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—THE—
CANADIAN ARCHITECT AND BUILDER,

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

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ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS,
DECORATORS, BUILDERS, CONTRACTORS, AND MANU-
FACTURERS OF AND DEALERS IN BUILDING
MATERIALS AND APPLIANCES.**C. H. MORTIMER, Publisher,****14 King Street West, - TORONTO, CANADA.**

TEMPLE BUILDING, MONTREAL.

SUBSCRIPTIONS.

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EDITOR'S ANNOUNCEMENTS.

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

The Ontario Association of Architects has appointed the "Canadian Architect and Builder" its official paper.

The publisher of the "The Canadian Architect and Builder" desires to ensure the regular and prompt delivery of this Journal to every subscriber, and requests that any cause of complaint in this particular be reported at once to the office of publication. Subscribers who may change their address should also give prompt notice of same, and in doing so, should give both the old and new address.

PUBLIC opinion in the United States is being brought to bear upon the State authorities to prevent the construction in future of buildings more than one-storey in height for hospital and asylum purposes. This idea strongly presented itself to the minds of the people of Canada on the occasion of the recent holocaust at Longue Point.

THE City Council of Toronto would do well to act upon the suggestion of the City Engineer to restrict the privilege under which one of the electric light companies has been tearing up the pavement on the principal thoroughfares for the purpose of putting its wires underground. The company are supposed to replace the pavement, but the manner in which this has been done is very unsatisfactory, and must entail heavy expense upon the city for repairs, not to speak of the patched appearance of the roadway. The damage thus far resulting from the company's operations has been comparatively slight, owing to the life of the pavement on the three principal thoroughfares having almost expired. In view, however, of the notice given the City Council of the company's intention to proceed with the laying of wires on a large number of the business streets, steps should at once be taken to protect the public interest. In England, it is said, the wires are laid beneath the flag sidewalks, where they are at all times easily accessible without much inconvenience to the public. What is to prevent the adoption of such a plan

here, by which the destruction of costly roadways might be avoided and the streets kept in proper condition?

WE have frequently of late been asked to state when the Executive Council and Registrar for the Ontario Association of Architects, provided for by the Ontario Architects' Act, would be appointed. In reply to enquirers Mr. Townsend, Secretary of the Association, desires it to be stated that the Minister of Education in a letter dated the 30th of June, promised that the appointment of the Council would be made as soon as the Executive Council of the Government should meet, which he expected would be within a week. The appointment was not made, however, within this period. A meeting of the Council of the O. A. A. will be held a few days after its appointment for the purpose of appointing a Registrar, and when this has been done, the Secretary of the Association will notify every architect within the province whose name and address he may be able to obtain.

THE Civic Health Committee of the city of Hamilton have approved of a by-law providing for the appointment of a Plumbing Inspector, and defining his duties. The Finance Committee, however, has refused to provide the paltry sum of four or five hundred dollars required to pay the official's salary. Consequently, it is presumed, disease will unchecked continue to lay low its victims. This may be taken as a fair sample of the economy practised by city representatives. If some one should propose a junketing trip to the United States for the ostensible purpose of gathering information, but really in order that the aldermen might enjoy an outing at the expense of the taxpayers, it would be safe to assume that four or five hundred dollars or even twice that sum, would readily be forthcoming for the purpose. The refusal of the Finance Committee appears to be little short of criminal, in view of the insignificance of the sum asked for, and the important work which by its means could be accomplished. A city of 50,000 inhabitants cannot afford to do without plumbing inspection. The result of such false notions of economy must be a death rate that will cause the city to be regarded as anything but a desirable place of residence. The citizens who pay the taxes should insist upon the appropriation of the small sum required to secure official oversight of plumbing.

THERE are three classes of individuals in the ranks of "organized labor." First and foremost are the walking delegates or professing leaders, who have seldom been known to exert themselves except to proclaim with loud voice and voluble tongue that they are the representatives of the wage earning classes. Then there are the individuals who are entirely devoid of ambition, content if they can but secure the pittance necessary to keep body and soul together, and never better satisfied than when, having helped to bring about a strike, they may lounge about in idleness, and draw an allowance of five or six dollars a week from the unions. To these two classes must be added a considerable body of intelligent, industrious workmen, desirous of making their way in the world by the

attainment of superior skill, and the putting forth of their best efforts. Were it not for the fact that this latter class are outnumbered and outvoted by the other two we should hear much less about strikes and the labor problem. A predominant characteristic of the first class mentioned is to endeavor to secure for themselves an easy living at the expense of the industrious men whose interests they profess to champion. The suggestion during the recent strike in the building trades in Toronto of the necessity of having a representative of "organized labor" stationed in the old country "to look after the interests of workingmen," might doubtless be traced to this source. The names could be mentioned of several self-styled representatives of the labor interests who so manipulated affairs as eventually to drop into comfortable positions in the Knights of Labor, civil service, etc.

OUR esteemed contemporary, the *American Architect*, says: "We imagine that some of our readers will be surprised to hear that architects in Canada are 'protected' by a tariff, which places an *ad valorem* duty on all plans of buildings imported into the Dominion, calculated upon the proposed cost of the buildings represented by the plans. What the rate is we do not know, but the tax is conscientiously collected. The duty is avowedly imposed for the protection of Canadian architects, and those of our own people who are called upon to practice in Canada will do well to look out for it. It is obvious that a duty amounting to a very small percentage on the cost of a building would be a very large percentage on the architects' fees, and architects should be particular to have it clearly understood with clients in the Dominion that 'all duties and expenses of importation of drawings are to be at the cost of the latter.'" The existence of an import duty on American plans entering Canada should not be a matter of surprise to American architects, seeing that the American government imposes duty upon the drawings of foreign architects. As to the conscientious manner in which the duty is collected in Canada, it can only be said that if the tariff is to be truly protective, the customs authorities must add to their conscientiousness a keener watchfulness of smugglers. The Canadian exchequer would be richer by many thousands of dollars if a well-known American architect had not succeeded in eluding the vigilance of the customs department. The Government should make a determined effort to convict this smuggler and make of him such an example as shall effectually put a stop to the practice, and make the tariff protective in reality and not in name only.

M R. Lacroix, Building Inspector for the city of Montreal, appears to be conscientiously striving to fulfil the duties of his position. Those who would evade the provisions of the building by-law find it difficult to escape his vigilance. Not unfrequently by his direction their work has to be pulled down and re-built in compliance with the regulations. Such conduct on the part of an official should give the highest satisfaction to the citizens and the council. Strangely enough, however, some of the aldermen have sought to throw obstacles in his path of duty and destroy his authority, apparently because his official acts sometimes conflict with the interests of their friends. An instance of this kind occurred at a recent meeting of one of the civic committees. A letter was read from a gentleman asking to be allowed to utilize in the construction of some buildings an existing wall which the courts and the committee had previously declared was not built in accordance with law. The applicant stated his opinion that the wall was strong, and he was willing to take the responsibility of using it in his buildings. The Building Inspector said the wall was defective, not having been constructed with good mortar, and produced a letter written by the owner in which he acknowledged that it was not constructed in the manner required by law. In the face of all this evidence, one of the aldermen strongly favored the granting of the application, saying he could see no reason why the permit asked for should be refused, and accordingly moved reconsideration of the committee's former action. The chairman could not find any legal authority for overriding the opinion of the Court and of the Building Inspector. A majority of the members of

the committee displayed their good sense by coinciding in this view. Accordingly the action of the Inspector was very properly sustained.

THE attempt is to be made by the City of Toronto to establish technical schools for the benefit of young men who purpose devoting themselves to mechanical pursuits. This step has been taken none too soon. Our young men have for several years been at a disadvantage compared with those of the United States, where a number of very successful institutions of the kind are in operation. The sum of \$9,500 is proposed as the initiatory expenditure for the purpose. Three schools containing in all ten rooms, having ten teachers and accommodating 400 pupils, are to be established in different parts of the city. The subjects to be taught are arithmetic, algebra, geometry, trigonometry, statics, dynamics, theory of construction, hydraulics, mechanical drawing, chemistry, heat, light, electricity and the elements of sanitary science. A board of directors has been appointed, representative of the Association of Stationary Engineers, the Trades and Labor Council, the manufacturing interest and the City Council, with Prof. Galbraith of the School of Practical Science. It certainly appears strange that no representative of the architectural profession or of the building trades should have been appointed on this board. From no other quarter can a larger proportion of applicants for instruction be expected, therefore a voice in the management should not be withheld. In order that justice may be done to all the interests concerned, and the sympathy and co-operation of all secured, the first opportunity should be taken to make good this omission. In view of the experimental nature of the undertaking, the wisdom of the decision to establish at the outset three schools seems open to question. It might have proved to be a better plan to concentrate the efforts of the management upon one school in the central portion of the city, and there thoroughly test methods of teaching and management, before extending the undertaking. Much depends upon the wisdom exercised in the conduct of this important enterprise at the beginning. Anything like a serious blunder made at the present time would undoubtedly retard the progress of technical education in Canada for many years to come.

CONSIDERABLE ill-feeling prevails against the Federated Builders' Association of Toronto on the part of contractors who have not identified themselves with the organization. It is founded on the allegation that through the influence of the Association the cut stone dealers of the city will not supply stone on equal terms to contractors outside the Association, but give them quotations so much above those supplied to members of the Association, that they are placed at a serious disadvantage in tendering. The intention is said to be to use this method of forcing outside contractors to join the Association. A contrary result seems likely, however, to be brought about. The outside men, associating themselves together, sent an agent to Cleveland to purchase a quantity of stone, and they express the opinion that the terms on which they can obtain it will enable them to compete with members of the association. Some of them express their willingness, under other circumstances, to unite with the Association, but refuse to be forced into doing so. They claim that an invitation has never been extended to them to join, and that the Association, even during the recent strike, manifested no desire to strengthen its position by adding to its ranks many reputable outside contractors, but now that the strike has gone against it, adopts the unwise policy of coercion.

It is due to the Association to say that its secretary disclaims any knowledge of a combination to raise prices on outside contractors, and suggests that "it may be that the cut stone dealers don't want to trade with these bosses." Whatever may be the fact, it would be very impolitic on the part of the Association to admit a combine, in view of the penalties imposed by the Anti-Combines Act, and the intention expressed on behalf of the outside contractors to test the value of that Act in connection with the matter under consideration. In view of the fact that the members of the Federated Association are outnumbered

three to one by contractors who are non-members, it is a foregone conclusion that any attempt to force the majority to comply with the will of the minority, must prove abortive. It is manifestly desirable, if not absolutely necessary, that a strong master builders' organization should be maintained. Without such organization, the master builders cannot hope to hold their ground against the demands of the unions. The latter are perfectly organized, and being in affiliation with the International Unions of the United States, are in a good position to enforce their claims. The recent strike in this city fully illustrated this, and also the fact that organization can only be successfully met by organization. So long as the master builders neglect to make use of the weapon which the workmen have used to such good advantage, they will lose ground in every conflict. It is not desirable that the struggles of the past between employer and employee should be perpetuated. On the contrary, it is believed that if the employers possessed an organization as perfect as that of the workmen, it would be a potent influence for the settlement of disputes without recourse to strikes, which under such circumstances would be certain to be of a very protracted character, and much more likely than at present to result in favor of the employers. It is a significant fact that for many years past the peace of Europe has resulted from what is termed an "armed neutrality." So it would be in the adjustment of labor disputes. The desire has many times been heard expressed for the formation of a Builders' and Contractors' Association for the Province of Ontario. The Toronto Federated Builders' Association should seek to bring all the reputable contractors of the city into its membership—not by coercive measures but by appeals to their intelligence and self-interest—and thus form the nucleus of a Provincial organization.

THE ADVANTAGES (?) OF EMPLOYING AN AMERICAN ARCHITECT.

MONTREAL, July 12, 1890.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—During the recent political contest in Ontario, the name of a Buffalo architect was used very freely, and our own name was also quoted in this connection without our consent. At the same time, the facts which were brought forward against Mr. Waite as favoring Americans at the expense of Canadians were correct, and without any desire to injure Mr. Waite, we think it is only right that Canadian manufacturers and contractors should know how we have been treated by him in several cases, and to be able to avoid being put to the same trouble and expense for nothing as we have been.

The first instance of this was in connection with tendering for the iron work of the Bank of Commerce. In this case we were led to believe that our tender would be accepted, provided we could do the work in a certain time. We named ten weeks as the time in which we would complete the work, but upon the pretext "that this was not soon enough," the work was given to a Buffalo firm who promised to do it a few days sooner, but they took a very much longer time to do the work than was agreed upon, or than we had offered to do it, and we have been informed that in place of nine weeks they were nearer six months before the work was entirely completed. We enclose herewith an article from the *Trade Bulletin* showing how we were treated in the matter of the Canada Life building with comments by the editor.

Before sending in our tender for the Canada Life building, we got a letter from the manager of the Imperial Insurance Co. here, stating that we had recently completed iron work for their building in this city to the extent of some twenty-three thousand dollars, and that we had done our work in the best manner and promptly. This letter we forwarded to Mr. Waite, although after our thirty years experience in this country with this class of work, it should not have been necessary. The work was to have been completed by the first of July; you can easily ascertain in what state it is at present time.

Since the above we have another grievance, in which we were thrown out of a job on the same pretext, "that the time which we set for the delivery of the work was too long," although we had been asking for particulars of the job for at least four months

previously. We have a letter from the parties to say that "they had been obliged to order the work in the States at a higher price in consequence of the architect considering that the time set was not short enough." Of course, this must directly or indirectly come out of the pockets of proprietors.

We are, yours very truly,

H. R. IVES & CO.

OUR ILLUSTRATIONS.

INTERIOR OF RECEPTION HALL IN SUMMER RESIDENCE OF HON. JUSTICE DAVIDSON, DORVAL, QUE.—A. F. DUNLOP, ARCHITECT, MONTREAL.

The sketch shows the interior of main hall viewed from the front entrance. On the left is the library, the entrance to which is hung with curtains, and adjoining is the dining room. On the right is situated the billiard room. The size of the hall is 18' by 27'. The ceiling is wood, with the joists dressed, molded, etc. The stair is of red pine, with French string of ash, turned ash balusters, cherry moldings and handrail. Underneath the platform of stair and facing the entrance, is a fire-place with cherry mantel-piece.

INTERIOR EGLISE DE ST. MARIE DE LA BEAUCE.—C. BAILLARGE, ARCHITECT, QUEBEC.

SKETCH FOR RESIDENCE IN ROSEDALE, TORONTO.—DARLING & CURRY, ARCHITECTS, TORONTO.

STILL ANOTHER COMPETITION.

"FROM bad to worse" correctly describes the condition of architectural competitions in this country. In proof whereof, witness the following circular sent out for the information and guidance of certain architects by the St. George's Society of Toronto: "A Company has been organized from members of St. George's Society, called the St. George's Hall Company, for the purpose of constructing a St. George's Hall on a lot on Elm St., 50 feet frontage, by 117 feet deep, the property of St. George's Society. The cost of the building is not to exceed from \$13,000 to \$14,000. The requirements for the special use of the Society in the building are as follows:—A committee room, two ante-rooms for applicants, four rooms for secretary's dwelling, and a hall as commodious as the ground will permit, certainly not less than 65 x 35 feet. For renting or revenue purposes, lodge rooms in the upper flat and such other arrangements as are most likely to be available and advantageous, are required, and I am instructed to invite you (though upon the express conditions that the Directors do not bind themselves to accept, or pay for, yours, or any other plans furnished) to furnish plans for the proposed building, together with an outside estimate of the total cost, not later than the 1st August next." To quote the words of the circular, the "advantageous arrangements" are all on the side of the Society; almost the only definite information given the architect is contained in the familiar clause freeing the Society from any obligation to accept or pay for any of the designs which may be sent in. Let the response on the part of architects invited to enter this competition be as liberal as the remuneration offered for their services.

THE ONTARIO ARCHITECTS' ACT.

WE publish, in full, in this number the bill which the architects of Ontario have succeeded in getting through the Provincial Legislature. While we congratulate our professional brethren over the line on their success in winning legislative recognition, and must award them the palm because they have succeeded where we have failed, yet we frankly confess that the "Ontario Architects' Act" is a disappointment. We doubt if any legislature in these United States would pass such a bill, and sincerely hope they would not. A state has undoubtedly the right to guard its citizens against incompetent practitioners, and the State of Minnesota has already done so in regard to the medical profession, but we hardly think a state has a right to delegate its authority to a private corporation. We do not see anything in the act to prevent a non-registered architect practising his profession; in this country there would

be enough first-rate men who would, under the circumstances, glory in showing their independence by keeping out of the corporation, while a large number of the small fry would rush in and become "registered architects" for the supposed prestige it would give them. With the best men out and the small men in how much weight would the title, "registered architect," carry with it?—*Northwestern Architect*.

AN ENGLISH OPINION UPON THE ONTARIO ARCHITECTS' ACT.

PARLIAMENT has made the Ontario Association a body corporate, and passed "The Ontario Architects' Act," whereby from and after the 1st prox. "no person [within the Province of Ontario] shall be entitled to take or use the name or title of "Registered Architect," either alone or in combination with any word or words, or any name, title, or description, implying that he is registered under this Act, unless he be so registered"—under penalty of a fine; and whereby "every registered architect summoned to attend any court, civil or criminal, for the purpose of giving evidence in his professional capacity or in consequence of professional services rendered by him as an architect," is to be paid per day, in addition to his travelling expenses (if any) "the same fee or allowance as is payable to provincial land surveyors" attending such court. The act provides that every person registered thereunder shall become, *ipso facto*, a member of the association, and gives a council of nine members thereto, to be appointed in the first instance by the Lieutenant-Governor of the Province, and subsequently by ballot, as by-laws may ultimately decide—the first nine members to be British subjects residing and practising the profession of architecture within the province for at least ten years before the passing of the act. The council are given authority to appoint examiners for the purpose of ascertaining and reporting the qualification of all persons who shall present themselves "for admission and enrolment as students at any of the matriculation, preliminary, intermediate, or final examinations;" and also to make by-laws respecting the "admission and registration of students, the periods and conditions of study, and the enrolment of architects as members of the association, and all matters relating to the discipline and honour of the profession." Sections 5-10, relating to the constitution and appointment of the council, and sections 21-24, which lay down definite rules respecting the qualifications of students desirous to register, are undoubtedly valuable and important, because they open a way for the association to permanently influence the welfare of young men starting in life as architects within the Province of Ontario. The act is printed at page 368 of this number of *The R. I. B. A. Journal*, and it also appears in the CANADIAN ARCHITECT AND BUILDER of April—a newly founded journal (now in its third volume)—which thinks that the Act, though in a great measure disappointing to the association, "should be considered as one step forward in the direction of securing for the architectural profession the recognition and respect which is its due, inasmuch as it enables the public to distinguish between the qualified and unqualified practitioners." But does it? And will an architect who carries to Ontario the certificate of Fellow or Associate of the Royal Institute of British Architects be distinguished by the inhabitants of that province as "unqualified" if he fails to register under the Ontario Architects' Act? Such a consummation is hardly to be wished, and the Council of the Ontario Association will probably not be long in finding it out. In one particular, however, they will be regarded by the architectural profession with curiosity; they are "the first by whom the new is tried." For though, during three centuries, the world has known that there are always architects and architects, a British Legislative Assembly has decided that, within at least the confines of the Province of Ontario, there shall be architects and "registered architects."—*R. I. B. A. Journal*.

The Supreme court of New Jersey held that where one builds a party wall under a city ordinance authorizing and regulating city walls, he cannot claim the benefit of such ordinance unless the wall is of the thickness required by the ordinance, and otherwise conforms to it, and is without openings.

THE NEW TORONTO BUILDING BY-LAW.

IT is the intention of the Toronto City Council to put into force at no very distant date a new or rather revised by-law "for regulating the erection of buildings and the storage of inflammable material." By-law No. 627 is to make way for by-law No. 2468.

Unfortunately this new by-law is not much nearer perfection than its predecessor. Its framers have apparently not availed themselves of the assistance they might have had of men well versed in building matters, engaged in connection with building operations for many years, and whose opinion would certainly, one would have thought, have been only too readily listened to by those who had such a by-law to draw up.

But what is the use of such a by-law when there is no one to see that it is carried out? The City Commissioner is the appointed "Inspector of Buildings" for the purposes of the by-law, but his multifarious duties entirely prevent his giving his attention to plans or to supervision of buildings in course of construction, and much less time has he for looking after defective flues and drains and so on in existing structures, so that unless one of these things has become already a general public nuisance or many have died through breathing sewer gas, is it possible for him to take cognizance of it.

The new by-law gives him power to notify the owner direct, instead of having, as heretofore, to notify the Mayor or a Magistrate who in turn shall notify the owner. This no doubt saves time and avoids some amount of red tape, but how does the Commissioner happen to hear of any defective flue or drain or tumbling wall, when his own time is taken up looking after dirty lanes, the protection of shade trees and grass, and so on?

We have repeatedly urged the necessity of having an Inspector whose duties shall consist in looking after plans and the works being carried out, and hunting up defects in new and old structures, and the by-law expressly states that a "practical mechanic" shall be appointed to the post, but that for the present the Commissioner shall take upon himself an inspector's duties. A practical mechanic might possibly be better than the Commissioner, but do not let it be forgotten that there are practical mechanics and practical mechanics, and we very much doubt if the right kind of man for Inspector would be found among this kind of men.

We have not space to criticize the new by-law as we would like to do, but a few of the most glaring defects, in the failure to enforce a good clause when it exists, should be commented upon.

Who looks after our churches and theatres, and takes the trouble to notice whether the hose and apparatus for quelling an outbreak of fire is in good order before the play is commenced? Or who sees that the seats and doorways, corridors and doors, are arranged so as to admit of the most rapid exit of all the occupants of any public building? Clause No. 34 says that there shall be no filling up of aisles or passageways with seats, chairs or drawseats—that obstructions to egress shall not be permitted. This is certainly a good point, but who is to see it carried out? Has our Commissioner ascertained to his satisfaction that our theatres are safe, that they can be emptied of the largest audience in two minutes, that there is no undue risk of fire behind the scenes? When statistics show us that when a fire breaks out in a theatre there is only a space of time, on the average of five minutes between the alarm and total extinction of life within the building, surely there should be no trifling about this particular.

Brick veneered buildings are still to be allowed within the limits of the city, provided they have stone foundations. Suppose fire breaks out from one cause or another in the frame building before the brick veneer has been added, what will be the result? total destruction of that particular building (which would be a good thing), and the probable destruction of a great deal of valuable property adjoining. One would have thought the terrible conflagrations in frame towns would have taught our council that there was folly here, if nothing else.

It is intended to extend the fire limits to the limits of the city—no doubt a good idea if the rest of the fire by-law was of any use, but they may as well fix by law the actual limits that a conflagration shall reach, as pretend to do any good with such poor and ill conceived clauses respecting protection from fire.

STEREOTOMY.

STONE-CUTTING.

J. A. PEARSON.

FIGURE 1 is the section of a battering curved wall. A. B. is the vertical height of the wall. Set off the batter at the base to the point C. Join A C, which is the face line, and divide it into the number of courses required. Drop the vertical lines cutting B C, at 1 2 3 4 5 6. The radius of

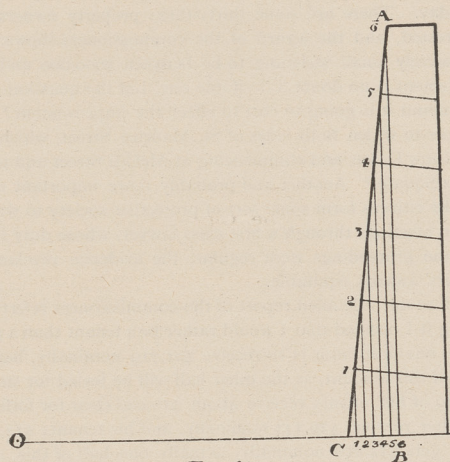


Fig. 1

the different courses may now be obtained from the point O., which is the centre of the circle. It is required to work any one of the stones in the wall.

The beds of the courses of a battering wall are worked at right angles to the face, their front arrises running parallel. Make a curved templet to the radius of the front arris. The length of this templet must be a little more than the longest stone in the course. Each bed joint requires a separate templet, but the same templet may be applied to the top bed of one course and the bottom bed of the course above.

Bring A B C D and E F G H to plane faces parallel to each other. On the face A. B. C. D. apply the templet for the top bed, scribe the templet

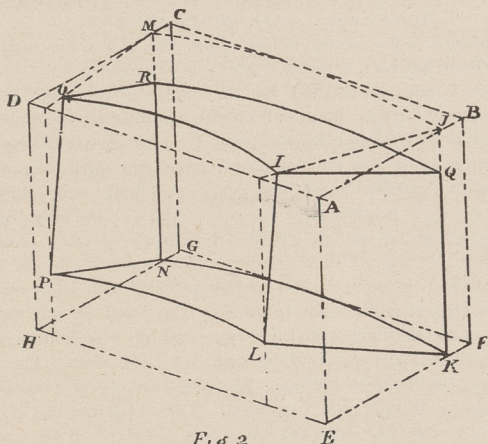


Fig. 2

marking the radiating joints I J and O M, sink the drafts J K and I L square with A B C D, connect L K with a draft and bring to a plane face.

Work the joint M N O P similarly. With the bevel set to the angle of the batter of the face applied on the plane A B C D, raise the drafts I L and O P, run a draft to the scribed radius of the face I O, sink cross drafts in the length of the face, and with a reverse made from the radius of the templet of the bottom bed, connect L P. Straighten the face by repeated applications of the straight-edge between L P and I O. Work the back face of the stone J K M G square with A B C D. Work the top bed I Q O R square with the face I O P L, and the bottom bed L K N P square with the face I O P L.

QUEBEC.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

AMONG the improvements being made to the Basilica is the lowering of the boundary wall on Buade St. In taking down the wall a rather ancient marble slab has been removed bearing the following inscription :

"In memory of the wife of Thos. Ainslie, Esq., collector of His Majesty's Customs of Quebec, who died March 14th, 1767, aged 25 years.

If Virtues' charms had power to save
Her faithful votaries from the grave,
With Beauty's ev'ry form supplied,
The lovely Ainslie ne'er had died."

The slab is plain, bearing on a carved moulding, which is carried by two corbels built into the wall. It will be placed in the gable wall of an adjoining building abutting on the space enclosed by the late boundary wall. In

past times this was used as the burying ground for the parish in connection with another enclosed space on the north side of church. The bodies were removed many years ago.

The contract for paving with wood blocks the lately widened St. John street has been given to Mr. W. J. Peters, at the rate of \$1.70 per super. yard. The sidewalks will also be formed of wood blocks. The plan adopted and specified by Mr. Baillairge, City Engineer, is as follows: A double floor of spruce to be laid, the lower one 2" thick, the upper one 1"; upon the latter sound tamarac blocks 7" in depth to be placed, the interstices to be filled with bitumen or cement, the Road Committee being as yet undecided as to which would be the better material to use.

Mr. Parent is making a handsome addition to the list of new buildings on this street. It will be three stories in height and mansard roof. The front is of fine cut Beauport stone with Deschambault lime stone enriched trimmings. The plans prepared by Mr. Peachey, architect, provide for a shop on ground floor and dwelling above; cost will be about \$8,000.

The June number of the CANADIAN ARCHITECT AND BUILDER has the following item: "The largest system of hot water heating in use says the *Winnipeg Commercial*, is believed to be that of the McIntyre block, Winnipeg, containing 600,000 cubic feet to be heated. The system uses Plaxton boilers which supply 28,000 feet of pipe in coils." This statement is a very incorrect one, as I am quite sure there are many much more extensive systems than the one above given. The Provincial Parliament Buildings in this city have a cubical space to heat of 4,667,000 feet, the buildings aggregating in length 1,032 feet, with a width of 42 feet, and height 56 feet, four pipe furnaces with eight fires are used with the best results.

Mr. F. X. Berlinguet, architect, has been named Deputy Commissioner of Public Works for the province of Quebec, in place of Simeon Le Sage, Esq., retired; so say the French papers.

Mr. L. Parquet, the great retail dry goods merchant of Quebec, having instructed Mr. J. B. Bertrand, architect, to prepare plans for the building of an additional store to enlarge the premises already occupied by him on St. Joseph street, that gentleman on the 17th of June awarded the contract for the front, which is to be 47 feet frontage and six stories high, to be built of Stanstead granite with 32 polished columns, etc., to Messrs. Laforce & Son, Quebec. The contract for masonry, brick and plastering, was given to Mr. J. B. Jinchereau, of Quebec. Shortly M. Bertrand will call for tenders for steam heating apparatus, dynamos, plumbing, painting and iron works. This new building of 135 feet depth, together with the two other stores, will give 64,908 superficial feet of flooring for the retail trade of Mr. Parquet. Add to this several warehouses of proportionate dimensions, and we must say that for a small city like Quebec, it speaks well for Mr. Parquet's enterprise.

DEFECTIVE CONSTRUCTION.

IN a recent number of the *Building News*, attention was called to defects of construction that were common to most building undertakings in England. What has been said of them will apply with almost equal force here. Where concrete is specified as a footing for masonry walls, it has become a practice on the part of some of our contractors to have the concrete thrown from a height into the trenches, when it is a matter of experience that an unequal resistance is offered by this means of concrete laying, as the material is consolidated at certain points only, and the intervening lengths are simply shovelled in or levelled. The chief objection to the throwing is that the heavy ingredients are separated from the fine. The best plan is to deposit the concrete by shovels and consolidate the mixture by a sort of gentle ramming or kneading.

Concrete should be composed of broken stone or gravel that will pass through, by its largest cross-section, a two or two and one-half inch ring, free from dust and dirt, and be screened if required. To be thoroughly mixed with three-sixteenths of its bulk of mortar, carefully put into place by an improved process and rammed or pressed gently to a solid mass. The stone may be furnace slag or hard brick. The stone should be spread out evenly in a layer not to exceed six inches in depth, and sprinkled so as to slightly wet the surface of all the stones. Upon it should be spread evenly the proper quantity of mortar, freshly made; the whole is then to be quickly and thoroughly mixed until every stone is coated with mortar; water must be gradually added by sprinkling, if necessary to obtain a better consistency.

Concrete should not be mixed in larger quantities than is required for immediate use. Any excess that has been standing for more than two hours should be condemned. Concrete over two hours old cannot be retempered and used with any safety. Concrete layers should not exceed nine inches in depth at one deposit, while six inches in depth at one ramming is considered better practice. As soon as it is in position it should be settled into place by slight ramming, just enough to flush the mortar to the surface.

When a fresh layer is to be put on one which has set or partially set, the entire surface should be previously made thoroughly wet. When in place, all wheeling, working or walking on it should be prohibited until at least twelve hours after being deposited.

All dirty or dusty stone should be screened or thoroughly washed before it can be used. One of the most frequently occurring practices is to litter up the top surface of concrete footings with dust, dirt, shavings and debris of all kinds, without taking any particular pains to clear it off when a new

layer is to be deposited. All work in the process of hardening should be protected by a temporary plank covering.

In brick-work, one sometimes finds broken bricks, spawls and fragments used to fill up chinks in the backing of a brick arc. It is almost unnecessary to say that broken bricks are not to be used except as closers.

Failure is frequently found to take place at an angle or pier because the line of pressure has not received proper attention. Another defect is a want of care in selecting the proper material in the wall work adjoining the angle. This is true, of course, only in stone masonry. Generally a corner or an angle is built up with extreme care (where such corners are built up in the solid), and the supporting walls are made up of stone of variable sizes and indifferently bonded, and the result is a settlement or break in the supporting wings. In angles or corners toothed in and anchored by means of irons, as practised in this city, the angle or corner is in reality the weakest portion of the building.

It is not necessary to try to prove that bonding fresh work into work that has been set or hydrated for days, by means of toothing, supplemented by anchorage, is a very poor substitute for solid corners or angles. If there is any doubt in the matter, it will be necessary to examine but few of the present structures in our streets to be satisfied of the truth of this assertion. Corners and exposed angles should, more than any other part of a building, be a matter of especial care in construction, as they are generally the most exposed to the action of the elements, and exhibit the first signs of decay. This is seen on chimney corners, apices of cables, tops of walls, brackets and cornices. In England lead copings are used to a large extent. In this country asphalt has been used, Portland cement at times and stone copings the most frequently. Slate slabs, one and one-half to three inches in thickness, according to the width of walling to be protected, form a splendid protection against weathering. In some of the better class of buildings, earthen tiles are used as copings, but it is proper to remark here that where such tiles are used the top surface should be glazed, and the joints be lap-joints, laid in lead and caulked, or in asphalt properly applied.

The temptation to span every large opening with an arch, using deep voussoirs, and backing this up by a relieving arch, has brought many a contractor to expensive grief. Precedents cannot be relied upon to guard against the thrusts of an arch, for each arch built is a separate undertaking, its load may vary considerably from what apparently a similar arch sustained, and the consequence is that its construction involves a new problem in mathematical "pyrotechnics," as some contractors have derisively termed the calculations. The most frequent cause of failure, however, is due to disregard of the piers or abutments upon which such arches are placed. It is a very good rule to avoid the placing of an arch in such a manner that its opening is partly over an opening below it. In other words it should spring from a solid pier with no break in it to the foundations, in line with the point of springing. And when supported by piers alone, such piers should be loaded sufficiently from above to withstand the thrust of the arch which acts upon the pier to overthrow it. In technical language the moment of stability of the pier must exceed the moment of thrust of the arch.

MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

MONTREAL HARBOUR IMPROVEMENTS.

NO definite information regarding the order in council reported to have been recently issued has yet been made public. It is understood, however, that plan No. 6 as submitted by the Harbour Commission will not be adopted in all its details. It is stated that a few days before Mr. Page's death he submitted a supplementary report to Sir Hector suggesting that a commission of five engineers be appointed to consider all the plans submitted and to prepare from them a final plan, embracing any good feature of each. He drew the attention of the Ministers to the danger of flooding Longueuil and St. Lambert's, and hinted that the Government might be held responsible for damages resulting in securing better harbour accommodation for Montreal. It is not known whether these suggestions will be adopted or not, but an answer is daily expected. It is also reported that a French engineer has submitted to the Public Works Department plans for the Montreal harbour improvements, embracing the features of many of the other plans, and providing an addition for a system of Glance piers from the head of St. Helen's Island to Victoria bridge, the removal of half of Isle Rond and the deepening of the south channel below St. Lambert's.

If the commission recommended by the late Mr. Page is appointed, I hope the "Shearer scheme" will be submitted and fully explained to them, when, I have no doubt, it would receive favorable consideration and give at the same time harbour improvements, wharfage accommodation, prevent floods and connect the north and south shores of the St. Lawrence. If it were only a question of preventing floods, I think the cheapest and most effective plan would be a system of booms in Lake St. Louis and Lake St. Francis, (which would cause the lakes to freeze over and prevent the ice coming down until the river was open below) and deepening the channel between St. Helen's Island and St. Lambert, thus causing the main body of the river to pass in the south channel in place of the north as at present. If properly carried out this would have the effect of doing away with the St. Mary's current.

STREET WIDENING.

Like most old cities laid out by French engineers, Montreal's streets, especially in the business thoroughfares, are far too narrow, and the city council for the past year or two have gone in for extensive widening. Last year St. Lawrence Main Street was widened at what was considered a very high cost, but Notre Dame street, from McGill to Chaboillez Square, which is about to be widened, has opened our eyes to what an expensive luxury street widening is. The report of the commissioners on expropriation was filed on Friday. There are some thirty-three property owners and their tenants interested, and the award of the commissioners shows the cost of this comparatively small widening to be between \$600,000 and \$700,000. The improvement is no doubt a desirable one, but the question arises. Is it worth the amount it is going to cost to effect the improvement? Might it not be cheaper to widen both sides of St. Maurice Street, which is a street parallel to Notre Dame, and commencing at McGill Street and terminating at Chaboillez Square? Another and probably more important question is, should not the citizens form some sort of protective society to watch all the expropriation meetings through a first class lawyer, whose duty it would be to see that the proceedings were regular, the evidence relevant and the commissioners' awards equitable.

I have before me a detailed report of the commissioners referred to, and on examining it I decided that I would rather be a tenant than a proprietor. For instance, one proprietor is to receive \$21,719 nominally, but in reality about one-half this amount, as the other half will be levied for street widening, while two of his tenants receive about \$10,000 clear for forfeiting their lease. Another receives \$20,144 nominally, and his tenants \$12,600. Another owner gets \$14,756 nominally, actually one half of this, and one of his tenants \$12,135, and another \$1,782. Now I hold that if a properly organized contestation of these awards is made, that any Court of Justice would reduce very considerably the lessees' awards. It has been a known fact for some time past that Notre Dame Street was to be widened, and tenants leasing the stores were fully aware of it at the time. Some of the leases went so far as to state that the tenant in the event of the street being widened would have no claim against the owner for damages, and yet the city is bound by the commissioners' awards to pay them heavily. It would almost pay the city to have notified the tenants of their intention to widen the street, and await the expiration of their leases, than to pay such heavy damages.

I believe the City Surveyor's estimate for damages was about \$180,000.

MOUNT ROYAL PARK INCLINE RAILWAY.

The extension of the above railway from the foot of the mountain to Fletcher's Field has been completed, and was yesterday open to the public. The station is not yet finished, but the road was yesterday thoroughly tested by upwards of four thousand people who availed themselves of the opportunity to visit Mount Royal Park. Everything worked splendidly, and notwithstanding that the machinery, ropes and track were new, and hardly could be expected to be into gear, everything went off like clock work. It is a great acquisition to the poorer classes; the only objection is that it does not go far enough. It should, properly speaking, be continued to the corner of Craig and Bleury streets. The length of the new incline is about 12,000 feet, is drawn by steel cables provided with safety ropes, with tension weights at either ends to take up the slack of the rope. The machinery is of the strongest and best type, and has been built in Montreal under the personal supervision of the company's engineers. The grade is one in twelve for the lower portion. About 600 feet of it is of timber trestle, and the balance through rock excavation. The upper elevator is five hundred feet long, and rises some 420 feet in this distance. Both roads have been recently tested at the request of the City Council by the City Surveyor and the engineer of the Dominion Bridge Company, who reported that they found everything in first-class order and perfectly safe. They submitted the road to some severe tests. The road has been built with every possible care under the supervision and specifications of W. McLea Walbank, C. E., and Capt. James Wright, M. E., the former having charge of the civil engineering and the latter the mechanical department.

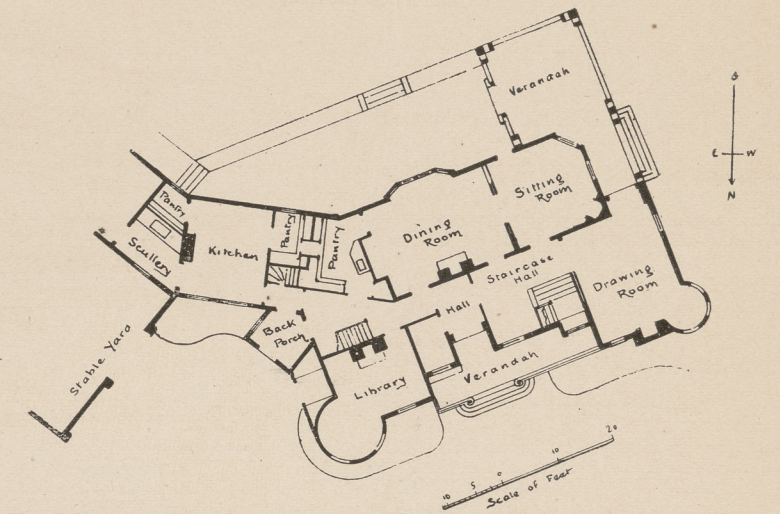
BUILDING NOTES.

A large residence is in course of construction for Mr. Ross, C. E., late of the Canadian Pacific. I understand the plans were prepared in the first case by a Montreal architect, but for some reason best known to himself Mr. Ross has seen fit to dispense with the services of his Canadian architect, and to employ a Boston architect to make new plans and carry out the work. I cannot understand how it is when Canadians have any money to spend they always avoid local men and prefer to employ alien architects. It is to be hoped "every dog will have his day." The only thing left for the local architects to do will be to see that duty is collected by the Customs for the plans in question.

In pile driving, it is said in the University of Michigan *Technic* to be held by many experienced engineers, both on the Atlantic Coast and on the Mississippi, that for ordinary ground the pile should not be sharpened. They say that the pile if sharpened rarely has its point in the neutral axis, and that the blows of the hammer are not applied so that the action line of the force passes through the point, and hence a couple is introduced tending to strain and weaken the timber. If, on the other hand, the pile is left blunt, the consolidated earth forms a point which, changing with each blow, keeps itself continually in the line of force and hence the straining couple is not introduced. In ordinary practice, however, the pile is tapered somewhat at the lower end, although not sharpened to a point.

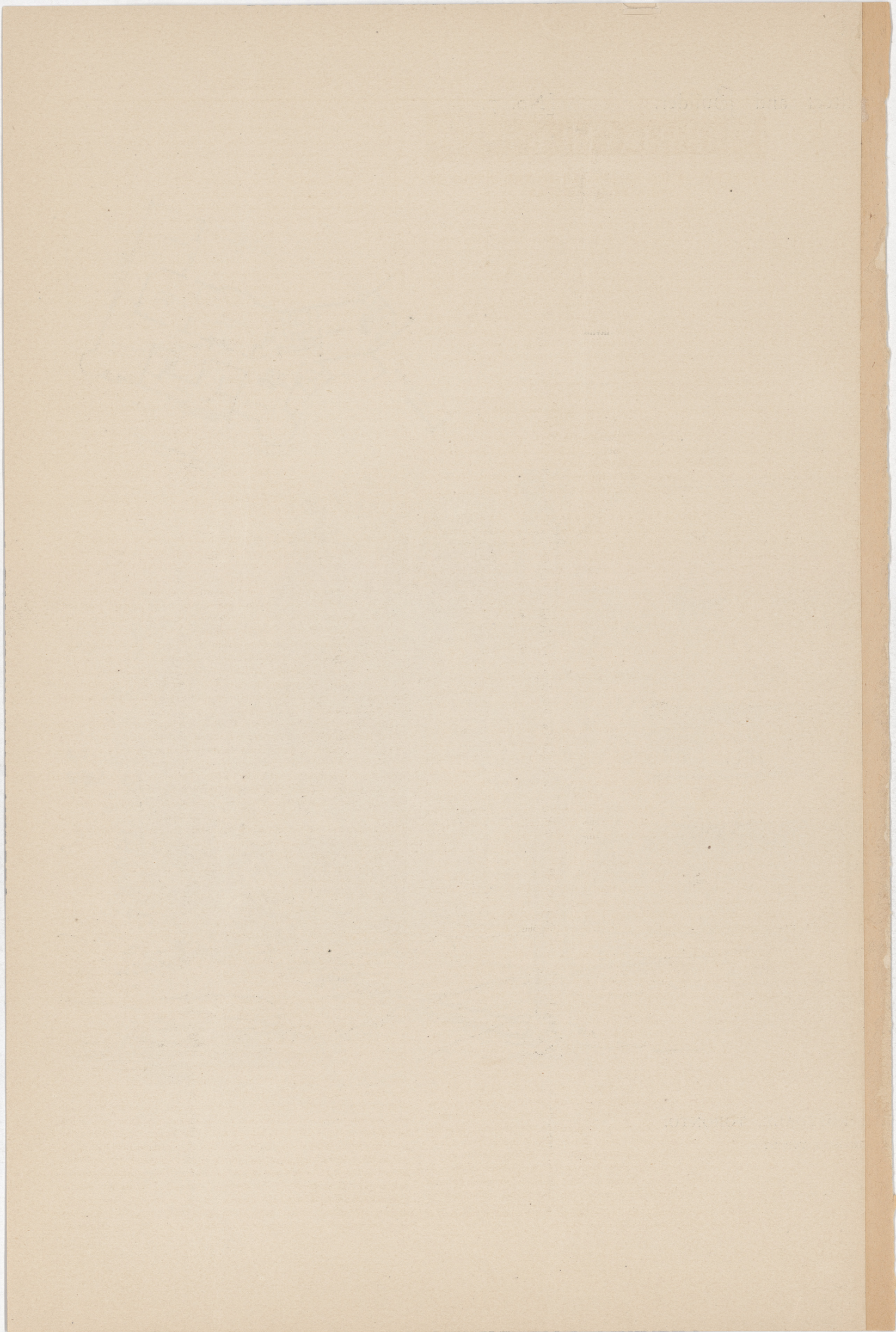
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SKETCH FOR RESIDENCE, ROSEDALE, TORONTO.

DARLING & CURRY, ARCHITECTS, TORONTO.



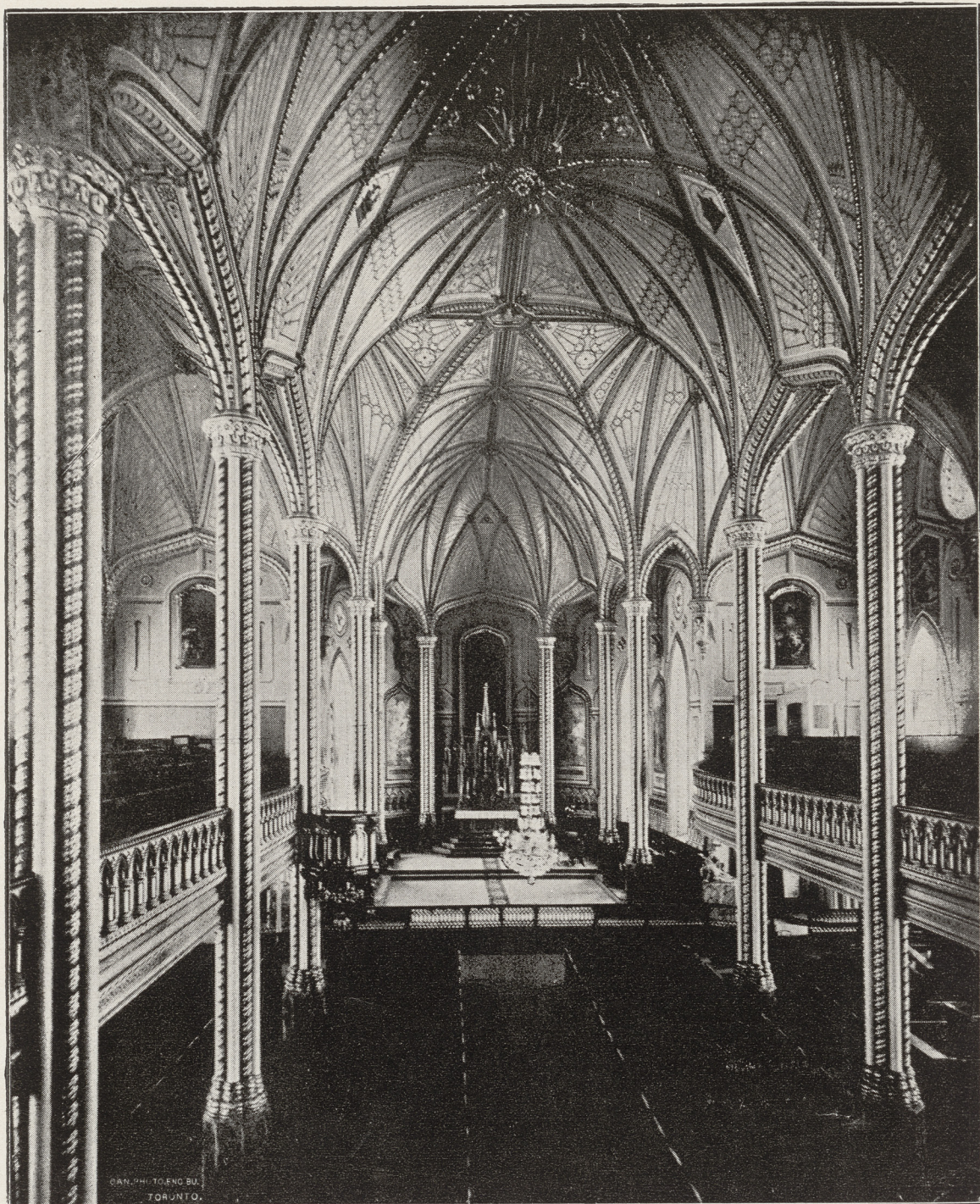


INTERIOR OF RECEPTION HALL IN SUMMER RESIDENCE OF HON. JUSTICE DAVIDSON, DORVAL, QUE.

A. F. DUNLOP, ARCHITECT, MONTREAL.

THE UNIVERSITY OF CHICAGO PRESS





INTERIOR EGLISE DE ST. MARIE DE LA BEAUCE.

SUPPLEMENT TO
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C. BAILLAIRGE, ARCHITECT,
QUEBEC.



PLUMBERS' WORK AS APPLIED TO THE DUTIES OF SANITARY INSPECTORS.*

I WILL endeavor to deal with a few details in which plumbers' work bears directly upon that part of a sanitary inspector's duties where he has to examine, condemn and refix drains, water-closets, baths, etc. I consider our first and chief duty is the prevention of disease; when disease appears, to trace its source, also to remedy the cause (if possible) so that it may not recur again. In this duty we are constantly brought into contact with plumbers' work in the shape of waste, soil, rain-water pipes, drains, &c. Although the latter may not be, strictly speaking, the work of the plumber, yet on many large and good jobs the plumber is held responsible, and has the superintending of the laying of the drains; especially is this the case where drains of this kind have to be brought to meet his soil or waste pipes; at any rate, a plumber ought to be able to know what size his pipes will require, and why such size.

Before we proceed any further, I think we ought to consider what system of drainage is best, viz., the "trap" or the "trapless system." In a very able paper read before this association in September, 1888, a gentleman gave as his opinion that the latter was the perfection, or, to be more correct, the acme of perfection in house drainage. I have my doubts about this matter, for reasons which I will not try to explain. I do not wish or intend to set up my knowledge or experience, which are both very small, against the knowledge or experience of the reader of that paper, but there were one or two points not dealt with which I think come entirely within the subject of my paper.

In the first place, the "trapless" system is a misnomer, for a trap is used to intercept or disconnect the drains from the sewer; secondly, I think the great objection to it is that there is no check to prevent the disagreeable odors, waste pipes, etc., from entering the house. Experience seems to show that, be the waste pipes of lead of the best workmanship, laid with the greatest care, all burrs and sharp bends avoided, in fact, a perfect job so far as the making and laying of the pipes are concerned, in a few years time, if not before, there will be complaints of disagreeable smells arising from the center or other soap which has congealed to the sides of the bath and lavatory waste pipes, or from the soil which has found a resting place on the sides of the soil pipe. For the first few months all will go well, but by degrees the smooth bore of the pipe—to use a plumbers' phrase—would be "eaten into," i. e., the water and air acting alternately on the lead would have a chemical effect, causing the smooth bore to become rough; then, instead of cleansing themselves they would become more and more fouled.

This is what suggested itself to me if the pipes were of lead. But, if the pipes were iron, it seems to me—from what I have read—that they would become foul in a much shorter time. An experiment was made in the room by the same gentleman to show that sewer air will pass through any number of water barriers; this seems to be a greater reason why the "trapless system" should find little favor. I, and I am sure all of us are, open to conviction, and if any gentleman in the room will try and show us, from conviction and otherwise, that the "trapless system" is the best, we will use our poor influence to bring about this "acme of perfection." With regard to the trap system, I think the old fallacy that because a pipe is trapped, therefore there can be no danger, is fast dying, else why disconnect soil-pipes and waste-pipes at the foot. We claim for traps that they can keep out any sewer-gas that may escape, and certainly they keep out any disagreeable odors of soap and soil that may lodge in the pipes. If the soil and waste-pipes are well and properly ventilated, there can be no danger of a pressure upon the traps, and if the traps are regularly flushed out, there can be no danger of the water in them becoming foul. No doubt there is much to be said for and against both systems, but on these I do not intend to enter; it is too large a subject for a paper like this is intended to be.

Having thus briefly touched upon the trap and trapless systems, it devolves upon me to say something about traps in general. Trap-making is one of the great arts in connection with the plumber's handicraft. In many large shops they keep what are called "bench hands," who are engaged upon nothing else but the making of traps, bends, etc. Traps and trap-making is a part of plumbers' work which has a direct bearing upon a portion of our duties; for how often are we called upon to examine the traps of a house where typhoid or diphtheria has made its appearance. Perhaps, in the whole history of sanitary matters, no article can be found which has more perplexed the British householder than the article known as a trap. Each inventor, vendor and fitter-up has lauded some such contrivance. The essentials of a good trap are, that it should be self-cleansing; that the water should be changed every time of using; that it should be free from any working parts likely to get out of order or become fouled; that it should hold enough water to prevent the escape of any noxious vapors, and not too much surface exposed to the air. For ordinary purposes the lead S or P trap, properly made, fulfils all the above conditions. No doubt this

is the reason why patents of various other sorts find so little favor. There has been put into the market cast and drawn lead pipes of the shapes mentioned, but it has been found that they will not last as long as the hand-made trap. For some reason or other, they collapse completely. Then, there are other makes of lead traps in the market, e. g., the old D trap, which we rightly condemn for reasons upon which I need not dilate; and yet the old D trap has its good quality, which is such a good one that it has been produced in a new form, and finds much favor in the south, I mean the "geometrically formed trap." It is almost the same shape as the old D trap, but so constructed that it conforms to the requirements of a good trap. The good quality of the D trap is that it is not so easily syphoned as the pipe trap; this, when a number of water-closets or sinks are fixed on a length of pipe, is a great consideration. This syphonage can be obviated to a great degree by fixing a number of relief (or ventilating) pipes; but in every case the fixing of these is an impossibility. I need not enter into the merits or demerits of the different kinds and makes of traps. We are all familiar with Buchan's, Bowers', &c. Our duty lies not in the making of the traps, but in the fixing. I do not for a moment wish to imply that we ought not to know the advantages and the disadvantages of the various makes of traps, for it ought to form part of our duty to acquaint ourselves with all the different forms and makes. With regard to the fixing of traps (for the present I exclude the water-closet traps), the trap ought to be fixed perfectly level, or on such a slope that the water seal is not too much diminished or done away with altogether. It ought to be fixed as near the bath or sink as can be. Sometimes we get complaints of unpleasant smells from the fact that the trap has been fixed too far away—perhaps two or three feet away—from the inlet, leaving this length of fouled pipe to cause the smell complained of. This happens most often when a "running, horizontal or U" shaped trap has to be fixed. For the convenience of making the joints, the plumber will leave two or three feet more pipe than he has need to do. This kind of trap is rarely used when a P or S trap can be fixed.

I think it will be obvious to us that a trap is better if made in one piece, but as they take a longer time in making, they are more expensive; consequently we generally find traps made in two pieces and soldered together. The great art in trap-making is to get the lead equal in every part; there is a tendency for the lead to get thin at the edges and thick at the center. If a trap is fixed in this state, the hot water will cause it to expand, the cold water to contract, and the trap will give in the weakest or thinnest place, viz., the seams. No doubt we have seen traps that have given way in this manner. Another reason for traps giving way at the seams is the galvanic action set up by the two metals used in the solder, and the water and air acting upon them alternately; so that when we are examining lead traps we ought to carefully examine the seams, for although the defect may only be enough to allow a drop of water to escape every minute, yet that drop will cause the trap to become unsealed.

Now, a few words on water-closets and the fixing of them, for it is in this part of our duty that we need a good knowledge of plumbers' work. The first thing we require to know in the alteration or carrying out a system of the disposal of fecal matter by the water carriage system, is what kind of a water-closet apparatus we are going to fix. There are such a number of "perfect sanitary closets" that the difficulty is to pick out the most perfect. The valve water-closet finds great favor with some of the leading sanitarians of the day; there is no doubt it possesses advantages over many of the water-closets now put into the market, but there are several drawbacks to its general use, i. e., it is too expensive for common use; there are too many working parts about it, and it is not so cleanly as the earthenware: therefore, I think we can divide water-closets into two divisions, viz., the wash-out (manufactured in one piece) and the hopper and trap. Personally, I have great objection to the wash-out. It offers, to my mind, several objections; first and foremost, it is not as clean as it might be. I have taken particular notice of several that have been fixed, and I find that the back part of the outlet of the basin is oftener than not covered with filth. Several have told me that this is due to inefficient flush, but to my mind it is due, not to the inefficient flush, because I have noticed that it is not only in the back and side of the flush wash-out, but in those with a flushing rim where the water drops direct on the part complained of, but it is due to the water not being able to scour the back part of the trap. Another drawback is that if it is used as a urinal, as a water-closet ought to be used—for urinals are objectionable in private houses—the urine trickles over the basin and causes not merely the staining of the basin, but in time an objectionable odor; this will be especially noticeable if the closet is used by a number of females. Again, if the water-closet happens to become choked, the whole apparatus has to be taken out to unstop it, and I can tell you from experience that it is anything but a pleasant job. In the hopper and trap none of these objections offer themselves, provided we get a good form of basin with a good scouring flush; the best I have seen in the market was a pattern made by Dodd (late of Cable street). The hopper and trap can be used as a urinal if fitted with an earthenware top, without any fear of objectionable odors arising therefrom, for it can be scrubbed every day with a brush, and each and every part can be so cleansed if the seat is hinged so as to allow of it being raised for this purpose. I assisted to fix this form of water-closet in the Hospital for Women, Shaw street, and they gave the greatest satisfaction. Now, as to the mode of fixing water-closets in general, the soil-pipe is the first to be fixed; this ought to be fixed outside the

* Read before the members of the Association of Public Sanitary Inspectors of Great Britain by A. E. Adams, R. P. C., Asso. San. Ins.

premises, disconnected at the bottom by a trap made specially for that purpose, and carried by a continuous line of pipes to a safe distance above the roof. The branch-piece that attaches the water-closet to the soil-pipe ought to receive our particular attention, for I am sorry to see many plumbers using the iron branch-piece; this branch-piece is too short to receive the outlet of the earthenware trap, which means that a piece of lead pipe has to be inserted into the iron socket and over the outlet of the trap, making two joints in place of one, and one of these joints buried very likely in the wall. This joint being made with putty or red-lead is apt to crack or break; if this happens we have the whole fumes of the soil-pipe escaping into the house, and where the soil-pipe is not disconnected, sewer-gas finds only too ready an entrance.

Let us discourage, as far as we can, the use of iron branch-pipes; the branch-pipe ought to be made of lead, with an arm sufficiently long to reach the earthenware trap. This branch piece is better made of three pieces of lead than soldered on to one perpendicular piece, as is most common, for a reason which I will give later on. The joint between the earthenware trap and lead ought to be fixed by means of a lead flange, bolted on to the flange of the trap, packed with red lead, paint and tow. The joints of the soil-pipe, presuming them to be iron, ought to be rusted together, which is made by mixing iron fillings, sal-ammoniac, water, and a pinch of sulphur; the joints are packed with tow, hemp or rope; the rusting is then driven tight into the joints by tools made specially for that purpose. Before the trap is finally placed in position, it ought to be tested as to whether it is a trap, for I remember a large house being fitted up with new sanitary arrangements, and the last state was worse than the first—owing to the water-closet traps being no traps—for when the job was done it was discovered that the water seal in the water-closet traps formed no barrier to the escape of sewer-gas, and new water-closets had to be substituted at the cost of the firm carrying out the work. Various cisterns are used for the various patterns of water-closets, but perhaps the best is the simplest form of syphon system we can get, for the reason that persons very often, when using a water-closet, neglect to hold the handle long enough to ensure a sufficient flush. In making the selection of a cistern, we ought to try and get a ball tap that will allow of the cistern being filled as quickly as possible after it has been used. If we get a slow-filling cistern, the probability is that the next time the water-closet is used, there will only be a partial flush. The cistern ought to be fixed, if possible, directly over the water-closet, so as to allow the full weight and force of water to cleanse the basin and trap; if we cannot get above four feet of a drop from the bottom of the cistern to the basin, a $1\frac{1}{2}$ inch pipe ought to be used; if over four feet, a $1\frac{1}{4}$ inch pipe will generally be sufficient. There is a great knack in the way the flush-pipe enters the basin so as to obtain a good scouring flush. I cannot enter into the various methods employed, or the various shapes the mouth of the pipe is made to ensure such a flush, for their name is "legion," except to say that cork or wood should *not* be employed, for in time these temporary methods will come out of the place, and the flush perhaps be worse than ever. The putty joint is made as follows: The arm of the basin and the flush-pipe is painted just around the arm; the putty is then laid around the two, over this is carefully wrapped a piece of rag, which has also received a coat of paint, and then to bind the whole together a long piece of string is tied in a peculiar manner known only to the craft. The joint is thus made, and may receive, if thought necessary, a coat of paint, which will tend to bind them all together.

A few remarks on the water-closet branch-piece, and then I have finished. I stated that the branch-piece is better made out of three pieces of lead and soldered together than the branch-pipe soldered on to the perpendicular soil-pipe; but even this plan is better than an air-pipe taken from the top of a bend—the first-named plan is the best for several reasons. (1) We get the full bore of the pipe both for the soil and air-pipe. (2) There is no chance of any solder to form a burr or projection into the pipe. (3) The danger of allowing the branch-piece to the socket into the perpendicular pipe too much, or the air-pipe to socket too far into the soil-pipe, is obviated. A few of the mistakes that may occur—unless the greatest care is exercised—in the two last-named systems of branching air-pipes on to soil-pipes are: The solder in making the joint may run inside and form an obstruction to the soil and paper; the branch-piece may be socketed too far into the perpendicular pipe, and so allow an accumulation of filth to gather; the branch-pipe may get moved from its angle before soldering, and thus cause a bad joint at its upper end. Those of you who know the mode of getting the angle and fixing these pipes will understand what I mean. The soldering of an air-pipe on the top of a bend coming from a water-closet is the worst plan of all. Oftener than not, the top of the bend is only opened out to $2\frac{1}{2}$ or 3 inches diameter, then a 4-inch socket is planted on the top of the opening and soldered, so that really we only have a $2\frac{1}{2}$ or 3 inch air-pipe. Again, this socket-pipe may be lowered too far in the bend, thus forming a barrier to the passage of the soil, and if it does not actually cause a stoppage, it allows the accumulation of filth, which is far from desirable.

There are several small items I would like to have pointed out to you in connection with this part of my subject, but I think I have said enough to show you that there are many small details which we would do well to study.

Messrs. R. McDougall & Co., of Galt, have sent us a handsome lithographed hanger, on which is displayed perspective and sectional views of the Plaxton hot water boiler, of which they are the manufacturers.



DECORATION OF HALLWAYS.

NOTHING can be more stiff and unattractive than the old-fashioned long, narrow hallway, which is a mere passage and needs to be relieved by a few artistic effects. Modern architecture serves to break up the long straight lines, especially in country villages where there is a chance to throw the staircase into a niche built for that purpose at one side, or to carry it up by easy stages from the rear of the small reception room into which the hall is thus converted.

Luxurious dwellings, costing many tens if not hundreds of thousands of dollars, are, of course, entered through stately apartments which give dignity and value to the whole structure. It is not of such that we principally treat to-day, but of those modest houses already built in which the majority of well to do citizens find their homes.

Much ornamentation in such a hall is impossible. The best thing to do where expense is not objected to, is to drop a couple of light Moorish archheads from the ceiling directly over and in a line with the foot of the staircase. They meet over the newel post and must be constructed of the same wood as that used in the finish of the hall.

Then drop a Mikado bead portiere from the hall arch head, which may be very simply carved—the shape imports more than the finish—permanently fastening it against the wall at the height of the newel post. In front of the fastening and contiguous to it place a small slender circular table, gilded if the hall be not well lighted, sustaining the inevitable and useful card receiver.

A thicker hanging may be used but the effect is then less happy, since the narrow portion of the hall shows as a half seen and dimly lighted vista, giving that appearance of space which is rather increased by the intervention of the portiere.

The treatment of walls and ceiling is entirely a matter of light and location. A house situated on the north side of a city street, and with that handsomest vestibule door of all—one of plain plate glass, beveled and uncolored—will allow a good deal of deep, dark color in the hall. A strawberry red, or a transparent carmine glaze over deep yellow, any color which is glorified by sunshine, may be here admissible. The dado may be rich dark reddish brown or bronze, either stippled or stenciled in geometrical figures or painted lincrusta walton. The ceiling may be cream or a warm gray, with a line of bronze lined without the wall color some six inches from the wall and an inch in width. The mouldings are also bronze with narrow lines of crimson.

This coloring, while very effective, is florid for a quiet taste. Suppose we use chocolate for such, with a canary yellow for the ceiling and dado. The chocolate is light or gray enough to allow stencilings of citrine color in the dado. They must be small in size and archaic, arabic or geometrical in figure, never in the remotest degree copying natural forms. The dado should not be more than eight or ten inches wide, and the figures should be edged or outlined with black. The citrine ought to reappear in the mouldings, and a line of dull orange brown, six inches from the wall, finishes the ceiling.

These old-fashioned stencilings with the painted wall upon which they are super-imposed are always more or less in vogue. This method of decoration, though costing a third more than a good quality of paper, is both durable and quaint, and will never entirely go out of style. Hand-finished work has a certain quality to recommend it which cultivated people are not slow to recognize. Besides, it can easily be kept free from dust and shows no joinings like wall paper.

Upon a wall of light reddish brown, in a dark hallway—one having a northern front, may be stenciled figures in three sizes, ranging from two to five inches in diameter. These may be of the color of *café au lait*. In the frieze reverse the order, using the reddish brown large figure of the stenciling alone upon the ground of the lighter tint. The ceiling ought to be lighter than

the cone, scarcely more than a pale salmon, a color which gives a pleasant glow to the darkest corner.

Where paper is preferred to paint, it is desirable to use large figured yet unobtrusive designs, such as a canary yellow ground with conventionalized flowers of a slightly deeper tint, or deep crimson upon light, that is, shade upon shade. Two distinct colors in one small room serve to make it smaller still unless they are finely broken and mixed in the Persian style. Even then this kind of paper suits rather a bed room than an entrance way. Sand finished walls are, indeed, very suitable for a hall as well as a dining room. In this case the stenciled frieze should be used, not paper. The cove-color should harmonize with that of the stenciling.

The richest finish of all are hangings of painted tapestry, but these are beyond the reach of moderate purses. In this manner the hallway of Geo. W. Childs, of Philadelphia, has lately been decorated.

It is a lofty room, some twelve feet wide. The door casings, base board and mouldings are made of native and foreign marbles, ranging in tint from black to yellow. From top to bottom the walls are covered with what appears to be Gobelin tapestry, at least to a cursory observer.

Instead of that it is skilfully executed painting on tapestry canvas, the subject a beautiful landscape which climbs the staircase, hillwise. Beyond the foreground of bosky dells and groups of forest trees are vistas of beauty. The whole makes an exceedingly rich, variegated and striking piece of decoration.

In the front of the newel-post of the grand staircase, in this same hall of Mr. Childs, is set in the dial plate of a handsome clock, also of marble like the post and railing. This staircase rises from a side hall at right angles to the main entrance. In it are some noble specimens of cloisonne enamel, which were brought from Japan by General Grant and by him presented to Mr. Childs. One of them, a huge vase, is the largest and finest to be found in this country.

To the top of a newel-post might easily be attached a quaint, large mouthed, low vase, suitable for holding ferns, a small palm or any other decorative plant. It might be changed from time to time, and would always serve to break the straight, stiff lines of the staircase. And if there is a landing, let a piece of rich Japanese embroidery or a Turkish rug be thrown over the balustrade, or hang a bit of rich color on the wall behind.—*Decorator and Furnisher.*

PERSONAL.

An award for distinguished merit has recently been made by Cornell University to Mr. W. N. Gibb, a former Upper Canada College student, for a thesis on "Library Architecture."

Mr. John Page, Chief Engineer of Dominion Canals, died very suddenly shortly after entering his office in the new Departmental Buildings, Ottawa, on the morning of the 2nd of July. Disease of the heart is said to have been the cause of his death. The news of the sad occurrence brought a sharp pang of sorrow to the hearts of many acquaintances throughout the Dominion whose high admiration he had won by his kindly disposition and sterling integrity of character. Mr. Page was born in Scotland on 9th August, 1815, and served first under the late Robert Stephenson as engineer of the northern lighthouse board. He came to the United States in 1838 and was engaged on the Erie canal until 1842, when he entered the service of the Canadian Government as resident engineer on the Welland canal. In September of the same year he was appointed resident engineer of the Junction and Williamsburg canals, which position he retained during 1850-52. He then filled the position of superintending engineer of canals below Kingston from 1852 to 1853. In 1863 he declined the deputy ministership of public works. On the 8th March, 1864, he was appointed chief engineer of public works of the provinces of Quebec and Ontario, and on 15th March chief engineer of public works of Canada. The survey for the Welland canal enlargement was commenced in 1870, and from 1872 to 1873 he was engaged in making reports on the enlargement of the canals from Lake Erie to Montreal. On the 10th December, 1873, he made a report on the proposed Baie Verte canal. On the 16th February, 1880, he presented a special and general report on the canals of the river St. Lawrence. He was chief engineer of canals from 1879 up to the time of his death, and altogether had been 47 years in the service of the Government. He was fourth president of the Canadian Society of Civil Engineers, being proposed for the present year. The funeral, which took place from the late residence of the deceased at Brockville, Ont., was attended by many men of prominence within the engineering profession as well as outside of it. It is a pleasure to learn that steps have already been taken to erect a monument to his memory.

MANUFACTURES AND MATERIALS

STRENGTH OF LEAD PIPE.

MR. George L. Knox, of the Colwell Lead Company, in writing on the strength and durability of lead pipe, says:

"Lead pipe will sustain quite a heavy pressure if it is applied without shock, but in all practical work, in the plumbing of houses especially, the column of descending water suddenly stopped by the closing of a faucet exerts an increased pressure that will burst pipes which would stand a very much larger weight of still water. If the safe working pressure given in the table referred to were only slightly in error I would not think it necessary to call your attention to them; but my practical experience has shown that the figures there presented are very far from consistent with safe practice. Perhaps the best evidence to present in support of my views are instances that occurred in practical work.

When aerated bread was first made in this city we were asked to furnish a tin-lined lead pipe under two inches in diameter to stand a pressure of 140 pounds to the square inch, the pipe to be used for conveying the carbonic acid gas, which was forced through the dough after it was mixed. We furnished for the purpose AAA pipe, but it would not stand the pressure. We then made for them a heavier pipe, but with no better results. Finally, we made a pipe that was at least three times as strong as AAA pipe, but even this did not stand the 140 pounds pressure. Of course these pipes did not give out at once and the strongest lasted a few weeks, but eventually the lead swelled and burst. The parties for whom we furnished the pipe were finally obliged to use an iron pipe, tin-lined, the tin being necessary to prevent the corrosion of the iron by the carbonic acid gas. You will notice that the pressure was only 140 pounds to the square inch, and according to the table you printed the 'safe working pressure' of all the AAA pipes under three inches was considerably in excess of this figure."

GOOD TIMBER.

THE loud reports that our supply of good timber is fast being exhausted has naturally attracted science in that direction, the diagnose to quality produced in the great timber regions of the south. Professor Rankine says:

"There are certain appearances which are characteristic of strong and durable timber to what class soever it belongs.

1. In the same species of timber that specimen will in general be the strongest and most durable which has grown the slowest, as shown by the narrowness of the annual rings.
2. The cellular tissue, as seen in the medullary rays (when visible), should be hard and compact.
3. The vascular or fibrous tissues should adhere firmly together, and should show no wooliness at a freshly cut surface, nor should it clog the teeth of the saw with loose fibres.
4. If the wood is colored, darkness of color is in general a sign of strength and durability.
5. The freshly-cut surface of the wood should be firm and shining, and should have somewhat of a translucent appearance. A dull chalky appearance is a sign of bad timber.
6. In wood of a given species the heaviest specimens are in general the strongest and most lasting.
7. Among resinous woods, those which have less resin in their pores, and among non-resinous woods, those which have the least sap or gum in them, are in general the strongest and most lasting.
8. It is stated by some authors that in fir-wood that which has the most sap-wood, and in hardwood that which has the least, is the most durable—but the universality of the law is doubtful. Timber should be free from such blemishes as clefts or cracks radiating from the centre; 'cup-shakes' or cracks which particularly separate one annual layer from the other, V 'upsets,' where the fibres have been crippled by compression, V 'ringalls,' or wounds in a layer of the wood which have been covered and concealed by the growth of the subsequent layers over them.

The sub-committee of the Kingston city council appointed to consider the advisability of the city encouraging the establishing of cement works there, has reported that there is plenty of the material required for cement manufacture available. There is said to be marl at the bottom of every lake in the county of Frontenac, the whole of the bottom of Laboro lake, twenty miles long, being composed of it. A specimen of cement of satisfactory quality has been made from this material by Mr. Lenderoth, the promoter of the new enterprise. A Committee has been appointed to canvass the city for stock in the proposed works.

Not only are the natural colors of oak and mahogany, including the white variety, very extensively used, but with the partiality for light wood generally apparent, even a library, as in a recent decorative arrangement by a good architect, may be finished in sycamore free from stain. The method is not claimed as a novelty, considering that for centuries the Japanese and East Indians have done the same. Instead of elaborate molded work, a tendency is shown to have plain panels, rails and stiles, exposing as much as possible the nature of the wood. Whitewood is valued as a material to be finished in enamel, as is done in many rooms.

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TESTIMONY FROM MANY PLACES—FILLING A GREAT WANT IN THE PUBLIC SCHOOLS—AN IMPORTANT TORONTO INDUSTRY.

WITH the increasing size of Canadian towns and cities and with the growing importance of their leading institutions the question of how to heat and ventilate great public buildings has come more and more to the front as to how that must be settled. Especially is this the case with the schools of the country, for the rooms in these buildings are in use almost every day and almost continuously for at least six hours a day, and their occupants are those with whose lives and health we can least afford to trifle. Engineers and sanitarians have long been convinced that the two questions of heating and ventilation were in reality only the two phases of one question, and that to solve one rightly was to solve the other also. Judging by the favor with which it has been received, the system inaugurated by Mr. Smead, and developed and brought into practical use by the firm of Smead, Dowd & Co., answers satisfactorily the public demand in this regard. The firm established a Canadian agency some three years ago, with headquarters in Toronto, and in the short time since then the excellent work done has established for the firm a reputation equal to that it has already gained in the United States, where it stands unsurpassed, if not unrivalled. Mr. Dowd, one of the leading members of this great manufacturing house, gave to a reporter yesterday some facts concerning the apparatus and the extent to which it is in use.

"You understand," said Mr. Dowd, "that our system is adapted especially to the heating and ventilation of public buildings. We not only warm a room but ventilate it, changing the air in a school room, for instance, from six to eight times every hour. The importance of such a thing in relation to the health of children can hardly be exaggerated. One feature of our business that is very gratifying to us is that once our apparatus is tried in a town or by any section of the community and the need arises for a further order we always get the contract. Soon after we established our office in Canada in 1886 we got the contract for the Collegiate Institute in Chatham. When the question had to be decided how the new Chatham and Kent county building should be heated the contract was given to us. This building is a very large one, and is now just being completed. In 1887 the Montreal School Board sent a deputation to Toronto to investigate our system, and they were so well pleased with it that they actually cancelled a contract they had made for a hot water apparatus for Victoria School, then in course of construction, and gave us the contract for the heating system. Next year they placed our apparatus in the Royal Arthur School, taking out a hot water apparatus which had just been overhauled. Last year they introduced our system in the St. Jean Baptiste Ward School, and this year they are placing it in a new school in the Hochelaga Ward, and a few weeks ago they gave us the contract to take out the combined hot air and hot water heater in the Anne Street School and put in our own.

Ottawa is another city in which we have won success, which is most gratifying to us. The School Board sent a deputation to Toronto in 1887 to investigate this matter, and, as a result, our system was put in the Percy Street School. This was found to do such satisfactory work that in the following year they adopted it for the Central School West. The Collegiate Institute Board was convinced by the practical results of our work and gave us the contract to take out their steam

heating plant and replace it with our system. In the same year the Separate School Board also gave us a contract for warming and ventilating three of the schools under their charge which had then just been completed. This year we have our third contract with the Public School Board to furnish the appliances for heating and ventilating a new school which is to be erected.

The Hamilton School Board, desiring to be informed upon this question, sent a deputation to Toronto in the spring of 1888 to investigate and report. They were so well pleased with what they learned of our system that they put it in the Picton Street School, and, as this practical test resulted satisfactorily, they called upon us to fit up in the same way the Wentworth Street School and the Ryerson School, two very large buildings. The Separate School Board showed their belief in the completeness of our system by ordering an apparatus for a large new school being built this summer.

The School Board of London, Ont., sent a deputation to the United States in 1887 to investigate the various systems of heating and ventilating in use. They adopted our system for the Hamilton Road School. In the following year they put our apparatus in the new Simcoe Street School, a very large building costing about \$40,000. The work evidently gave satisfaction, for we were given the contract for the Collegiate Institute, which had decided to use our system instead of the hot-air furnace then in use. This year we have contracts from the School Board for the Waterloo North School and the Talbot Street School, and our system has been adopted for two other schools, the apparatus to be put in place this season.

Winnipeg made a trial of our plant last year in the Girls' Central School. The experiment resulted to their satisfaction as well as ours, for we were instructed to place the apparatus in three other schools. We have just received word that our system gives complete satisfaction in every respect. As the temperature last winter went as low as 45 degrees below zero, the test shows that our claim of being able to warm and ventilate a large building in extremely cold weather is fully justified.

In 1886, soon after we established our business in Canada, the Board of Education of Campbellford gave us a contract for the warming of the High School. Last year they built a new school and adopted our system for it. Peterboro' gave us a contract last year to place our system in two schools—the North Ward and the South Ward schools—and the reputation that this work has established for us is such that his Lordship Bishop O'Connor gave us the contract for heating a large girl's school which is being constructed there this summer. The authorities in Halifax, N.S., have given the subject of warming and ventilating a great deal of consideration, and this week we have their signatures to a contract to place our heating and ventilating plant in a large fourteen-roomed school which is to be built this year.

Of course, our record in Toronto is well known. Our first work here was done in the Brock Avenue school in 1886, and was so satisfactory that we have had the contract for every new school since erected, and for replacing the systems formerly in use in many of the old schools. Our system is now in use in over thirty large public school buildings in this city. The Toronto School Board about a year ago sent a deputation to the United States to inquire into the subject of school architecture, including heating and ventilating. This deputation spent about six weeks in its mission, and visited twenty of the largest cities on the other side of the line. In making their report they concluded with these words:

"Your committee are unanimous in the opinion that in no one in all the schools visited did we find a system of heating and ventilation superior to the Smead & Co.'s, such as we have in our recently built schools, nor one equal to it in the facilities for the admission of large volumes of fresh air."

"In Windsor, two years ago, we placed our apparatus in the new High School that had just been completed there. This year we were instructed to provide the means for heating and ventilating three new schools which are now in course of construction.

The heating and ventilating of hospitals is a very difficult matter. Our system was adopted for the General Hospital in Brockville, and in the new Roman Catholic Hospital in Peterboro' where the work is about completed. The Protestant Hospital for the Insane in Montreal, a very large building costing over \$200,000, also uses our system, and we have just been awarded the contract for the new Nicoll wing of the hospital at Kingston.

In churches we have done considerable work, especially in Toronto. We have our system in nine of the largest churches in the city, including the Trinity Methodist, Cooke's Presbyterian, College Street Baptist, Dovercourt Baptist, the Presbyterian church just completed on the corner

of Bloor and Huron streets, the new Methodist church in Parkdale, which is to be opened on the 29th of this month and the Presbyterian church now being erected on Bloor street, to be occupied by the congregation of the old Charles street church.

We have done work in the Dominion from Regina in the Northwest Territories to Canso in Nova Scotia, and in no single case have we had any complaint, and, as I say, when a church board or board of trustees once use our system they take an interest in seeing it adopted for other buildings.

In the United States our system is extensively in use. Our apparatus exists in 50 school buildings in Washington city, in more than 20 school buildings in Columbus, Ohio, in every school building in Toledo, Ohio, and in 25 school buildings in Detroit. In the last named city the apparatus is now being placed in three large 16-roomed school buildings in course of construction.

The outlook for our business in Canada this season is better than it has ever been before. We flatter ourselves that we have added an important industry to the many industries of Toronto. We made over a million pounds of iron into castings last year in Canada alone, and the prospect is that this year the output will be considerably larger.

Our dry closet system, which is an important feature of our work, is held by sanitary experts to be better than any system of water closets, especially for use in public buildings. All danger to health is avoided, and there is no chance of any breakage or disarrangement of machinery such as occurs in systems now in use, causing great danger to the health of every occupant of the building."

RULES REGARDING CEMENT.

EMINENT engineers are authority for the following important conclusions:

Cold water is probably not injurious, only as it retards setting.

All cements when mixed with sand to a proper consistence for mortar will fall to pieces if placed in water before setting has commenced.

Any American cement of good quality will with one and one-half to two measures of sand give a mortar strong enough for most engineering purposes.

Pressure while setting, with the degree of thoroughness of the mixing or the gauging, the proportion of water used, and other considerations, may easily affect the results one hundred per cent. or even much more.

American cement requires less water than Portland.

Sand retards setting, so that cement which, by itself, would set in half an hour, may not do so for some days if mixed with sand.

When one part sand is added to one part of cement, the strength is lessened one-half. Two parts of sand to one of cement, averages about one-third the strength of pure cement. These for tensile and transverse strains.

The crushing strength does not diminish so rapidly.

Slacked lime retards the setting of cement.

After using in air, cement, or cement with sand, should be kept moist or watered until completely hard.

Walls of buildings are often built of cement concrete deposited between smooth-faced planks as a mould, the planks being moved upwards as the work goes on. Cement should be nearly dry and tamped hard.

Post holes running down below frost and tamped full with concrete are safe and economical supports for warehouses and similar buildings.

Concrete may be used in large masses under water, and when properly put down, is found good for piers and shore protection.

Incorporation has been granted "The Ottawa Brick Manufacturing Co., limited." The company propose to manufacture and sell brick, including terra-cotta, pressed, ornamental and fire-brick, brick used for street paving or coping, also tile, pottery and other articles made from clay. The promoters are: Alexander Maclean, G. H. Perley, G. B. Greene, J. E. Askwith and H. C. Monk, Ottawa.

A very complete filling for open cracks in floors may be made by thoroughly soaking newspapers in paste made of one pound of ordinary flour, three quarts of water and about a table spoonful of alum; these ingredients to be thoroughly boiled and mixed, the final mixtures to be about as thick as putty, and it will then harden like papier mache, and may be used for moulds for various purposes.

A correspondent of the St. Croix *Courier* describes the new granite cutting factory of Epps, Dodds & Co. at St. George, N. B. This is 115 feet long and 70 feet wide; the main building 40 feet wide and 25 feet high. On each side are two wings running its entire length, and 15 and 19 feet wide respectively. A main line of shafting carries to all parts of the building power obtained from a 100 horse power water wheel. This is probably used for polishing, the north wing being occupied by stonecutters. Upwards of fifty hands are employed, and the company pays an average of \$500 per week in wages. One-third of the trade of this firm is with the United States, nearly all the remainder with Ontario.

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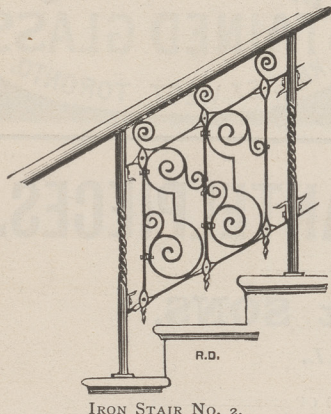
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