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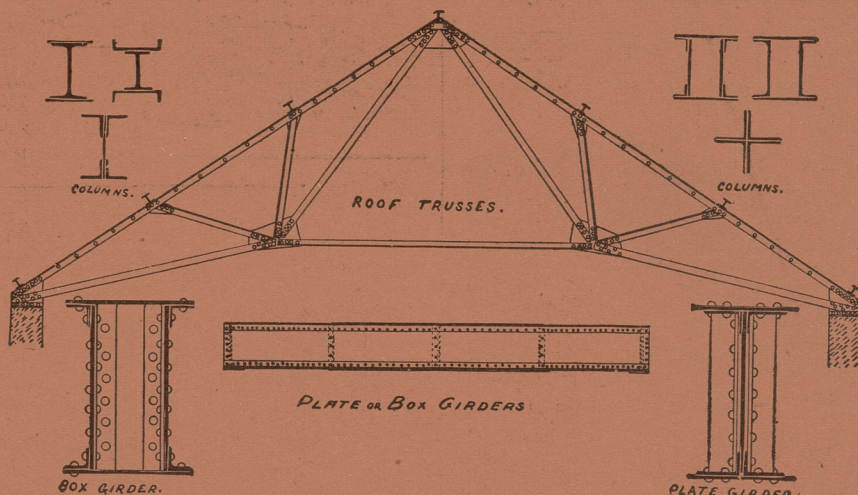
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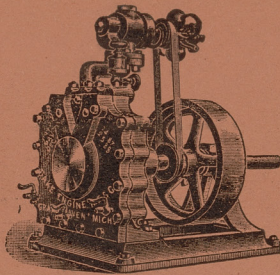
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The Crows Nest Pass Grievance.

THE Canadian Pacific Railway authorities have issued a statement in which evidence is submitted to show that no injustice was practiced by the company in its dealings with workmen employed in the construction of the Crows Nest Pass Railway. The men's grievances are alleged to be due to the fact that they were unaccustomed and unfit for the kind of work which they engaged themselves to perform. A correspondent of a Winnipeg paper who claims to have thoroughly investigated the matter corroborates this statement. The public will no doubt reserve judgment on the case until the result of the investigation which is now being conducted by the government shall be known.

THE management of the International The Paris Exhibition. Exhibition to be held in Paris in 1900, appear to be extremely alive to the importance of providing novel and startling features such as will be likely to attract curiosity hunters. On the other hand, it appears that the accommodation for exhibits of the products of the leading nations is altogether too restricted for the requirements. The United States Commissioner is endeavoring, with little chance of success, to obtain 500,000 square feet of space, in lieu of the 150,000 square feet allotted to that country. Great Britain is moving in the same direction. This great Dominion is expected to crowd its exhibit into 12,000 square feet. When a nation invites the world to contribute to an international exhibition, it should provide accommodation on a more liberal scale.

MARKED changes are taking place in the climate of Canada, particularly in the Northwest and Ontario. As a rule, the winters are shorter and less severe than a quarter of a century ago. In the Northwest the much dreaded early frost has to a large extent disappeared. These favorable changes are no doubt rightly attributed to the cutting down of the forests and the increased area of land under cultivation. Climatic changes of a less agreeable and beneficial character have likewise been induced. Prominent among these are lessened rainfall and increased wind pressure, de-

veloping on occasion into hurricanes and cyclones, like to that which last month devastated a portion of the town of Merritton. It is to be hoped that wind storms approaching in velocity the one referred to are not likely to occur at frequent intervals in the future, as the result of changed climatic conditions. At all events it would seem that increased wind pressures are likely to characterize the climate of this country in the future. Architects would do well, therefore, to take this new factor into account in the designing of their buildings, and exercise greater care than hitherto in the design and construction of roofs and projections, such as chimneys, towers and spires.

What an Architect Should Know.

ARCHITECTS owe it to themselves, as well as to their clients, to make themselves thoroughly acquainted with the history of Architecture. If this were the universal practice, meaningless and out of place features in design would not greet us at every turn as they do at present. The fact should be apparent to every designer that if his work is to be above ridicule, it must be founded on an accurate knowledge of architectural styles. Herein lies the principal difference between true and sham architecture. The architect who places a lych gate at the entrance to the grounds of a summer residence, proclaims himself ignorant of the knowledge which is a first requisite of his profession. This, however, is precisely what a city architect of our acquaintance did quite recently. Hitherto, in Canada, no adequate opportunity has been afforded for the study of architecture, yet books on the subject have been sufficiently available to render inexcusable such glaring displays of ignorance. With Departments of Architecture, in charge of competent professors, at McGill University, Montreal, and the School of Practical Science, Toronto, supplemented by the examinations of the Province of Quebec Association of Architects and the Ontario Association of Architects, means now exist by which students may become thoroughly equipped for the practice of architecture, and the work done in the future should be to a large extent free from the absurdities and crudities of the past and present.

The Proposed Palace Hotel for Toronto.

WE print in this number a reproduction of a water color drawing, by the architects, Messrs. Geo. Harding & Gooch, of New York, of the design for the palace hotel which is shortly to be erected in Toronto. We learn from Mr. Aemeliëus Jarvis, the promoter of the enterprise, that it has been decided that the building shall consist of nine stories, instead of seven as shown in the illustration. In lieu of illustrations of the plans, which are as yet in a transition state, we give a letterpress description of the general character and arrangement of the building. The carrying out of this undertaking will especially benefit that section of the business portion of the city bounded by Yonge, Adelaide, Front and Jarvis streets, where a large amount of city property is located. In conjunction with the improvement of St. Lawrence market, it will no doubt be the means of stopping the present tendency of trade to move westward and northward, and save a heavy slump in real estate values within the district described by the above named boundaries. It is to be hoped that the City Council will deal with these important projects with greater celerity than has marked their deliberations in

connection with awarding the contract for elevators for the new municipal buildings.

Day Labor vs. Contract.

THE Dominion Trades Council, in annual session at Winnipeg recently, reiterated its previously pronounced opinion that all public works should be carried out by day labor rather than by contract. A committee was appointed to urge this view upon the government and endeavor to secure its adoption in a practical way. We are not in a position to say what purpose is actuating the Trades Council in seeking to bring about this radical change. Probably, it is thought that if all public works were under the direct control of the government, there would be the opportunity to compel the employment on such works of union labor only. Regarded from this point of view, we can see where advantages might accrue to organized labor. From the standpoint of public economy, however, experience has demonstrated that the minimum of cost in the construction of works of this character is attained under the contract system. Not long ago, the municipal authorities of London, England, took the construction of public works out of the hands of contractors, and had them carried out by day labor under the direction of the municipal officials. The result was not satisfactory. While in a few instances savings were effected, in others the losses were so great as to more than offset them. The experiment was tried for a sufficient length of time to permit the results to be averaged, and the total showing was most unfavorable to the day labor plan. The same results followed more limited experiments in the same direction by the Council of the city of Toronto. There is no ground to hope that the outcome would be different were the method to be tried in connection with government works.

Workingmen's Relief Systems.

THE principal features of the Workmen's Compensation Act, which recently passed the British Parliament, and which is now in operation throughout the United Kingdom, have previously been referred to in these columns. In view of the extent to which this legislation departs from all past precedents in the direction of placing responsibility for the workman's safety entirely upon the shoulders of the employer, the latter has suddenly found himself placed under obligations such as he had never dreamed of, and for which, therefore, he was entirely unprepared. The adoption of this legislation in Great Britain is taken as an indication of what should be expected and prepared for on this side of the Atlantic. Employers of labor in contracting and other lines in Canada should therefore give this subject consideration, and acquaint themselves with the nature of the legislation thus far enacted by other countries for the protection of the laboring classes. Some particulars of the German Workingmen's Insurance System, as presented by Mr. J. C. Monagahn, U. S. Consul at Cheming, should prove interesting in this connection: The system aims to alleviate the condition of workmen and their families (1) in cases of sickness, (2) in cases of accidents incurred at work, (3) in cases of feebleness, wasting diseases, decreased capacity for work and old age. In cases coming under No. 1 there is given free medical treatment, money during period of sickness with which to obtain medicine, nourishment, etc., or, if desired, free treatment in a hospital and support for the family, and money, in case of death, is supplied the

family. The fund is furnished by employers and employed—the former paying one-third, the latter two-thirds. In cases of accident insurance the parties receive support during convalescence, from the fourteenth week after the accident happens. Money is given the wounded person from the fifth week. Rents ranging from two-thirds to three-fifths of the workman's yearly salary, are paid from the first day of the fourteenth week after the accident. The fund for burial purposes is furnished by the employers. In cases coming under invalid and old age insurance, the parties receive rents from the time they are unable to work, without regard to age; old age rents, from the seventieth year, even if they can work and do not draw invalid rent, as assistance against disease so as to prevent incapacity. In case of death or marriage, the full sum paid by the party is returned. During the period from 1885 to 1897 the employers paid under this system \$318,382,399, and workmen \$279,281,053, a total of \$597,663,452. Out of this sum there was paid for relief \$405,121,816, so that the workmen received \$125,830,600 more than they contributed. The annual amount paid out is increasing at the rate of \$3,570,000 per annum. The reserve fund at the end of 1897 amounted to \$202,500,000. Every twentieth person of the population has been paid insurance, under one or other of the above heads. It is said that under this system, notwithstanding the low standard of wages prevailing, poverty is practically unknown in Germany. While it might not be considered necessary or wise to adopt, in this new country, the German system in its entirety, legislation which would make it compulsory on the working classes to contribute to a fund from which they could draw in time of need or old age, would seem likely to operate to their advantage in particular, and be a means of promoting the national welfare.

STYLE.

It is a generally received view that true architecture ended with the beginning of the Renaissance, because traditional architecture ended then. It is certainly not true that it is only traditional architecture that is or can be genuine, and it is open to question whether there cannot be as much style in architecture now and in the future as there was in the days when only one style was recognized at a time.

In the days before the Renaissance, style in architecture was of the kind that obtains now in dress. Illustrations of contemporary life, such as the drawings in *Punch*, can be dated, over the limited period of history which is covered by that observer, with the precision with which the date of cathedrals is fixed by antiquarians learned in architecture. Somebody, some inventive mind, must be at the back of the fashions, but the ordinary tailor needs only to be a technician, not necessarily an artist. And such were doubtless the master workmen who built, in the current style, the ordinary run of churches during the Gothic periods.

It is doubted by some people, and very naturally, whether there were architects at all in those days. There is no such doubt now. Architects are as common now as writers, and for the same reason—that the art of architecture has become an art like literature. Like literature, its elements are common to all. All designers compound their work of the same forms in varied combinations. Like literature, there are leading characteristics which mark the work of each generation or each

nation. Anyone who takes both English and American architectural journals can see that all English work is English and all American work is American, no matter in what historical line the fashion may be running. Finally, like literature, the masterpieces reflect the personal characteristics of the designer. The work of H. H. Richardson, bold in conception, large in scale, rich, but refined in line and in detail, was purely individual; the work of a big, black, fat man with a flaming necktie, preceded by a strong odor of perfumery, who nevertheless left upon the mind a first and final impression of high and intellectual refinement. When his works sprang up, all in a very short practice, and it was seen that they were not only real architecture and good architecture, but distinctively American, a wave of enthusiasm swept over the country. Here was the American style. Architects in the United States and Canada hastened to put their admiration into practice. But it was all a failure. The result was only a fashion of brutal masses grossly enriched. The imitators soon wearied of their own work. It was simply the case of Dickens, Carlyle or Ruskin over again.

In architecture as in literature there is a style which is the man. Imitators can discern the characteristics but the character behind which gives life to the work proves to be inimitable. This is style. What makes it? The analogy of literature may perhaps help us to see. What makes style in literature? It seems to be only the full expression of a man's own mind. For great work of course a great mind is presupposed; the masters whom we admire have full and rich minds to express, but their style in itself is not the greatness or beauty of the ideas expressed but the great and beautiful expression of them which the fervid mind, insisting upon expression, has worked out of the elements of expression which art supplies. Trueness of expression is the bottom of it all. Even narrow minds truly expressed have style in their degree. That which has no style, but instead the unfortunate quality of uninterestingness, is the class of mind which seems not to produce ideas for itself, but to keep instead a stock of them ready made, which expresses itself not so much by a process of conception as of recollection and seems to delight in ready made phrases which have been common property for generations until they have almost lost the power of making an impression upon the mind.

A college don may sometimes at a university dinner or convocation liken his college to a ship (a well used simile), and steer that vessel through storms, past shoals and into havens with an elaborate exactness of similitude that makes the pulses of his listening colleagues swell with the delight of literary workmanship. We may perhaps forgive the substitution of an academic grace for native style by such a speaker before such an audience, to whom literature is an end rather than a means, and its composition a sort of intellectual game. But alas for the artist, whether in words or bricks and mortar, who takes this kind of thing seriously; whose second hand ideas are not the result of an over trained mind so much as of a native lack of original quality, and culture not too great but too little. To him, if a poet, belong the whole list of similes, metaphors and epithets which are recognized as coming under the head of poetry. To him life is a journey, man a pilgrim, death a bourne; the moon is chaste or serene, clouds are fleecy or lowering; morn is ruddy, eve is dewy, and everything else is something that it has so often

been before that we have no difficulty in understanding that we are reading poetry. Our grandfathers liked this kind of poetry and dabbled a little in composing it. They built Gower street and other dull quarters of that period in this manner. In a similar manner we have whole streets of wooden porches or verandahs, which are Tuscan, Doric, Ionic or Corinthian, built up of boards in the likeness of trabeated stone. They are as a rule well done, and are architectural forms which content the eye if they do not delight the mind, so that we may be glad they are there rather than a worse thing. Indeed, a fuller application of the order to the house would be a measure of safety. But let us not mistake such a system of design for anything better in style than this poetry of conventional expression which our grandfathers affected. Such poetry would find no sale now-a-days, and there is every indication that the day of conventional architecture in England is also ending.

The movement towards true design seems to have had a wavelike advance. Starting as a reaction from the extreme convention of classic formality, and adopting truth as a watchword, it found itself soon drawn back again by formalism; Gothic formalism this time instead of Classic, that was all. The exposed construction which represented its idea of truth was not a large enough idea to save it from ending in a sham style. The movement seemed to come to an end, but in reality a younger generation has caught the idea and is finding that truth in design is something greater than the exhibition of construction. It is expression; expression of everything—of function, construction and material.

The object of seeking truth in design is not the avoidance of falsehood as an immoral thing, but to hold on to truth for its own sake; because to hold to it, however hard it may be to do so, is the surest road to making a good thing. To design is to make first and above all what might be called a functional plan and to express it in elevation. In the plan is contained all that makes the poetry of the building. It is not throwing it into recognized architectural forms nor covering it with recognized architectural ornament that gives real poetical expression, any more than a few elegant thoughts, expressed in terms culled from poets and arranged, by the help of the printer, in a pattern on the page, make poetry. These efforts are properly called verses. There is no convenient term of the kind to define the kind of architecture which compares with it; indeed production of this kind has so long possessed the exclusive right to call itself architecture that it seems like interfering with a vested right to deny it the title. But if architecture means the true poetry of building, it is to something else that the term should be applied—to the functional arrangement of parts both horizontally and vertically so that the nature of the building is expressed as truly as the nature and functions of an animal or indeed of that majestic creation of our own, the locomotive, are expressed by their appearance.

In the matter of construction it is no more reasonable that it should always be displayed than it is that we should wear our skeleton on the outside; but we may take a hint from our bodies as to the way in which construction is the groundwork of form.

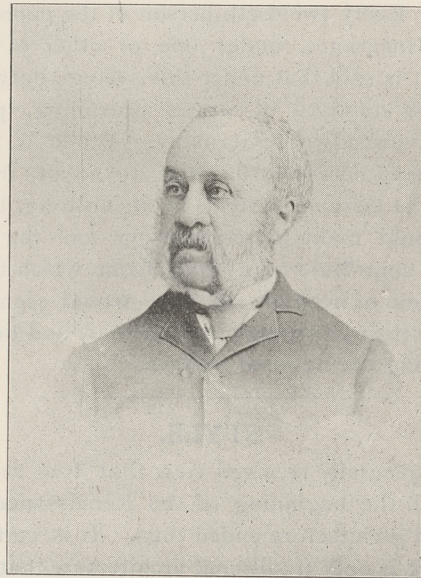
Truth to material is the easiest nut to crack, for most if not all material has character which any one who has feeling for architectural design ought to delight in bringing out, and this is easily done since every ma-

terial is most easily used in the way that suits its special characteristic.

In these three elements of design—function, construction and material—the mind of the designer displays itself, and in making the design proceed from them lies the straight road to style, the style which is the man, which gives the quality to design no matter to what period it may lean in form. It represents the interest the designer took in his work when doing it, and will be the source of the pleasure which others take in it when it is done.

THOMAS FULLER.

THE late Thomas Fuller, formerly chief architect of the Public Works Department of Canada, the intelligence of whose death at Ottawa last month was received with widespread regret, was born in Bath, Eng., March 8th, 1823, and was educated in Bath and London. His first large work (when only 22) was the cathedral at Antigua, West Indies, the erection of which he superintended. He came to Canada in 1857, and commenced practice in Toronto, with Chillion Jones of that city. In 1859 designs for the parliament build-



THE LATE THOMAS FULLER.

ings, departmental buildings and Governor-General's residence were invited by public advertisement. His designs were awarded for the parliament buildings first premium, and for the departmental buildings and Governor-General's residence second premium. On the 2nd December, 1859, he was appointed architect for the parliament buildings, and the work, under his supervision was formally commenced on the 20th December, 1859.

In 1862 a Royal Commission was appointed to report on all the government buildings then in course of erection at Ottawa. In 1863, it having been decided to proceed with the works, new contracts were made with the former contractors; Thomas Fuller and Charles Baillarge were appointed joint architects for all the buildings. In May, 1865, the services of Mr. Baillarge were dispensed with, and from that period until 1867 the whole duties devolved on Mr. Fuller, when the buildings were completed, with the exception that the completion of the library and upper part of the main tower remained in abeyance for four years, and were then carried out by the officers of the department in accordance with Mr. Fuller's original designs.

In 1867 he entered into a competition for the state capitol at Albany, New York state, and was awarded first premium. In a second competition he associated himself with Mr. Augustus Laver and prepared a joint design, which was accepted.

Their design for the city hall, San Francisco, Cal., was awarded first premium, and being accepted, Mr. Laver then left to take charge of the work, Mr. Fuller remaining at Albany until a change of politics brought a change of architects.

In 1881 he was asked to return to Ottawa to accept the position of chief architect of the Dominion government. Having accepted this position, he remained in charge until he was superannuated in 1897. During his term of office there were erected from his designs 140 public buildings, which include six drill halls, the Langevin block on Wellington street, the printing bureau, all the experimental farm buildings, and many other prominent buildings.

He was elected a Royal Canadian Academician by Lord Lorne, and his original design for the Parliament buildings and Governor-General's residence are now in the National Art Gallery.

In 1853 he was married to a daughter of W. Green, J.P., of Bath, England, who survives him. Mr. Fuller also leaves three children, all of Ottawa—Mrs. Greene, wife of Mr. George M. Greene, barrister; Mr. T. W. Fuller, architect, Department of Public Works; and Mrs. Moore, wife of Mr. W. H. C. Moore.

ARCHITECTURE IN NEW ZEALAND.

MR. R. Mackay Fripp, F.R.I.B.A., Victoria, B.C., sends us the following interesting though somewhat discouraging description of architectural conditions in New Zealand, from which country he has recently returned: I went to Auckland about two and one-half years ago and found building in a very extraordinary condition, particularly in the direction of domestic work which is extremely expensive and entirely without interest from an architectural point of view. Nearly all buildings are covered with mean little hip and valley roofs of galvanized iron which gives a very abject appearance to the town. The detail is entirely "stock" manufactured by the mills. Front doors are of a few stereotyped patterns. Inside doors, windows, skirtings and architraves, even verandah posts and mantel pieces, are all repeated hundreds and thousands of times; shingles applied to walls and gable ends and the thousand and one uses to which they are turned in this country are (or until I showed them how they might be used) practically unknown. Shingles split and uncolored are used for roofs, and soon turn black and twist, but galvanized iron is fast driving them out. The method of framing is much the same as in Canada, but timber being very costly, as much as \$30 per mille for plain sawn stuff, it is used with greatest economy, there being no such thing as shiplap beneath the weather boards and finished floors, which are laid direct on the stud and joist respectively. Partitions and inside surfaces of walls are lined with rough boards 8 to 10 inches by $\frac{1}{4}$, 3-16 and $\frac{1}{2}$ inch; though all sold as half inch in thickness, it varies tremendously. Scrim, a very coarse open webbed material like sacking, is stretched, taped and tacked before the skirtings, architraves or wooden cornices are fixed. On the scrim, wallpapers, for the most part very commonplace in character, are laid. The ceilings are mostly composed of $\frac{1}{2}$ " x 12" boards with a moulded batten

(mill stock, of course) nailed over the joints; and these flimsy, ugly mushrooms cost about twice as much as a well designed and carefully detailed house costs here. The labor is slow, the methods antiquated, and the architects being not quite but almost entirely drawn from the ranks of the builders, not frequently the architect cares nothing about his work beyond the interesting fact that a commission more or less reduced to meet the demands of his employer is attached to the "job." Such a state of affairs is hopeless, so much so that though a man of some ability occasionally finds himself in New Zealand, he almost invariably soon leaves in disgust.

During my sojourn in Auckland, I imported fine red roofing tiles made on a French system in Sydney. I also obtained a few thousand bunches of redwood shingles, and advertised for and found a couple of men who knew how to cut a shingled arch, lap a hip or an angle, and dip the shingles before laying. By refusing to use any stock door, sash, moulding or turning, and by designing everything myself, and seeing it made too in many cases, I succeeded in breaking through the stereotyped style of work, though not without some fierce opposition on the part of the builders, and less open but not less bitter resentment of many of the architects.

To give you some idea of the very great difficulty I experienced in getting work executed in New Zealand, I may mention that I made 24 sheets of detail drawings for a house that would not cost more than \$5,000 here. Now that the ice is broken, so to speak, I hope and believe that the younger architects will keep the fight going and gradually improve matters.

UNIVERSITY OF CALIFORNIA COMPETITION.

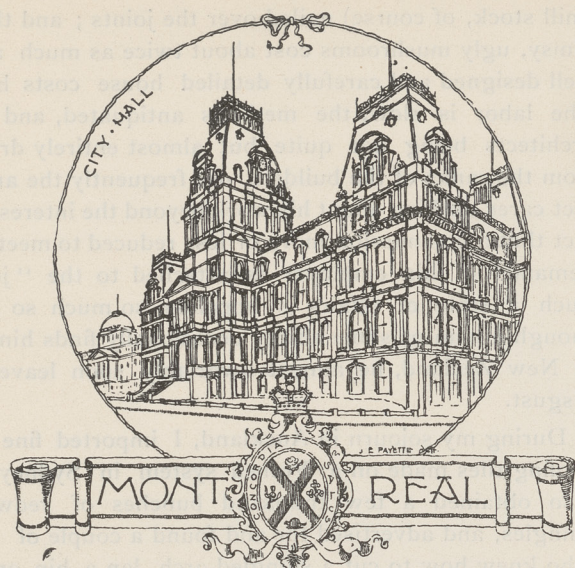
THE jury have given their award in the preliminary competition for plans for the University of California. Out of one hundred sets of plans submitted, the following have been chosen to enter the final competition: Barboud Bauhain, Paris; E. Benard, Paris; F. Blunschli, Zurich; D. Dexpradelles and Stephen Codman, Boston; Rudolph Dick, Vienna; J. S. Freedlander, New York; Howard & Eichmuller, Paris; Howard & Cauldwell, New York; Howells, Stokes & Hornbostel, New York; Lord, Hewlett & Hull, New York; Whitney Warren, New York. Successful competitors in the preliminary competition will have six months in which to perfect their plans for the final competition, and a sum of at least \$20,000 will be devoted to premiums for the best plans. These premiums will be awarded to at least five of the competitors.

PERSONAL.

Mr. G. M. Miller, architect, Toronto, has removed to new and more convenient offices, Nos. 51 and 52 Victoria Arcade building, 18 Victoria street.

Mr. R. Mackay Fripp, F.R.I.B.A., has returned to British Columbia after an absence of two and a half years spent in New Zealand. Mr. Fripp has opened offices in the Board of Trade building, Victoria.

The firm of Simpson & Ellis, architects, Toronto, has recently been dissolved. Mr. Simpson retains the office formerly occupied by the firm at 9½ Adelaide street east, while Mr. Ellis has temporarily opened an office in the same building. It is understood to be his intention, however, to remove to new offices at an early date.



(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

Frequent meetings of the Council of the Association have been held during the last six months, at which matters of importance were considered. At the preliminary examinations held on July 28th and 29th, three candidates presented themselves, none of which, however, succeeded in obtaining the required number of marks. Owing to the increased responsibility to the public imposed on the Association by the Quebec Architects' Act, the Council have fixed as the programme of studies for the preliminary examination, the following: Arithmetic, Mensuration, Geometry, Algebra, Freehand and Linear Drawing, Universal History, Histories of Canada, England and France, also the translation of French into English, and vice versa.

The Council have given much consideration to amendments to the by-laws and regulations of the Association, as well as to applications for membership in the Association, of which there have been received 86, and accepted 75. The by-laws will be kept on view at the offices of the Association, where persons desiring to do so may examine them. The refusal of the application of Mr. Richard Waite, of Buffalo, for membership in the Association, gave rise to considerable comment on the part of persons unacquainted with the circumstances of the case. The following letter, addressed to the local press by the Secretary of the Association, will be a sufficient explanation of the matter:

"It is unfortunate that there is a tendency to rush into print without due knowledge of the subject dealt with. With reference to the paragraph in your issue of this date, reflecting upon the action of the P.Q.A.A. in refusing the application of Mr. R. A. Waite for membership, I beg to say that under our Act of Incorporation and By-Laws, without reflecting in any way on the ability and status of Mr. Waite, it is not in our power to accept him. Membership is restricted to those who were definitely and regularly practising in the province of Quebec previous to the date of the passing of the amendment of the act, and excludes those who may be domiciled in a foreign country.

JOS. VENNE, Sec. P.Q.A.A."

The 3rd and 4th of November are the dates selected for the eighth annual meeting of the Association, for which the following is the programme:

FIRST DAY.—Session to open at 10 o'clock punctually in the rooms of the Association, New York Life Building, Montreal. 1, Reading of the Minutes; 2, Presentation of the Annual Report of Council; 3, Statement of the Treasurer; 4, Election of Officers; 5, Address from the Retiring President. Afternoon session to open at 2 o'clock punctually. 1, Consideration of Amendments proposed to the By-Laws of the Association; 2, Motions by members and other business; 3, Address from the President-elect. Evening—Assemble at 7:30 at the Viger Place Hotel; Dinner at 8 o'clock; evening dress.

SECOND DAY.—1, Visit of inspection to the new building of Chemistry and Mining, McGill University, to meet at the building at 10:15; 2, to the residence of Hon. G. A. Drummond to view the Picture Gallery, to meet at 2:15; 3, to the Architectural Department, Engineering Building, McGill University, to meet at 3:30.

MONTREAL PLUMBERS' ASSOCIATION.

The Association recently appointed a committee to examine the amendments, recently enacted by the city council, to the city plumbing by-law, and make a report thereon. A committee has

likewise been appointed to confer with the Council of Arts and Manufactures relative to the instruction to be given in the plumbing classes.

REAL ESTATE OWNERS' ASSOCIATION.

The above association at a recent meeting gave expression to their regret that they had not been invited to participate in the discussions of the committee which has in hand the revision of the City Charter. The association likewise placed itself on record, as being opposed to the introduction in the new charter of any changes which would have the effect of increasing the present tax on real estate.

PLUMBING AND VENTILATION.

Mr. J. W. Hughes, of this city, chairman of the Committee on Sanitation of the American Health Association, presented the following report at the meeting of that organization held in Ottawa last month:

From such information as has been obtainable from the large field covered by your committee, we are justified in reporting an increased interest in all matters relating to what may be termed practical sanitation, or the carrying out, in actual work, of the theories and plans of the advanced thinkers and experimenters in sanitary science. The work of our association and kindred organizations, as well as the untiring efforts of individual sanitarians in the past, has resulted in awakening an active inquiry and interest, and there is no longer heard the scoffing remark and sneering insinuation when an improvement is suggested that involves a pecuniary outlay. This is especially noticeable in the plumbing department of our work. We are of opinion that there is a tendency, in some cases, to rush from an extreme apathy and do-nothing policy to one of too great an elaboration and complication in the carrying out and planning of plumbing apparatus; safety, effectiveness and simplicity are the requirements. Sewers, public and private, are to-day better constructed and more carefully planned than in the past, but the question of the best method for the disposal of sewage has yet to be solved, and is becoming of more pressing importance every day. That our great towns and other centres of population can continue to use the rivers and streams as public sewers, without serious danger to the public health, goes without saying. We are pleased to note an increased and practical interest in the question of the disposal of sewage by means of irrigation farms and other plans than that of running it into the streams.

The ventilation of the public buildings is receiving the attention that its importance merits; the introduction of the power fan, combined with the developments of cheap electrical force, has opened up a large field of possibilities; whether the effectual ventilation of private buildings and dwellings will receive its solution from this source is a question. The greatest objection to the introduction of a system of ventilation into a private building, that will at all approach the necessities of the case, especially in northern climates, is the greatly increased cost of fuel. Fresh air cannot be introduced, warmed and expelled at the rate required for an apparatus that will be even approximately effective without a largely increased fuel bill. The question of effective and economical ventilation of dwellings is one presenting many difficulties and large profits to the inventor who can solve it.

A PROTEST AGAINST THE PROPOSED MONUMENT TO GENERAL MONTGOMERY AT QUEBEC.

The Women's Canadian Historical Society have put themselves on record in the following resolution as being opposed to the erection of a monument to General Montgomery at Quebec: "That, whereas an international monument is proposed to be erected to Gen. Montgomery in the public square of Quebec, we, the Women's Canadian Historical Society, do hereby enter a protest against such action and do appoint a committee to deal with the question and to confer with the other historical societies in the matter."

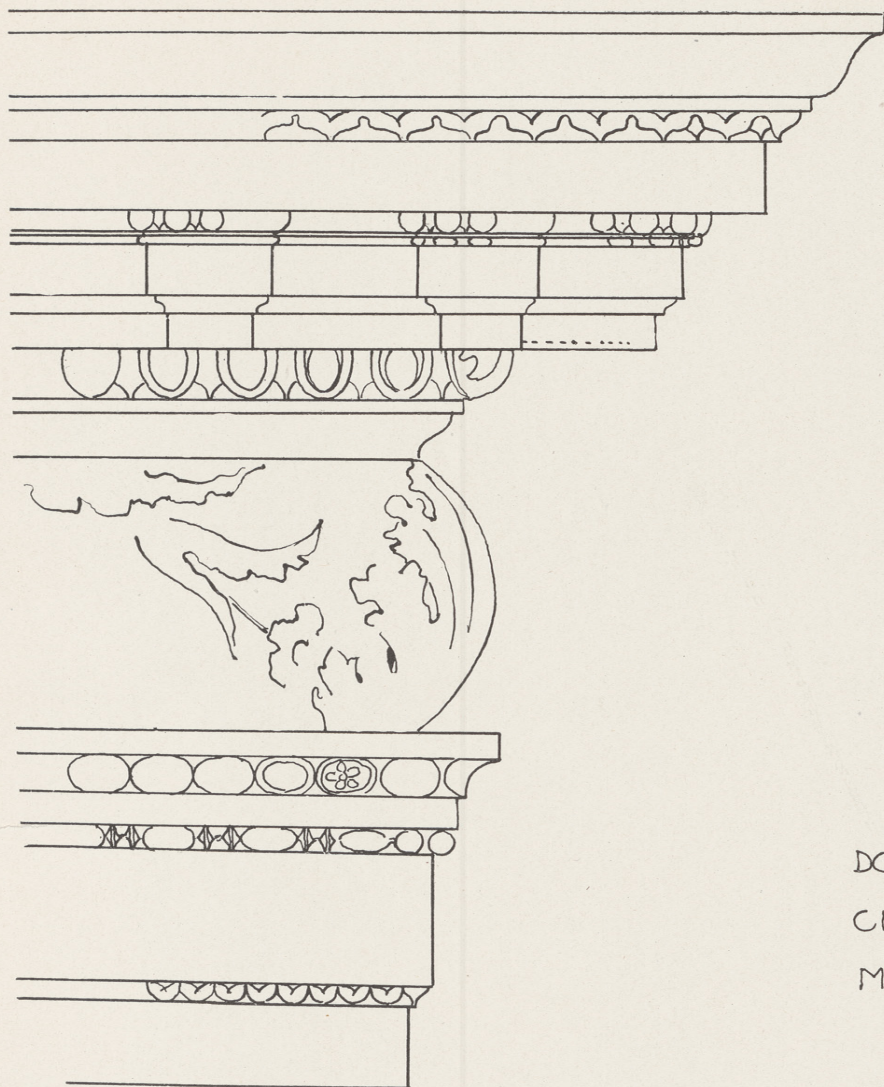
The City Building Inspector has ordered a house in process of construction on St. Lawrence street to be torn down. The foundations are declared to be defective. The inspector is deserving of commendation for his vigilant efforts to enforce compliance with the requirements of the building by-laws.

The eighth annual convention of the Association of Railway Superintendents of Bridges and Buildings is now in progress at Richmond, Va. An interesting and instructive programme, including a number of valuable papers, has been prepared for the occasion.



PROPOSED NEW PALACE HOTEL, KING STREET EAST, TORONTO.

MESSRS. GEO. HARDING & GOOCH, ARCHITECTS.



CORNICE OF FIREPLACE
DOGES' PALACE, VENICE.



DOOR HEAD AND ARCHITRAVE,
CHURCH OF STA. MARIA
MIRACOLI, VENICE.

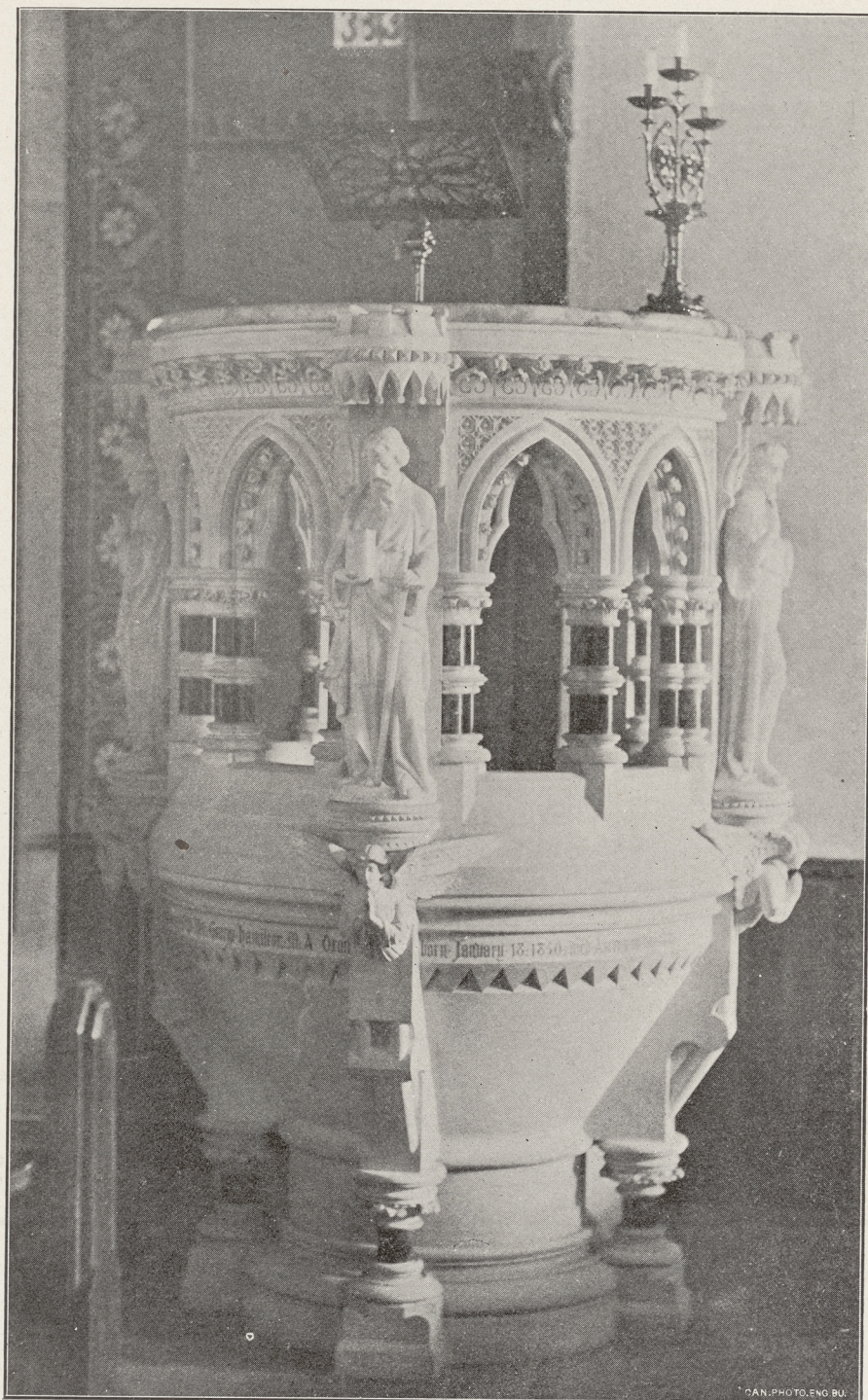
SOME ITALIAN DETAIL.—ONE-QUARTER FULL SIZE.

MEASURED AND DRAWN BY WILLIAM RAF.



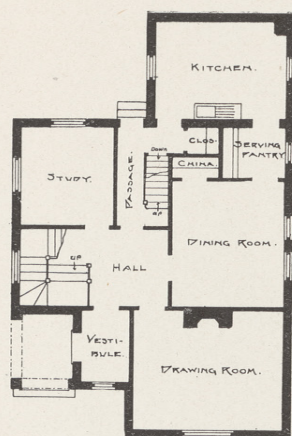
CLUB HOUSE FOR THE HAMILTON GOLF CLUB CO.

W. W. LACHANCE, ARCHITECT.

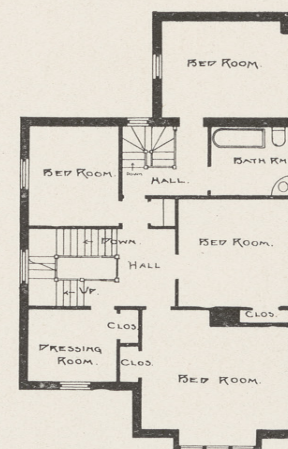


STONE PULPIT IN ST. MATTHEW'S CHURCH, QUEBEC.

FELIX MORGAN, ARCHITECT AND SCULPTOR.



GROUND FLOOR PLAN.



FIRST FLOOR PLAN.



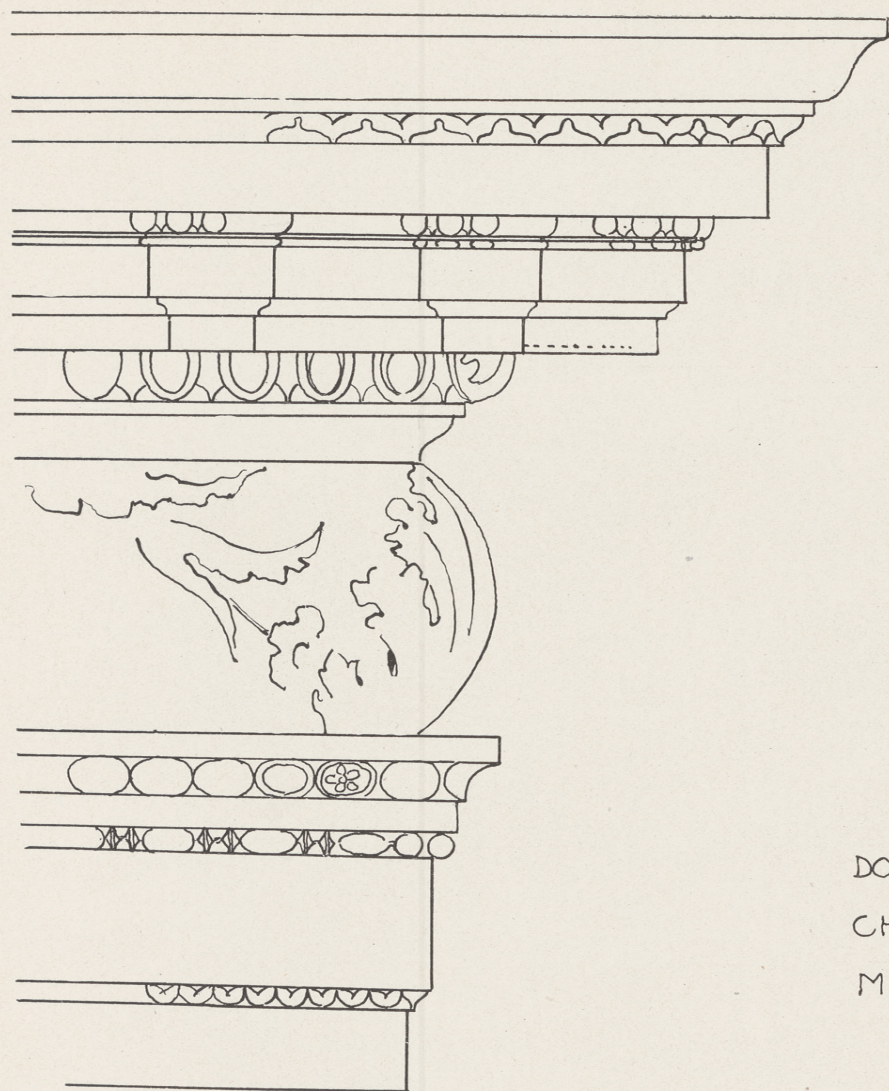
PROPOSED RESIDENCE, STEWART STREET, OTTAWA.

BAND, BURRITT & MEREDITH, ARCHITECTS.



PROPOSED NEW PALACE HOTEL, KING STREET EAST, TORONTO.

MESSRS. GEO. HARDING & GOOCH, ARCHITECTS.



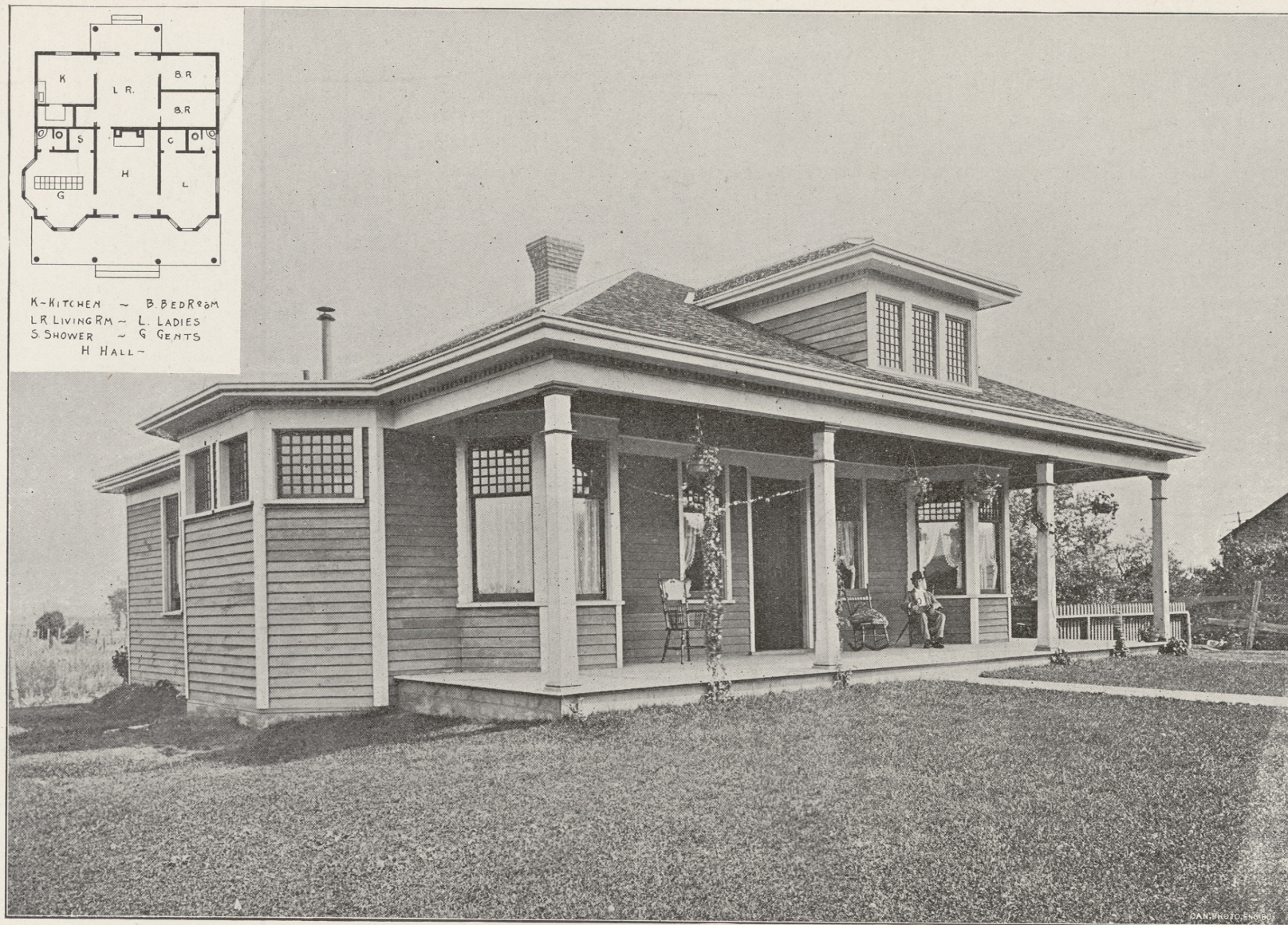
CORNICE OF FIREPLACE
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MIRACOLI, VENICE.

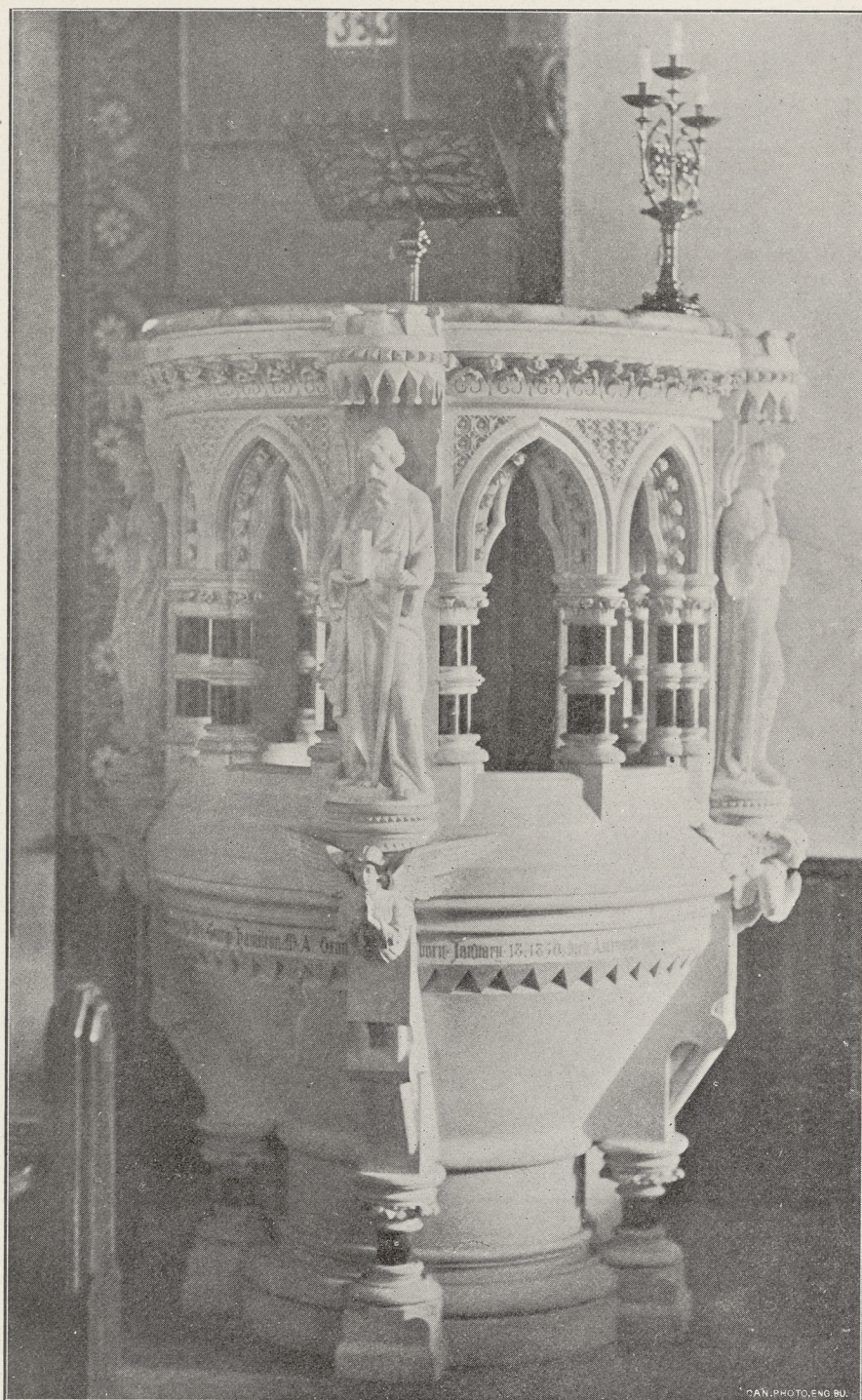
SOME ITALIAN DETAIL.—ONE-QUARTER FULL SIZE.

MEASURED AND DRAWN BY WILLIAM RAY.



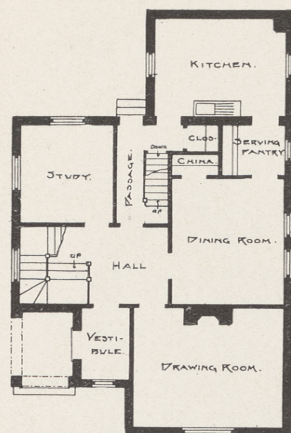
CLUB HOUSE FOR THE HAMILTON GOLF CLUB CO.

W. W. LACHANCE, ARCHITECT.

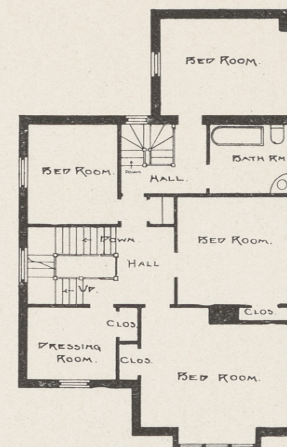


STONE PULPIT IN ST. MATTHEW'S CHURCH, QUEBEC.

FELIX MORGAN, ARCHITECT AND SCULPTOR.



GROUND FLOOR PLAN.

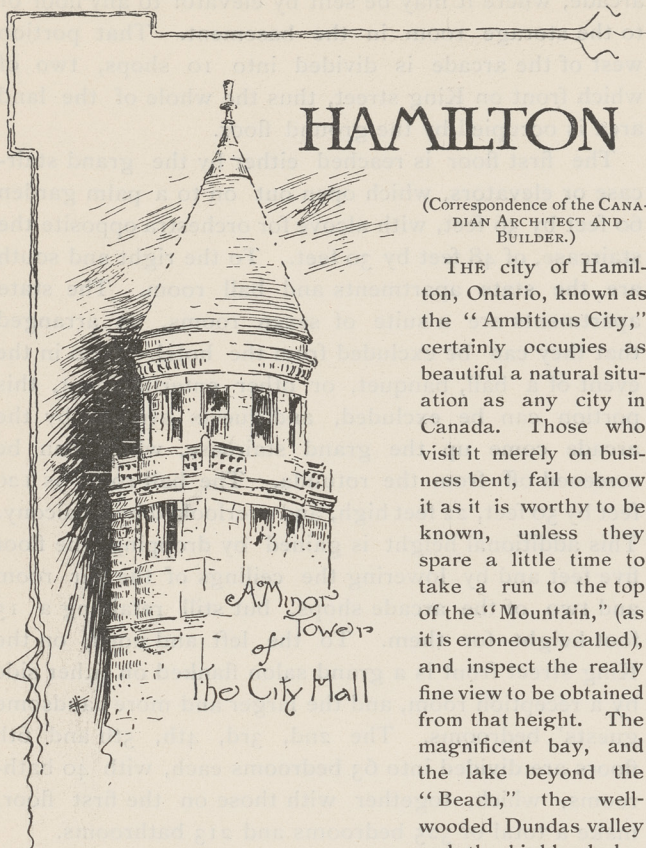


FIRST FLOOR PLAN.



PROPOSED RESIDENCE, STEWART STREET, OTTAWA.

BAND, BURRITT & MEREDITH, ARCHITECTS.



(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THE city of Hamilton, Ontario, known as the "Ambitious City," certainly occupies as beautiful a natural situation as any city in Canada. Those who visit it merely on business bent, fail to know it as it is worthy to be known, unless they spare a little time to take a run to the top of the "Mountain," (as it is erroneously called), and inspect the really fine view to be obtained from that height. The magnificent bay, and the lake beyond the "Beach," the well-wooded Dundas valley and the highlands beyond,

form a picture well worth the visit; while the city itself, with its many picturesque residences half hidden by foliage, from that point of view is a very pleasing sight. The city, viewed from its own streets, does not look as attractive, but it is being vastly improved year by year by the sweeping away of old buildings and the introduction of new substantial business premises in their room. A walk round the residential portions of the city reveals, however, a remarkable sameness of design, and one wearies of the repetition of projecting tiled gables, overhanging stories and verandahs, so similar in outline if not identical. This is no doubt due to two causes at least, the materials at hand and cheapness desired by the owners. Picturesque effects are easily obtained, and at small cost, by the style commonly used. Few seem to care about the introduction of stone, and the new residences of stone might be counted on the fingers of one hand. There seems to be very little originality among the designers of houses, even in plan, for in outline, forty-nine out of every fifty houses seem to have the same general idea. Speculative building is to a certain extent responsible for much of the sameness; cheaply produced plans, used over and over again with little variation, have no doubt been found very convenient, but that is all the more reason why those responsible for the design of houses should at any rate try to get away from repetition. "Ambitious" as the city is supposed by outsiders to be, it is difficult to find evidence of this character in the place itself. It gives the appearance of being financially crippled. The streets for the most part are in a deplorable condition, except the two principal streets for say a couple of hundred yards or so from the centre of the city, along their lengths. Block pavements worn out beyond repair; grass growing where the traffic is not heavy, give it anything but an ambitious smile. On the whole the old macadam roads and the square, plainly built, hipped-roofed houses of thirty years ago are to be preferred to the attempts at modernizing.

As a summer resort, if money were to be invested with a view to attracting visitors, the natural situation of Hamilton would make it a formidable rival to Toronto, and one would like to find the citizens wake up to the advantages of their mountain slope for park purposes, instead of "kicking" because there is no money to lay out on the improvement of the "Gore." The Gore, let it be understood, is an area at the junction of the two principal business streets, of the shape the name implies, planted and turfed, railed in and jealously guarded against dogs; containing seats and a fountain with a dozen turtles in the basin. The Gore extends one block east and west, and at the widest part is about fifty feet across. The citizens have for years desired the extension of this magnificent park eastward 50 feet, but the thought of terracing their mountain has apparently never entered their heads.

BY THE WAY.

TRANSLUCENT oyster shells are said to be used instead of glass in the windows of the buildings in Manilla. An average window, 6 feet long by 4 feet wide, contains about 260 of such panes, which temper the heat of the sun, the shells being very low conductors of heat, and also prevent the blindness which is induced by the fierce glare of the sun in that part of the world.

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MR. Wm. Stuart, contractor, of Ottawa, has recently returned from Dawson City, where he erected a building for the Canadian Bank of Commerce. The expensiveness of material and labor may be realized from the fact that the building referred to, although constructed of logs, cost \$13,000. Mr. Stuart is authority for the statement that lumber costs \$200 per 1,000 feet. An ordinary pane of glass 16 inches by 12 inches can be bought for \$2.50; a common door costs \$22 and a newel \$6.

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A BROWN stone monolith, measuring 15 feet in length and 9 feet at the base, was quarried at Washburn, Ohio, prior to the World's Fair at Chicago, the purpose being to transport it to the fair as a feature of the Wisconsin exhibit. After \$5,000 had been spent on labor on this the largest block of stone ever quarried, funds could not be raised to transport it to Chicago and place it in position at the great fair. After having lain in a bed of sand and water for six years, the great stone will now be sawn into blocks and used in the construction of a residence and barn at Menasha. After all it will thus serve a more natural and useful purpose than the one for which it was originally intended.

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ON several recent occasions the Building Inspector of Montreal has compelled the tearing down of buildings which were constructed in a manner contrary to the provisions of the city by-laws. I have rarely if ever heard of action of this kind being taken by the building inspectors of Toronto and other Canadian cities. I am curious to know the reason. Are the architects and builders of Montreal lacking in knowledge as compared with those of other cities, or are they more eager to evade the law? Are the building regulations in Montreal more stringent, or is the inspector more alive to his duties than the gentlemen who occupy a similar position in other cities?

× × ×

THE first strike of workmen in the building trades is believed to have been that which occurred about 1450 B.C., in connection with the erection of the Temple of Thebes. The masons complained of the insufficiency of the monthly allowance of provisions granted to them by the contractor in lieu of cash. They stated that they were being cheated by the use of false weights by the contractors' clerks. The difficulty was temporarily tided over by the Pharaoh of the period making a liberal grant of corn to the dissatisfied workmen. This soon became exhausted however and the strike was resumed. The trouble only came to an end when the governor of the city, before whom the case was presented, drew an order for corn on the public granary.

The Cutler Manufacturing Company, of Rochester, N.Y., have published a monograph with ten plates of classical architecture on the shores of the Mediterranean, by Russell Sturgis, F.A.I.A.

ILLUSTRATIONS.

SOME ITALIAN DETAIL—ONE-QUARTER FULL SIZE.—
MEASURED AND DRAWN BY WILLIAM RAE.

PROPOSED RESIDENCE, STEWART STREET, OTTAWA, ONT.
—BAND, BURRITT & MEREDITH, ARCHITECTS.

CLUB HOUSE FOR THE HAMILTON GOLF CLUB CO.—
W. W. LA CHANCE, ARCHITECT.

The inside of the building is finished in Georgia pine, oiled and varnished. In the reception hall is a pressed brick mantel. The building cost \$1,000.

STONE PULPIT IN ST. MATHEWS CHURCH, QUEBEC.—
FELIX MORGAN, ARCHITECT AND SCULPTOR.

The pulpit was designed and executed by the late Felix Morgan, an English sculptor of merit, who was for many years a resident of Quebec, and who also executed two carved capitals in the transept arch of the same church. The pulpit is built of English sandstone. The columns are of various marbles; the cap moulding and figures of St. Peter, St. John and St. Mathew are of alabaster. The pulpit is a memorial of the late Rev. George Hamilton, for some time assistant priest of the church, during the rectorship of the present Bishop of Ottawa, uncle of the deceased.

PROPOSED PALACE HOTEL, KING STREET EAST, TORONTO.
—MESSRS. GEO. E. HARDING AND GOOCH, ARCHITECTS

The building will occupy the site of the Walker stores on King street east, with frontages on King and Colborne streets. The area of the site is 207 feet 10½ inches on King and Colborne streets, by a depth of 197 feet 7½ inches. The building, which is to be seven stories in height, is designed in the free Renaissance style. It will be surmounted by a roof garden 90 x 200 feet. An arcade, entered from an archway 48 feet from the western wall, will extend directly through the building, the entrance to which on Colborne street will be directly opposite Scott street. The plan of the building is in the form of the letter H, whereby is solved the problem of efficient lighting.

The Colborne street elevation is similar to the King street one, with the exception that there are no towers. In the centre of this facade an alcove is shown off the street, fitted with elevators for lowering supplies into the basement, without interfering with the traffic on the sidewalk. An entrance may be effected either from King street or through the arcade. The King street entrance occupies the corresponding eastern arch to the arcade. This leads into a handsome vestibule. To the left is the reception-room for ladies. To the right is the restaurant, facing on King street, this room being 78 feet by 48 feet.

Further on, and in the centre, is a rotunda finished in marble and tiles, in the eastern portion of which is the administration office; to the west is the main entrance from the arcade, immediately to the left and right of which leads the grand staircase to the first floor. To the north of the rotunda are four passenger elevators. The rotunda is lighted by domes at either corner, one of which is fitted for a reading room, another for a writing room. To the east of the department of administration is the dining room, opening from the eastern dome of the rotunda. This room is 140 feet by 42 feet. The southern 50 feet is divided off by a colonnade. To the right and west of this inner dining room is situated the cafe, reached from the rotunda or dining room. The bar is entered either from the arcade or rotunda, and from it an entrance can be effected to the cafe.

Baggage is brought in from the southern end of the

arcade, where it may be sent by elevator to any floor or to the storage room in the basement. That portion west of the arcade is divided into 10 shops, two of which front on King street, thus the whole of the land area is occupied by the ground floor.

The first floor is reached either by the grand staircase or elevators, which open out on to a palm garden 60 feet by 56 feet, with alcove for orchestra opposite the staircase, of 48 feet by 30 feet. To the right and south are the state apartments and ball room. The state apartments are a suite of seven rooms, so arranged that they can be excluded from the hotel. Also in the event of a ball, banquet, or other entertainment, this portion can be excluded, and guests arriving by the arcade come up the grand staircase, which can be screened off from the rotunda. The ball room is 120 feet by 50 feet, 22 feet high, and overlooked by a balcony. This additional height is gained by dropping the floor five feet and by lowering the ceilings of the bar room and two of the arcade shops, but still retaining a 15 foot height for them. To the left and north on the King street front is a grand salon flanked on either side by a reception room, and the larger and more handsome guests' bedrooms. The 2nd, 3rd, 4th, 5th and 6th floors are divided into 63 bedrooms each, with 40 bathrooms, which, together with those on the first floor, make a total of 325 bedrooms and 213 bathrooms.

The centre of the basement or kitchen is occupied by the range boilers and cooks' tables. Immediately opposite is the "garde manger." The cafe and dining room on the south and east ground floor are served from here to the right and left. All supplies are brought in from Colborne street entrance by the lift, already described as being situated in a recess, and are received in a receiving room, from which point the various articles are distributed to their proper destinations. The engine room and boilers are in the south-west portion, in which room are situated the pump and tank room, ice-making, refrigerator and laundry machinery. On the east are the store cellar, flour room, bakery, the cooks' dining room, confectioner, ice cream making, wine cellar. To the north the servants' dining room, with toilet rooms adjoining. This floor also contains barber shop, gentlemen's general toilet and lavatory, Turkish baths and billiard rooms.

PLANS FOR ARTIZANS' DWELLINGS.

At the Mechanics' Fair, which opened in Boston on the 10th inst., under the management of the Mechanics' Charitable Association of that city, the designs for artisans' dwellings submitted in competition by architects of the United States and Canada, for the Shattuck prizes, are exhibited. The problem which the competing architects were asked to solve, was to provide upon four acres of land in the suburbs of a large city for the housing of fifty artisan households in an attractive, agreeable, sanitary and independent manner, in such a way that the property shall be recognizable as a single property, and shall provide, at rentals within the reach of the artisan class, a fair return upon the invested capital. The land is square and is bordered upon one side by a street—the main thoroughfare of the suburb—and it is valued at fifteen cents per square foot. The programme is purely an imaginary one, and its somewhat indefinite requirements are made purposely so, since it is conceived that an investor of a philanthropic turn of mind, with abundant yet not limitless resources, would seek advice from his architect in about as indefinite language.

INTERIOR LIGHTING.

A COMPETITION was recently instituted by the American Luxfer Prism Co., of Chicago, open to the architects of America, for building designs, the essential feature of which should be the securing of improved natural interior light. Fifteen graduated prizes, amounting in all to \$5,000, were offered the competitors. A committee of award was appointed, consisting of Messrs. D. H. Burnham, W. L. B. Jenney, William Halabird, Frank S. Wright, architects, and Prof. Henry Crew, of the Northwestern University. The committee, having concluded their labors, report that 39 designs were submitted, each having been numbered as received, and discussed always under the title of its number. Only fourteen were found to be deserving of any prize whatever. To the authors of these fourteen designs, prizes have been awarded in the following order of merit:

1st prize, \$2,000—	Robert Spencer, Jr., Chicago, Ill.
2nd " 1,000—	Adami Boari, Chicago, Ill.
3rd " 500—	S. S. Beman, Chicago, Ill.
4th " 300—	Curtiss Hoffman, Chicago, Ill.
5th " 200—	Frederick S. Sewell, Chicago, Ill.
6th " 100—	James E. Fisher, Bloomington, Ill.
7th " 100—	Hugo F. Liedberg, Chicago, Ill.
8th " 100—	Frederick S. Sewell, Chicago, Ill.
9th " 100—	Field & Medary, Philadelphia, Penn.
10th " 100—	J. L. Wees, St. Louis, Mo.
11th " 100—	J. L. Wees, St. Louis, Mo.
12th " 100—	Alfred Fellheimer, Chicago, Ill.
13th " 100—	David S. Williams, Fort Snelling, Miss.
14th " 100—	Howard Bowen, St. Louis, Mo.

COLOR DECORATION.

THE following extract is from a lecture delivered by Mr. F. Scott Mitchell before the Master House Painters' Association of Hartlepool, Eng.:

"Any color may be made to serve two or more purposes by its use in different positions: (1) With respect to shape of surface covered—concave surfaces add a gray shade and subdue the tone of the color; convex surfaces reflect a maximum of light with the color, which thereby appears lighter and brighter; and flat surfaces give a medium effect. Another color should always intervene to give full value to this arrangement. (2) With respect to contrast with other colors in juxtaposition—A medium tone of color will appear dark by contrast with lighter tints, and lighter when opposed to rich, darker colors. It will appear assertive or subdued as it is contrasted with colors more or less subdued than itself.

Country houses admit of cooler coloring and plainer surfaces, because of the ever-present beauty of nature's landscape with flowers and foliage, that contrasts to the disadvantage of man's best handiwork, and if ornamental decoration be applied it should be of strictly conventional design on this account. Likewise, all coloring should be in neutral tints and shades, its value thus becoming enhanced by contrast with the incomparably brilliant products of nature all around.

Shop fronts in large and manufacturing towns should be always painted in light and cheerful tints, in face of the prevailing custom to the contrary. Wherever this course has individually been adopted, it has been proven that pale colors, if well varnished, last as long as their darker contemporaries, which are often a dirt color to begin with, while the lighter coloring actually mellows with age, and looks cleaner through the dirty accumulation of long neglect than the darker color did at the start. It is generally admitted that not only do the displayed goods look their best in contrast with pale tints on shop fronts, but the appearance of a whole street is

improved, and thereby the whole town appears to greater advantage where this is already the prevailing custom.

Entrance halls should appear of medium warmth and be cheerfully inviting in general coloring, as special contrast to the locality outside.

Drawing rooms should present a smart contrast to the entrance hall, though still cheerful in treatment, as it is essentially a room for the entertainment of friends. Coloring may be light and airy, and such as will emphasize the complexions and dresses of ladies, as the drawing room is where they always have preference.

Dining rooms should be rich in coloring and not too dull. They should always be suggestive of richness, and bountiful provision of the prime necessities of life, and sufficiently cheerful to have a stimulating effect on any who may approach the dining table with appetites impaired by worry or anxiety.

Bed rooms should give the impression of repose and cleanliness above all else, though not depressingly dull, since when sickness necessitates the occupancy of the room for any length of time, its decorations have much to do with the comfort and even the health of an invalid."

ARCHITECTURAL WROUGHT IRON.

IRON has been known and used for about five thousand years, says a writer in the Engineering Magazine. Tubal Cain, son of Lamech and Zillah (only seven generations from Adam) was "the instructor of every artificer in iron and brass." The British museum contains a piece of masonry from an inner masonry joint in the Pyramid of Cheops, the oldest known edifice built by the hand of man. In early history the power and skill of the blacksmith was deified in the person of Hephaistos by the Greeks, or of Vulcan by the Romans, and volcanoes were supposed to mark the spot below which, in the nether world, he worked at his forge in shaping the thunderbolts of Jove or the armor of Mars. Dr. Schliemann, in his excavations at Mycenæ and Troy, found numerous specimens of wrought iron, some of which may now be seen in the museum at Athens; Greek painted vases show anvils, hammers, pincers and bellows, and welding is said to have been invented by Glaucos, of Chios, 600 B.C.

In the twelfth and thirteenth centuries the blacksmith who could fashion an elaborate hinge was accounted the master of his trade, as in Venice was the bricklayer who could build successfully the fantastic chimney tops of that city. At that time bar and sheet iron were not to be found already manufactured, and the use of the file was not known; but the paucity of materials and tools brought about great skill in the use of the hammer, and as, with the gradual introduction of mechanical appliances, many difficulties, especially of large or intricate pieces, were overcome, by degrees manual dexterity declined. The working in iron possesses, in common with painting and sculpture, the charm of proceeding directly from the hand of the originator; the personal element is pronounced.

TO REMOVE INK SPOTS FROM PAPER.—Shake 20 grams of lime chloride in 30 grams of distilled water until dissolved, let stand for some time, pour off the clear liquid into a dark (blue) flask and add 5 grams of acetic acid to this liquid. In order to remove writing, etc., paint it with the fluid, using a fine hair pencil, press with blotting paper and dry. By this method erasures are avoided on the paper, which is important with documents and other valuable manuscripts.

STUDENTS' DEPARTMENT.

C. A. & B. STUDENTS' COMPETITION.

THE publisher of the CANADIAN ARCHITECT AND BUILDER invites architectural students to submit drawings in competition for designs for four ornamental chimneys, for which first, second and third prizes of \$15, \$5 and one year's subscription to the ARCHITECT AND BUILDER, respectively, are offered.

The chimneys may be of brick, stone or terra cotta, or any or all of these combined.

Competitors are required to show by plans, perspective sketches and details, with or without elevations, the chimneys and sufficient of the plan and arrangement of building to explain the reason for form and position adopted, and to show roofing and other adjacent features if affecting the treatment of the chimneys.

Drawings must be made with pen and perfectly black ink ONLY, on white drawing paper, bristol, or tracing linen, to the size of 15 x 21 inches, and must be so drawn as to give their proper effect when reduced to one-half this size. No brush or color work is permitted.

The competition will close at 5 o'clock p.m. on Thursday, December 1st, 1898. No consideration will be given to drawings which may be received subsequent to that date and hour.

Drawings should be sent by mail or express, addressed to the editor of the CANADIAN ARCHITECT AND BUILDER, Confederation Life Building, Toronto, and marked on the outside "C. A. & B. Competition." All postage and express charges are to be paid by the competitors. Each drawing should be marked only with the non de plume of the author, and should be accompanied by a sealed envelope marked with the same non de plume and enclosing the full name and address of the competitor. This envelope will remain sealed until the competition is decided.

The merits of the designs which may be submitted in this competition will be decided by a joint committee, composed of officers of the Ontario Association of Architects and the Province of Quebec Association of Architects, whose decision will be final.

The right is reserved to withhold one or all of the prizes if, in the opinion of the judges, the designs submitted should be so inferior as to warrant such a proceeding.

Students are requested to read carefully the above conditions, absolute compliance with which will be required of each competitor.

GIORGIO VASARI.

THE renowned architect and painter of Arezzo was born in 1512 and as early as the year 1524 he was taken to Florence, where he studied design under competent masters. Subsequently he travelled to Rome and other places, where, as he himself says, "I set myself to design all the best works that I could find, nor was there anything remarkable at that time, whether in Rome, Florence or any other place wherein I sojourned, that

I did not copy in my youth, works ancient and modern, in sculpture and architecture, as well as paintings."

As an architect, Vasari stands deservedly higher than as a painter; as an historian of the arts, he occupies an eminent position, for he is the source from which all other writers draw their best and most important materials. Worn out by the pains and fatigues of a life unusually active and laborious, Vasari closed his mortal career on June 27, 1574, in the sixty-third year of his age, crowned with fame and honors and very sincerely lamented. His remains were conveyed to his native city of Arezzo, where they were laid in the tomb of his family, within the principal chapel of the Decanel church. He left behind him a very great reputation, more perhaps for the vast number than for the excellence of his pictures, but the beauty and perfection of his architectural works are universally admitted, and he was indeed an accomplished architect.

ENGAGED COLUMNS.

THE use of colonnades partially built into a wall, as we see exemplified in the banquetting hall at Whitehall, is not uncommonly condemned as a departure from the dignity and real use of columns, and as something false or absurd. If tested by the standard of common sense, there is no sufficient ground for such condemnation. Columns are points of support, and we may with equal correctness consider them in that light, whether insulated or engaged, for as supports they are equally valid in either case. We may regard the wall intervening between engaged columns as the means of enclosure, not of support—assisting the columns, it may be, in the support of the entablature, but not an essential and integral part of the fabric. The great Doric temple at Agrigentum and the Erechtheum at Athens suffice to show that even in the best period of Greek art this practice was not held to be opposed to the canons of good taste. The critics who would condemn engaged columns have, of course, a wide field for the exercise of their censorship in the engaged pillars or wall shafts of Mediæval art, the use of which is an exactly analogous practice, inasmuch as they represent the points of support of the arches and vaulting which spring from the capitals. The truth is that there is perfect masonic propriety, whether in the wall shafts of a cathedral or in the engaged pillars of a Greek temple. They represent an accumulation of power at the particular point of the wall on which the principal weight is charged; and not only have they constructive truth to justify them, but also great æsthetic value. These vertical lines of support convey to the mind the idea of the active and efficient support of any particular imposed weight far more satisfactorily than can be effected by presenting a plain unbroken wall of apparently uniform solidity and strength, and this idea is still more forcibly and distinctly produced on the mind when the vertical engaged shafts are of different color and material from that of the general surface of the wall. This practice, so prevalent both in Mediæval and Classic art, gave rise to additional beauty and variety by the use of colored and polished marbles.

A ready means of taking a fac-simile copy of a drawing done in ink which contains a salt of iron or copper is to lay over it a sheet of paper which has been moistened with yellow prussiate of potash and pressing on it, when the iron or copper salt will react on the paper and leave a copy wherever it comes in contact with the ferro-type paper.

MANUFACTURES AND MATERIALS

THE ST. JOHN, N.B., EXHIBITION.

UNDOUBTEDLY the most important and attractive display made by any firm at the recent exhibition at St. John, N.B., was that of the James Robertson Company, Limited, of Montreal, Toronto and St. John, manufacturers of plumbing supplies. The booth containing the company's exhibit was artistically painted and festooned with bunting, while a background of black velvet served to display to best advantage the white porcelain, brass and nickel goods. The exhibit included a decorated "Acme" syphon closet with automatic attachment; a large roll rim enamelled bath, with hot and cold shower bath attachment; an Italian marble lavatory and bath room complete, with gas water heating device for same; Imperial porcelain wash-tubs, enamelled sinks of all descriptions, copper and galvanized boilers, brass fittings, decorated basin, patent overflow and common overflow, etc., etc.

THE C. P. R. CEMENT WORKS.

The report comes from Vancouver, B. C., that negotiations are nearly completed whereby the C.P.R. cement works, on False Creek, will become the property of an English syndicate. It is said that the purchasers will install a new plant, with a capacity of one million barrels per year. The present output is only about 12,000 barrels, half of which is used by the C.P.R. Raw material for the manufacture of cement is available in abundance in the immediate locality.

TESTS OF WINNIPEG CLAY.

By direction of the city council of Winnipeg, Mr. H. N. Ruttan, city engineer, recently sent to the Diamond Brick Company, of Kansas City, a number of samples of clay, taken from deposits in the neighborhood of Winnipeg for a test and report as to their adaptability for use in the manufacture of paving brick. The results are embodied in the following report:

Sample No. 1. Soft blue clay; requires no grinding; wet; requires very little water in mixing—should be handled as dry as possible; dries well; does not check; shrinks very little; stands heat well; does not vitrify at approximately 1800 degrees F.

Sample No. 2. Hard slaty shale; requires careful grinding; requires water for mixing; works well in brick machine; checks very little in drying; stands heat well; does not vitrify at approximately 1800 degrees F.

Sample No. 4. Soft red clay; very tough; no grinding; mixes easily; works well in machine; checks very badly in drying, and on that account very difficult to handle. (Samples too much broken up to burn.)

Sample No. 5. Soft yellow clay; no grinding; requires very little water in mixing; works well through machinery; dries without checking; burns well; color when burned light cream, speckled with iron; would make fine building brick if repressed or made by dry process.

Mixture of 1 and 2 equal parts. Works well; makes good brick but not suitable for paving; see memorandum.

Mixture of 1, 2, and 4, equal parts. Best results obtained from this mixture; works well through machine; dries well; very little checking; probably will make a good paving brick; see memo. of tests.

It will be seen that none of these clays worked alone will produce a good paving brick.

In accordance with your request, we combined Nos. 1 and 2 with the results as stated. The most satisfactory results were

obtained from the mixture of Nos. 1, 2, and 4. In these bricks you will notice that while perfect vitrification has not occurred, still there has been a sufficient amount of heat applied to make the bricks very compact.

The rattler test shows that the bricks do not chip to any extent, but wear off evenly. The absorption is quite high, but this could probably be reduced by using a larger proportion of No. 4. We think if the clays can be conveniently combined, you may expect very excellent results in the paving brick line.

The samples of No. 4 were so badly broken up by checking in the drying process that we had nothing in shape to burn, but we are putting samples of the same material through a further process and if we obtain results that are worth reporting, we will communicate with you.

It is possible we could have obtained results more satisfactory to your friends if we had been told the relative location of the bodies of clays from which samples were sent us. Other combinations might prove of value.

In presenting this report to the city council Mr. Ruttan says:

"Some of the samples have proved satisfactory by themselves, and the mixing of Nos. 1 and 2 and 4 is without doubt a very good paving brick.

The following comparison with the Chicago specification is most satisfactory:

ABRASION.

Chicago—Time in rattler.....	1 hour.
Allowed maximum loss.....	.8 per cent.
Winnipeg—Time in rattler.....	30 minutes.
Average loss.....	1-10 of 1 per cent.

ABSORPTION.

Chicago—Time in water.....	72 hours.
Allowed maximum absorption.....	2 per cent.
Winnipeg—Time in water.....	48 hours.
Absorption.....	.8-100 of 1 per cent.

SPECIFIC GRAVITY.

Chicago, not less than.....	2.1
Winnipeg.....	2.18

While the collection of the clays to make the mixtures would add considerably to the cost of the brick, the price laid down in Winnipeg would probably not exceed \$16 per thousand. This is about two-thirds of the cost of imported brick. The cost of brick pavement on a six-inch macadam foundation would make it about \$1.80 per square yard."

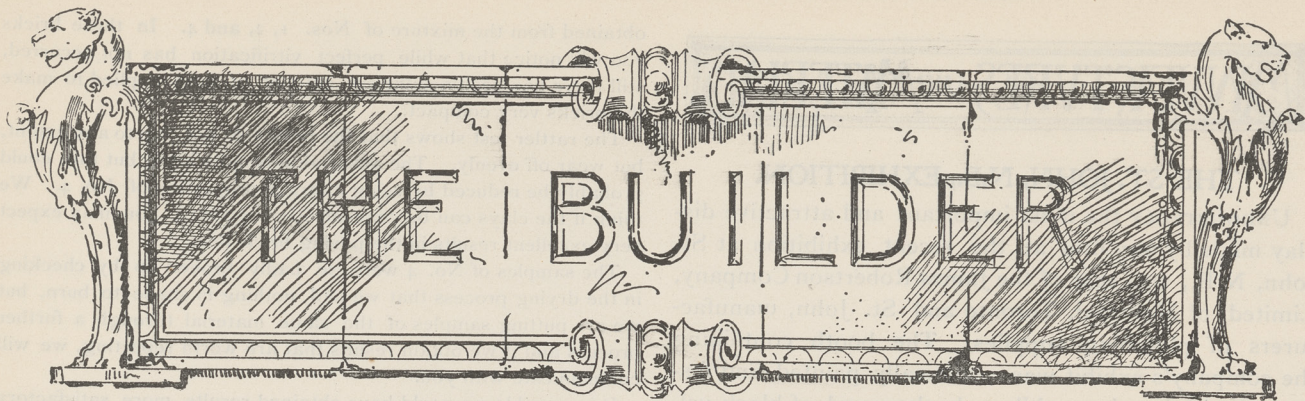
It is reported that a new company is being formed to take over the quarries and assets of the defunct granite companies at Beebe Plain, Que.

The works of the Toronto Lock Company at Oshawa, Ont., have recently passed into the hands of the Oshawa Stove Co., who will engage in the manufacture of furnaces, builders' castings, etc.

The Standard Drain Pipe Co., of St. Johns, Que., have commenced the manufacture of salt glazed vitrified paving bricks for sidewalks. Bricks of this character have been in use for this purpose for many years in American cities.

Cement roofing tiles, the manufacture of which was introduced about two years ago in the United States, is of long existence in Europe. In Bavaria, Switzerland, and other countries where the climatic changes are sudden and of destructive nature, and where no roofing material has withstood the ravages of elements any considerable length of time, cement tiles are said to have been found efficient in every respect.

The manufacture of enamelled paper bricks is reported to be assuming practical form and giving promise of satisfactory results in Europe. The bricks are made hollow, the object of this being practically the same as that sought in the making of hollow forged steel shafting. Not only is a defective centre removed, but it is possible to put a mandrel into the hollow, and by applying pressure the walls are operated upon both from the inside and outside. When a solid body is heated, the temperature of the interior always varies from that of the outer portion at first, often resulting in the expansion of one or the other that causes defects. For these reasons the bricks are made upon the hollow principle and plugged afterwards.



[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.]

Bedding Bricks.

If left to his own way, the bricklayer, as a rule, will not use more mortar in flushing up his work than he can avoid, yet the importance and necessity of solidly bedding the bricks and effectually flushing up the interior joints—particularly the cross joints—is scarcely measureable. Apart from solid bedding and “flushing up” the brickwork, as means of obtaining the maximum amount of tensile strength, in addition to that obtained by good transverse and longitudinal bonding, to carry the loads to which most walls are subjected, and to provide against the possible lateral movement of any of the constituent parts when the whole is under strain, the question has its sanitary aspect also; and by reference to most of the published engineers’ pocketbooks will be found formulæ to find the amount of air in cubic feet which will, in a given time, under certain stated conditions, pass through walls of varied thickness, built of different materials, painted or otherwise. The walls of dwelling houses defectively flushed up are, therefore, admittedly air filters on a very large scale. They are also liable to be receptacles of damp driven in by storms, and induced by the hollow, or partially hollow, state of the brickwork, leading up to disease, and in some instances probably to fatal consequences. It should be the duty of builders to see that a solid brick wall is solid in more than name.

Concrete Footings.

FOR an ordinary two-story brick dwelling, footings six inches thick formed of good concrete will be found quite sufficient to support the building, particularly if the footings are five or six feet below the ground line, similarly as shown in Fig. 1. Here the footing is formed of six

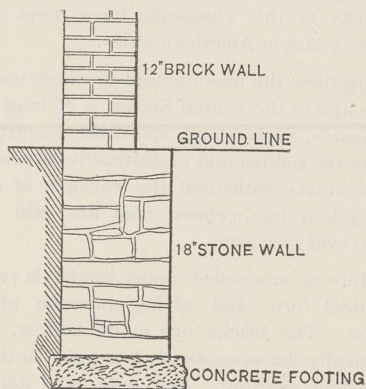


FIG. 1—FOUNDATION.

inches of concrete well rammed in place, and allowed to stand twenty-four hours before the stonework is laid upon it. Concrete for footings should be mixed in the proportion of 1 part of cement to 2 parts of sand and 4 of stone for natural cements, and 1 to $2\frac{1}{2}$ and $5\frac{1}{2}$ for

Portland cement. The most satisfactory method of mixing concrete by hand is to first prepare a tight floor of plank, or better still, of sheet iron with the edges turned up about two inches, for mixing the materials on. Upon this platform should first be spread the sand, and upon this the cement. The two should then be thoroughly and immediately mixed by means of shovels or hoes, and the broken stone or aggregates then dumped in on top and the whole worked over dry with shovels, and then worked over again while water is added from a sprinkler on the end of a hose, or from an ordinary watering can. Only as much water should be added as is necessary to cause the cement to completely coat and cause to adhere all the particles of the aggregates. Too much water will lessen the strength of the concrete. The water used should be clean and at about the temperature of 65° . As soon as a batch of concrete is mixed it should be dumped into the trench at once, but in no case should it be thrown more than four feet, for if dumped from a greater height the heavy particles are apt to separate from the lighter ones. The whole layer of 6 inches in thickness may be filled in at once, and where the thickness of the footings is to be more than six inches, two or more layers may be applied to make the required thickness, but the layers should never be more than 6 inches thick in any case. As soon as a square yard of concrete has been deposited, it should be tamped with a wooden rammer weighing about 20 pounds. The tamping should be sufficient to just flush the water to the surface. The concrete should not be permitted to dry too quickly, and when there are to be two or more layers, and if twenty-four hours elapse between depositing the layers, the top of each layer should be sprinkled with water before the next is deposited. When good broad stones are scarce, it will be found much more economical to use concrete footings than footings of stone.

Useful Literature.

Two books recently published contain much that both architect and builder would find to be of great service in the general routine of daily activity. The first of these is entitled “Specifications,” and was prepared by W. Frank Bower, architect, and consists of a strongly bound volume covering some 130 pages 9×12 inches, exclusive of copious index and reference notes. The object of this work is to aid the architect in preparing specifications for every department of work by calling his attention to every possible item and detail connected with such department. It is also intended to help the builder and contractor to prepare correct estimates, as with this volume before him he can check off every item of labor and material required to complete the work

being estimated upon, making it almost impossible to leave anything unaccounted for in his bill of items. Later on this book may receive further notice at our hands. The second and more important work is "Building Construction and Superintendence," Part 2, covering carpenters' work, by F. E. Kidder, C.E., Ph. D., architect. Part 1, which was devoted to masons' work, bricklayers' and plasterers' work, was well received by the profession, and the volume now under notice is sure to claim equal notice. The plan of the work is something the same as that of the excellent English service published by the Rivingtons of London, in four volumes. Kidder's work, however, is more particularly adapted to American and Canadian usage, and to the materials employed for building purposes in this hemisphere. The work contains upwards of 500 explanatory illustrations, which give to it a useful value that will be appreciated where the architect has failed to give detail drawings for special or unusual work. The volume contains many illustrations of methods for preparing work not found in any other book, some of which are not only new, but are decided improvements over all other usual methods for performing the same work. There are two illustrations on pages 188 and 189 which show an effective method of building skylights, by which the drop caused by condensation is completely avoided. If arrangements can be made with the author—who has had the work copyrighted—several of these illustrations and explanations will be reproduced in this journal. This volume is to be followed up with Part 3, which will cover the other building trades.

Window Frame
for Frame House.

IN making window frames for frame buildings, when the sashes are to be single or double hung, it is not necessary that the back of the frame should be lined in to protect the weights, as the window studs will answer that purpose quite well, as shown at A, Fig. 2. When, however, the window is double as in bays or quarries, the central mullion must be cased in all round, leaving a hollow space for the two sets of weights to operate, as shown at B, Fig. 2. In this example the hanging

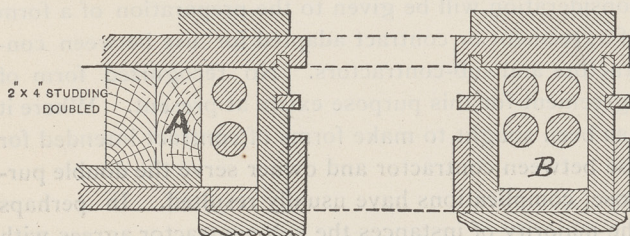


FIG. 2—SECTION THROUGH WINDOW FRAME.
Scale, $1\frac{1}{2}$ Inches to the Foot.

stiles are tongued into the inside grounds, while the outside ground is nailed in between the hanging stiles. The outside ground forms the outside stop for the upper sash, and is left thick enough to receive two thicknesses of siding, or two thicknesses of lathing and a roughcast coat, if the building is to be roughcasted. The outside casing should be thick enough to receive venetian blinds. The manner of finishing the inside of the window is shown in Fig. 2, and in the section shown at Fig. 3 a very good method of constructing and finishing the window sill inside and out is exhibited. The parting beads are let into hanging stile not less than three-eighths of an inch, and they project inside the opening one-half an inch. The sashes, of course, will be provided with bevelled meeting rails, to which should be

attached, when finished, one of the many sash locks now in the market. The sill is provided with a drip groove and subsill, and its inner edge is finished with a moulding and tongued apron. The inside casings are flush with the inside edge of the frame, or the stops, as Fig. 2, shows inside stops wide enough to have the joint

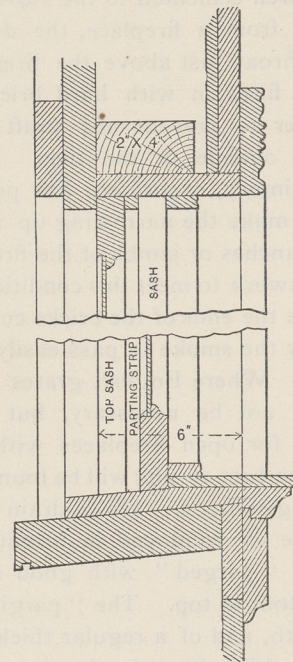


FIG. 3—DETAIL OF WINDOW SECTION.
Scale, $1\frac{1}{2}$ Inches to the Foot.

covered with casing, while Fig. 3 shows a narrow, beaded, invisible stop. The hanging stiles must, of course, be provided with axle pulleys, and with pockets. Frames should be set perfectly plumb in the wall, face and edge, to insure good free working of the sashes. If set in the wall square and plumb, there will be no dashing of the weights, nor will they require any parting strips in the boxes. The sashes should be fitted "easy," but not so loose and easy as to render them liable to rattle during a wind storm. About 3-32nds of an inch play each way, before the work is painted, is quite enough space to allow for the sashes to work in, if all the other work is well wrought.

Chimney
Construction.

MANY builders insist in making their flues a little less in area at the top than at the throat, under the idea that as the smoke and gases rise to the top they get cooler, and of course contract, and therefore require less flue area than on their first entering it. To this method of flue construction is due many a "smoky chimney," for, as the smoke and gases ascend, the nearer they get to the top of the flue the slower they travel, and as a consequence, the upper part of the flue gets congested and prevents the lowest strata of smoke from getting up the flue, and the result is that it escapes into the room. Modern experiments have proven that a flue having equal areas top and bottom draws as well, and often better, than one having unequal areas, the smaller being at the top. Better results, however, are obtained by making the flue larger at the top than at the bottom, the best results being obtained by making the flue greater in diameter as it ascends, about half an inch to every twelve feet in height. For instance, a flue 24 feet high, being 9" x 9" at the throat, if built by the rule given above, should be 10" x 10" at the top of the chimney. Flues that are formed of eight-inch glazed drain tiles are generally efficient, and rarely—if ever—

take fire from burning soot, as their smooth interior leaves no restment for soot or dirt. The tiles are placed with the socket joint uppermost, and all joints should be well cemented with neat Portland cement. Where connections are to be made with stove piping, T joints are used, the short end of the pipe connecting with the brickwork and well cemented to the stove-pipe thimble. If the flue leads from a fireplace, the drain tiles may start from the throat just above the fireplace, and the angles may be filled in with hard bricks and cement mortar, in order to prevent any draft from getting current on the outside of the tiles. In forming the throat of the chimney, experience has proven that the best shape is to make the narrowing up at an angle of 45° from the haunches or jambs of the fireplace; and in setting the brickwork to meet this condition, care should be taken to have the ends of the bricks cut to this angle, in order to allow the smoke to pass easily to the throat and up the flue. Where English grates are used this precaution may not be necessary, but for American made grates, or for open fireplaces with and-irons or basket grates, the best results will be found by following the foregoing suggestions. When drain tiles or other like materials are not employed in forming the flue, it should be well "parged" with good mortar on the inside, from bottom to top. The "parging" should be well done, smooth, and of a regular thickness throughout. Besides making it easier for the smoke, etc., to ascend, parging helps very much to make a chimney safer from fire, as the parging fills up every possible faulty joint in the brickwork with mortar, preventing thereby sparks or flames from passing through to the outside of the chimney.

The Size of Bricks.

"In England the size of bricks is fixed by law." So speaks our esteemed contemporary, the CANADIAN ARCHITECT AND BUILDER. Unfortunately, we are not referred to the particular statute enacting the said fixture, so that for the present our clayworkers may go on in the usual style. Our contemporary makes this assumption as a pretext for the Dominion government to take the matter in hand, but we trust that before doing so the promoters of any bill in the Assembly will study the size of British bricks on the spot here. We can show them a few just to whet their appetites. The cry for a brick of uniform size is as old as the "sea serpent," and although of late years manufacturers have for their own and clients' convenience done something in that direction, we seem to be getting no nearer to real uniformity, and probably we never shall. Our friends across the Atlantic will, of course, understand that bricks of a certain name and make will always be of a definite size, and many kinds of bricks may be of one size, either by design or usage. We have got no farther than that. The uniform size recommended for Canada is $8\frac{1}{4}$ by 4 by 2 inches. It is stated that such sized bricks, either hand-moulded or pressed, will absorb from half to three-quarter pound of water, which, of course, is an absurd observation, unless the actual kind and composition of the brick are known."—"F.R.I.B.A." in British Clayworker.

If "F.R.I.B.A." is right, then "to the dogs" with authorities, and, to some extent, with our own experience. English authorities tell us that: "By the 17th Geo. III., cap. 42, all bricks made for sale were directed, when burnt, to be less than $8\frac{1}{2}$ " long, $2\frac{1}{2}$ "

thick, and 4" wide." (Gwilt.) In "Notes on Building Construction," Vol. III., page 3, 1889 edition, we are told: "Before the year 1839 a duty was paid upon bricks; their size was then practically fixed by Act of Parliament, and it has since remained materially unaltered." Seddon, and other recent authors, practically tell us the same story, so that, if we have erred, we have erred in good English company. In America a number of recognized authorities tell us nearly the same thing. Prof. Ira Baker says, in his "Masonry Construction," page 46: "In England the legal standard size for bricks is $8\frac{3}{4} \times 4\frac{3}{8} \times 2\frac{3}{4}$ inches," etc. Again, Trautwine, in "Engineers' Pocket Book," has it: "The size of bricks in England is fixed by law." Davies, Thursten, Hatfield, and many other competent American and Canadian authorities are in evidence that such an Act exists. The "absurd" observation anent the absorption of water as stated exists only in the imagination of "F.R.I.B.A." In "Notes on Building Construction," Vol. 3, page 110, we are told by this English authority that: "The absorption of average bricks is, however, generally about one-sixth of their weight, and it is only very highly vitrified bricks that take up so little as one-thirteenth or one-fifteenth." We could fill a column with quotations from English authorities on the same lines, but, as we were writing on Canadian, and not English, bricks, it is fair to presume we know more about the subject than it could be possible for "F.R.I.B.A." to know.

NOTE.—The four volumes of "Notes on Building Construction" were prepared by competent authorities to meet the requirements of the syllabus of the science and art department of the Committee of Council on Education, South Kensington, and the work is considered the most reliable and the most complete of its kind in the language. It was published by the Rivingtons, London, Oxford and Cambridge.

SUB CONTRATORS' AGREEMENT.

It is announced that at the next convention of the National Association of Builders of the United States, consideration will be given to the preparation of a form of agreement or contract adapted for use between contractors and sub-contractors. No recognized form of agreement for this purpose exists at present. Where it has been sought to make forms of contract intended for use between contractor and owner serve the double purpose, complications have usually resulted. In perhaps the majority of instances the sub-contractor agrees with the contractor to perform certain work in a certain manner and at a stated price, while the general contractor agrees to nothing. It would therefore seem to be a wise step to provide such a form of agreement as proposed, by means of which the rights of all parties would be conserved.

RENOVATING OLD PARQUET FLOORS.—Caustic soda lye, prepared by boiling for $\frac{3}{4}$ hour with 1 part calcined soda and 1 part slaked lime with 15 parts water in a cast iron pot, is applied to the parquet to be renovated by means of a cloth attached to a stick. After a while rub off the floor with a stiff brush, fine sand and a sufficient quantity of water, to remove the dirt and old wax. Now spread a mixture of concentrated sulphuric acid and water in the proportion of 1 to 8 on the floor. The sulphuric acid, says a German exchange, will remove the particles of dirt and wax which have entered the floor, and enliven the color of the wood. Finally, wax the parquet after it has dried completely and has been washed off with water.

DANGER OF INTERCEPTING TRAPS.*

By J. W. HUGHES, Montreal.

At the meeting of our association held last year, a paper from my pen was read, in which the fitting of the intercepting trap in private sewers was condemned, and reasons given for such condemnation. My study and observation during the time that has since elapsed have fully confirmed and strengthened the opinions then set forth, and I am indebted to an able paper by W. M. Watson, in a recent issue of the *Canadian Engineer*, for results of a series of experiments bearing upon this question, conducted in the city of Cologne, Germany.

The city fathers of that place, finding their by-laws, which were up-to-date and called for an elaborate system of back vents, intercepting traps, fresh air inlets and the usual accompaniments, had not given the expected results, appointed a committee to investigate, and associated with it Herr Maniewski, the leading architect, and Herr Unna, the famed sanitary engineer. These gentlemen went thoroughly into the question, erected complete apparatus with glass pipes for practical demonstration, investigated the condition of existing apparatus in daily use, and, in short, gave the matter that careful and painstaking attention so characteristic of the German. Their report has been published in detail in Nos. 4 and 5 of the *Gesundheits Ingenieur* for 1898, and been republished in English papers.

I can only give brief extracts taken from W. M. Watson's paper bearing more particularly on the question of the intercepting trap, although the results of the experiments bearing upon the question of back vents are of equal importance, and may be taken up at a future time. It was shown that when a main intercepting trap was used that it not only modified the speed and partly obstructed the flow of sewage, but it prevented any of the air carried down by the soil and other waste water pipes from discharging into the street sewer, where its aerating functions are so necessary to commence the purification of the sewage in the drains and assist in preventing sewer gases generating in the sewers. It was also shown that when the main intercepting trap is omitted there is a superior and self-cleansing flow of sewage, and that large volumes of air pass forward to the street sewer, creating a healthy atmosphere, and circulation of air down the soil pipe through which the fluid is passing and up other soil pipes that are at the time standing idle.

These experiments, especially those that show air is carried down with waste waters, and that the main trap is a dangerous obstruction, fully explain the reasons why those towns that do not use back air pipes, and that extend their soil pipes from the crown of the drains to the highest point of the roof, and which make every rain water leader and waste water pipe to pass to the street sewer without any obstructing trap or sharp angle or interceptions of any kind, are almost free from odors in the houses and streets and free from diseases that can be traced to sewer gas poisoning, while, on the other hand, those cities which have adopted the principle of intercepting traps, back air ventilation pipes, with all their intricate complications, are often quite the reverse; and of disease, a great deal is found among the inhabitants who happen to live in the modern built houses, where the obstruction system has been installed. This is in spite of the fact that the same towns often spend

large sums of money in flushing drains and artificially ventilating the street sewers, a thing which is never necessary if the sewers are laid down properly and the straight unobstructed system is adopted.

The city of Cologne has now had enough of the complicated system of plumbing and draining, and, in future, will avoid such expensive luxuries, and again allow their sewage water to leave inhabited premises with as much expedition as possible, and secure all the aeration it can through the journey to the outfall, without making itself a nuisance to the public.

The Cologne investigation has bearing on sewage purification. It will be remembered, more than twenty years ago, Dr. Pasteur, of Paris, and Dr. Warrington, declared that sewage contained the necessary organisms for its own purification.

Dibdin, of London, England, has shown us the way to compel sewage to clean and purify itself. Adney, of Dublin, has proved that domestic sewage requires three times its own bulk in air, regularly and evenly supplied, and distributed to every particle and atom of the sewage to enable the friendly bacteria to destroy the poison, etc., the sewage contains. Lowlock, of Birmingham, has shown us a method of applying the atmospheric air to the sewage, and Reid, of Staffordshire, recommends that all sewage should be purified while fresh, before putrefaction sets in, or sewer gas begins to generate. The fathers of Cologne have shown us, by their experiments, that the sewage will split up with fine threads, and spray and take up atmospheric air in larger quantities even than, Adney tells us, is needed, during the time it is following vertically down the waste pipes.

If all house rain water leaders and waste water pipes were made to form street sewer ventilators, and the water coming down each of the pipes will bring down four times its own bulk of air, which will go a long way towards providing all the air that is needed to do the necessary work of cleaning the sewage, and, in that case, the public sewer will be changed from a gas generating chamber to a receptacle for the aeration and purification of sewage and dirty filters.

While under obstructive plumbing by-laws, and private drain arrangement of interception traps, no aeration of the sewers can take place, therefore, putrefaction sets up, and the sewage gas is generated abundantly, which poisons the dwellings and the atmosphere of densely populated towns. The Cologne investigation has demonstrated that most sanitary appliances can, and ought to be, made of glass.

I have quoted so copiously from Mr. Watson's paper, as he has put the matter much better than I could, in confirmation of the objections I gave against the intercepting trap in last year's paper.

As a brick fell from a carrier's hod it knocked down a Spanish flag displayed from a store front below. "That must have been an American brick," said a passer-by. "Yis," said the hod-carrier above, "but it was of Oirish descint."—(Ex.)

The James Smart Mfg. Co., Brockville, Limited, have published their first catalogue of hot water heaters, which contains a description accompanied by numerous illustrations of their "Perfection" horizontal sectional hot water boilers.

The master plumbers of Halifax, Nova Scotia, had a most enjoyable picnic at Heffler's Grounds, Bedford Basin, on Sept. 1st. The important features of the occasion were the series of athletic sports and a bountiful luncheon. The prizes were presented to the winners of the various athletic events by Mr. Geoffrey Morrow.

* Paper read at the annual meeting of the American Public Health Association, held at Ottawa.

LIEN LAWS AND CONTRACTING.

THE general tendency of business for some years past, says the California Architect and Building News, has been, for a smaller number of individuals, as principals, to do a larger business at a smaller profit. But in the business of contracting to build, the tendency has been, on the contrary, for a larger number of individuals to do a smaller business, at no profit at all, and often at a loss. This does not often fall upon the contractor, because a large majority have nothing to lose. These conditions have naturally reduced the number of responsible and experienced contractors, many of whom have abandoned the business, while others have been obliged to do so, after sacrificing their legitimate accumulations in the throat-cut purse scramble we call competition.

It is claimed by some sufferers that the prevailing conditions have been the result of a grasping disposition on the part of owners; others again insist that architects are to blame in encouraging incompetent irresponsible bidders. But it must be remembered that the system, if we can call an anarchistic state of things a system, has encouraged incompetent, irresponsible people who have failed at other employments, to adopt the calling of contracting or the profession of architecture; and it is not wonderful if these disturbers of the peace and prosperity of a community should combine to get a living at other peoples' expense.

We believe that no improvement can be hoped for as long as the "Lien Law" is in force. The law relieves everybody connected with the building operation of responsibility, though it is ostensibly intended to fix responsibility and protect innocent parties. In practical operation it enables any impecunious person to get credit and bonds, in order that he may have the handling of the funds to be distributed, often pro rata; in consequence of the impossibility of doing the work at the contract price, or because in the handling, too large a percentage has adhered to his sticky fingers. Sound business principles are always, in the long run, stronger than any statute which conflicts with them, and that attempts to prevent their action. This is what might be expected, because business principles are the result of the experience of the world for ages, and have become a natural force that can be counted on, like the laws of gravity; and any attempt to ignore or defeat it, brings confusion to the man or class who make the attempt. It has been believed that the Lien Law was a necessary protection, first to the journeyman mechanic against the misfortunes or dishonesty of his employer, the contractor; then to the sub-contractor against the same. The business community has, however, discounted the practical working of this elaborate machinery to entrap an unwary owner into paying for twice as much as he receives. A counter machine of bonds, and retention of contract money, together with time limits and other technicalities, was soon set up; and while the expenses and uncertainties of building, for all concerned, have been increased by this legislation and counter legislation, the inevitable net result has been to increase unscrupulous competition, or, rather, to turn the business into a gambling scheme, as devoid of business principle as a bluff in a game of cards.

The fact is that the Lien Law is class legislation, and as such has been pronounced unconstitutional by the supreme courts of more than one state. The Supreme Court of the state of Ohio used this language in a decision in 1897:—"No court can see that it is for the

common public welfare that the liberty of contract should be taken away from the owner of a building to enable the seller of materials to collect their value from a man who never purchased them, and who has already fully paid the one with whom he contracted for all that he received."

It will be seen that without a lien law, business would be transacted on the usual basis. Bonds would not be expected, because owners would take only the usual business risks in employing contractors—and these risks would be mutual. Hence only responsible parties could engage on either side, and remuneration would be adjusted as real compensation.

STRUCTURAL IRON AND STEEL WORK.*

In setting iron work, great care should be observed to have the top and bottom and the bedding plates of stanchions perfectly level and truly fitting together closely without the need of wedging to bring them to a vertical position, so that the entire of the surfaces shall be bearing the load equally distributed throughout; also that bedding plates of stanchions upon stone pier blocks shall be evenly bedded with Portland cement; also that the bearing surfaces of girders upon cap plates and other supports shall be in full contact all over, without resorting to wedging. Be it observed, that when wedges are used the actual bearing surfaces are reduced to the sum of the areas of only the portions of them which may be in close contact with the upper or under surfaces, whereby greatly intensified stresses are brought upon these parts which may produce danger. The head and foot plates are planed smooth and truly square to the vertical axis of the stanchions. Cast iron, in the absence of stone, may be used for templates to receive the wall ends of girders, beams, and trusses, which should never be laid directly upon brickwork. In the best systems of construction the structural iron or steel framework of large buildings is made quite independent of the stone, brick, terracotta, or concrete casings by which the stanchions or columns are surrounded and the intervening bays of light walling, and each successive floor is supported independently by those below it, instead of several upper floors and partitions being carried by the trussed girders of one of the lower floors, usually of the first or second floor. The methods of making joints and connections between stanchion and girder framework are various, and many of them more or less ineffective in attaining rigidity, especially when a fire has taken possession of a building and the girders are liable to be bent or distorted by the heat. Many lives and much property are then often sacrificed because of the insufficiency of the details of the fastening and connection.

Steel (mild) for joists and girders, lintels, bressummers, and other structural purposes, in price and adaptable sections in stock between 3 in. and 16 in. deep, is, considering its greater strength and better properties, generally preferred to wrought iron for the more important classes of structures. Its safe tensile strength is about one-half greater than wrought, and between five and six times greater than that of cast iron. Its compressive strength is three times that of wrought iron, and nearly two-thirds greater than that of cast iron. Steel plates, joists, angles, and channels, which by riveted combinations are made into girders and trusses for floors and trusses for roofs, are now much used.

* Extract from "First Principles of Building," by Alex. Black, C. E., published by Biggs & Co., 139-140, Salisbury-court, Fleet street, E. C.

Manufacturers' lists of sections of rolled-iron joists usually give weight per foot run, and the safe load for a variety of spans for which they are in usual practice adapted. It must be observed that these lists differ as much as 25 per cent. for the same section, the smaller loads having five tons per inch of section as the limit of stress, the larger loads taking a greater limit—perhaps over six tons. The safe load on steel joists of similar section may be taken at 40 per cent. greater than for wrought iron, but the deflection in steel joists will for the correspondingly greater load be 40 per cent. greater than the deflection of iron. When the depth of joist is one-twenty-eighth of span, the theoretical deflection will be about $\frac{1}{2}$ in. for wrought iron joist, but for a similar steel joist with 40 per cent. more load it will be about $\frac{3}{4}$ in.

As rolled beams are often made of inferior iron, the limiting stress of the extreme fibre of the flange should not exceed four tons per square inch of the flange section, especially in the flange in compressive resistance. The limit of fibre stress on steel joists is $6\frac{1}{2}$ tons per square inch of flange section. Steel joists differ in appearance from iron joists in having generally a smoother and more cleanly-rolled surface.

It is more economical to use a deeper section in proportion to span than one twenty-eighth, in order to limit the stress to four, five, or six and a half tons, as the case may be, per square inch of flange section, and avoid undue deflection. Thus, if the depth be from one-fifteenth to one-eighteenth of the span, the deflection in centre should not exceed $\frac{1}{8}$ in. in every 5 ft., or one four-hundred-and-eightieth of clear span. This deflection will not crack plaster ceilings.

A usual approximate estimate of safe load for cast-iron tubular columns of height = 12 to 15 diameters, thickness of metal being one twenty-fifth of section area or one-ninth of diameter (per square inch of section area) = $2\frac{1}{2}$ tons. For stanchions of +, with equal arms, 12 to 15 diameters in height (if of unequal arms the least dimension of cross section is taken), two tons.

Eighteen diameters in height	$1\frac{1}{2}$ ton.
Twenty " "	$1\frac{3}{4}$ ton.
Twenty-two " "	$1\frac{1}{2}$ ton.
Twenty-four " "	$1\frac{1}{4}$ ton.
Twenty-six " "	$1\frac{1}{2}$ ton.
Twenty-eight " "	1 ton.
Thirty " "	$\frac{3}{4}$ ton.

A column or stanchion of a height under about 12 diameters will fail by crushing, but when over that one-twelfth ratio of diameter to length or height, it fails by bending. A small deviation of axis, of pressure from axis of column, or a slight bend in casting makes the load act eccentrically, and may reduce strength to one-half or one-third of normal conditions.

The tubular form of column being a more efficient disposition of metal to resist longitudinal pressure than the + or similar open form of section of stanchions, the diameter of the arms or flanges and the thickness of the metal is increased by about one-fourth to one-fifth, so that thereby the metal cross section area becomes increased by about one-eighth to one-fifth, according to increase of height ratio. As castings are sold by weight economy is sought by making wide slot openings, 24 in. to 30 in. long, at intervals in the flanges. This, however, can only properly be done when the metal section, which may be required to fill up a certain width for the sake of appearance or symmetry, is made in excess of statical requirements.

HEATING RULES.*

THERE are approximate rules of the size pipes necessary to warm rooms with hot air, by which furnace men are guided. These rules, coupled with a practical knowledge of the conditions upon which they may be increased in size, or decreased, are as follows, for rooms on the first floor: An eight inch pipe may be used for a room containing one thousand two hundred to one thousand five hundred cubic feet of space, provided the room has not more than one wall exposed, and the pipe not more than six or eight feet from the furnace. If the room has two or three exposed walls a nine-inch pipe would be necessary.

A nine inch pipe for a room containing one thousand five hundred to one thousand eight hundred cubic feet under favorable conditions. The same size room under unfavorable conditions, such as large wall and glass exposure, and long distance from furnace, say twelve or fifteen feet, will require a ten inch pipe.

A ten inch pipe for a room containing about two thousand cubic feet of space with two walls exposed, and hot air pipe not longer than eight or ten feet, but under unfavorable conditions, such as long distance from furnace, and large wall and glass exposure, same size room would require a twelve inch pipe.

These examples are given to show you that it is difficult to lay down a hard and fast rule, that must, under all conditions, be observed for the size pipe required to heat a given space with hot air.

We all know that there are rules given by which the quantities of air passing through a pipe of given size can be figured out. So also can the temperature of the air and its velocity be calculated. A knowledge of these rules and how to figure them out is a good thing to know, but the furnace man who depends upon figuring out the sizes pipes necessary, according to these rules, will get sadly astray, and will probably come to the conclusion that it is not always true that figures do not lie.

I have diverged somewhat to explain why an eight, nine or ten inch pipe will not always heat the same size room, and will now go on to tell you how I would arrive at the sizes necessary, when hot air and hot water heat is to be used in the same room.

The room to be warmed, we will suppose, is fourteen feet wide, twenty-five feet long and ten feet high, containing 3,500 cubic feet of space; it has a bay window and faces the north; it has two walls with outside exposure and is considered a room requiring a large appropriation of heat to warm it in severe cold weather.

If the furnace has large hot air duty to perform in other parts of the house, I would use, in this case a ten inch pipe, and as the hot air register is only about five feet from the furnace, it will warm, under these circumstances, 2,500 cubic feet of the space of the room. I then take the balance of the space, which is 1,000 cubic feet, and for hot water allow one square foot of radiation for each twenty cubic feet of space, which will be fifty square feet. This may seem to you a larger ratio than is usually allowed, but when you consider that this radiator has the cold air of a bay window, with a large cooling surface surrounding it, you will readily understand the wisdom of providing plenty of radiation.

* From a paper on Combination Heating by John Miller, read before the Master Steam Fitters' Association.

MOVING FOUR DOUBLE BRICK FLATS.

WE have in the past, says Carpentry and Building, made mention in these columns of a number of interesting pieces of work in connection with the moving of buildings, both large and small, but the latest to attract attention is the moving at one time of four five-story double brick flats, 100 x 75 feet in size. The work was commenced the early part of September, and the houses moved about 6 feet per day, the work requiring nearly 300,000 feet of 12 x 15 inch yellow pine. The buildings are to be moved 75 feet in one direction and 35 feet in another.

The operations are being carried on at Willis avenue and 134th street, New York City, the contractor being Frederick Damm. In doing the work the outside and party foundation walls were torn away at intervals to allow the erecting of cribs, the east and west walls resting on sills which are lapped and stepped to conform to the four levels of the houses. The sills rest on the timbers, which form the 24 cribs and which run completely under the building, east and west. A series of 14 run north and south under the building and interlace with the others to form a complete frame. Owing to the building being about 5 feet lower at the south side than at the north, the supporting frame is stepped off in four great steps, each about 15 inches high, at the north the frame being seven timbers high, while at the south it is only four. After this frame was built, 325 ordinary 4-inch jack screws were placed under it at regular intervals. The buildings were then jacked up and the remaining walls removed. The tracks, 14 in number, were wedged up to the timbers and the jacks removed. The tracks are lubricated with a very greasy soap, which has body enough to keep the sliding timbers from actual contact with each other. The houses are moved by 20 of the jacks, which are set in timbers and buckled to the tracks by chains. They are distributed regularly throughout the frame and are operated simultaneously by signal. The buildings when properly situated will be lowered by jacks a distance of 3 feet, and the new foundation walls will be built up and wedged.

GREEK MASONRY.

WHAT must be observed in the edifices of Greece is the high finish of all the parts. In them the object, which is not intended to be seen, is wrought with as much care as the exterior composition. The junctures of the blocks which form the columns of the Parthenon are so perfect as to require the greatest attention to discover them, and they leave a mark no thicker than the finest thread. In order to attain this extraordinary perfection, the marble was first reduced to its proper shape by a chisel. Afterwards the two pieces were rubbed one upon the other, and sand and water thrown upon the center of friction. The courses, by means of this practice, were placed with incredible precision, and this precision in the shafts of the columns was determined by a square pivot of olive wood. The roses, the plinths, the moldings, the astragals, all the details of the edifice, exhibit the same perfection. The lines of the capitals and the flutings of the columns of the Parthenon are so sharp, that you would be tempted to suppose that the entire column had passed through a lathe. No turners' work in ivory can be more delicate than the Ionic capitals of the Erectheum and the Caryatides of the Pandroseum are perfect models.

EXAMINATION IN SANITARY SCIENCE.

THE following papers were given to the candidates in the recent examination in Practical Sanitary Science at the Sanitary Institute:

1. What is the difference between density and specific gravity? How would you determine the density of a piece of coke?
2. State what is meant by the term "latent heat," "radiant heat" and "convection"? How does "convection" differ from "conduction"?
3. Give the composition of a typically good drinking water. State the character and composition you would expect water to have when drawn from the following sources:—(a) chalk, (b) loose sand or gravel, (c) upland surface gathering grounds, (d) rain.
4. Describe the method you would propose to purify a river water intended for public supply, and explain its action.
5. State briefly the precautions to be taken to obtain a stable, dry and healthy building upon the following sub-soils:—(a) stiff clay, (b) sand containing springs.
6. At what depth of flow does a drain discharge the greatest volume? Explain why the velocity of a drain running full is no greater than when it is running half full.
7. What are the advantages and disadvantages of "combined" and "separate" town sewerage systems? and what are the principal considerations that govern a decision as to which system shall be adopted?
8. What is meant by the "flashing point" of petroleum oils? How is this regulated by Act of Parliament? What are the defects in construction of some of the lamps commonly sold that render them dangerous in use?

PLUMBERS' EXAMINATIONS.

THE first examinations under the new plumbing by-law adopted by the City Council of Vancouver, were held recently. The Board of Examiners consisted of the City Engineer, the Plumbing Inspector and Mr. S. A. Wyse. The following persons wrote on the theory of plumbing:—H. McQuarrie, W. Blackmore, J. Scott, A. Patton, J. Moran, S. Mortimore, W. Braden, J. Hunt, O. Laursen and C. A. Green.

USEFUL HINTS.

The following formula supplies an ink which will write easily on glass: White lac, 10 parts; Venice turps, 5 parts; turpentine, 15 parts; and powdered indigo, 5 parts. The first three ingredients are mixed and melted, and the indigo is added. The writing is unaffected by water.

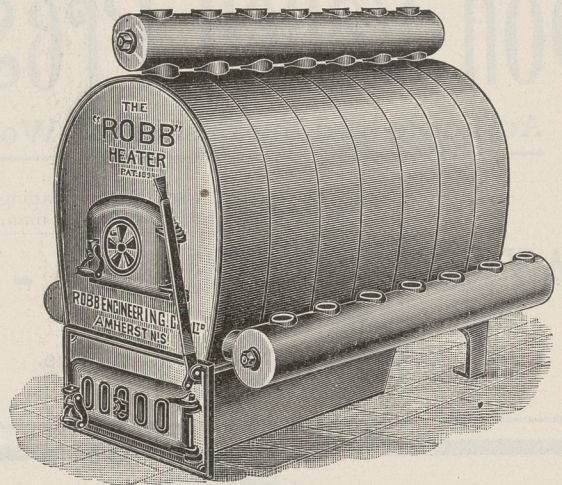
Oil must be used in the first coat of paint for brickwork, for it is the oil which forms the material which binds the pigments together. Certainly brickwork must be perfectly dry when the paint is applied, for otherwise it would soon scale off. If the proper precaution is observed in the work of painting this kind of work there will be little cause for complaint, and the protection added to this kind of work by paint is almost as great as is the protection added to woodwork.

THE ART OF BRONZING.—Dissolve copper filings in aqua fortis. When the copper has impregnated the acid, pour off the solution, and put into it some pieces of iron or iron filings. The effect of this will be to sink the powder to the bottom of the acid. Pour off the liquor, and wash the water in successive quantities of water. When the powder is dry, it is to be rubbed on the article with a soft cloth; but observe that previously to the application of the bronze powder, a dark blackish sort of green is first to be laid on the article. If you wish the powder to adhere stronger, mix it with gum water, lay it on like paint with a camel's hair brush, or previously trace the parts to be bronzed with gold size, and when nearly dry, rub and powder over it.

REGISTRATION OF PLUMBERS.

A CONGRESS of plumbers has been held in Glasgow, when the subject of "Registration" was considered. Mr. W. R. E. Coles, clerk to the Worshipful Company of Plumbers, said the whole fabric of the congress rested on the two broad facts that registration was actually one of the most elementary conditions of organization, inasmuch as there could be no corporate body without it; and the necessity for registration of plumbers had been affirmed by common consent of the plumbing craft throughout the kingdom, the medical profession, the sanitary authorities, architects and others particularly acquainted with the subject, as well as by increased majorities in the House of Commons whenever the Plumbers' Registration Bill had been before Parliament. He pointed out that the necessity for plumbers' registration was first affirmed at a meeting held in London in 1884, and in the fourteen years which had since elapsed the proposition had been approved by public meetings in all the principal centres in England, Ireland, Scotland and Wales. The advantages of registration were primarily that it enabled members to legally combine for the common purpose of building up and maintaining their status, and the public to distinguish those who were qualified and responsible for the discharge of their duties. Indeed, registration was the final condition of legal qualification. Abuses could only be assaulted or met from some vantage ground or stable condition such as a register afforded. The methods of registration adopted for the National Registration of Plumbers had stood the test of fourteen years' experience, and should be continued. He further urged that the necessity for registration should be impressed on the employers and workmen, on the sanitary author-

ities, on the educational authorities, and particularly on the architects, who were held primarily responsible for the efficiency of all the arrangements of the house built under their direction. He added that the necessity should also be pressed on the attention of Parliament and the public at large.



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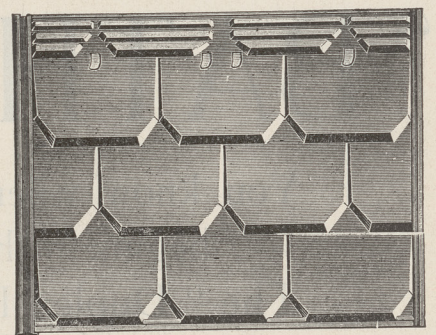
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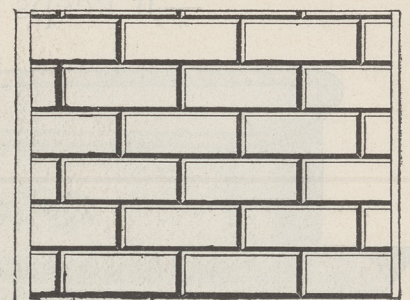
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Important discoveries, says the Plumbers' Review, are often made by accident, and a permanent whitewash was discovered in this way. A few years ago it was decided to whitewash a cellar to make it lighter. For this purpose a suitable quantity of lime was slacked. A workman, who had to carry a vessel of common salt for some other purpose, stumbled over the lime and spilled

some of his salt in it. To conceal all traces of his mishap, he stirred in the salt as quickly as possible. The circumstance came out afterwards, and this unintentional addition of salt to the lime excited curiosity. On investigation it was found that not only was the whitewash blameless, but it was as hard as cement and would not wash off.

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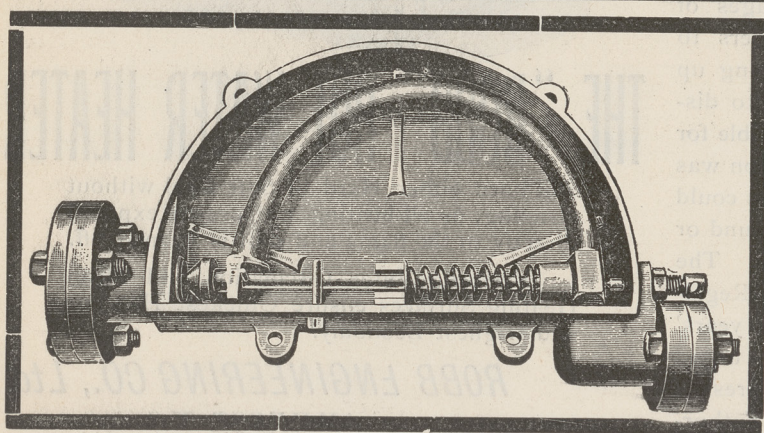
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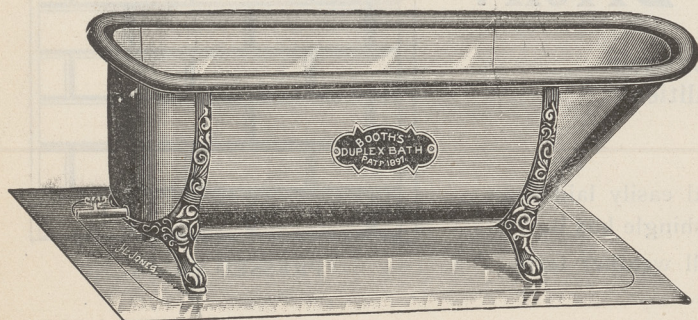
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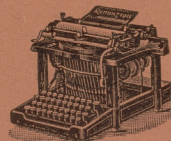
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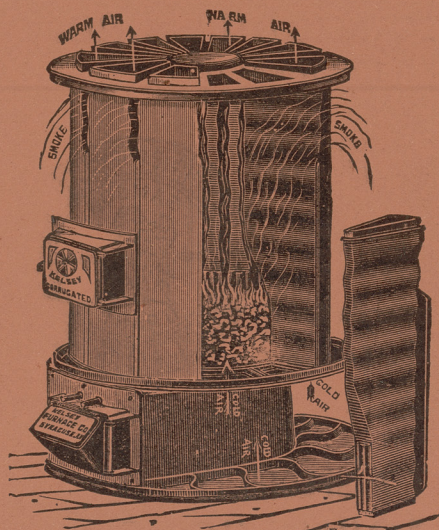
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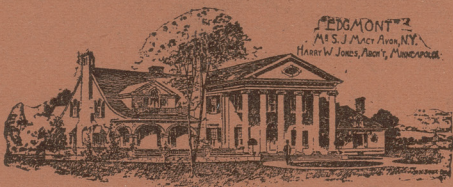
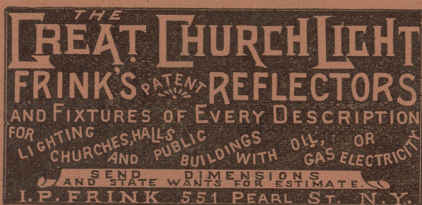
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