor, has entered a suit against Woodrow for \$500 extra work on Bruce Avenue sewer, which will be tried at the spring assizes. The towns offered to settle the claim for \$150.

The wife of Sandford Fleming, the well-known engineer, died recently at Ottawa, aged 57 years. She was a daughter of the late Mr. James Hall, Sheriff of Peterboro', and was highly esteemed for her Christian qualities.

The Master Carpenters' Association, of Toronto, has unanimously rejected the following officers for the ensuing year:—President, J. J. Withrow; Vice-President, Geo. Mober; Treasurer, William Ross; Secretary, William Simpson; Committee, Wm. Forbes, William Simpson, Queen street west, C. R. S. Dinicoff, Geo. Gall, George Bury.

The *West of March* contains a biographical sketch of Mr. Sandford Fleming, C. E., L. L. D., C. M. G., from the pen of Rev. Principal Grant, of Kingston. Mr. Fleming was born in Scotland, where he spent the first eighteen years of his life. At that age he came to Canada, where he has lived for forty-three years. During this period he has been connected with many important public undertakings. Mr. Fleming has also attained considerable prominence as a writer.

Sir Alexander T. Galt is projecting a railway bridge across the St. Lawrence from Prescott to Ogdensburg, and asks for incorporation as the Grenville International Bridge Co., for construction purposes.

Amongst the signs of the improved class of buildings now going up and projected in the larger cities of Canada is the greatly increased employment of rolled iron joists, which are now generally specified for all first-class buildings, both public and mercantile. Besides the advantage of greater strength, and occupying far less space than timber, the immunity from danger from fire is appreciated as of the utmost importance. The improved methods of manufacture has now brought down the price so as to freely compete with the present prices of timber. Mr. G. Lester, of Montreal, who has successfully carried out some of the largest contracts with the Government and railway corporations, solicits correspondence from architects and builders as per his notice in another column.

COMPOUND FOR PATCHING STONE.

THE restoration of some of the most important stone structures in Paris has been mainly accomplished by means of a metallic cement invented by Professor Bruze. It consists of a powder and a liquid, the first composed of two parts by weight of oxide of zinc, two of crushed limestone of a fine nature, and one of crushed grit, the whole intimately mixed and ground, ochre in suitable proportions being added as a coloring matter. The liquid employed consists of a saturated solution of zinc in commercial hydrochloric acid, to which is added a part by weight of hydrochlorate of ammonia, equal to one-fourth of the dissolved zinc, and this liquid is diluted with twenty times its bulk of water. In using the cement, one pound of the powder is mixed with two and a half pints of the liquid. The cement hardens very quickly and is of great strength.

BRIDGING.

BRIDGING floors is not to prevent the joist overturning, but is principally to distribute the weight resting directly on one joist over the others immediately adjoining, and in that way to considerably stiffen the floor as a whole. The places of timber, which the bridging is composed may, and do set either as ties, or struts, according to the manner in which the load is entered, and in the case of a moving load, and of a person passing over the floor, will not alternately as ties and struts in quick succession. The strutting being placed obliquely to the joists, the strain is practically neither that of a direct tie, nor of a direct strut, that is, neither simple compression nor simple tension in either case, but is in both modified by a cross strain. There is some tendency for the joists to turn over, which augments the cross strain, so that, of the three struts, the cross strain is of most importance.

Now, it is a very well-known rule, that the strength of a beam or a piece of timber subjected to a cross strain is directly as its breadth and as the square of its depth, and it will be obvious, therefore, that the system of placing the bridging with its greatest scantling vertical is the proper one, and is a good deal stronger than the system usually employed. In the first system the bridging is reversed alternately so that the pieces may butt against the joists at points directly opposite one another, which tends to further strengthen and stiffen the floor.

The only advantage in the second system over the first is, that it does not necessitate a man turning round to nail the pieces alternately as he comes to them, and therefore is saving of a small amount of time, but when it is considered how much additional strength is obtained by the first method, it will be seen that the saving of time under the circumstances is by no means a wise economy.—*Building.*

STRENGTH OF BUILDING MATERIALS.

MR. J. B. JOHNSON, in an article in the *Journal of the Engineering Society*, gives some interesting points in regard to testing the strength of building materials. Speaking of tests of brick and stone, he says: "Most tests on substances have been in cubes, but such results are uniformly too weak. In the case of a brick, a crushing test made flatwise, on one brick, is very misleading. From three series of tests on standard St. Louis brick as many manufacturers, fifty brick being tested for each firm, I have included that a brick, crushed endwise, will always carry considerably more than the same brick will stand in a wall. I took 24 brick graded from medium red to paving, and tested them endwise, and then 24 brick similarly graded cut into halves, and four half bricks piled into a column with thin joints of neat Portland cement and laid to harden for three weeks. The average strength of the endwise test was 3,520 pounds to the square inch, and of the flatwise column test, was 2,635 pounds to the square inch, and showing that the endwise test gave a strength about one-third more than a flatwise test, piled four high. All these brick were dry pressed, one lot hydraulic pressed, one mechanically pressed and one made with a hammer blow. Those made by the mechanical pressure were considerably stronger than the other, and those by the hammer blow the weakest."

Stone and brick lose a large part of their strength when thoroughly wet. If their strength is required in foundations, or where they receive their full load when water-soaked, then they should be tested wet. If they are to withstand the action of frost then the amount of absorption is important, anything over 12 per cent. being objectionable, and liable to disintegrate from freezing.

"Any beam, whether of wood or iron, is as much stronger when placed on its edge as when on its side, as the width is greater than the thickness. Thus the stick or bar of iron one inch by three inches, when used as a beam, is three times as strong when placed on its edge as when on its side. This is true only within limits. It would not be true of a piece of boiler plate, on account of the flexibility."

The atmospheric influences producing disintegration of bricks, tiles, etc., are noted by the *Chronique Industrielle* as being much less active and destructive in a season of continuous humidity than during alternately wet and dry periods. Their action also is obviously affected by the chemical and physical composition of the bricks and the degree of burning. An excess of sand destroys cohesion, and calcareous matter is reduced in burning to lime, which will be cracked by exposure to moisture, and, by the expansion which follows, causes disintegration.

The king of the Belgians has offered a prize of 25,000 francs (about \$5,000) for the best work, in manuscript or print, on the means of procuring in abundance and at small cost the best quality of portable water for large cities, especially for Brussels and its suburbs, "regard being had to the future increase of population." French, English, Flemish, Italian, German or Spanish may be used, but for-

TENDERS

WM be received by the undersigned up to noon of

WEDNESDAY, April 25th, inst.,

FOR THE ERECTION OF

Pair of Semi-detached Houses

ON NORTH STREET, TORONTO.

The lowest or any tender not necessarily accepted.

DARLING & CURRY.

«THIS SPACE»

BELONGS TO

J. C. SPENCE & SONS,

Manufacturers of ART STAINED GLASS

37 BLEURY STREET,

MONTREAL.



PAINTING WOOD.

ONE coat of painting, says a correspondent of the Mechanical News, takes 20 pounds of lead and 4 gallons of oil per 100 square yards; the second coat 40 pounds of lead and 4 gallons of oil; the third, the same as the second—say 20 pounds of lead and 16 gallons of oil per 100 square yards for three coats.

Table listing various paint colors and their prices per gallon, including white zinc, white lead paint, lead color, black paint, stone color, yellow paint, blue color, green paint, bright emerald, and bronze green.

Winnipeg streets will be block paved with British Columbia cedar. Over 230 men are employed in the quarries on the mountain in Hamilton.

The Ottawa Vindicator says there is a fine opening in that vicinity for a brickyard. The Dominion Marble Company is about being formed in Halifax, N. S., for the purpose of developing the valuable marble deposits at Mount Marble, West Bay and Cape Breton.

The Hyun Manufacturing Company, Toronto, will be incorporated with \$30,000 capital stock for the sale of builders' supplies, etc.

The Owen Sound Quarrying and Construction Company, lately organized at Owen Sound, Ont., have two large quarries in operation.

It is said that certain Hamilton capitalists will start glassworks at Port Colborne, Ont., utilizing the natural gas found there so abundantly, as fuel.

Experiments recently made in England go to show that "Silicate cotton" pulled on the under side of the joists will prevent the spread of fire from a lower to an upper floor.

Messrs. A. Robb & Sons, Amherst, N. S., are manufacturing a system of hot water heating for residences, halls and stores. They are also introducing a hot air wood-burning furnace.

An ethoxy finish for wood is made by dissolving 4 ounces of shellac with a pound of borax in half a gallon of water. Hot boil a perfect solution is obtained, then add half an ounce of glycerine, after which add sufficient aniline black (soluble in water), and it is ready for use.

A serious fire took place recently in the Dominion Glass Company's works on Papineau Road, Montreal. A large portion of the interior was destroyed. The value of the building was \$125,000, and the total loss is estimated at \$25,000 or \$30,000. Over one hundred men will be thrown out of employment.

A score of the largest lime dealers in Ontario have presented a petition through Messrs. Scott and Christie, of Toronto, to the Minister of Inland Revenue, asking that the Weights and Measures Act be so amended as to provide for a uniform method of selling lime by weight instead of by measurement throughout Canada. The Minister promises to consider the matter.

Captain Holmes, of Napanee, on behalf of Canadian glass manufacturers, has asked the Dominion Parliament to place a duty on the importation of cheap quality of glass. It is claimed that importations from Belgium are destroying the demand for the Canadian article in spite of the fact that the latter is better in quality.

A paste that will adhere to whitewashed and all plastered surfaces is made as follows:— Soften eighteen pounds of finely powdered bole in water; next boil one and a quarter pounds of glue, adding it to the above with two pounds of gypsum. The whole is to be diluted to a thin paste. When putting fine paper on old walls it is well to coat them with a ground paper, using this paste.

The following churches have been furnished by the Bennett Furnishing Co., of London, Canada, and Glasgow, Scotland:— St. Mary's church, Tottenham, Eng., architects, Messrs. Pugin & Pugin; Larklet parish church, Larber, Scotland, architects, Messrs. Burnet & Sons, Glasgow, Scotland; St. Francis' church, Liverpool, to the order of Cardinal Manning; New Mission church, Havel, Hanappet, architects, C. B. & J. C. Cuts; the English church, Lisbon, Portugal, architects, Messrs. Medland & Powell; St. Saviour's church, Holloway, London, Eng., architects, Messrs. Cuts; the Kensington Mission Church, London, Eng.; the Merchiston Mission Church, Edinburgh, Scotland, architect, R. Wilson, Esq.; St. Mary's church, Dublin, Ireland; the chapel of the Charbonnais Schools, London, Eng., etc. The Company are also sole manufacturers of improved desks and fittings for the School Boards of London, Liverpool, Edinburgh, Glasgow, etc.

Latest Canadian Patents.

Art or Process of Wall and Ceiling Decoration. No. 28,564. James S. Henderson, (assignee of Alfred Otway), Toronto, Ont., 25th February, 1888.

Claim.—The process of working paper upon prepared linen or other fabric as a back, and painting and coloring said paper in suitable sizes as a decoration for walls, ceilings and other surfaces. Filed Feb. 2nd, 1887.

Flush Valve for Water Closets. No. 28,437. Thomas Campbell and James H. McPartland, Saint John, N. B., dated 2nd February, 1888.

Claim 1st. The combination of the cylinder C and the piston A, substantially as and for the purpose herebefore set forth. 2nd. The combination, with the cylinder C and the piston A, of the rod F and the down-pull G, substantially as and for the purpose herebefore set forth.

Heat Radiator. No. 28,527. John R. Tracey, Winnipeg, Man., dated 13th February, 1888.

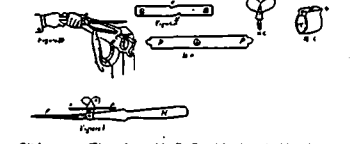
Claim 1st. The combination of outside casing B, cone A, with opening at I, inner pipe M, having hole at C, outer pipe N, hav-

ing hole at D, handle E in horizontal slot, cross-bar H and vertical rod G, having narrow-shaped bottom, substantially as and for the purpose herebefore set forth. 2nd. The combination of radiators and self-cleaning rod G, substantially as and for the purpose herein set forth.

Means for Glazing Roofs, Etc. No. 28,514. Joseph D. MacKenzie and Joseph Gillespie, London, Eng., 11th February, 1888.

Claim.—A solid metal sash-bar having its central web or feather and the inner surfaces of the grooves or channels covered by a protecting sheathing in combination with the glazing material applied over said sheathing and covering the flanges of the sash-bar and part of its central web or feather, and overlapping the glass, substantially as and for the purposes set forth.

Machines for Sharpening Saws. No. 28,494. William Rutten, Picton, Ont., dated 4th February, 1888.



Claim.—1st. The rake guide B, B, with slotted sides, in combination with the bevel guide P, P, substantially as and for the purposes herebefore set forth. 2nd. The bevel guide P, P, secured as above described, in combination with the rake guide B, B, substantially as and for the purposes herebefore set forth.

Splitting Lumber. No. 28,489. William L. Earing, Brockville, Ont., dated 7th February, 1888.



Claim.—The improvement in the art of splitting lumber, which consists in slotting the pieces to be jointed lengthwise from the end, the intervening tenons parallel and slightly exceeding the slots in width, bevelling or rounding the ends of the slots and tenons to coincide, cementing the contact edges of the joint and driving the pieces endwise together, whereby the tenons will be compressed laterally together, and the bevelled or rounded ends crush into the bevelled or rounded ends of the slots throughout the whole thickness of stuff, to make an almost impenetrable and practically unbreakable joint, as set forth. 2. A joint or splice formed by slots D and tenons C cut endwise in pieces of board to be jointed, the tenons bevelled or half round at the points, and the slots bevelled or half round at the ends, the tenons having parallel walls for a portion of their length and slightly exceeding the slots in width, the joint glued and the pieces driven endwise together, as set forth.

BUILDING MATERIALS.

Table listing various building materials and their prices, including lumber, shingles, and other construction supplies.

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Table listing various building materials and their prices, including shingles, siding, and other construction supplies.

CEMENT, LIME, etc.

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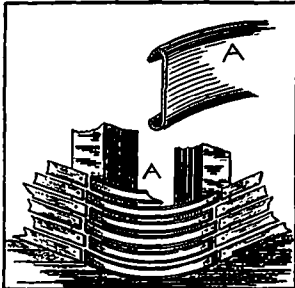
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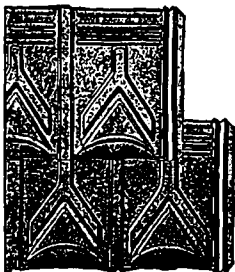
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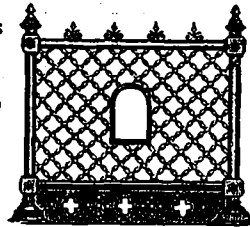
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