



AN ADIAN ARCHITECT & BUILDER

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Vol. XI.—No. 6.

JUNE, 1898

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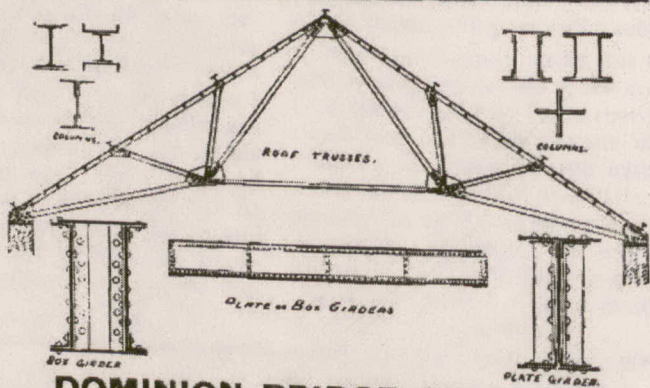
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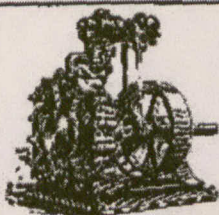


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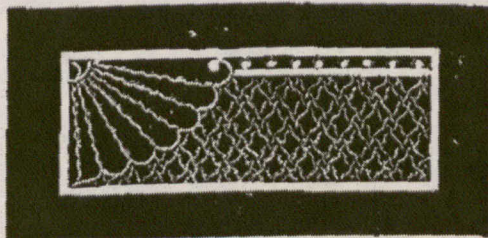
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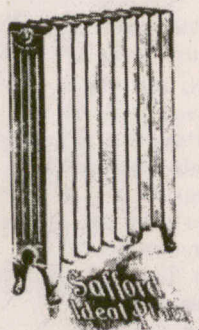
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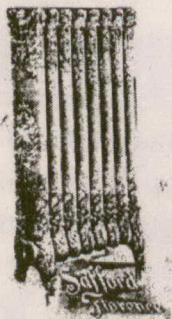
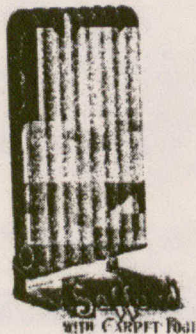
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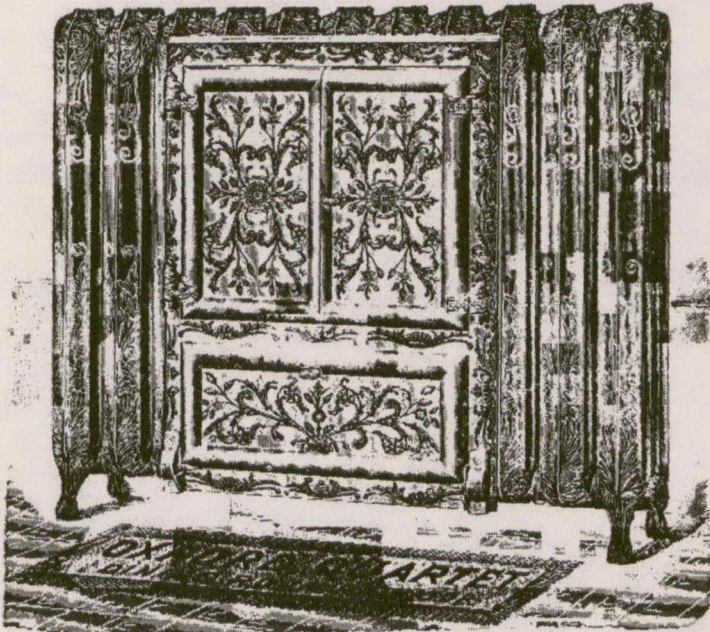


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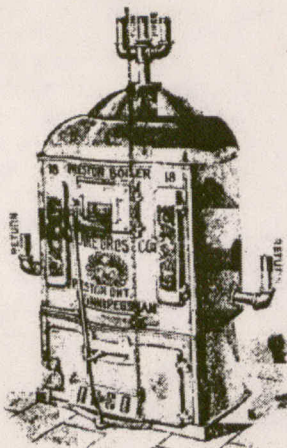
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VOL. XI.—No. 6.

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American Institute of Architects. PURSUANT to a decision reached at the convention of 1897, the lease has been taken of a building in Washington, which is to form the permanent headquarters of the American Institute of Architects. The opening ceremonies will take place in connection with the annual convention in November.

The Use of Shingles.

THE Timberman, of Chicago, contends that the quantity of shingles used nowadays is larger in proportion to the use of lumber than it ever was before. Two reasons are given for this—one that there is more brick used in the construction of buildings than formerly, without any corresponding decrease in the number of shingles required; and the other that the life of shingles at the present time is not as long as it used to be. It is not an easy matter to advance an apparently correct theory why the lifetime of shingles has become so much shorter. It is claimed by some to be due to the use of the steel wire nail, which will not resist the elements for more than about ten years, while the shingled roof was, in earlier days, expected to last twenty-five years.

The Dominion Heating and Supply Association.

THE article headed as above which appeared in the ARCHITECT AND BUILDER for May has given rise to considerable discussion among the members of the Dominion Plumbers' Association. The sentiments expressed therein by a member of the Dominion Heating and Plumbing Supply Association are clearly not entertained by the management, as witness their repudiation by the vice-president and a member of the Executive in our Correspondence Department. It may be well that we should state that the views were only those of an individual member of the association—not of the association. As such they were published. Hence they should not be looked on as being in any sense official, nor should an attempt be made to place responsibility for them on the shoulders of the officials of the Dominion Heating and Supply Association. It is a matter of regret to us that the publication of the article in question seems to have had a tendency to disturb the pleasant relations which have and should exist between the plumbers and supply companies.

An Injustice to
Contractors.

It seems to be the practice of some municipalities, when inviting tenders for public works and supplies, to allow outside contractors insufficient time in which to submit tenders. An example of this is afforded by the city of Montreal, which recently asked tenders for the supply of cast iron pipe, lumber, and other material. The first appearance of the advertisement in the daily press was on June 11th, and the date limit for the reception of tenders was June 14th, thus giving contractors only three days in which to tender. It is claimed by contractors that this time limit is insufficient and causes unnecessary hardship. It is not always convenient for a contractor to find the necessary time in which to figure within the brief period of three days, while the plans and specifications are not at all times available. So far as the city is concerned, there does not appear to be anything to lose by giving ample time for all intending contractors to submit tenders, while better results are almost certain to be obtained in consequence of greater competition.

Trade Openings.

GUILLEMO Espinosa, a prominent importer of Venezuela and Quito Ecuador, states, in a recent letter to a New York export firm, that a demand exists in South America for sanitary apparatus, such as basins, closets, bath tubs, etc., and that a recent consignment from the United States found speedy sale. Canadian manufacturers of these lines of goods should place themselves in communication with the Canadian government trade representatives in South America, furnish them with catalogues, etc., descriptive of their goods, and endeavor to secure a share of the trade in this market. Notwithstanding the somewhat discouraging statement made by Sir Richard Cartwright in the Dominion Parliament the other day, regarding the possibilities of an extension of our trade with South America, the National Association of Manufacturers of the United States have recently opened a sample warehouse at Caracas, Venezuela, which is intended to serve as a permanent exhibition, and as a bureau of information, both for the Venezuelan buyers and the members of the Association, rather than as a store for the actual sale of goods; its aim is to bring American goods before the buyers in Venezuela more prominently than is possible by any other means now available.

Modern Street
Pavements.

THE construction of street pavements which shall meet all modern requirements has been the subject of much study and experiment in recent years. While much has been accomplished, there remain many unsolved phases of the problem. In Canada the powerful disintegrating action of frost is an added difficulty. The cedar block pavement so much in favor fifteen years ago is no longer employed to any extent. It is undoubtedly true that the defectiveness of this class of pavement in Canada was quite as much due to improper methods of construction as to unsuitability of material. In Chicago and other American cities where block pavements were laid on a plank and concrete foundation, they are declared to have given very satisfactory results. In Canada, asphalt, brick and macadam roadways are now the favorites. Asphalt, if properly put down, is probably the best material for streets, except those traversed by street car lines and subject to the heaviest traffic. Its cost, however, proves a hindrance to its general use. Properly

manufactured vitrified brick makes a clean and durable pavement, easy to repair, and will, no doubt, come into use to a considerable extent. In Toronto its use on residential streets has been objected to on account of its noisiness. From observation we should say that there is ground for this objection, the importance of which appears to be becoming more generally recognized. A well constructed macadam roadway is durable and noiseless. It is, however, somewhat dusty, and on this account requires more frequent watering. This class of roadway requires to be well drained and otherwise skillfully constructed, otherwise the cost of repairs is likely to be large as compared with either asphalt or brick.

Present Day
Architecture

MR. James Hine, in an address delivered recently at the annual meeting of the Devon and Exeter Architectural Society, referred to the causes from which springs much of the unsatisfactory architecture of the present day. "Why was it," he said, "that in the more modern towns, fashionable and unfashionable, which had sprung up during the present century, the impress of architecture was so imperfect and unsatisfactory? Because, for the most part, they had not been the creation or work of architects. This had been a misfortune for the profession, but it had been a greater misfortune for the towns, and had been the occasion of numberless blots on the face of nature. Occasionally it had no doubt been possible to carry out in such new towns a well-considered and effective design; but one swallow did not make a summer, and one good building did not usually make a beautiful street. In an age like the present, when nearly everything pertaining to a building could be produced by machinery, there must necessarily follow great monotony and absence of artistic interest in the buildings largely composed of them. Trade catalogue architecture might be all very well from a strictly commercial and economical point of view, but the tendency of it was to destroy all individuality in a building and to drag architecture proper into oblivion. Buildings were being pulled down in all parts of England possessing historic interest and features of architectural beauty; were they to be supplanted by lifeless structures of this automatic type? This was a subject which demanded the consideration of all. Let them hope that in the coming century, as in all great periods of architecture, buildings might be more and more the reflex of the individual mind of the architect."

Rights of Workmen on
Public Contracts.

THE treatment accorded workmen employed on the construction of the Crow's Nest Pass railway, as per the recent report of a Parliamentary Commission, was of the most inhuman character. The charge is laid at the door of the contractors, their agents and sub-contractors, of having taken advantage of the workmen in every possible way. It is alleged that they were charged a regular amount per month for postage and medical attendance regardless of whether they wrote any letters or were in need of medical attention. It is likewise alleged that the camp was without sanitary provisions of any kind. When from this and other causes the workmen became ill, they are declared to have been cruelly neglected, and two young men from Nova Scotia, victims of diphtheria, are stated to have been allowed to die like dogs on the floor of a miserable hut. These particulars will suffice to show the scandalous

treatment to which workmen can be subjected at the hands of unscrupulous contractors. All honor is due those members of Parliament who insisted on thorough enquiry being made into a condition of affairs, the existence of which is difficult of realization in a Christian land. One result of the revelations which have come to light in this case, should be the enactment of legislation compelling public contractors to properly house and feed their workmen, and provide for them proper medical treatment. To this end means should be provided for a fair adjustment of disputes between contractors and workmen, and to compel both to fulfil their pledges of agreement.

GREAT Britain has fallen into line with Germany, Austria and Denmark, in recognizing the principle that workmen who suffer injury by reason of accidents are entitled to receive compensation from their employers. In furtherance of this principle the British Workman's Compensation Act received the assent of the British Parliament, and will go into operation on the first of July next. Under this act compensation must be granted by employers to workmen who may be disabled or killed while employed in mines, quarries, engineering works, factories, railways and building operations where machinery is employed or the scaffolding is over 30 feet in height. The act provides in the event of total disablement that the workman is to be paid one-half of his regular weekly wages so long as he shall live, but this allowance is not to exceed one pound per week. If a workman is killed in an accident, leaving no heirs, the sum of \$48.66 only is to be paid by his employer for funeral expenses. If he has heirs they are to receive one-half of three years' wages, the minimum amount to be \$750 and the maximum \$1,460. It is unquestionably right that compensation should be made for injuries resulting to workmen through lack of proper precautions being taken by employer for their safety, but in view of the well-known carelessness of many workmen, it does not seem just that the whole responsibility should be thrown on the shoulders of the employers. As the funds from which compensation is to be provided must be furnished wholly by the employers, elaborate calculations are being made by insurance experts and others interested as to the proportion of accidents to workmen and the cost of insurance against same.

Method of Obtaining Tenders for Glass Work.

OUR attention has been called to the method which obtains among architects in Canada of letting contracts for stained glass work in conjunction with painting. In some instances, such as the erection of churches, separate tenders are invited direct from the glass works, but this is not the usual course. Although some have recognized the advantage of taking separate tenders on stained glass, it is said that, as a rule, architects in this country have been slow to adopt the practice which is followed in European countries and the United States. The present method is claimed to be unfair alike to the client, architect and stained glass contractor. For example, the painter submits a tender for certain work, including stained glass at, say, \$1.50 per foot, which is accepted by the architect. The painter retains from twenty-five to fifty per cent. for his commission. The balance goes to the stained glass manufacturer, who is expected by the architect to furnish goods worth \$1.50

per foot. There are said to be instances on record where the glass contract has been turned over from the painter to a wholesale dealer, who would supply the plain glass from his stock, and place the balance of the contract with the stained glass manufacturer, thus necessitating two commissions, and reducing the price paid for the glass far below that which the work should command. Were separate tenders taken for glass, it is contended that the work could be done at less cost, and that better value would be given. We would be pleased to give the necessary space for a fair discussion of this question, and to learn the views of the trade on the subject.

ILLUSTRATIONS.

DESIGN FOR COTTAGE—ARTHUR E. WELLS, ARCHITECT.

RESIDENCE AT LONDON, ONT.—MOORE & HENRY,
ARCHITECTS.

SKETCH FOR CHURCH DOOR.—J. A. RADFORD, ARCHITECT,
TORONTO.

DESIGN FOR SCHOOL.—W. A. EDWARDS, ARCHITECT,
HAMILTON, ONT.

DOORWAY ON VIA DI S. STEFANO DEL CACCO, ROME.—
MEASURED AND DRAWN BY MR. J. C. B. HORWOOD.

BY THE WAY.

AN antiquated rule which ought long ago to have been abolished provides that all petitions and communications submitted to the British House of Commons and official departments of the government must be on written or lithographic form. A typewritten memorial recently introduced by a member to the Sacred interior of St. Stephen's, was declined by the Speaker on the ground that it was an infringement of the dignity of the House; his contention being that type-writing was not manuscript or lithography, although he admitted that the rule was laid down before the invention of the typewriter.

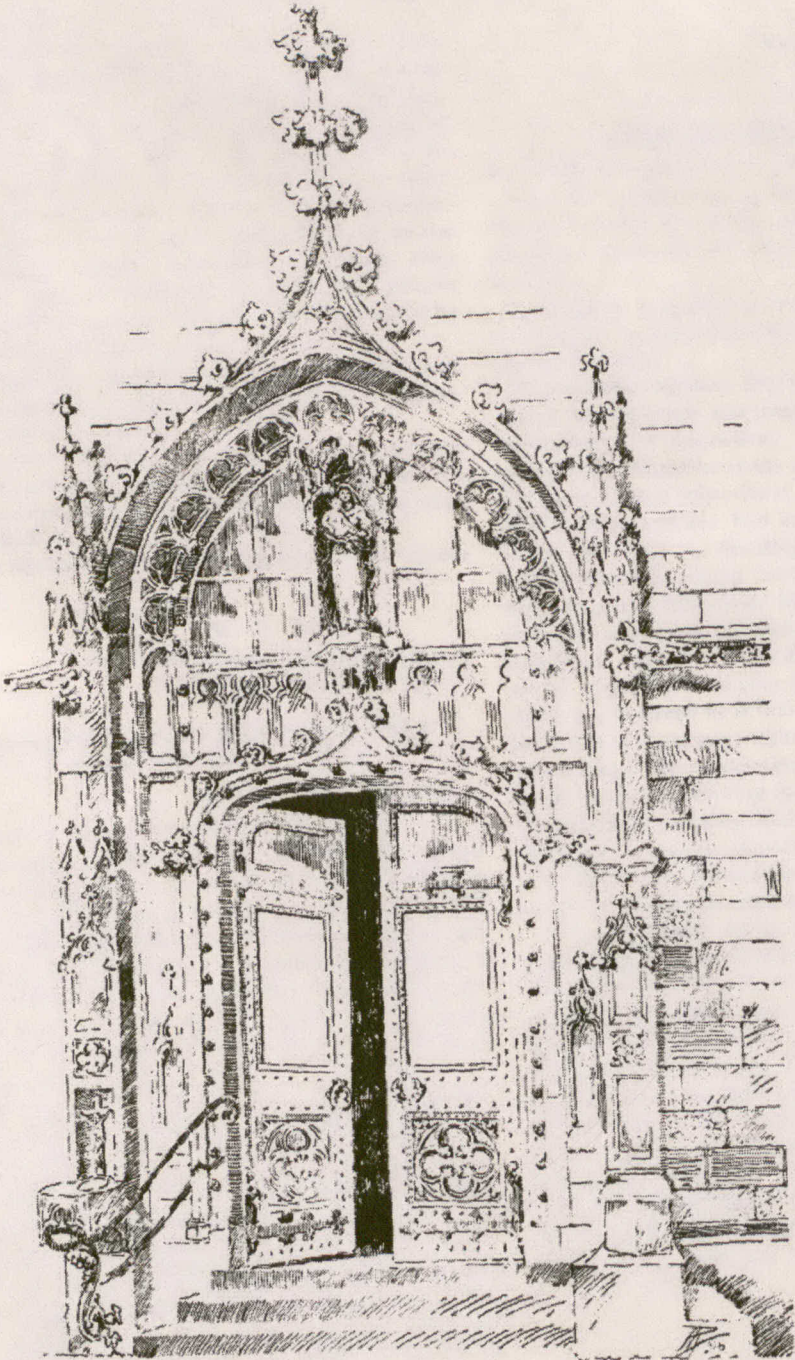
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A LONDON newspaper takes a shy at the methods of the Jerry builders in this fashion:

BUILDING IN TOPSYTURVEYDOM.

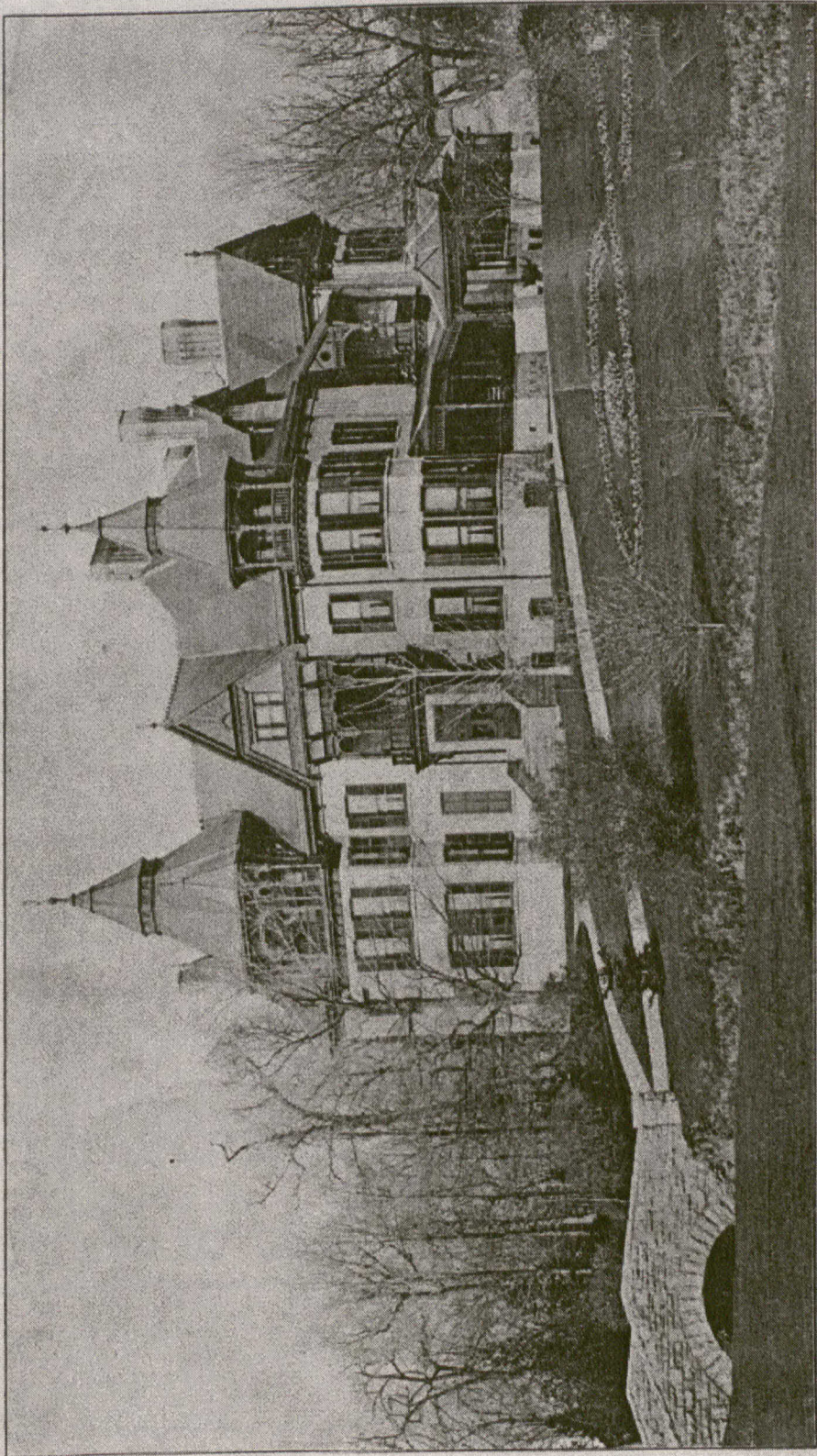
It was a lonely building,
Though it ended in a loss,
For every one was foreman
And every one was boss.
And each one built his portion
Just according to his mind,
And altered the construction
If he chanced to feel inclined.
The girders were short measure,
Which was quite a trifling thing;
And they hadn't any rivets,
So they tied them up with string.
But it must be owned the concrete
Was indubitably poor,
Which was proved by a mechanic
Falling through a fireproof floor.
And the bricks were rather crumbly
For the strain they had to bear,
But they wouldn't drop to pieces
If you handled them with care.
Oh, it was a lovely building,
From the point of view of spooof.
And it held together bravely
Till a fly sat on the roof.

The death was recently announced at San Francisco of Mr. Augustus Laver, who designed the Western Departmental Block at Ottawa, and was afterwards associated with Mr. Thos. Fuller, late chief architect of the Dominion Public Works Department, in the construction of the Capitol at Albany, N. Y., Mr. Fuller's design for which was accepted and awarded first prize. Mr. Fuller having subsequently obtained first prize for a city hall for San Francisco, and being unable to leave Albany, Mr. Laver took charge of the work, and afterwards made that city his home. While there he erected many important buildings, among others the palatial residence of the Floods, the furniture for which alone cost \$100,000. Mr. Fuller writes us that Mr. Laver was "a man high in his profession, and an old and dear friend."



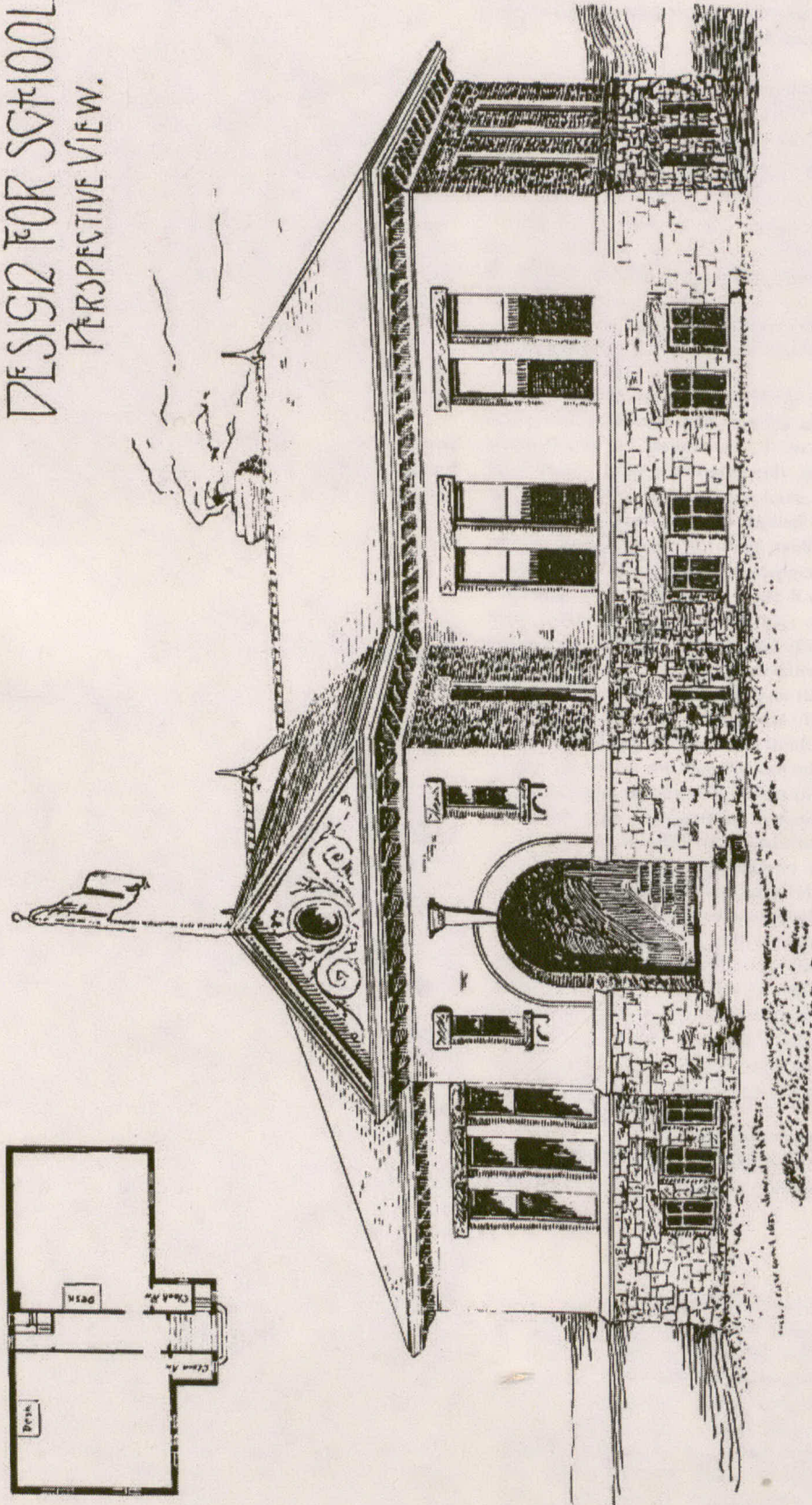
SKETCH FOR CHURCH DOOR

J.A. RADFORD
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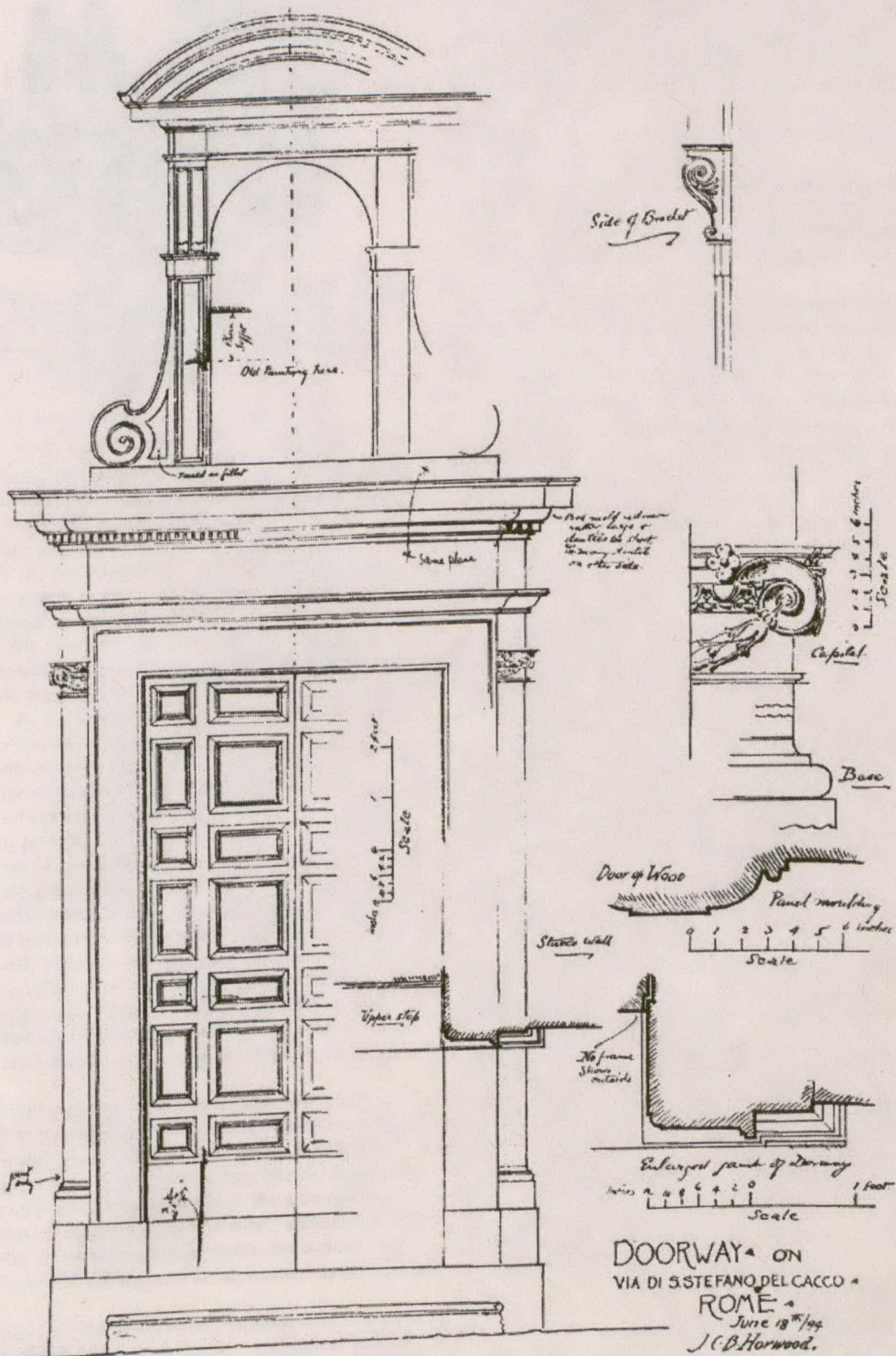


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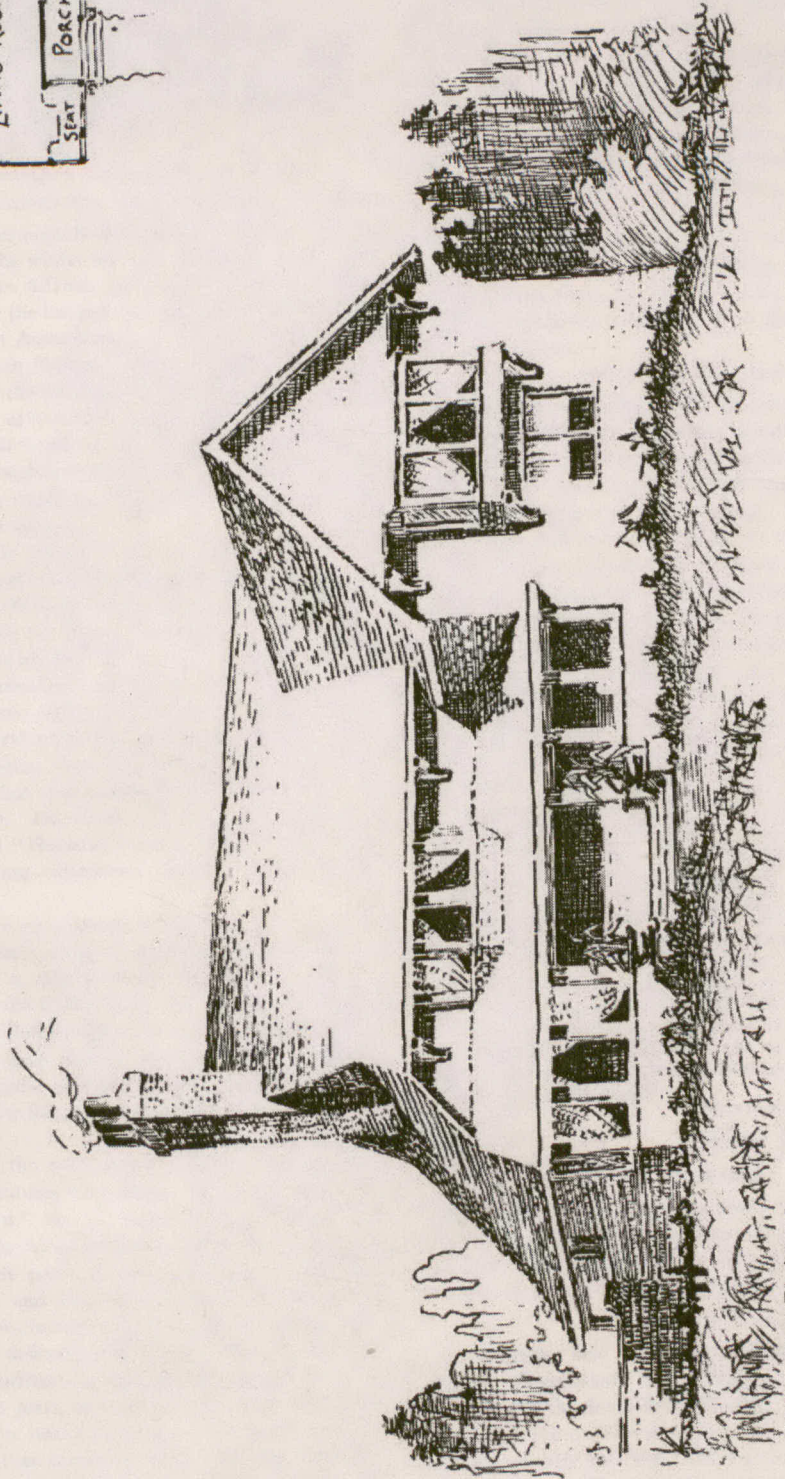
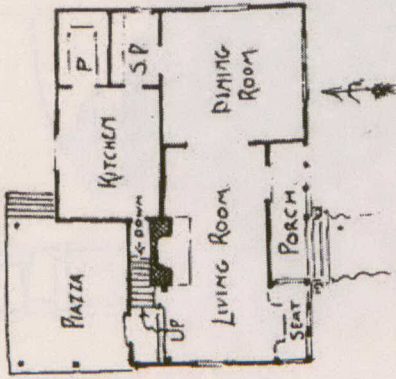
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DOORWAY ON
 VIA DI S. STEFANO DEL CACCO *
 ROME *
 June 18th 1909
 J. C. B. Horwood.

DOORWAY ON VIA DI S. STEFANO DEL CACCO, ROME.

MEASURED AND DRAWN BY MR. J. C. B. HORWOOD.



DESIGN FOR COTTAGE.
 ARTHUR E. WELLS, ARCHTCT.

ARTHUR E. WELLS
 DESIGNER

CORRESPONDENCE.

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

A CORRECTION.

QUEBEC, May 28, 1898.

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

SIR,—Some of the information given you regarding the purpose in the formation of the Dominion Plumbing and Heating Supply Association is erroneous, and I think it would be well before publishing these statements to have them corroborated by some of the officers residing in your city. While I have no doubt you inserted the item I allude to with the best intentions yet it is likely to do harm to those whom you most desire to benefit. The formation of our association was brought about principally at the request of the Master Plumbers' Association of Canada, they deeming it advisable that an association of the leading jobbers and supply men who would work in harmony with them, would be of great benefit to the master plumbers.

This then is the object for which this association is formed, and not as your correspondent has informed you, to work antagonistically to that of the master plumbers.

Nothing whatever of what your correspondent gave you was debated or brought before our association, and for this reason I think in future it would be well to see that the truth is stated when these items are published.

Thanking you in advance for the publishing of this letter in your columns, I remain

Yours truly,

W. H. WIGGS,

2nd Vice-President Dominion Plumbing
and Heating Supply Association.

DOMINION PLUMBING AND HEATING SUPPLY
ASSOCIATION.

TORONTO, May 31st, 1898.

To the Editor of the CANADIAN ARCHITECT AND BUILDER :

SIR,—On page 94 of your journal, THE CANADIAN ARCHITECT AND BUILDER for May, there is an article under the heading of "Dominion Plumbing and Heating Supply Association" to which my attention has been called from several different sources, and as I observe that my name appears in the article as a member of the executive (and this is the first intimation I have had of the appointment) I seem to have been a mark for some of my friends in the plumbing and heating business upon whom to lay the blame for having written the article.

When my attention was first called to the article I did not pay much attention to it, as I concluded that the fact of the blame being put off on me was merely being done for pastime on the part of some mischievous competitor who desired to make capital at my company's expense, but as time rolled on the blame thrown upon me has grown to an enormous size, and for this reason I feel that it is my duty, not to myself, but in justice to the company of which I have the honor to be the chief executive officer, to say that the article when it was first shown to me in print was the first knowledge that I had of it either directly or indirectly. I did not write the article; I did not inspire it; I was not consulted about it; and more than this I did not attend the meeting which is referred to at Montreal, so that I could have no knowledge whatever of any of its proceedings, and have not to my knowledge even received a copy of the minutes of that meeting. I had an invitation to attend it and fully expected to be in Montreal, but unfortunately I was absent from home at the time.

I would not have taken the trouble to direct your attention to the letter, or to have repudiated any knowledge or connection with it had it not been that the Plumbers' Association of Canada are a most estimable body of men, and further their executive officers in Toronto, and some of their most prominent members throughout the province, have expressed themselves as feeling very sore at the article having appeared, and because I am inclined to believe that some uncharitable competitors or parties engaged in the same class of business as that in which our company are engaged are deliberately making capital out of this and blaming the wrong party, it is only fair that I should set myself and the Toronto Radiator Company in the proper light.

In conclusion I may add that the Toronto Radiator Company have been one of the strongest fighters in support of the rules laid down by the National Association of Master Plumbers of Canada. I believe that they have done more for the protection of the

legitimate plumber than any other firm doing the same class of business in the Dominion. They have stood idly by and let the trade go past them in order to protect the plumber, as we believe that the tradesmen must be protected, otherwise they cannot live.

I hope now that the man who was so free to give all the information about what is said not to have happened, will have backbone enough to step out to the front that we may see him.

Yours respectfully,

JNO. M. TAYLOR,

Managing Director of the Toronto
Radiator Manufacturing Co., Ltd.

A SECOND REPLY TO MR. WELLS.

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

SIR,—Mr. Wells wrote a letter in your March number saying that the Ontario Association of Architects is wrong to advocate education for architects when what is wanted is inspection of buildings.

I replied in your April number that the Association advocates both inspection and education and is taking as much pains about one as the other.

Nevertheless we have Mr. Wells again in the May number still crying for inspection and treating me with much bitterness as an under-valuer of inspection. I do not consider that fair correspondence. One who reads only Mr. Well's last letter, as I dare say some of your subscribers have, would not imagine that Mr. Wells' correspondent had replied in effect: "The Association which you attack for devoting itself to the education of architects instead of to advocating the inspection of buildings is not, as you suppose, neglecting to do what it can to procure good building laws and inspection of buildings; on the contrary it has been for some time taking a great deal of pains about these things and would be glad to have your assistance. Indeed the only point of difference between us is that you think the inspection of buildings is all that is necessary, while the Association (and the legislators who founded the Association) think it important to get to the root of the matter by working for the education of architects who plan the buildings; and they think that this is the more important work in the same ratio as prevention is more important than cure."

Surely that is sufficient answer to prevent a return to the question in precisely the same manner as before.

In the remainder of his letter Mr. Wells hints disapproval of some characteristic or characteristics of the Association, but does not state what they are with that straightforwardness to which I think a well meaning body is entitled. If he will say straight out what harm the Association (to which, by the way, he owes much in the way of education) is doing him or any other young man, I shall be glad to answer his objections if I can. If there is no answer I shall say so. I (nor I think the promoters of the Association) have no interest in supporting the Association except as a means of doing good.

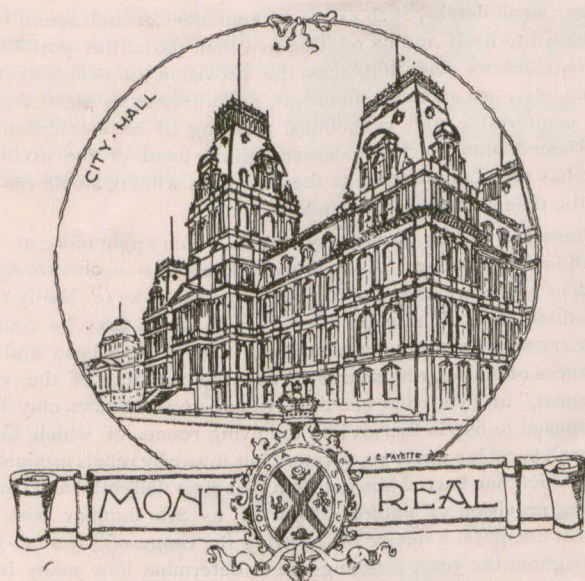
I only beg to suggest that a copy of Mr. Well's letter be sent to me that I may answer it before you go to press, so that his letter and my reply may be read together on the same page.

Yours truly,

W. A. LANGTON.

Mr. Geo. Anderson, Commissioner to Japan, in his report to the Dominion government, says: Shingles are used extensively for roofing purposes, being nailed on the sheathing and then covered with mortar, tiles being put on over all. For this purpose No. 2 and 3 quality should find a very large sale. They are also used in the northern part of the Main Island and in Hokkaido, the Northern Island, in the same way as in our own country, with this difference, that bamboo strips are put across the row, the strips being held on by large flat stones, instead of each shingle being nailed. A better quality would be required for this latter purpose.

WIRE STONE SAWS.—In the French quarries at St. Triphon stone is sawed with steel wire cables moistened with wet sand, and passing in an endless rope over a series of pulleys. The wire, which runs from 1,000 to 1,200 feet per minute, is charged as it enters the cut with a jet of water and silicious sand, which forms the cutting material. A running cable of 500 feet can make a cut 100 feet long. To remove a ledge, pits three feet in diameter are dug to the depth of the desired cut and the stone sawed vertically in slabs to the bottom, being then easily split off by wedges. The slabs are removed by an electric travelling crane and sawed to any desired size.



(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)
LECTURE BY PROF. CAPPER ON "ANCIENT ROME."

THE course of public lectures organized by the Province of Quebec Association of Architects for the winter of 1897-1898, comprised three lectures, delivered by Professors Adams, Colby and Capper, all of McGill University. As last year, the lectures were arranged to fall in with the course promoted by the Art Association, and were delivered in the large hall of the latter society in Phillips' Square. These lectures are evidently much appreciated by the public of Montreal, all being exceedingly well attended. The last of the series was delivered by Mr. S. H. Capper, McDonald Professor of Architecture at McGill University, on March 29th to an overflowing audience, under the chairmanship of the Rev. J. Edgar Hill. By the courtesy of the lecturer the following abstract has been placed at our disposal:

Professor Capper took as his subject "Ancient Rome," the lecture being illustrated by a fine series of about fifty lantern slides. The lecturer made an appreciative reference to Prof. Adams' lecture on "Pompeii" (the first of the course), pointing out that in Pompeii, as nowhere else, the domestic architecture of the ancient classical world could be studied in wonderfully complete preservation and detail. At Rome, on the other hand, examples of domestic architecture were almost wholly lacking. The remains that had survived the ravages of time and violence were those of public and imperial architecture—the great buildings of the metropolis of the world; but the private dwellings of the Roman citizen had wholly disappeared. One house only remained in a tolerably perfect condition, the so-called "House of Livia"—really, in all probability, the house of Germanicus—discovered in 1869 on the Palatine Hill.

Into the scope of a single lecture it of course would be vain to attempt to condense the vast field of the archaeology of Ancient Rome; the lecturer therefore confined himself to a survey of the Palatine Hill and its immediate surroundings, from the Coliseum to the Forum Romanum. In so doing, he made ample acknowledgement to the unremitting and splendidly fruitful labors of Signor Rudolfo Lanciani, undoubtedly the foremost living authority, to whose published works the audience were referred as the repositories of the fullest and most recent knowledge on the subject.

The original settlement on the two-peaked Palatine Hill was first dealt with, and its primitive features were noted. The earliest Romans, or "dwellers in the river-town" (as the name has been interpreted), were probably refugees from the Alban hills whose homes had been overwhelmed by volcanic eruptions much in the same way as, centuries later, the citizens of Pompeii and Herculaneum were overwhelmed in historic times. This earliest settlement was of a pastoral people, who had ample room on the easily defended hill-top for housing both themselves and their flocks; the surrounding valleys were largely marshes, liable, as down to quite recent years, to be submerged when the overflowing Tiber rolled down in heavy flood to the sea, which then was several miles nearer to Rome than is now the case. Passing from these early and prehistoric times, still brought home to us by tradition and myth (in which historical facts can yet be discerned), the lecturer took up the existing remains of imperial architecture, which occupy, though in fragmentary ruins, the same site, and described, with the help of plans and views shown by lime light, the palaces of the Caesars, from the early and modest house of the Emperor Augustus to the later and much more magnificent buildings carried out through several centuries by his successors. Of the earlier buildings of imperial times, the house of Germanicus (to which reference has already been made) is the best preserved. It is a comparatively small dwelling, and was probably spared throughout the succeeding alterations and additions to the imperial

residences owing to the extreme and affectionate veneration in which the memory of Germanicus was held. The vast buildings of Tiberius and Caligula, of which only the substructures remain, were next traced; in the long gallery or crypto-porcius of the latter the young Emperor who built it was murdered in the dreadful tragedy so thrillingly told by the historian Tacitus, the murderers actually escaping by way of the house of Germanicus adjacent. The Domus Gelotiana—or Paedagogium—was also added by Caligula, who bought it because of its proximity to the Circus Maximus and the jockeys' quarters there, the young prince being as much addicted to the racecourse as any modern English aristocrat or American millionaire. In this building were found some of the most interesting graffiti—or mural scribblings—extant, including one believed to represent in caricature the Crucifixion.

The vast public and reception halls of the imperial palace added by the Flavian Emperors were next traced. To carry these out the entire ravine or valley separating the two peaks of the Palatine was filled with huge substructures, and on the gigantic platform thus made the magnificent state apartments were built.

Leaving the Palatine Hill, after reference to the later buildings of Sevetus, the lecturer took up the grand and world-famous buildings occupying the valley that bounds it on the north-east. The Arch of Constantine and the Coliseum, the Arch of Titus with its sculptures, the Basilica of Maxentius and Constantine, and the Temple and Cloister of the Vestal Virgins were successively reviewed, all being very fully illustrated and discussed, both from an archaeological and a more especially architectural point of view, this concluding portion of the lecture thus embracing the buildings of the Sacra Via, perhaps the most famous street of the ancient world, until at the northern spur of the Palatine it opens on to the Forum Romanum, the centre and heart of Ancient Rome.

MONTREAL BUILDERS' EXCHANGE.

At the general meeting of the Exchange held on the 3rd inst., there was a large attendance of leading contractors. The principal feature of the meeting was an animated discussion of the employment of foreign architects and contractors by public companies and institutions of the city, to the detriment of local interests. The numerous handsome and substantially built buildings erected by local architects and contractors in this city were pointed to as evidence that there is no lack of ability on the part of local architects and contractors to meet satisfactorily all requirements in this direction, and that this fact, combined with loyalty to the city's interests, should restrain these public corporations from employing foreigners in preference to those on whose shoulders rest the responsibilities of citizenship. The following resolution referring to this matter was unanimously adopted, accompanied by a vote of thanks to the city council for having stipulated that in the erection of the new G. T. R. offices, only local architects and contractors should be employed.

"Whereas, according to a practice of recent introduction, both on the part of some architects and proprietors, and especially of public companies, of bringing in aliens and non-residents for the carrying out of work in the building line that our own builders and contractors are fully competent to execute, the members of the Builders' Exchange of Montreal hereby strongly and emphatically protest against the countenance of this unpatriotic, unfair, and injurious practice, and request all those who have the interests of our city at heart to use their influence to put a stop to what has, in the past, worked serious injury to our city and citizens. Especially is such action desirable in view of the fact that the contractors in the province of Quebec have to carry responsibilities for a length of time not called for in any other country that we know of, and which necessarily cannot be enforced against aliens

Resolved that a copy of this resolution be sent to the Press, the Board of Trade, Architects' Association, and various public institutions.

We have the honor to remain

Yours respectfully,

(Signed) { JAMES SIMPSON, President.
GEORGE J. SHEPPARD, Secretary.

MASTER PLASTERERS' ASSOCIATION.

THIS Association has recently been thoroughly reorganized and is now on a good working basis. Efforts will be made to protect the interests of the members against incompetent jobbers, and place plastering in its proper rank among the building trades.

LIBERAL CONTRACTORS' CLUB.

At a meeting held in the new club rooms, 90 St. James street, on the 7th inst., the president, Mr. Sauvageau, being in the chair, a discussion took place on the desirability of having the provincial law amended so as to reduce the period for which contractors may be held responsible for the safety of their buildings, from ten to five years. The discussion was participated in by Hon. Mr. Dodidoux, Mr. Louis Gonne, M. P., C. A. Chenevert, M. P. for Berthier, J. O. Lamert, Mr. J. P. Blosgraw, G. I. Leveille, Joseph Beland, Pierre Ricotte and Joseph Lamarche. This is said to be the only province or country in which the law places such a responsibility upon contractors.

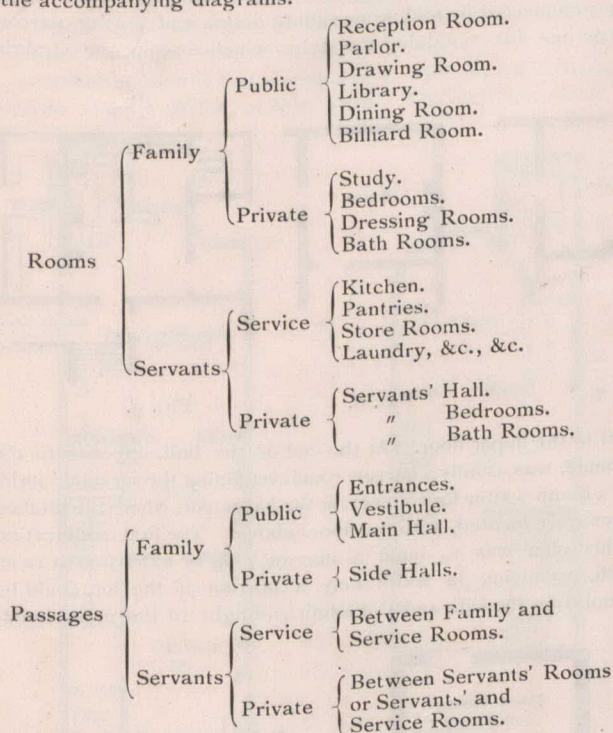
DEGREE CONFERRED.

In recognition of his services in giving to the engineering students a course of lectures on the actual design of bridges, Mr. Ira G. Hedrick has received from McGill University the degree of B. A. Sc.

Messrs. Mesnard & Daoust, architects, have dissolved partnership.

In the study of house planning the writer has found Prof. Osborne's excellent work on this subject most helpful, and many of the points presented in this paper, as well as several of the diagrams, have been taken from his book.

In analyzing a plan we find, obviously two main divisions, i.e., rooms and passages. These are further subdivided, as shown in the accompanying diagrams.



A critical examination of any plan shows that the passages or thoroughfares of a house form the backbone, as it were, of the whole scheme. Let us now apply the principle of analysis. First take the plan of a simple four-roomed house, consisting of parlor, dining room, sitting room and kitchen. Arrange these as in Fig. 1. Now trace on this plan lines showing the natural thoroughfares between these apartments. What is the result? A servant going to the pantry runs into a guest coming from the parlor; another, entering the dining room, comes into collision with a member of the family at the foot of the stairs. The lines of passage cross and tangle. Now arrange rooms as in Fig. 2, and trace passages as before. Here we have an arrangement at

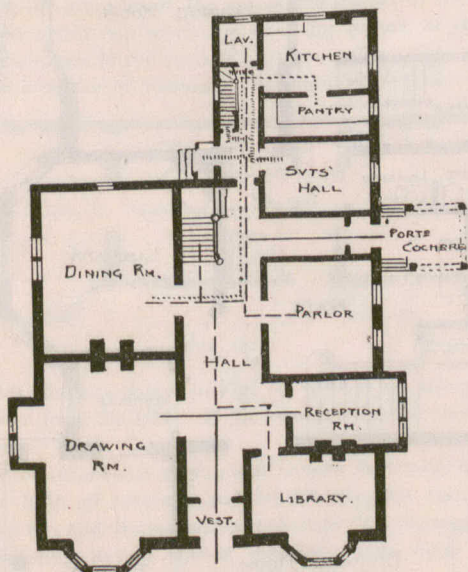


FIG. 3.

once orderly and convenient. The servants easily accomplish the work of the house without interfering with the movements of the family, who, on their part, can enjoy comfort and quiet.

Apply the same test to a more extensive plan. Figures 3 and 4 represent a large house of seven rooms on the ground floor. In Fig. 3 we have a dining room shut out from the pleasant rays of the morning sun, but fully exposed to its scorching heat at the evening dining hour. The library, with door nearest the entrance, lacks the retirement desirable for that room. Visitors shown to the reception room have a full view of the former and its occu-

pants. The lines showing passage-ways conflict, especially in the rear hall, where guests, family and servants are mixed up in hopeless confusion and under most embarrassing circumstances. In Fig. 4 all this is different. The lines of passage are direct and distinct from each other. The whole arrangement is harmonious and at the same time remarkably simple—a large square hall, with the principal rooms grouped about it, and one short hall to the serving offices. Notice too that the rooms are properly placed, not only with regard to aspect, but to comfort and propriety as well. One can readily picture the beautiful and im-

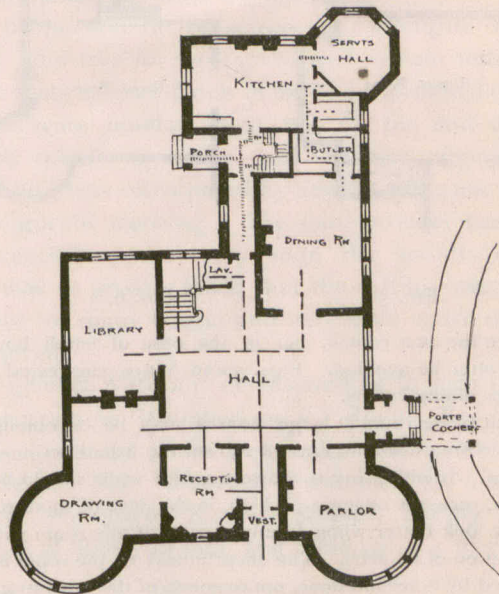


FIG. 4.

posing effect of such a hall, compared with which the interior of Fig. 3 appears most commonplace.

The same method of analysis applied to the upper floors of a dwelling will clearly reveal its excellencies and defects.

It is not enough, however, that the rooms and passages should be arranged in the proper relationship to each other. Each individual apartment and passage may and should be planned with regard to its specific use and purpose. The requirements of a drawing room are quite different to those of the library, and a room that would make an admirable kitchen would be most unsuitable for a dining room. The passages, too, demand a very different treatment according as they are to serve a public or private purpose. Time will not permit even a brief examination of the main requirements of all the rooms and passages of a house, but it may not be amiss to refer to a few of the more important points applicable to rooms that even the simplest house must contain.

First, the Entrance.—This consists properly of three parts—porch, vestibule and hall. The porch may range from the spacious and imposing adjunct of the mansion, with its porte cochere, down to the simple hood over the door; but no entrance should be without a feature which is necessary both for the purpose of emphasizing the approach and of sheltering the waiting guest. It is important that the entrance does not have a north or west aspect, but if that is unavoidable, so arrange the porch as to break the force of the wind from those quarters. If a carriage porch be provided, see that it does not interfere with the approach of those on foot. In cold climates such as ours vestibules are a necessity. One sometimes sees these so small that the door to hall must be opened before the outer one can be closed after the incomer. The hall, as we have already seen, is an exceedingly important factor in the plan. It opens up the whole scheme, and usually contains the main staircase. Specially avoid a long, narrow effect. Often it can be so arranged that a portion may, by a judicious placing of the doors, be kept free from traffic and form a useful apartment. The stairs are better kept well away from the entrance, not only because more convenient there, but the appearance is much better, and the upper part of the house is not thereby exposed to view.

No room in the house is more important than the dining room. East to south aspect is best, or, if there is a breakfast room, it may be placed to the north. In size, a width of eleven feet is the least that will allow of passage behind those seated at the table, and this makes no provision for furniture; thirteen feet had better be regarded as a minimum in all but very small houses, with a

length of not less than seventeen feet. It is most desirable that the position of the dining room should be retired from the entrance, although we constantly see this rule disregarded. End light is best, but it should be diffused; shadows in a dining room are to be avoided. The fire-place is best located in the end opposite door. Easy access to the culinary department, yet distinctly separated from the family thoroughfare, is a prime necessity. At the same time direct communication with the kitchen is not allowable, nor is it advisable even that only one wall should

having only front and rear light, or, as in the case of a corner lot, on a third side as well. These changed conditions naturally call for a very different treatment of the plan. Owing to the possibility of lighting only a limited number of rooms on each floor, additional stories are necessary, and three, four and even five flats are often seen.

The old-fashioned house of this type was planned with two large rooms connected by folding or sliding doors, and a long narrow hall on one side containing the stairs, which rose in one straight

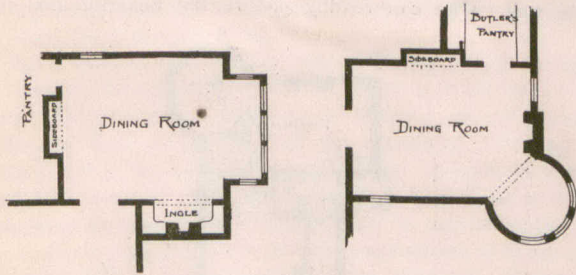


FIG. 5.

FIG. 6.

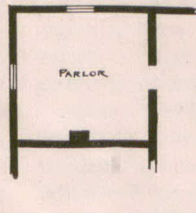


FIG. 7.

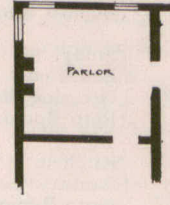


FIG. 8.

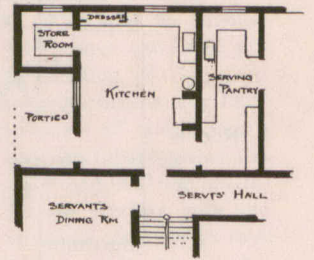


FIG. 9.

separate the two rooms, but in the case of small houses this cannot often be avoided. Figs. 5 and 6 are suggested as good plans for dining rooms.

The drawing room in large houses may be of oblong shape, but if the area does not exceed 230 sq. ft., it had better approach a square. In either event, however, the walls should be broken by bays, recesses or ingles, which, in the case of small rooms, invariably look better when forming part of the room without the intervention of an arch. The cheerfulness of the room is greatly enhanced by a second door, not to speak of the advantages in the entertainment of guests thereby gained. Figs. 7 and 8 show how a few trifling changes, such as altering the positions of doors and windows, will transform a most uncomfortable and disagreeable room into a comparatively attractive one.

Both library and sitting room are of a semi-private character, and should not be placed too near entrance. If the former is to be used chiefly by a student, and not for a general family reading room, it should be well isolated. As to aspect, south is best for a sitting room, while with the library this is not so important, provided, of course, that a good light is always secured.

There are many details about the kitchen requiring careful attention. Briefly, the points to be seen to are, a thorough yet

flight to the upper floor. At the end of the hall, opposite to the entrance, was usually a narrow room containing the servants' stairs and a dumb waiter for connecting the basement, where the kitchen offices were located, with the floors above. The first modification of this plan was to build a narrow wing or extension at rear, which, occupying in width only a portion of the lot, could be lighted from the side and still admit end light to the main build-

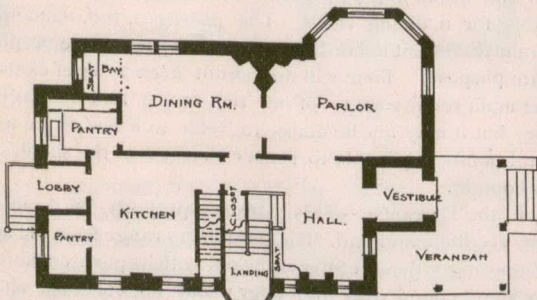


FIG. 10.

convenient separation from the family rooms and passages, good light (preferably from windows on different sides), space for sink, dresser and table. These articles should be grouped together and out of the way of through traffic. Fig. 9 is offered as a fair solution of the kitchen problem.

Of the many other important rooms we cannot now speak, except to refer for a moment to the bedroom. It would seem hardly necessary to say that the position of the bed should receive special attention, but experience shows the contrary. It ought to be shielded from draft, not directly opposite the light, nor in view from the hall when the door is open. The bureau or dressing table should be well lighted, and the washstand in an inconspicuous place.

We have now concluded the analysis of a plan, first in its general aspect, and secondly in the details of the separate rooms. The examples we have taken thus far by way of illustration have been of the suburban type, or at least of town houses of the detached class. Fig. 10 shows a plan for a small house of the class most commonly called for, as adapted to either town or suburban lots. Fig. 11 is the plan of a city house for a 50 ft. lot. Both are given as exemplifying in a fair degree the principles already laid down.

It only remains now that we should briefly consider the city house of the kind usually understood by that term, viz., the house

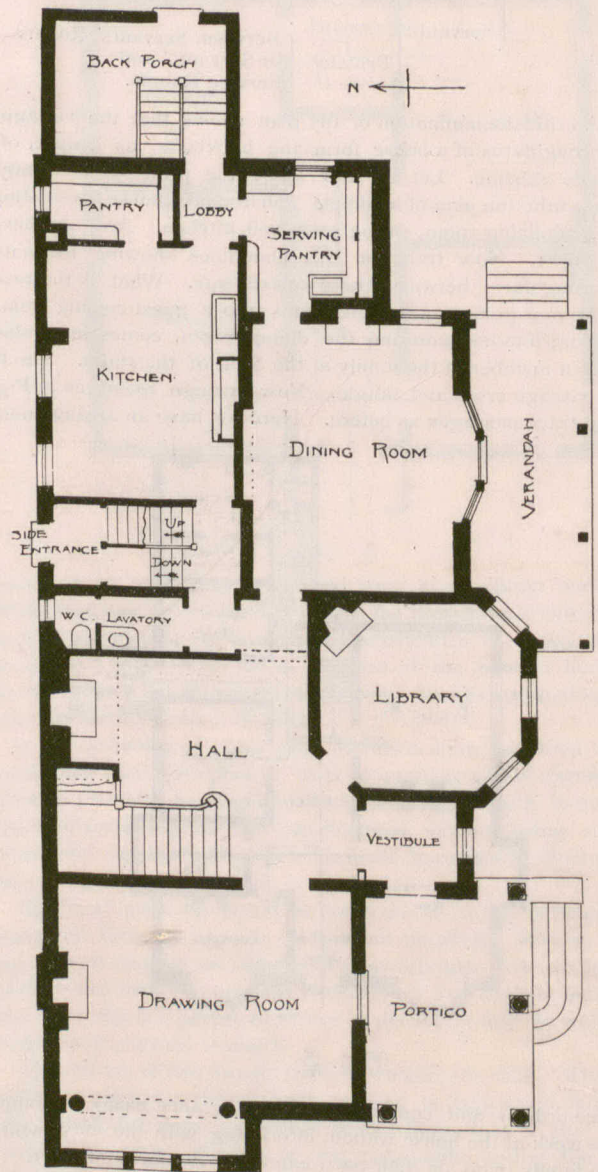


FIG. 11.

ing. The long, narrow hall was next attacked. A side hall of good width was placed across the house between the large front and rear rooms, and in it the stairs were placed. This was a decided improvement on the old plan. The stair, broken into short flights, was more easily mounted; the hall itself, with fireplace,

formed a pleasant and useful room, fairly well lighted, partly from the stair well and partly by borrowed light from the adjoining rooms. But it was in the artistic effect gained that the great attraction lay, the new arrangement being capable of an exceedingly beautiful treatment.

In New York and other large cities, where, on account of the high value of land, the attached house almost universally prevails, this type of plan, modified, of course, by circumstances, is still commonly adopted. (See Fig. 12.)

An excellent plan is that shown in Fig. 13 of a modern house by McKim, Mead & White, of New York. The entrance is on the

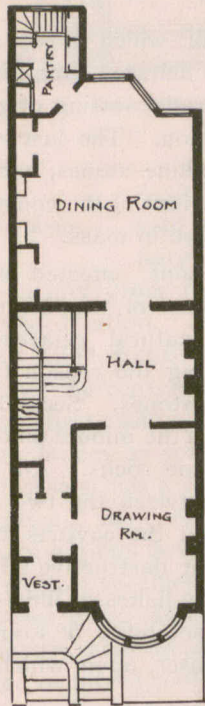


FIG. 12.

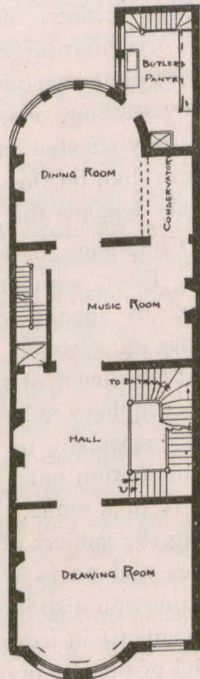


FIG. 13.

floor below that shown, being but a step above the ground, through a vestibule into a large hall occupying the whole front portion of the house. In this is the stair up to the principal floor (the one illustrated). There is a simplicity of treatment about both these plans that is most admirable and well worthy of study.

One difficulty common to the city house is in connection with the reception of guests. During an entertainment late comers are forced to run the gauntlet of the assembled guests to the central stairway before they can reach the dressing rooms, or the same inconvenience arises in the case of a person calling unexpectedly, it may be on a matter of business. An ingenious attempt to over-

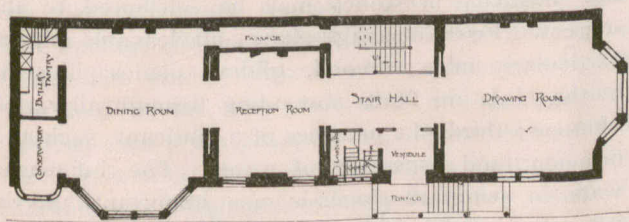


FIG. 14.

come this drawback is shown in Fig. 14, where we see a private stair is carried from the lobby off the vestibule for use under such circumstances.

In conclusion, there are many other points in connection with our subject both of interest and importance, but the paper is already too long, and the writer can only hope that the suggestions on house planning herein offered may not have been without some slight value to those who have heard them.

The Amherst Red Stone Quarry Co., of Amherst, Nova Scotia, start the season with excellent prospects. A large area has been cleared and the indications are that the stone improves steadily in quality as it extends westward. The company have put in a new boiler and have a steam drill at work. The latter is proving a great saver of labor; with it a hole can be made in five minutes that by the drill and hammer process would take three men two hours. The company, which at present employs 21 men, have been invited to tender on some of the best buildings now in contemplation in the lower province cities, and have already been awarded a number of important contracts.

TESTS OF QUICK-SETTING CEMENT.

On this subject, Prof. Cecil B. Smith, of McGill University, writes to the Brickbuilder as follows:

Because of the abuse which our quick-setting cements (the natural set of which may be in ten or twenty minutes) receive at the hand of careless or ignorant users by frequent retempering in order to use large batches of mortar extending over a period of several hours, the following tests were made:—

The proportionate reduction of strength would probably hold true for mortars as well as neat tests.

In the tests a large batch of mortar was mixed up and briquettes were molded from it. At the end of one hour the remaining mass had become appreciably stiffened and was retempered by adding sufficient water and by vigorous working. The same process was gone through each hour, but very soon the activity of the cement was so greatly killed that the setting would not take place for many hours, and very little extra mixing was required.

The "Quebec Natural," corresponding to such United States cements as "Cumberland," "Round Top," etc., has an incipient set of about 30 min. and a full set of 2 to 3 degs. The "Peacock Portland" is a sound, well-burnt, but coarse English cement, having an incipient set of about 20 min. and a full set of 1 to 2 degs.

QUEBEC NATURAL.

Original test	Time of Set	Neat Tensile Strength per square inch		
		1 wk.	1 mo.	10 mos.
Original test	3 hrs.	157 lbs.	278 lbs.	520 lbs.
1st retempering	4 "	123 "	210 "	485 "
2nd "	4 "	80 "	163 "	435 "
3rd "	19 "	73 "	153 "	405 "
4th "	19 "	52 "	157 "	380 "
5th "	19 "	72 "	172 "	295 "
6th "	21 "	....	173 "	290 "
7th "	....	....	....	265 "

PEACOCK PORTLAND.

Original test	Time of Set.	Neat Tensile Strength per square inch.		
		1 wk.	1 mo.	2 mos.
Original test	2 hours.	407 lbs.	515 lbs.	596 lbs.
1st retempering	5 "	202 "	341 "	425 "
2nd "	4 "	184 "	290 "	382 "
3rd "	Very Slow.	185 "	365 "	388 "
4th "	"	....	165 "	308 "
5th "	"	213 "	347 "	383 "
6th "	"	180 "	310 "	402 "
7th "	"	220 "	332 "	367 "

This table seems to point out one or two things rather clearly:—

1. That the first and second retempering do all the injury, the subsequent ones being merely the reworking of a mass which has not set.

2. That the strength of retempered cements is roughly one-half of those not thus treated.

3. That time does not "heal all wounds," as the strength at ten months with the natural cement, and two months with the Portland, has not recovered to any very appreciable extent. This last deduction does not agree with the student thesis paper on the subject published about two years ago in the Engineering News, which claimed a recovery of strength in course of, say, six months.

I trust that such a memorandum as this will bring out some discussion on the matter from men whose experiences on the subject will be of value to the profession.

A. C. Hutchison, architect, Montreal, recently had tests made of the new Kingsley water tube boilers in the Ottawa General Hospital. These tests are said to have given highly economical results, exceeding the makers' guarantees by 10%. This type of boiler was used in nearly all the recent Ottawa work, including the American Bank Note Co.'s works, and the C. Ross Co.'s building.

SAFETY OF ELEVATORS.

MR. Fred. C. Floyd, Elevator Inspector, Boston, Mass., read a paper entitled "Modern Elevators" before the International Convention of Building Commissioners and Inspectors, in which he suggested the following additions to laws governing the installation and operation of elevators for passenger and freight service:

1. It is of first importance to introduce a provision that every elevator, whether for freight or passenger service, shall be operated by a competent attendant who shall not be otherwise employed.
2. It should also be made the duty of owners and tenants of buildings to notify the building commissioner or other authorities of any elevator accident upon or within their premises.
3. The inspection of new elevators in the absence of the manufacturer or his representative is often attended with difficulty in consequences of new appliances and their complicated character. A test of these devices by the manufacturer in presence of the inspector before the elevator has been accepted and placed in commission, should be made compulsory by law.
4. Some improved method of attaching hoisting ropes seems to be demanded, two accidents having recently occurred in Boston on freight elevators, caused by ropes pulling through the socket at the yoke or cross-head. One of these accidents was fatal to the operator, who fell with the car, the safety appliance of which was inactive and therefore useless in accomplishing the object for which it was designed. Here was an instance in which hoisting rope and safety appliance were both defective at the fatal moment. A legal enactment would guard against such accidents by requiring a more secure method of attaching the ropes.
5. It should also be prescribed by law that elevator hoisting machinery shall be located where inspection and supervision shall not be difficult by reason of darkness and inaccessibility. This important and costly equipment is now too frequently placed in a contracted space in a dark basement and at the top of the shaft, or near the ceiling adjacent to the shaft, where a man cannot reach it except by introducing his body from a ladder through an opening too small to admit of comfortable passage, and into a space in which he cannot stand erect. I am aware that floor space is valuable, but if it is none too valuable for storage it is none too valuable for the location of expensive machinery that accomplishes such vast results and that sustains such responsibilities as the safe conveyance of human beings.
6. The number of infractions and defects discovered by the elevator inspection of the Boston building department is sufficient proof of its necessity, and the inoperative safety appliance is so frequently met that some remedy other than by inspection is called for, and I suggest a law that would provide for such an adjustment as will cause the automatic engagement of the safety apparatus each time the car descends to the bottom of the shaft, thus preventing rigidity by frequent operation.
7. Openings at street entrances to freight elevator shafts that extend to the sidewalk might be abolished with positive benefit to all concerned, and I recommend a legal requirement that such openings shall begin two or three feet above the sidewalk. The outside wall would thus afford protection against falling into the basement, and the maintenance of a gate, which now is so perplexing, would be unnecessary, while the delivery

of freight would be attended with less manual labor, for the reason that a level platform would be feasible extending from wagon to elevator platform, thus permitting the use of a truck for transferring the freight.

STRENGTH OF BUILDING STONES.

THE chief elements of strength in building stones are briefly described in a paper by Prof. Alexis A. Julien of Columbia College, as follows:—

1. Interlockment of grains, of which three stages occur: irregular aggregation, in helter-skelter disorder and with poor consolidation; parallel sorting of grains; and dove-tailing, or interpenetration. The last is most thoroughly effected in the crystalline stones, and on it far more than on the specific gravities of the constituent minerals depends the weight, taken in mass.
2. Coherence between the grains, effected in two ways. First, cementation, mainly of the fragmental stones, by means of various natural cements, the presence of siliceous cement being the reason for the special excellence of certain sand-stones. Second, surface or capillary adhesion between the minute plates and grains, especially in the crystalline rocks. An important distinction must be made between the two classes of voids in a stone, the pores and the cavities, this involving the subject of the different destructive effects of cavities and pores when filled by flakes or films of ice. This question also includes the solubility of stones and their cements in fresh and salt water, upon which there is need of further investigation.
3. Tension among the mineral grains, and the active stresses which survive in stones and affect their strength, of which three classes occur. First tension produced by crystallization; second, tensions produced by subterranean strain; third, tensions produced by present physical conditions; all of which may cause a stone to behave very differently from previous specimens examined and tested.
4. Rigidity, or absence of mobility among the grains of a stone. Evidences of internal motion, flexibility, and plasticity in stones may be attributed to three sources. First, cleavage planes of cleavable minerals, particularly mica; second, gliding planes, illustrated by the miniature faults abounding through all varieties of stone; third, the presence of a lubricant, such as oil, bitumen, and especially of water. The influence of water in nearly all stones is most important, and there is need of special methods for determining the strength of wet or moist stones, especially as regards diminution of rigidity from this cause.

PERSONAL.

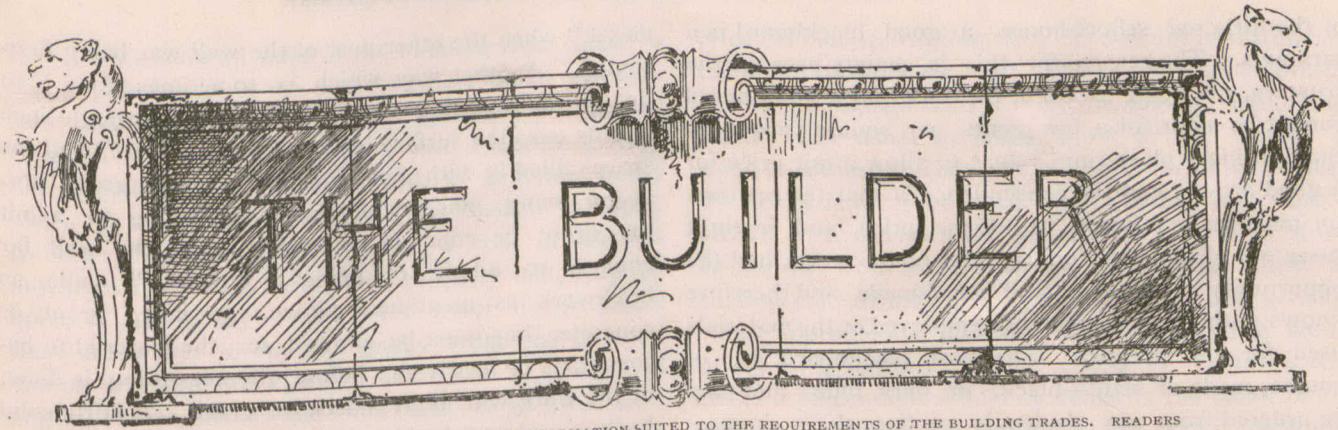
Mr. J. M. Mallory, architect, has recently opened an office in Vancouver, B. C.

Mr. Joseph Wright, of Toronto, president of the National Plumbers' Association of Canada, has just returned with his family from a trip to British Columbia.

Mr. Wm. Bunney, architect, has severed his connection with the Wm. Cane & Sons Manufacturing Co., and removed from Newmarket to Ottawa, having accepted a position with Messrs. W. C. Edwards & Co., of that city.

The executive of the National Plumbers' Association have in preparation a directory of all master plumbers in Canada.

The corporation of London, Ont., is threatened with suits for recovery of fees by some of the architects who submitted designs in the recent Victoria Hospital Competition.



[THIS DEPARTMENT IS DESIGNED TO FURNISH INFORMATION SUITED TO THE REQUIREMENTS OF THE BUILDING TRADES. READERS ARE INVITED TO ASSIST IN MAKING IT AS HELPFUL AS POSSIBLE BY CONTRIBUTING OF THEIR EXPERIENCE, AND BY ASKING FOR PARTICULAR INFORMATION WHICH THEY MAY AT ANY TIME REQUIRE.]

Flat Roofs.

A SO-CALLED flat roof, if properly covered and suitable materials used for the purpose, is as effective and will last as long as any other roof, cost and position being taken into consideration. In Canada and, indeed, many parts of the United States, the question in making a roof that confronts the contractor and owner is the important one of cost—first cost. The owner wants a good roof for as little money as possible. To meet this condition, the architect specifies a roof only good enough to save his reputation; the contractor follows the architect with a series of parings down, so that the roof seldom gets all the architect specifies, and the end is, a roof that in a few years gives satisfaction to no one. Owners should not permit themselves to be persuaded into accepting a pitched or tarred roof. While many of them may hold good for five or six years, few of them can be relied upon for more than three years in this variable climate, and any guarantee given by the contractor to keep the roof in good order for a period of five years is often worth about as much as the paper it is written on, as an experience of many years has proved. When a roof becomes troublesome, it is discovered the contractor is out of town, out of business, or in such a position as to render it impossible for him to attend to the matter; or it may be when the roof is loaded with snow, and the weather such as to prevent repairs being done; but the leak, like Tennyson's rivulet, "runs on forever," and more damage is done to the hidden timbers and exposed plaster than would have covered the extra cost of a first-class roof in the first place, and this damage is an expense, even if the guaranteeing contractor repairs the roof, for it must be remembered the contractor only guarantees to keep the roof in repair for five years. He does not guarantee damages. After being repaired two or three times, the whole roof covering gets in a bad condition, partly from unequal shrinkage of old and new materials, and partly because of the tramping and cutting and pounding of the workmen. Taking it all in all, a tarred and gravelled roof is about the most expensive in the end, and is never a satisfactory one.

If a composition roof is not a cheap or a good roof, what next best material will answer, and yet not be too costly? To answer this question properly would require a knowledge of all the conditions connected with the particular roof enquired about, and as these conditions change with localities, it would hardly be safe to offer as an inflexible rule, the use of any particular material. It is safe, however, to say that both a good brand of roofing tin, or a good quality of suitable gauge galvanized iron—say 28 gauge—would be better, and

in the end cheaper, than any roofing composition the writer knows of. Tin has its advocates, who claim that when properly laid, and good I.C. charcoal tin employed, the roof will remain good for 25 years, and if painted once in seven years with a good roofing paint, it will remain good for 50 years. This is rather a long while for a tin roof to last, but we know of several instances where they have lasted even a longer period than that. The cost of a tin roof properly made and laid, compared with a first-class composition roof, will be about as 10 to 7 per square; that is, a composition gravel roof costing \$7 per square, a similar roof, having the same conditions, would cost, if of tin, as described, about \$10 per square in the same locality. These prices, of course, are only comparative. Both gravel and tin roofs may be made for less money, or they may cost more. A composition roof will not remain good for more than 10 years at the farthest, while a tin roof that will not remain good for 20 years will be considered a very poor roof indeed. Considering these figures, it will be seen at once that a tin roof is from 25 to 40 per cent. cheaper in the end than one covered with composition. For many reasons a galvanized iron roof is preferable to one of tin if care is observed in putting on and a good brand of iron used. For flashings around chimneys and alongside fire or division roofs, the iron should be built in the wall as the work progresses, and the mortar used should be composed of one and one of cement and sand. The flashings should be "stepped" at regular distances, and when the iron is laid on the roof the flashings should be brought down and folded to the proper angle, well nailed and properly soldered. It is better to use tinned nails for this work, then if by any means moisture should attack the nail there will be no corrosion, as the tin will protect the nail. The edges of the iron should be turned up over battens and so arranged that two edges meet on the batten, one edge lapping over the other in such a manner that a row of tinned nails may be driven along the centre line of batten, fastening down both edges at once. All the nail-heads should be covered with solder, thus insuring a water-tight joint. Battens may be one and one-half inches square. The angles at the battens make ample provision for contraction and expansion.

NEARLY every workman, carpenter, painter or plasterer will tell you he has a good method for making a blackboard suitable for school purposes, and yet, it is a fact, that good durable and satisfactory blackboards are like "angels' visits." In cities and the larger towns, good boards may be found, but in country places, the home

of the little red school-house, a good blackboard is a *rara avis*. The reason for this is mainly because the trustees, not being aware of the fact that a good board cannot be made for a few cents per square yard more than ordinary plastering, refuse to allow a fair price for a good article, and the consequence is that the contractor must make a board to fit the price, and, in eight cases out of ten, the country contractor never had the opportunity of seeing a good board made, and therefore knows nothing of the methods employed or the materials used for the purpose. The best blackboard is, of course, made of slate—black, or dark blue—and may be ordered from any dealer in roofing slates, in sizes varying from 2'6" to 3'6" in width, and from four to seven feet in length. The cost of these slates, however, is more than country school trustees would care to expend when they know they can obtain something that will answer for a very much smaller sum. When a blackboard is to be made of wood or boards, the following suggestions should be adopted: Procure wide boards of clear pine or basswood, $\frac{7}{8}$ inch thick; groove both edges that are to be joined together, making the grooves half inch deep, and quarter inch wide. Then make a tongue one-quarter of an inch thick, and fifteen-sixteenths inch wide. Joint and glue the edges of the boards, cramp with screw-cramps to make a good joint, insert the feather or tongue before cramping, first giving it a coat of glue. When dry and hard, add another width of board, going through the same process, until the board is made the width required. When dry, screw batons to the back of the board, batons to be about 4 inches wide and $\frac{7}{8}$ inch thick, and to be placed about two feet apart. Dress off smoothly on face and finish up with fine sand-paper, then paint with drop black mixed with dryer and spirits of turpentine. Do not use oil of any kind. Make a crayon and eraser tray and attach. When all is dry, rub down again with No. 0 sand-paper, brush off, after which give the board two coats of liquid slating, which may be obtained through your druggist, or cover it with the materials recommended by the Educational Department of Ontario. This makes a fairly efficient and durable board, and is cheap. It may be re-coated with the liquid at any time.

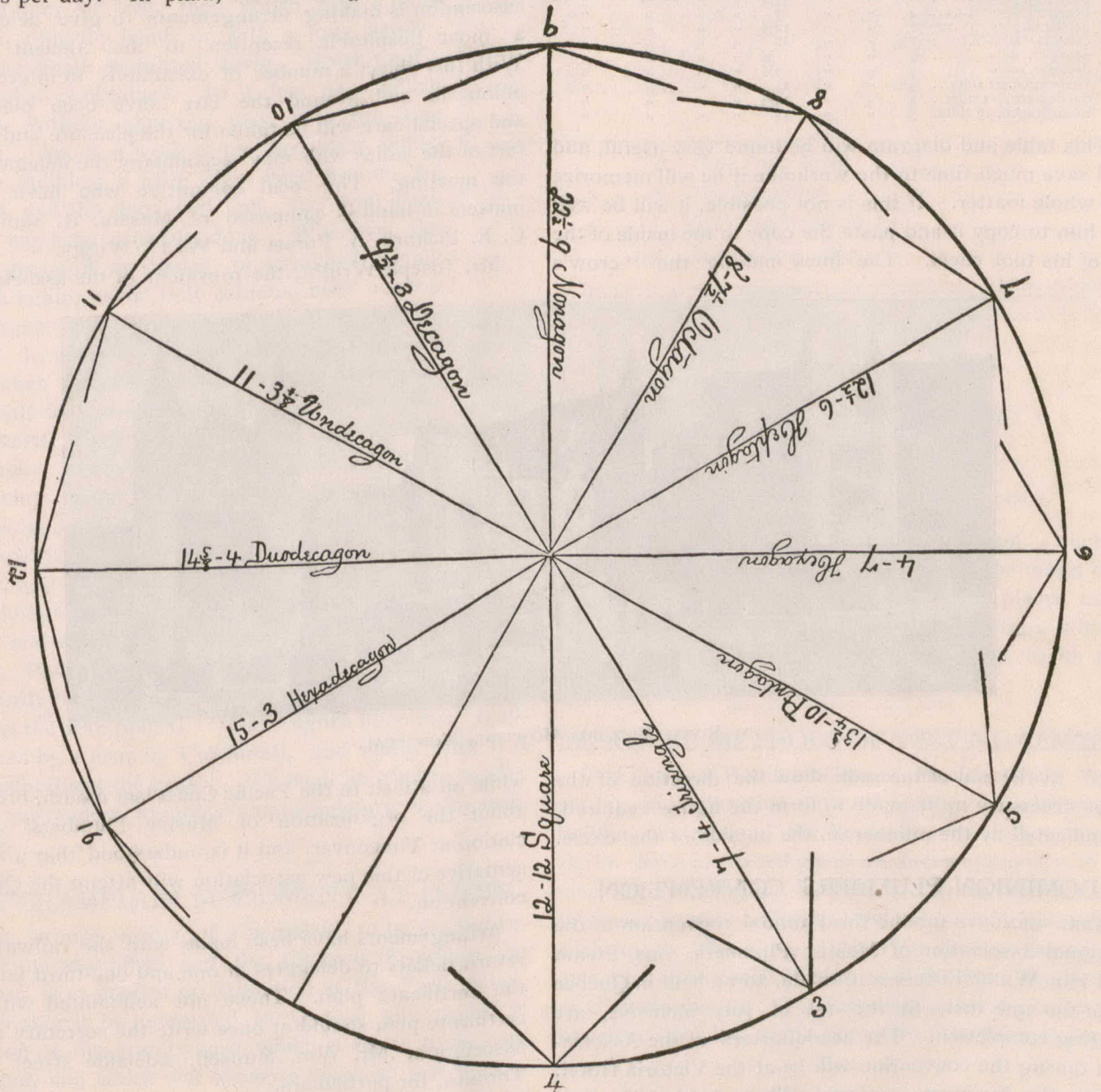
FREQUENTLY the plasterer is called upon to make a blackboard of mortar when he is plastering the walls, and if the work is done properly a board of this kind is generally pretty satisfactory. A good blackboard, however, can never be made of mortar unless the wall is prepared specially for it. The main requirement is solidity, and if the wall is brick, stone or concrete, then good results should follow, but if hollow, formed of studding sixteen inches from centres, with lath nailed on them, the usual way, it will be simply impossible for any plasterer to make a good blackboard on it, no matter how good the materials may be he employs. If the studding is boarded over with boards, and the lathing nailed on this double thickness, diagonally, and the wall does not settle, a fairly good blackboard may be made on the wall. When it can be afforded, it is better to fill in between the studding with brickwork that portion of the wall intended to be covered with the blackboard, allowing the bricks to project inwardly sufficiently far to receive the plaster on the same surface as the rest of the wall. This would allow the brickwork to be "ren-

dered," when the other part of the wall was being first-coated. Another way which is sometimes done is to line up the studding on both sides with rough inch boards over the surface intended for the board, and the spaces filled in with fine concrete or with grout, provision being made with the inside lining to admit the grout or concrete projecting inside the wall far enough to admit of being "rendered" same as brickwork as mentioned above. In using grout or concrete, time must be allowed for the material to become dry, or nearly so, before the plastering is done, or the work will likely check or crack. A fairly solid background may be obtained by using double the number of studs in the wall where the board is to be; that is to say, place the studs eight inches from centres, instead of sixteen. The spring between them at this distance will stand quite a while. The following is a very good method for the plasterer to follow in making a blackboard on a new lathed wall: Plaster the wall with a good scratch-coat of hair mortar, gauged with plaster of Paris. When dry, finish with an ordinary coat of "brown" mortar, colored black with any of the mortar mineral blacks, obtainable in any well supplied hardware store. When hard and dry, finish with a good coat of "hard finish," colored black with drop black dissolved in alcohol. When this coat is dry, apply two coats of liquid slating made as follows: One pound of white shellac, one-half pound powdered pumice-stone, one-quarter pound lamp-black, dissolved in one gallon of pure alcohol. If the blackboard is to be put on a brick, stone or concrete wall, the scratch-coat may be omitted. If these directions are closely followed, the work will last for years, and will be sure to give satisfaction. Flour emery may be substituted for powdered pumice stone; it will wear longer, but is not so effective on the board, and, being heavier, care must be taken in applying the liquid. It must be well shaken, as the emery will settle to bottom of vessel otherwise. A good coating for wooden blackboards may be produced from the following: Incorporate flour-emery with shellac varnish, adding sufficient lamp-black to give it the required color. If too thick, reduce its consistency with alcohol. Apply to the board with a camel's hair brush. Another good coating may be made by mixing pulverized slate or quartz rock with silicate of soda (water-glass of commerce), adding lamp-black to suit, and apply to the boards by means of a brush. This last mixture serves a good purpose in re-coating old blackboards on plastered walls. The old work in all cases must be rubbed smooth with fine sand-paper before the mixture is applied.

NEARLY every contractor has a way of his own of estimating brickwork, and it is a curious fact that authorities do not agree as to the actual number of bricks required to complete any given piece of brickwork. This variation is in some measure due to the fact that bricks vary in size, and that some bricklayers make thinner joints than others. In Ontario the contractor should base his estimate on the following figures, which experience has proven to be, on an average, correct. For a four-inch wall—such as is employed for veneered brick houses—count eight bricks for every superficial foot of wall. For a nine-inch wall multiply each superficial foot of wall by 15. In a fourteen-inch wall multiply each superficial foot by $22\frac{1}{2}$, and for an eighteen-inch wall multiply

by 30. Measure all sides of the building from corner to corner ; this takes in the corners twice, which compensates somewhat for cuttings, "bats" and chipped closers. As a rule, a bricklayer, with a laborer to keep him supplied with materials, will, in common house walls, lay on an average about 1,500 bricks in 10 hours. In better class work, such as facing a front of a building, from 1,000 to 1,200 bricks, properly laid, may be taken as a good day's work ; for street fronts, where there are arches to cut and gauge, from 700 to 900 ; and on very fine work, where there are a number of angles, offsets, arches and skew-backs to be fitted to, a man will not be able to lay more than from 150 to 300 bricks per day. In plain, massive engineering work a

price, of course, varying with the amount of cutting and the depth of the work. At this writing, brickwork for ordinary buildings costs to lay, including scaffolding, mortar and usual archings, about \$7 per 1,000. In some localities the cost may be more—in many it is less. This price is for good work, and is exclusive of cost of bricks. First-class front, pressed brick work is worth all the way from \$10 to \$20 per 1,000 to lay them, including colored mortar. These prices are only given as being approximate, and may have value when actual prices for given work are not available. In large contracts a percentage should be added to the result of the estimate to insure the contractor for risks, breakages and unforeseen delays.



STEEL SQUARE SOLUTIONS.—BEVELS FOR POLYGONS.

man would average about 2,000 bricks per day. In making estimates for brickwork the size and quality of the building should be considered. The price per thousand for laying should be greater on a small building than on a large one, and it will not cost so much to lay bricks on a low building as on one higher. On a high building, one laborer may not be able to carry up enough bricks and mortar to keep him steadily employed, and if another laborer becomes necessary this will make a difference in the cost of laying per thousand. When making an estimate, it is as well to figure separately on the different grades of work, assuming a price for each. Arches, cornices, quoins and ornamental belting courses should be estimated by the foot, the

Mitres and Angle Cuts.

THE diagrams shown herewith will enable any mechanic to obtain, by the aid of a steel square, the bevels or angles suited for the correct making of the polygons named in the diagram. The method for obtaining the angles as set forth and figured is the result of using two sets of figures on the square—one on the tongue and one on the blade. With the exception of the triangle, all the bevels used are those formed by the tongue of the square, the three-sided figure being formed by the bevel line on the blade. It is not necessary to give a long explanation of the why and wherefore of these cuts or bevels, suffice it for the workman to be able to get them and to know they are correct. A few examples, how-

ever, will give the operator an idea of how the figures are applied. Let us suppose we want a "mitre-cut" for a nonagon or nine-sided figure: Find the figure 9 on the outside of the circle, and following the line inside, we find the figures 22½ and 9. These figures indicate that we are to take 9 inches on the tongue and 22½ inches on the blade; lay on a line—same as for braces or rafters—mark down the tongue; this line will be the bevel or mitre for the angle of a nonagon. Try it by cutting nine pieces of stuff all the same length at the long points, using this bevel at each end. In like manner all the other bevels are obtained. We recapitulate the figures and polygons:

For a triangle.....	4	in. on tongue,	7	in. on blade,	blade gives cut.
" square mitre.....	12	" "	12	" "	tongue "
" pentagon, 5 sides...	10¾	" "	13¾	" "	" "
" hexagon, 6 ".....	4	" "	7	" "	" "
" heptagon, 7 ".....	6	" "	12½	" "	" "
" octagon, 8 ".....	7½	" "	18	" "	" "
" nonagon, 9 ".....	9	" "	½	" "	" "
" decagon, 10 ".....	3	" "	9½	" "	" "
" Undecagon, 11 sides...	3½	" "	11	" "	" "
" dodecagon, 12 sides..	4	" "	14¾	" "	" "
" hexadecagon, 16 sides.	3	" "	15	" "	" "

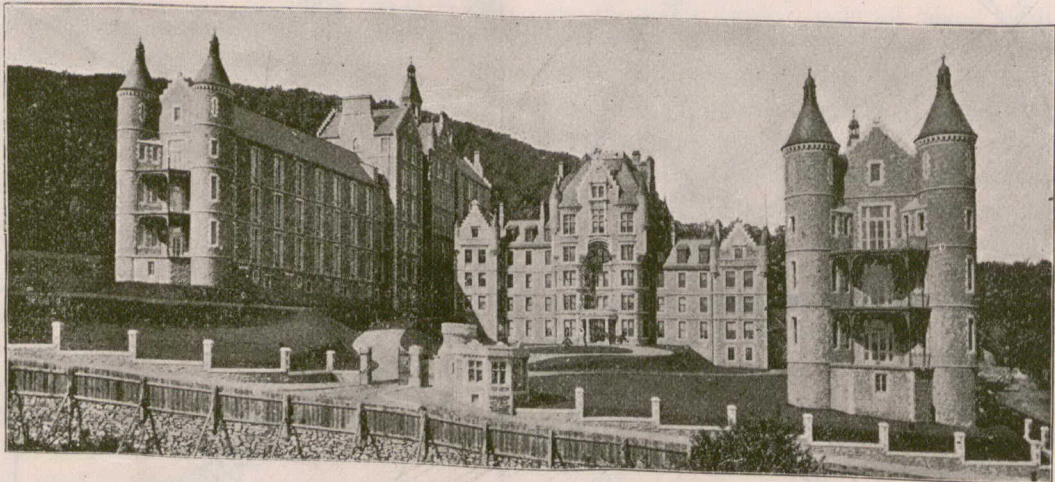
This table and diagram will be found very useful, and will save much time to the workman if he will memorize the whole matter. If this is not possible, it will be well for him to copy it and paste the copy to the inside of the lid of his tool chest. The lines making the "crow's

by which the manufacturers agree not to sell goods to other than legitimate plumbers and fitters.

It is the hope of the executive committee, comprising Joseph Wright, President, Toronto; Wm. Smith, Vice-President, London; W. M. Briggs, Treasurer, Montreal; Wm. Mansell, Financial and Recording Secretary, J. B. Fitzsimmons, Toronto; C. E. Pickard, Quebec; Thos. Campbell, New Brunswick; G. A. Perrier, Nova Scotia; T. Stevenson, Manitoba; Joseph Larmar, Montreal, that those plumbers and fitters who have hitherto held aloof from the Association, will become a part of it, and take part in the proceedings at the forthcoming convention.

In addition to the business programme, the local association is making arrangements to give delegates a most hospitable reception to the Ancient City. With this object a number of excursions to interesting points in and around the city have been planned, and special care will be taken for the pleasure and comfort of the ladies who may accompany the delegates to the meeting. The local committee who have these matters in hand is composed of Messrs. R. Sampson, C. E. Pickard, A. Forest and W. H. Wiggs.

Mr. Joseph Wright, the president of the association,



ROYAL VICTORIA HOSPITAL, MONTREAL.

feet" at the end of the radii show the direction of the sides necessary to be made to form the figure required, as indicated by the number on the outside of the circle.

DOMINION PLUMBERS' CONVENTION.

ARRANGEMENTS for the third annual convention of the National Association of Master Plumbers, Gas, Steam and Hot Water Fitters of Canada, to be held in Quebec from the 29th inst. to the 1st of July inclusive, are nearing completion. The headquarters of the Association during the convention will be at the Victoria Hotel, where the business sessions will be held. The programme which is being arranged for the occasion is designed to afford both profit and pleasure to the delegates. It might be well just here to mention that the convention is not intended to be one for delegates only, but is open to every one who is a master plumber, gas, steam or hot water fitter, and no one will be held by any action to be taken unless he is or becomes a member.

For the benefit of those who are not familiar with the present workings of the association we will state that about two years ago the men who directed its affairs, with the object of protecting the interests of the contracting plumber and fitter, adopted in July, 1896, certain "Trade Resolutions," which have received the assent of the Manufacturers' Supply Association, and

while on a visit to the Pacific Coast last month, brought about the organization of Master Plumbers' Association at Vancouver, and it is understood that a representative of this new association will attend the Quebec convention.

Arrangements have been made with the railways for return tickets to delegates at one and one-third fare, on the certificate plan. Those not acquainted with the certificate plan should at once write the secretary of the association, Mr. Wm. Mansell, Adelaide street west, Toronto, for particulars.

QUESTIONS AND ANSWERS.

A CORRESPONDENT, writing from Burk's Falls, asks the following: "I will be glad if you can give us any information as to the best methods of waxing floors, preparing the wax, and where it may be procured, etc.? Perhaps some of your readers may have some suggestions they would be willing to give through the columns of your paper."

The following is offered in reply: 1st. The floor should be of good sound hardwood, and should be perfectly clean and smooth. 2nd. Fill with any of the regular wood fillers; Wheeler's is one of the best. If a color is wanted, mix the color with the filler; rub in

the filler until the pores of the wood will take no more.

3rd. Let stand about twenty-four hours, then sand-paper smooth and clean off well.

4th. To prepare the wax, take, say one or two pounds of ordinary bees' wax, mix with spirits of turpentine made hot over a sand bath, that is, put sand in common iron pot and put over a fire until the sand is made as hot as boiling water, then in a tin can or other suitable vessel pour in the turpentine and let it remain until the spirits is hot enough to melt the wax. Cut the latter in small pieces and drop gently into the hot turpentine; stir up until the whole forms a sort of thin creamy mixture. Apply this to the prepared floor, hot, with a clean paint-brush; let stand for an hour or two, then polish with a hand brush, either by hand, or with a long handle, and the brush weighted down. Brush until a fair polish is obtained. In a few days polish again, without applying wax, with the same brush. About a week or ten days after, polish again, rubbing a little plain bees' wax on the brush, and the floor will look very well if the work has been properly done. Whenever the floor gets dull, or shaded, or scratched, simply polish again, using only common bees' wax on the brush, and the work will look as good as new. In many of the old Halls in England, the oaken floors have been waxed at regular intervals for centuries, and they look as well, yea, better, than when first laid. The fashion of having hardwood and parquette floors is becoming quite common in the United States, as well as in England, and in some of the most costly homes, nearly all the floors are of hardwood, and few carpets are used, there being only here and there a costly rug or mat. Floor wax is manufactured and sold by a number of firms in Boston, New York, Philadelphia and Chicago, and brushes made especially for polishing can be had from any of the firms selling the wax polish. "Old English floor wax" is advertised by a firm in Cincinnati, and along with it is also advertised the brush. We shall be glad to receive from our readers anything supplementary to the foregoing.

THE CHAMPLAIN MONUMENT AT QUEBEC.

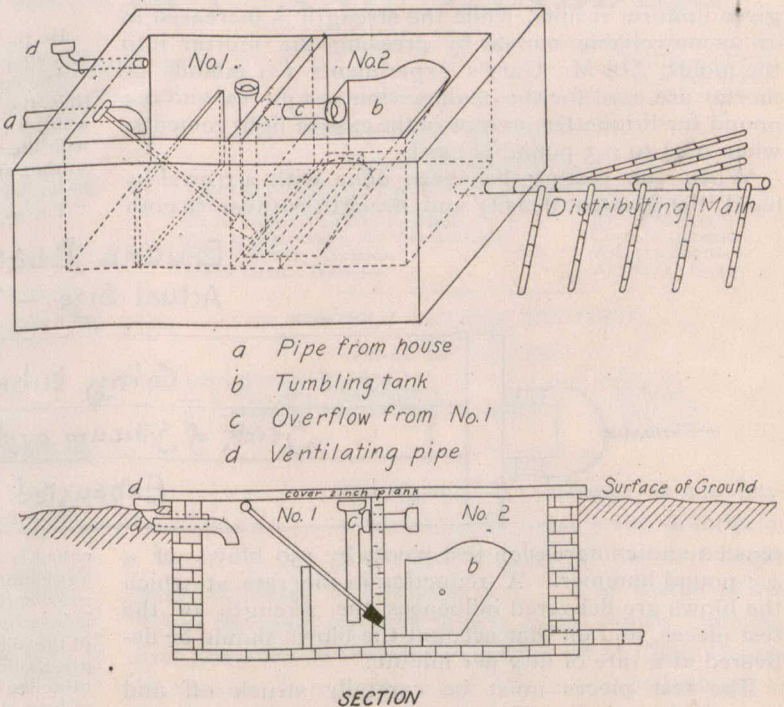
THE bronze statue of Champlain, to be erected between the post office and the Chateau Frontenac, at Quebec, is at present on exhibition at the Paris Salon. It will shortly be forwarded to Quebec and placed in position on the granite base, which is about to be constructed, and which will occupy a space 40 feet square. The statue itself is fifteen feet high and the base 37 feet, or a total of 52. Mr. Le Cardonnel, the architect whose design for the monument was chosen in competition, is a student of the School of Fine Arts of Paris, and is the winner of several other important competitions. The sculptor is Mr. Paul Chevre. The inauguration of the monument, which is to cost \$30,000, will take place in September.

The Great Northwestern Telegraph Company are installing a new heating system in their large building in Montreal, using the Kingsley water tube boiler installed by E. A. Wallberg.

The Cutler Manufacturing Co., of Rochester, N. Y., the well-known makers of mail chutes, are mailing to architects, in portfolio form, a series of five interesting pen and ink drawings by Harvey Ellis.

DISPOSAL OF SEWAGE OF PRIVATE AND PUBLIC BUILDINGS.

IN an article contributed to the Transactions of the Engineering Society of the School of Practical Science, Toronto, on the "Disposal of Sewage," Dr. P. H. Bryce, M.A., M.D., secretary of the Provincial Board of Health of Ontario, recommends the method shown in the accompanying diagram for the purposes of a private house, large hotel or public building, as for



- a Pipe from house
- b Tumbling tank
- c Overflow from No. 1
- d Ventilating pipe

SECTION
DISPOSAL OF SEWAGE OF PRIVATE AND PUBLIC BUILDINGS.

instance a county poor house or asylum. Such a method, he states, will amply supply all the needs by a system of sub-surface field tiles, which, if placed under a garden, not only will dispose of the sewage without cost or nuisance, but will add materially to its productiveness.

IMPROVED METHODS OF TESTING CEMENT.

THE German Portland Cement Manufacturers' Association, in conjunction with the testing department for building materials of the Royal Testing Laboratory of Berlin, have instituted elaborate investigations with the view of improving the methods of testing cement, so as to secure greater uniformity than at present in results of such tests. The same subject is now engaging the attention of a special committee of the American Society of Civil Engineers. The following general conclusions have been reached as the outcome of the German experiments:

In mixing the standard mortar of one part by weight of cement and three parts of standard sand, as much as 8.8 pounds may be used, yet it must be considered that the strength of briquettes of this mortar decreases when the mixing is continued longer than three minutes. As it has been observed that more intimate mixture of the mortar than is attainable with the trowel promotes the uniformity of the separate results, another method of mixing, such as by machines, is to be preferred.

The amount of water for the standard mortar must be proportioned to the properties of each cement and ascertained in each particular case.

With respect to the fastening and holding of the molds, it is to be noticed that the tensile strength of the

standard mortar can suffer if the mold is not held fast to the table.

The oiling of the molds, particularly in preparing briquettes of neat cement, should not be omitted, but is to be done carefully in order that the strength of the pieces may not go down. Thin oils are better than thick. A mixture of three parts of rapeseed oil and one part of petroleum has given satisfaction during several years.

In order to obtain uniform results it is necessary in tension as well as compression tests to adhere to a definite amount of mortar. The amount for each mold is to be weighed out. Mortar placed lightly in the mold gives uniform results, while the strength is increased in an uncontrollable manner by pressing the mortar into the molds. In Mr. Gary's experiments 1.9 pounds of mortar are used for the compression test pieces, and 0.4 pound for briquettes, except in the case of light cements, when 0.44 to 0.5 pound is used.

When the mixing has been done with a trowel by hand, the greatest density and strength is given to both

such conditions have not yet been undertaken at the laboratory. Fresh test pieces must be protected carefully from drafts and dryness.

For comparative tests of cement the water in which the pieces are placed should be kept as nearly as possible at a constant temperature of from 59 to 64 degrees Fahrenheit. The strength of the piece is increased by raising the temperature of the water, but the influence of temperature varies among the different brands, being apparently greater in the case of stronger cements.

ELECTRIC HEATING AND ITS APPLICATIONS.*

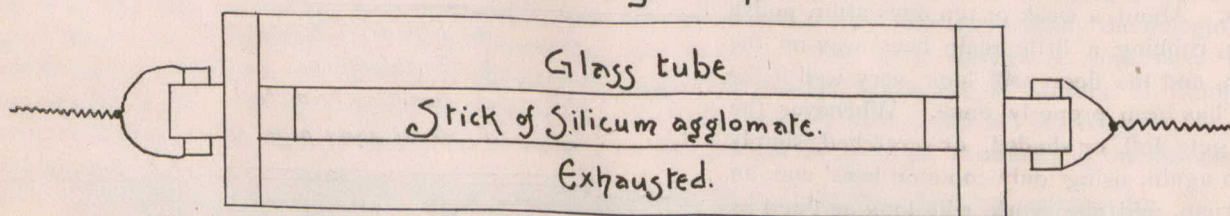
By M. FERNAND LE ROY, C.E.

In pursuing his researches Mon. Le Roy sought to attain the following results :

The construction of apparatus of such simple and handy form that the ordinary domestic would experience no difficulty in using it ; to make the application readily available in conjunction with the present forms of saucépans, kettles, stoves, irons, etc., so that any change of method on the part of housekeepers would be avoided.

The system is described as consisting essentially in what is

BÛCHE ÉLECTRIQUE
Actual Size. - Plan.



tension and compression test pieces by 150 blows of a 4.4-pound hammer. A reduction in the rate at which the blows are delivered influences the strength of the test pieces, and on that account the blows should be delivered at a rate of fifty per minute.

The test pieces must be carefully struck off and smoothed on the top if the most regular and reliable results are to be obtained. Mere striking off without smoothing lowers the strength and uniformity of the tests.

Tension test pieces cannot be left more than half an hour in the molds without influencing the results, while pieces for compression must be left 24 hours in the molds. The pieces must be kept under entirely similar circumstances.

Slow-setting cements must be protected from strong and protacted shaking during setting, because such shaking has a retarding influence which seems to increase with the age of the test piece. Experiments to determine the behavior of quick-setting cements under

called la Bûche électrique, or the electric log. A stick of silicum agglomerate metallised at each extremity in order to prevent the overheating of the joints and to insure good contact at the sockets is inserted in a glass tube, from which, to prevent the oxidation of the silicum, the air is exhausted. The two extremities of the glass tube are set in plaster and the metal ends of the stick are attached to the contact pieces in the same manner as in the case of incandescent lamps (see diagram).

Metal spring clips render the insertion of the heater in the circuit an extremely simple operation.

Each bûche or heater is constructed of such dimensions and resistance that the power absorbed under a pressure of 50 volts is from 60 to 100 watts, but of course they can be used under any voltage by arranging them in multiple series.

For warming rooms the apparatus would be particularly serviceable, and for general purposes in the kitchen this simple appliance is equally adaptable, as it can be utilized in connection with our present utensils. Hitherto electric cooking devices have been constructed on a much more elaborate and consequently expensive principle, but the method here described bids fair to revolutionize this branch of electrical industry.

* Summary of paper communicated to the Society of Civil Engineers, Paris, Feb. 4, 1898.



UNION DEPOT AT DALLAS, TEXAS, ROOFED WITH MERCHANT'S METAL "SPANISH" TILES.

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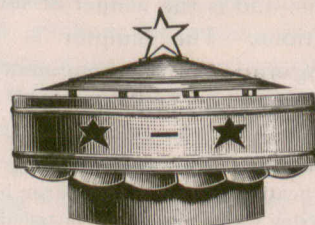
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AN IMMENSE TOWER.

FROM a paper recently presented before the Engineers' Club of Philadelphia, by Mr. Francis Schumann, M. Am. Soc. C. E., we learn that the tower of the Philadelphia city hall rises to a total height of 548 ft. 1 7/8 ins. above the ground level. The underlying soil is a reddish clay, mixed with sharp pebbles, very stiff and hard to pick and difficult to soften with water. For 337 ft. 4 1/2 ins. this tower is of brick, faced with marble, and forms a hollow shaft averaging 70 ft. square on the outside, and 45 ft. square inside. Upon this masonry shaft rests the metal dome with a height of 210 ft. 9 3/8 ins., to the top of the statue of William Penn, surmounting the tower. The estimated weight of the whole tower, measured from the top of the concrete foundation, 15 ft. below the ground line, is 62,768 tons; the 8 1/2 ft. bed of concrete covers an area of 7,150 sq. ft., and weighs about 4,000 tons more. To a height of 90 ft. the masonry is attached to and forms a part of the north wing of the main building.

SIGNS AND ABBREVIATIONS FOR HEATING AND VENTILATING WORK.

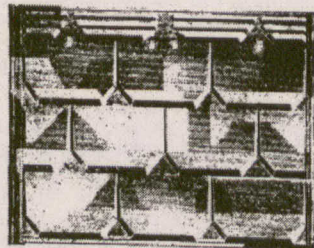
Mr. J. L. Bixby, jr., of Arlington Heights, Mass., has prepared a table of signs and abbreviations for use on heating and ventilating plans for his men. It is certainly most ingenious, says Heating and Ventilation, and we publish it herewith in the view that it may be of value to our readers.

- ✓ Feet.
- Inches.
- Square inches.
- ◻ Square feet.
- △ Area.
- △² Area in square inches.
- △² Area in square feet.
- ∩ Cubic feet.
- ∩² Cubic feet per second.
- ∩³ Cubic feet per minute.
- ∩⁴ Cubic feet per hour.
- ∩⁵ Velocity in feet.
- ∩⁶ Velocity in feet per second.
- ∩⁷ Velocity in feet per minute.
- ∩⁸ Pounds.
- ∩⁹ Pounds per square foot.
- ∩¹⁰ Pounds per cubic foot.
- ∩¹¹ Units of heat.
- ∩¹² Units of heat per minute.
- ∩¹³ Units of heat per hour.
- ∩¹⁴ Degrees.
- ∩¹⁵ Number of times air is changed per hour.
- ∩¹⁶ Horse power.
- ∩¹⁷ Square feet of heating surface.
- ∩¹⁸ Square feet of indirect heating surface.
- ∩¹⁹ Square feet of direct heating surface.
- ∩²⁰ Square feet of direct indirect heating surface.
- ∩²¹ Foul air current.
- ∩²² Fresh air current.
- ∩²³ Wet bulb.
- ∩²⁴ Dry bulb.
- ∩²⁵ Difference wet bulb and dry bulb.
- ∩²⁶ Temperature outside.
- ∩²⁷ Temperature inside.
- ∩²⁸ Temperature steam.
- ∩²⁹ Temperature hot air.
- ∩³⁰ Center.
- ∩³¹ Fresh or hot air radiator.
- ∩³² Foilura regulator.
- ∩³³ Ounces per square foot.

ANCIENT SPECIMEN OF WROUGHT IRON.

WHAT is believed to be the oldest piece of wrought iron in the world is a roughly-fashioned sickle blade found by Belzoni in Karnak, near Thebes, and now in the British Museum. Having been found imbedded in mortar under the base of the Sphinx, it is known as "the sickle of the Sphinx." It is believed to be four thousand years old. The preservative properties of mortar surrounding iron are being constantly realized by those who are pulling down old buildings.

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AN INTERESTING INSTALLATION.

A RECENT installation of electric lights in St. Mary's Cathedral, Halifax, Nova Scotia, is interesting, inasmuch as it consists in the application of the principle of interior conduits. The tubing within which the wires are enclosed is of the type known as electro-duct, which comes under the category of un-insulated conduits. These metal pipes are of soft steel, coated inside and out with a rust-proof compound, and are secured to the ceiling in the basement of the church, the branches being run from junction boxes to the various outlets. The slate switchboard is recessed in a handsome piece of woodwork in the vestry, and the different circuits are here controlled by eight D.P. switches, and protected by suitable fuse pieces. The brass fixtures, selected by the vicar-general, the Very Rev. E. F. Murphy, are of elegant design, those on each side of the altar being particularly handsome.

This is the first installation of the kind in the province, and is a good specimen of high class work, the wires from switchboard to lamps being completely enclosed in steel tubing. The specifications were drawn up and the work supervised by Mr. F. A. Hamilton, member of the Institution of Electrical Engineers, Messrs. John Starr & Son, of Halifax, being the contractors.

An attractive new catalogue has been issued by the James Robertson Mfg. Co., descriptive of their sanitary goods.

USEFUL HINTS.

Emerald or Paris green is rather permanent to light, but must not be mixed with pigments containing sulphur, because of the tendency to blacken when so mixed. It will not resist acids, ammonia and caustics.

Old bricks are readily cleaned in a new machine which is composed of a casing to support a shaft carrying a metal disk with a great number of steel pins fastened in the side thereof, which scrape the brick as the wheel revolves.

In papering rough plastered walls, or board partitions, says the Plumber and Decorator, they should be covered with thin muslin (cheese cloth) tacked around the edges, keeping the tacks far enough in to allow of pasting the edges down. The muslin should be wet with weak size and allowed to stretch and dry out before hanging paper on same.

Prof. S. H. Woodbridge, in a report on the hygienic condition of the public school buildings of Philadelphia, states that to suitably equip old and furnace-heated school-houses with ventilating means, has been found to cost on an average from \$9 to \$12 per capita occupant, and the expense of installing such equipment may be safely estimated on that basis, provided the work is done with the strictest integrity and economy.

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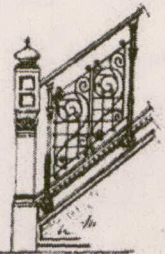
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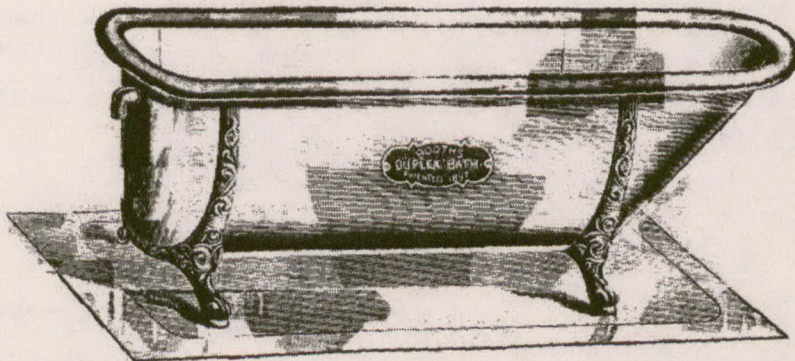
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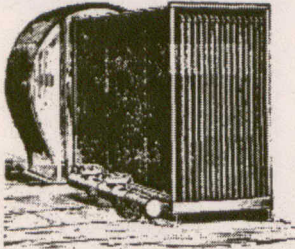
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dries quickly, and the coats may be put on quite rapidly. Employ mineral colors in toning the zinc. The water glass acts upon the zinc so as to thicken and harden it, and heat or hot water is said to have but little if any effect upon it. Use of bleuch shellac gum four pounds to a gallon of alcohol, maintaining those proportions for smaller quantities. This gives the shellac a ready working consistency, but if allowed to stand for some time it may thicken and need an additional cutting with alcohol. If the tub is zinc, as a preliminary, wash well hydrochloric acid and clean up finally with water.—Sanitary Plumber.

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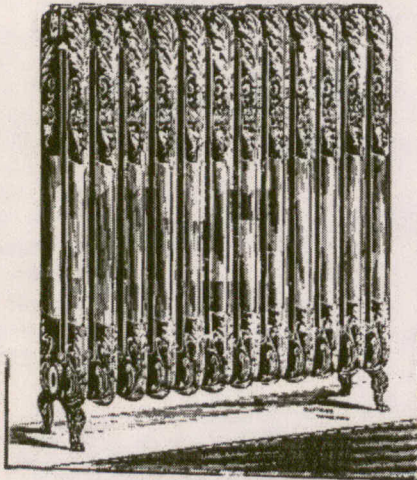
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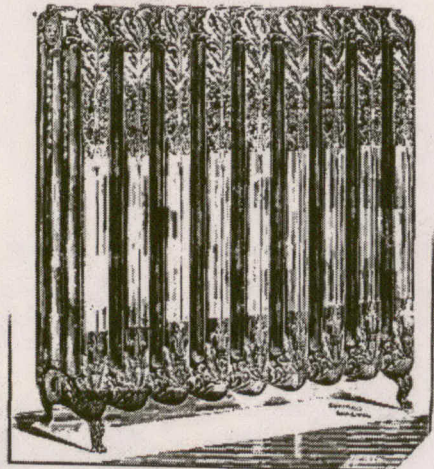
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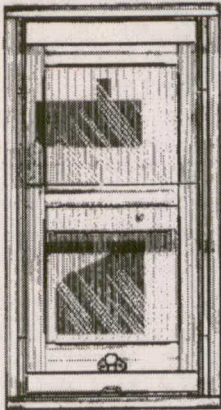
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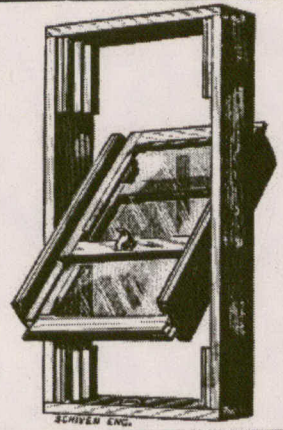
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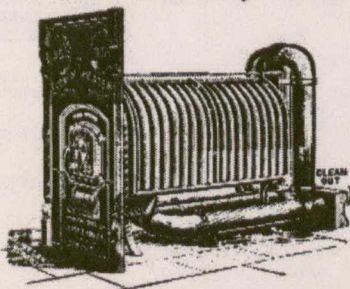
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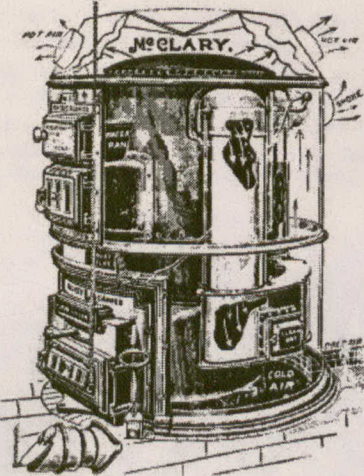
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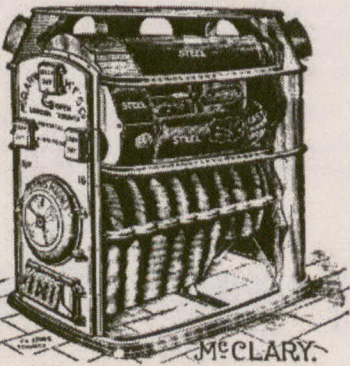
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