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MISSING

CANADIAN ARCHITECT AND BUILDER.

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—THE—

CANADIAN ARCHITECT AND BUILDER,

A Monthly Journal of Modern Constructive Methods.

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

PUBLISHED ON THE THIRD THURSDAY IN EACH MONTH IN THE INTEREST OF

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

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ADVERTISEMENTS.

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EDITOR'S ANNOUNCEMENTS.

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

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Students' and Draughtsmen's Competition.

WE desire to call special attention to the announcement appearing in the Students' Department of this number of a competition for students and draughtsmen. The subject—a cover design for the next New Year Number of the CANADIAN ARCHITECT AND BUILDER—is one which affords ample scope for the display of artistic skill. It is hoped, therefore, that the competition will be keenly contested, and that a satisfactory result will be achieved.

Canadian Country Architecture.

THE past few years have witnessed a most decided and marked change in the class of dwellings erected in Canada. Many new and elegant buildings scattered throughout the country, particularly in Western Ontario, have been characterized by a better construction, a finer finish, and the exercise of greater care in regard to detail. Pine is rapidly giving place to black birch, cherry, ash, oak and maple. It is quite a common sight now to see a pretentious farm house faced with pressed bricks, having generous windows with plate glass, and with painted glass in hall windows, hardwood doors built up on a pine or basswood core, ornamental stairs and handrailing, and alternate strips of dark birch and light maple floors. We notice these improvements in materials and good taste over old methods, with a great deal of pride and satisfaction, for it denotes a measure of substantial prosperity that tells of the progress the whole country is making.

Hardwood Finish.

THERE is no part in the whole construction of a dwelling where the amount of money expended counts for so much as in the woodwork, especially that part of it that shows in the hallway and drawing room, and where possible, it is always in the interest of the builder to finish these parts in hardwood. A hardwood trim creates an instant impression of something substantial, while the expense is not greatly increased, for the quantity of lumber used in a hallway and drawing room of a country house is really small, and the extra labor involved in working hardwood is not by any means great. A few dollars at the most, will be all that will be required to cover the expense, the style of work being the same as in pine. The wide-awake contractor must be aware that country people have been seized with the onward march of progress, and he will bend his energies accordingly and be up to the times in arming himself with a knowledge of all new styles of

work and methods of performance. If he fail to do this some more progressive man will soon be in his neighborhood quietly but surely taking away his trade. In these days of active competition a man to be successful must keep abreast of the times, for the law of evolution obtains in the building trades as well as in other matters, and it is only "the fittest that survive."

A Generous Offer.

THE Maharajah of Jeypore, India, has offered to supply free of charge to public institutions for the education of the young, six portfolios, containing 374 plates 15 x 22 inches in size, some in color, illustrating the most beautiful architectural work of India. The only expense will be the cost of packing and carrying charges. These portfolios may be obtained through Messrs. W. Griggs & Sons, Elm House, Hanover Street, Rye Lane, Peckham, London. Our Canadian educational institutions should lose no time in making application for these interesting illustrations.

The Utilization of Convict Labor.

CANADA'S expenditures on public works have probably been larger than those of any other country of equal population and resources. These expenditures have been made for the purpose of promoting immigration and assisting the country's development. The latter object has been realized in a more satisfactory degree than the former. The government should now turn its special thought and attention to devising means of increasing by immigration the population of the country. There are yet a number of public works, the carrying out of which would tend to assist our national progress, but which cannot, at the present stage of our history, be paid for out of the public exchequer. Why should not the labor of the inmates of our prisons, who are now being supported at the public expense, be utilized for the construction of such public improvements? If the financial resources of the country forbid that these improvements be undertaken in the ordinary way, is it not advisable that they should be carried out by this only available method? No injury would be done to free labor, and the country would derive some return for the large sums of public money which are annually expended for the support of the criminal classes.

Advantages of Building in Summer.

BUILDING in the country is now well advanced, and in many of our towns and villages, work that was commenced before the cold weather departed, is drawing rapidly towards completion. Country contractors generally find a lull in the building trades about midsummer, and often owners, who intend building, delay giving out their work, so that out-door operations have to be done when the weather is in an unsuitable condition. This is a factor, seldom taken into consideration in the summer, which often proves a matter of serious loss to the contractor, who should try and urge those having work to give out, to let their contracts as early in the summer as possible. Generally work taken during the winter previous to execution, is not the most profitable, as frequently the necessities of individual workmen compel them to cut prices down to almost starvation point, and as a rule, before the work is completed both contractor and owner become disgusted with the job; then comes a series of dishonest strategems by the workman on the one hand, to beat the owner; and a period of dissatisfaction and grumble by the owner when he discovers the knavery of his contractor. Summer jobs always pay best, and are more certain to give satisfaction all round.

If work be taken in the fall of the year to be completed the summer following, the chances are that both contractor and owner will be better served than if let under any other conditions. This would give the contractor ample time to digest his plans and to decide on the best and speediest methods of going about the work, and the owner would be better served, inasmuch as all his joiner's work would be—if the contractor does his duty—better seasoned, and in a much better condition to "stand" than if hurried from the factory to the building and put in place at once. The tendency in all our smaller towns is to "rush matters to completion," a tendency which acts injuriously to the whole building interests, and everyone engaged in these interests should set their faces against it. A good building, like a good tree, can only be the result of time naturally dispensed.

Safe Scaffolding.

As the tendency of the law is to make the contractor responsible for accidents to workmen caused by defective or improper scaffolding, it should be one of the chief objects of the foreman to see that every piece of scaffolding is sound, strong and sufficient. Many a limb has been broken and many a life lost because of the use of rotten or imperfect materials, or because enough nails have not been used in making the scaffold. Every contractor should have in stock a good scaffolding plant suitable for all work he may be called upon to perform. The English method of using good stout poles instead of sawn scantlings, is to be commended, as being safer and stronger, as the fibres of the grain are continuous throughout the whole length of the pole, whereas, in scantling, cross grain and knots render them liable to snap asunder at every sudden shock or strain. In scaffolding, when round poles are used, the putlogs or cross pieces are generally lashed to the poles with ropes —sometimes with chains—and this does away with the necessity of using nails to secure the brackets, and leaves the scaffolding undamaged when the work is completed. Taken all in all this manner of scaffolding, apart from being the safest, is, in the end, much more economical than the old slovenly way of nailing.

Tamarack or spruce poles are easily obtainable in Canada, and when once prepared and seasoned, if properly cared for, will last a lifetime and be as strong in the end as when first used. Putlogs should be made of straight grained rock elm, oak or rim ash. By using either of these woods, the dimensions may be small—not more than $3'' \times 5''$, and six feet will be found long enough to have them for most purposes. The ropes used for lashing should not be more than $\frac{3}{4}$ of an inch diam. and should be laid away in a dry situation when not in use. If the building is of wood that requires scaffolding, an ordinary right-angled bracket with braces nailed on each side, may be used instead of hardwood putlogs. The stuff from which these braces are made should be for the top and back, about $2'' \times 5''$, and the braces nailed on the sides at an angle of 45° should be of good sound stuff—pine—$1'' \times 5''$. The space between these braces is where the sustaining pole is inserted when the bracket is in use. The height of the

scaffold is regulated by moving the foot of the pole. To raise it higher the pole is moved closer to the wall, to lower it the foot of the pole is moved further away from the building. The difference between the lowest and highest point the bracket can reach, is limited by the length of the pole.

BUILDING TRADE DISSENSIONS.

BUILDING operations in Toronto have been affected during the past fortnight by a disagreement between employers and employees with respect to wages. Efforts were made by the Builders' Exchange, as well as the various building trades unions, to arrive at an agreement by which the season's operations would be carried on in harmony, and with the majority of trades this was effected. The agreement with the stonecutters has been renewed at the same rate of wages per hour as last year, while the stonemasons and bricklayers have signed an agreement at a considerable reduction. The Bricklayers' Union held out strongly against reduction but finally recognized the necessity of acceding to the proposition made by the master builders.

The Builders' Laborers' Union, however, notwithstanding the fact that agreements had been signed by the other branches at lower figures than last year, would not even accept the same rate as last year, which the builders were willing to pay, but apparently without considering existing conditions, demanded an increase of three cents per hour.

The refusal of the master builders to grant the request resulted in a strike being declared, which is still in progress. Several conferences between the parties to the disagreement have been held to endeavor to effect a settlement, but without success.

We are convinced that the strike has been brought on without proper consideration of the conditions in the building trades. It is admitted that building operations in Toronto during the present year are not likely to exceed those of last year, while many hold the view that their extent will be much less. The time, therefore, is not opportune for such a strike. The labor market is glutted, work scarce, and competition extremely keen.

Four years ago, the Trades and Labour Council, of which the Laborers' Union is a part, were successful in having a by-law passed by the City Council fixing the wages to be paid to laborers at 15 cents per hour as the least upon which a family could be maintained. At that time the purchasing power of a dollar was about one-half what it is to-day, consequently the workman who receives that amount to-day is in a much better position than he then was.

But probably the strongest proof of the unwise action of the laborers is found in the fact that the bricklayers and masons, who are skilled mechanics, and are compelled to spend several years in learning their trade, have considered it to their advantage to accept a lower rate of wages than last year. It is further claimed that few carpenters in Toronto receive a higher wage than is asked for by the laborers.

The master builders recognize the fact that it is not to their own interest to pay low wages, but in the face of the existing depression in the building trades the standard of wages is as high as can reasonably be demanded.

Mr. W. A. White, contractor, of Lindsay, Ont., was recently seriously injured by a safe falling upon him.

CORRESPONDENCE.

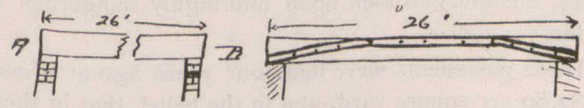
[Letters are invited for this department on subjects relating to the building interests. To secure insertion, all communications must be accompanied by the name and address of the author, not necessarily for publication. The publisher will not assume responsibility for the opinions of correspondents.]

A PROBLEM IN CONSTRUCTION.

KINGSTON, ONT., April 20, 1896.

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

SIR,—Will you please answer the following question and give the figures to show the difference in carrying power, or rather the resistance to bending stress of the two beams of pine. Given a joist 26′ x 3″ x 14″ resting



on a wall at each end as at A and another of same dimensions as at B but having pieces of 1″ x 5″ pine, nailed on as shown, does the addition of these pieces stiffen the joist, and how much?

Yours truly,

JOHN H. BIRKETT.

ANSWER.—The safe load for a 3″ x 14″ white pine beam having a clear span of 24′, is 2,940 lbs. The 1″ x 5″ pieces, if thoroughly nailed to the beam or joist, would help to stiffen the same against sagging, but that would not materially strengthen the beam. It is impossible to secure the rider firm to the main beam when the span is so great and the depth so little, that the whole will act together as one piece. The resultant strain is very great and the side pieces would slip upon the main beam in response to any weight thrown upon them. There is also the shrinkage in the timber to be taken into consideration.

THE O. A. A.

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

SIR,—As the proposed amendment to the Ontario Architects' Act has been withdrawn for the present, would it not be an opportune time for a discussion in your columns of the best means by which the Association might be strengthened? The more really active members the Association contains and the more good work can be done by it in raising the standard of architecture in our province, the more easily will the much desired legislation be obtained in the future.

The suggestion to form local chapters, which was made at one of the annual meetings, seems a good one. As it is now the members meet but once a year, while by more frequent gatherings of a less formal nature, much good fellowship might be promoted and much benefit be received by those attending. In this connection mention might be made of the meetings held by the English architectural societies, the reports of which in the English papers show the lively interest taken in them, not only by the members, but also by the professional journals, these reports forming no mean item in the contents of each number.

As Toronto is the headquarters of the Association and contains the largest proportion of its members, the initiative in the formation of such local chapters might well be taken here.

To carry out the proposal, convenient down town club rooms should be obtained. If these were comfortably furnished and provided with the leading technical journals, etc., they would soon become a pleasant meeting place for the architects. During the winter months lectures and occasional social gatherings could be arranged for the members, while for the students' section special classes and sketch competitions could be provided. By this means the social as well as the educational advantages of the Association would be greatly increased, and by keeping the daily papers informed of all meetings, the Association would become better known, and would be practically a necessity to all architects.

If these club rooms were obtained it should be arranged that the Registrar have his office and the library of the Association in connection, and all non-resident members should be made welcome to the use of the rooms, when in town. Of course the expense attached to such an undertaking would be borne by the local members. The way things are at present many Toronto architects support not only the O. A. A., but also the Guild and Sketch Club, which, of course, seems a needlessly heavy expense. If the two latter were in some way merged into the O. A. A., surely it would add to the power of the latter. It is surely not impossible to make the O. A. A. cover the entire ground of the three, and would most probably induce a better feeling and a stronger interest among those architects who are at present only half-hearted in their assistance to the O. A. A. in reaching the goal it is striving to attain.

Trusting that these views may meet with approval, and that some action may be taken accordingly, I am, dear sir,

Yours very truly,

A TORONTO MEMBER.

Toronto, May 1st, 1896.

DEFECTS OF ASPHALT PAVEMENTS.

THE doubts expressed in these columns last year concerning the merits of asphalt as a paving material on streets traversed by street car tracks, have proven to be well founded. The disappearance of ice and snow from the principal business thoroughfares of Toronto, viz., Yonge, King and Queen streets, has revealed the fact that between and on either side of the street car tracks, the asphalt has broken away in large patches from the concrete foundation, leaving the roadway full of great holes, unsightly to look upon and highly dangerous to traffic.

These pavements were laid four years ago at a cost of $2.80 per square yard, and in the belief that in them the city was securing a truly permanent pavement, the foundation of which would endure for about thirty years and the asphalt surface for about half that period. It is greatly disappointing to find that these expectations are not to be realized in any satisfactory degree, and that the recent large expenditures on pavements must be supplemented almost immediately.

It is true that the contractors are bound to keep the pavements in repair for five years, but a year hence that period will have expired, and then the cost of maintenance will fall upon the city. Soon after the city is called upon to assume the responsibility for keeping these pavements in repair it will probably be found necessary to renew entirely the asphalt surface. The cost of doing so will amount to about $1.50 per square yard, or above half the total original cost. Unless a better class of material and workmanship can be secured, the asphalt surface will require to be renewed three or four times at least during the lifetime of the concrete foundation, so that in the end the pavements will cost double the amount of the original estimate.

We believe that had vitrified brick been used on these streets instead of asphalt, the result would have been much more satisfactory in every way.

OFFERING BRIBES TO ARCHITECTS.

WE have more than once called attention to the reprehensible practice of some manufacturing companies who, instead of relying upon legitimate business methods and the merits of their goods, aim to secure contracts by offering commissions and other forms of bribes to architects. A well-known firm of architects in Western Ontario lately received a barefaced offer of this kind, which they have sent to us with the request that we would assist to put a stop to the practice. Believing that exposure is one of the most effective means to this end, we print the communication in full, as follows :—

DETROIT HEATING & LIGHTING CO.

DETROIT, Mich., April 7th, '96.

Messrs.————

————, Ont.

Dear Sir :—

As we conduct our business for profit, we assume that you conduct yours from a like motive. We propose to increase our profits by adding to yours, and, therefore, submit the following proposition for your consideration :

More than ten years ago, we began to manufacture hot water and steam heating apparatus. Such work was not then understood by the local fitter, and, in order to bring such systems into general favor, it became necessary for us to employ a force of about one hundred expert hot water fitters for installing the systems all over the United States ; a force of about fifteen engineers and draftsmen, for preparing plans, and about thirty traveling salesmen, to drum the country. The situation has now completely changed, in that : 1st, we no longer contract for the installation of such systems, and, consequently, do not carry a force of traveling fitters. 2nd, the local fitter is now familiar with the work, therefore, it is no longer necessary to employ a force of engineers and draftsmen. It is admitted that the present price on first-class heaters is too high, but manufacturers still maintain present high prices, because they continue to employ, at a heavy expense, a large corps of fitters, engineers, draftsmen and drummers.

Our heaters are well and favorably known all over the United States, and, as we now sell them only to local fitters, we propose, (allowing other manufacturers to conduct their business as may seem best for them), to dispense with our large force of engineers, drummers, etc., and divide the saving thus effected with the local fitter and architect : 1st, by offering our heater to the fitter at a lower price than any other first-class heater in the country ; 2nd, by paying to the architect a commission of 10 per cent. on net sale price of the heater specified by him, if sale is finally effected. Therefore, after this date, our representative will not visit you, as has been his custom in the past.

We trust you may be pleased to co-operate with us in the plan outlined above, and if so, to avoid errors or misunderstandings, when you specify our apparatus, will you kindly fill out the memorandum in the enclosed book, and forward to us, without delay, so that we may place on file, and when transaction is fully completed, we will remit, or protect your draft on us, for the amount of commission. This proposition also includes our Combination gas machine, at a commission of 5 per cent., net amount sale, up to, and including, seventy-five (75) lights, and 4 per cent. on one hundred lights, and larger.

We know that our plan of dividing profits will prove mutually profitable, and hoping that we may have your early reply, indicating that you will co-operate with us, we remain,

Yours very truly,

DETROIT HEATING & LIGHTING CO.

P. S.—Price lists and discounts on application.

The form of memorandum above referred to is as follows :—

Owner of Building	Date .....
.....	Specified by Architect .....
Capacity Gas Machine	State and City .....
Heater Specified, No.....	Address of Owner.....
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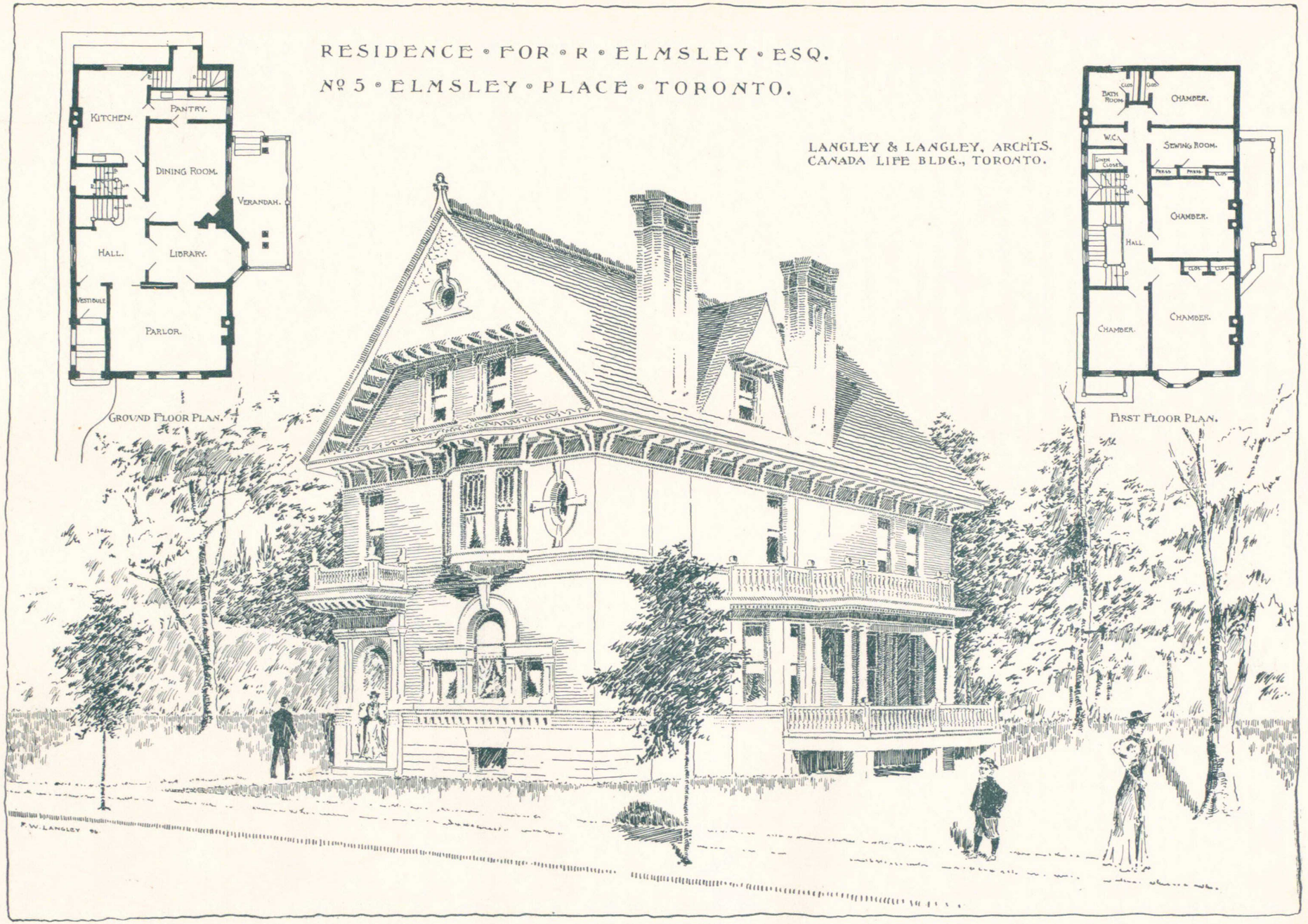
Heating Contract awarded to	Lighting Contractor's Address .....
Lighting Contract awarded to	Capacity or No. Heater .....
	Capacity or No. Gas Machine .....
.....	.....
Detroit Heating and Lighting Co , Detroit, Mich.	Mail this to Detroit Heating and Lighting Co., Detroit, Mich.

It may be that some architects do not scruple to receive and accept offers of this kind, and that the idea has consequently got abroad that all architects are open to do business on this plan. If so, the impression is a false one. We believe the leading architects of the country are guided in their practice by higher principles, and that an offer like the one printed above would be considered a sufficient offence to warrant the exclusion of the person making it from tendering upon future contracts. It is still true that honesty is the best policy.

MOVABLE FOUNDATIONS.

PROF. JOHN MILNE, of the Imperial College of Engineering at Tokio, Japan, has devised a novel form of foundation for buildings erected in countries subject to earthquakes, involving the use of huge ball bearings. About half a century ago a Japanese builder became convinced that the secret of protection rested in the foundations of buildings, and erected an immense bamboo structure on wooden beams resting on long iron rollers. Upon the occasion of the first earthquake the structure rose and fell with the undulations of the earth, but as soon as the trembling changed the building collapsed, for the reason that the rollers could only move one way. He next erected a building equipped with two sets of rollers, one above and at right angles to the other. This was more successful. At a later date, Prof. Milne, in taking apart a bicycle, noticed the ball bearings at the axles, and erected a building on this principle, making the walls with a groove at the base and resting them on rows of iron shot and balls. These in turn rested in grooves running in all directions, so that the house could move to and fro. This experiment proved entirely successful, and while the building swayed in a startling manner it did not collapse.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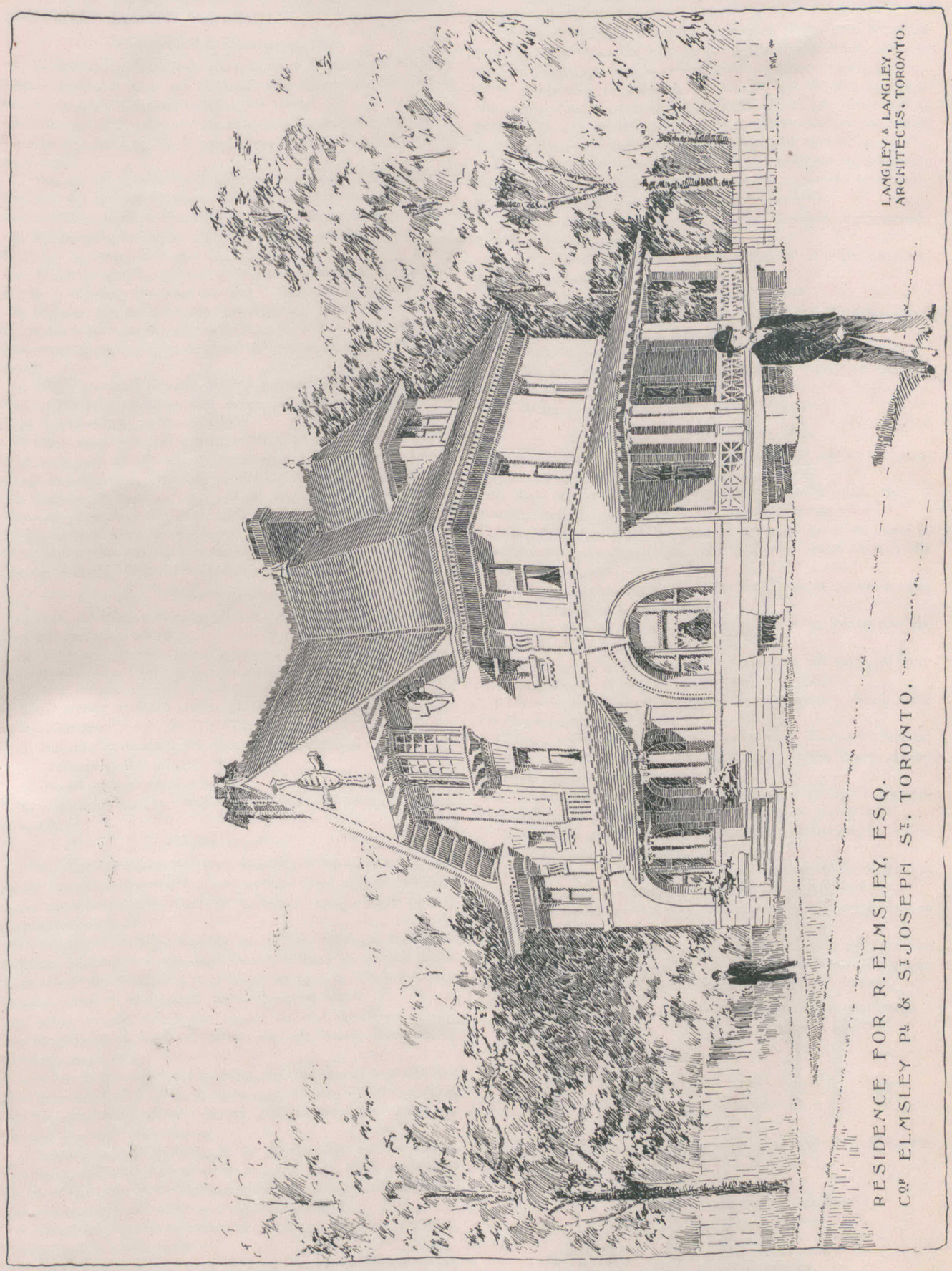


LANGLEY & LANGLEY,
ARCHITECTS, TORONTO.

RESIDENCE FOR R. ELMSLEY, ESQ.
COR ELMSLEY PL & ST JOSEPH ST. TORONTO.

EXAMINATIONS FOR BUILDING INSPECTORS.

THE following questions were set at the late examinations for building inspectors, both for iron and steel-work and for the general inspection of buildings, by the Civil Service Board of New York :—

TECHNICAL—MARCH 10, 1896.

1. State in full (giving their names) what drawings are in your opinion needed to give an inspector the information he should have to properly inspect a building.

2. Is it part of the duty of an inspector to examine the specifications of a building he is in charge of, and for what purpose in general?

3. What is the very first thing an inspector has to do in connection with the preparation for a building about to be erected, and how should he perform that duty? (State this in detail.)

4. Suppose that shelving rock be found in making the excavation for a building, what must be done?

5. What accidents are liable to happen in making the excavation for a building, and how are they to be guarded against?

6. Suppose the ground under one portion of an excavation to be loaded to 10 tons per square foot, and that under an adjacent part of the same building to have 5 tons load, what will be the result?

7. When you wish to build strictly sound stone masonry, state every detail of the process and every precaution you must use. (This does not refer to the cutting.)

8. State what are the characteristics of a strictly well-built brick wall, and all the details necessary to be observed by the mason in building it, including the inspection of the materials.

9. Give every detail of the mixing and placing of first-class concrete, (1) cement, (2) sand, (3) gravel or broken stone, including the inspection of the materials.

10. Is it a good plan to cement closely the ends or other portions of timber? Give a reason for your opinion.

MARCH 19, 1896.

11. Will painting, cementing or tarring timber prevent decay? State all you know about it.

12. What are the objections, if any, to the use of grout in masonry, where other methods can be used?

13. Add the following measurements together, 10 feet 9 inches, 13 feet 7 inches, 15 feet 2 inches, 12 feet 11 inches, 17 feet 1 inch, 23 feet 8 inches.

14. Subtract 27 feet 9 inches from 97 feet 5 inches.

15. Multiply 19 feet 5 inches by 6.

16. Divide 99 feet 7 inches by 5.

Six additional questions will be asked verbally respecting plans of buildings.

MARCH 17, 1896.

1. Suppose the excavation for a building to be completed, how would you determine whether the earth or other natural material under the foundation was suitable to found upon without further preparation or work?

2. Suppose rock to be exposed in making an excavation for a building, and that it slopes considerably so that its surface under a portion of the foundation runs below the level at which it is proposed to start the foundation, what should be done?

3. What matters would you expect to find described in the specifications for a building which are not usually given on the drawings or plans?

4. What is the reason for making the footing of a wall wider than the wall itself? Also, is there any reason for ever making this excess of width greater under one building than under another of the same dimensions?

5. Suppose a brick building to be 50 feet by 100 feet and 45 feet high, and to have no cross walls; and that, while putting on the roof beam one of the bearing walls shows signs of weakness, what steps should be taken to prevent accidents?

6. Describe fully the operation of cutting an opening through a bearing wall in a safe manner?

7. Suppose the ends of wooden floor beams to be left square where they enter a bearing wall, what objections are there to this method, and what danger may result?

8. What is the object of filling the space between the floor and ceiling in partitions?

9. Suppose an old brick wall is to be lined with a new one to make it heavier, how can you make the two work together?

10. In putting timbers under the wall of a building for the purpose of underpinning it, how do you tell when the wedges on the timbers are driven up sufficiently or sufficient strain taken on the lifting screws?

11. What makes the most solid work, cement mortar or cement grout, and for what reasons?

12. In the following specification for stone masonry, state what important omission there is.

"Stone to be found, free from weathered faces, beds to be full and square to face with no large pitch holes, exposed faces to be pitched true, to be laid in cement mortar mixed 1 cement to 2 clean sharp sand, all joints to be ⅜-inch and thoroughly filled, the stones to be bonded as shown in the drawings. The wall to be laid true and plumb, and all joints to be cleaned out for 1 inch from the face and thoroughly pointed with rich cement mortar."

13. Give, in your own language, every one of the requirements needing the attention of an inspector to insure that the brickwork in a building shall be as good as it can be made?

14. State what you know as to the best methods of protecting iron floor beams from damage by fire.

15. State what you consider the best method of protecting iron columns against fire.

16. What are the causes of dry rot in timber?

17. How would you know from the plans what materials were to be used in the walls of a building?

18. What is a transverse section?

19. To what drawings would you refer to determine the construction of floors?

20. What do the various colors on plans denote?

IRONWORK—MARCH 10, 1896.

1. What should be the finish of the ends of all columns or parts of columns to insure sound and plumb work?

2. How would you proceed to make a careful inspection of wrought-iron columns, girders, &c., before erection?

3. Suppose that in the erection of wrought-iron work some of the holes for rivets do not come fair with each other, what is the correct procedure?

4. How should the head of a rivet look after it is driven, and what test should be applied to rivets?

5. Can a rivet be driven tight if the plates to be joined are not in absolute contact? If not, why not?

6. Are bolts as good as rivets for fastening the parts of iron work together? Give your reasons for so thinking.

7. Is ironwork ever damaged in transportation? State what you know about it.

8. Does the wind ever displace or damage ironwork after its erection and before completion, and what provision, if any, should be made against such damage?

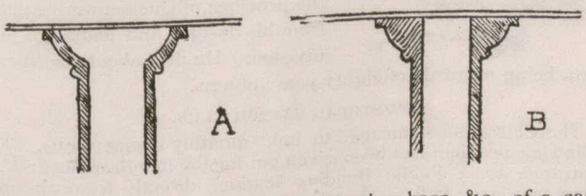
9. Are the floors of a building ever damaged during erection by overloading, and in what way does the damage show itself?

10. In which way is a rivet the stronger when sheered by a side strain or pulled endwise?

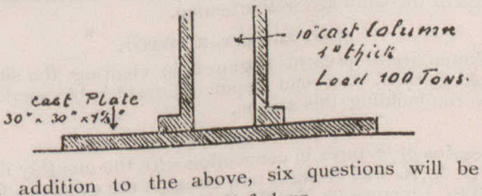
11. Could you tell with a cold chisel whether a piece of steel in a girder was soft and tough or hard and brittle, and how?

12. How would you inspect a cast-iron column if called upon to do so?

13. Criticise the following details of the tops of cast-iron columns and give your reasons for your conclusions. State also what should be done to make the one marked "A" correct.



14. How would you change the following base, &c., of a cast-iron column to make it safe?



15. In addition to the above, six questions will be asked verbally in connection with a set of plans.

MARCH 17, 1896.

1. Is there any objection to the use of "shims" in plumbing columns or parts of columns? If there is, state it.

2. State some of the dishonest expedients proposed by work

men at the shops used to hide bad work and mistakes, or to cover flaws or other defects in wrought-iron work?

3. Is "drifting" rivet holes a good thing to do when they do not meet? Is there any other course to pursue, or is this the best?

4. What are the characteristics of the best work in rivetting?

5. Does it make a difference in the quality of rivetting whether the blows struck in driving the rivets are light or whether they are heavy?

6. State the requirements for the best work in the use of bolts for fastening the parts of ironwork together.

7. Is ironwork ever displaced or damaged after its erection and before the completion of a building, and in what ways?

8. Suppose the floors of a building to be too heavily loaded with material during erection, how would you expect to discover that they were so loaded?

Have you ever seen cases where the fastening of floor beams to girders was insufficient; if so, how did you know it was insufficient?

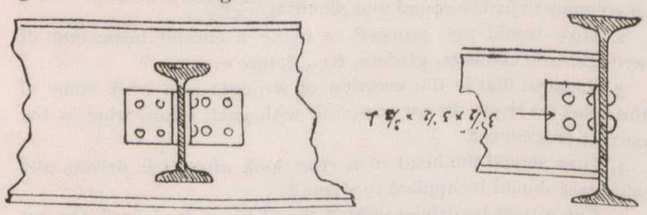
10. How would you test a piece of steel in a girder, &c., to tell whether it was soft and tough, or hard?

11. What defects are cast-iron columns subject to, and how would you proceed io discover them?

12. What is the very best way of protecting iron which is below the water-line in a foundation from damage by rust?

13. Is there ever occasion to provide for the expansion or contraction of iron roof trusses? If so, state when it is necessary and how it is done.

14. Is the connection shown below for joining a floor-beam to a girder of correct design! State what you know about it.



15. How would you know from the plans what materials were to be used in the walls of a building?

16. What is a traverse section?

17. To what drawings would you refer to determine the construction of floors?

18. What do the various colours on plans denote?

MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

VICTOR BOURGEAU.

In connection with the letter of a correspondent, the Inland Architect prints the accompanying portrait of Victor Bourgeau, who was the architect of St. Peter's Cathedral, and the designer of the altars, pulpit and organ of Notre Dame Cathedral, in this city. Many of the Catholic churches, schools and convents in the province of Quebec were erected from his designs and under his supervision. He died about three years ago, being upwards of eighty years of age.

MONTREAL SKETCH CLUB.

The Club has commenced to hold monthly competitions. The following problem has been given out for the month of May: "An Entrance to a Public Building leading directly from an open court to a large hall." Drawings must be sent not later than the 29th inst. The students one Saturday afternoon recently visited the Canada Life Building, now in course of construction. The meetings of the Club are well attended.

EAST END C. P. R. DEPOT.

Workmen are at present engaged in clearing the site for the proposed C. P. R. east end depot. Considerable work is to be done on the building this season.

P. Q. A. A.

The series of lectures in connection with the monthly dinners of the P. Q. A. A. was brought to a close on the evening of the 14th of April by a lecture by Mr. W. E. Doran on "Truth in Architecture." The Association held a general meeting on the 12th ult. to consider preliminaries in connection with a proposed Architectural and Arts and Crafts Exhibition to be held in Montreal next fall in connection with the annual meeting. A general committee has been organized to complete arrangements, and will hold its first meeting on Tuesday, the 19th prox.

SANITATION. HEATING.

PLUMBERS' SUPPLY MERCHANTS ORGANIZE.

A MEETING of manufacturers of and wholesale dealers in plumbers' supplies was held in Toronto on Tuesday, May 5th, to consider questions affecting the trade. The meeting was the result of certain concessions asked for by the Master Plumbers' Association. The attendance was representative, and included the following:

A. A. McMichael, Jas. Robertson Co.; James Morrison, James Morrison Brass Mfg. Co.; A. J. Somerville, Ontario Lead and Barb Wire Co.; A. D. McArthur, Craig & McArthur; John M. Taylor, Toronto Radiator Mfg. Co.; W. H. Carrick, Gurney Foundry Co.; H. S. Hergert, M. & L. Samuel, Benjamin & Co.; J. H. Patterson, Toronto Hardware Mfg. Co.; H. W. Anthes, Toronto Foundry Co.; A. G. Booth, Toronto Steel-Clad Bath & Metal Co.; W. B. Malcolm, W. B. Malcolm & Co.; Geo. Booth, Booth Copper Co., all of Toronto; E. Smith, Robert Mitchell & Co., Montreal; Geo. McAvity, T. McAvity & Sons, St. John, N. B.; T. A. Stevens, Stevens Mfg. Co., London; W. Armstrong, Essex Brass & Iron Co., London.

The necessity of organization, in order to more effectually carry out the objects desired, was apparent, and at the suggestion of Mr. Somerville, it was resolved to form an association, to be known as the Association of Manufacturers and Dealers in Plumbers', Steam and Hot Water Fitters' Supplies. Temporary officers were elected as follows: A. A. McMichael, president; A. J. Somerville, vice-president; A. G. Booth, secretary.

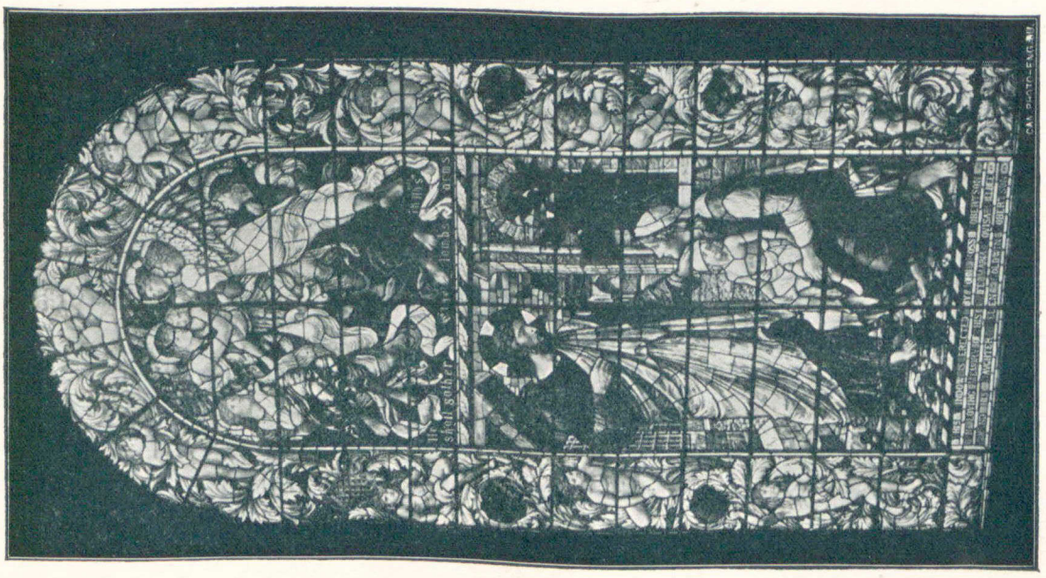
A committee was appointed to draft a constitution and by-laws, and a report therefrom will probably be presented at a meeting to be held on the 21st inst. A resolution was passed pledging the members of the Association to supply goods only to legitimate master plumbers and steam fitters.

The Association gives promise of developing into a strong organization. It is intended to represent the whole Dominion, and already a majority of the largest manufacturers have signified their intention of becoming members.

The organization of a Master Plumbers' Association, at London, Ont., has been effected, after a determined effort on the part of the promoters. The officers-elect are: W. J. Hazlett, president; W. Smith, first vice-president; W. J. Skelley, second vice-president. The Association held its initial banquet on May 19th, at which Mr. W. J. Burroughes, president of Toronto Association, was present.

The Master Plumbers of Toronto must have had a very good time at their recent convention, judging from the reports which we have read, says the Chicago Master Steam Fitter. At the banquet following the business session about 150 guests were present. During the toasts and speech making considerable merriment was caused by numerous amusing stories told on the plumber. Amusing stories did not occupy all the time, as the members seem to have had an eye to business and the welfare of the association at all times, and many of the jokes contained a strong business pointer.

He who refuses to consider heating and ventilation together, as a part and parcel of the same art, is not likely to achieve much in his efforts at improvement, says Domestic Engineering. In all future attempts at advancement in heating or in ventilating appliances they must be considered together. Good heating of buildings cannot be attained without ventilation, neither can good ventilation be obtained without heating. As well try to consider the steam engine alone, or the steam generator alone in the art of gaining power from steam as to separate the twins, heating and ventilation. No house, heated independently of the aid of airflow, is well heated. The ventilation of a building in winter without warming the inflow would not be good ventilation.

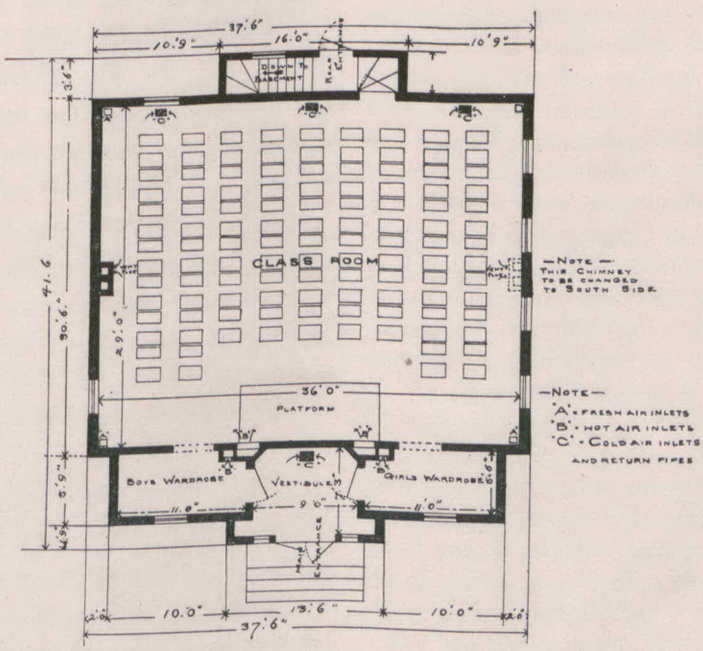


"ROBERTSON MEMORIAL WINDOW," SICK CHILDREN'S HOSPITAL, TORONTO.

DESIGNED AND EXECUTED BY HENRY HALLIDAY, LONDON, ENG.

CENTRAL PORTION OF STAINED GLASS WINDOW, ST. ANDREW'S CHURCH, BELLEVILLE, ONT.

DESIGNED AND EXECUTED BY N. T. LYON, TORONTO.



GROUND PLAN

ONE ROOM SCHOOL, PORTAGE LA PRAIRIE, MAN.

GEORGE BROWNE, ARCHITECT, WINNIPEG, MAN.

STUDENTS' DEPARTMENT.

"CANADIAN ARCHITECT AND BUILDER" STUDENTS' AND DRAUGHTSMEN'S COMPETITION.

THE publisher invites from architectural students and draughtsmen, other than practising architects, designs for front cover page for the New Year (1897) Number of the CANADIAN ARCHITECT AND BUILDER.

Designs must be rendered either with pen and perfectly black ink or with brush in sepia on a sheet of white drawing paper or card-board, drawn to the size or 22 × 14 inches, and capable of being reduced to 7 × 11 inches. The wording to appear on the design is as follows:

"CANADIAN ARCHITECT AND BUILDER.
NEW YEAR NUMBER. 1897. TORONTO, CANADA."

Drawings must be marked only with the motto of the author, and accompanied by the motto, full name and address of the author, in sealed envelope, must be sent, charges paid, addressed to the publisher of the CANADIAN ARCHITECT AND BUILDER, Toronto, so as to reach this office on or before 5 o'clock p. m., on Monday, the 6th of June next.

This competition will be decided by a majority vote of a committee of architects to be appointed for that purpose by the Council of the Province of Quebec Association of Architects and of the Ontario Association of Architects. The decision of this committee will be final.

If two or more suitable designs are submitted, a prize of $10.00 will be given to the author of the one awarded first position and $5.00 to the one awarded second place. The right is reserved to withhold the prizes if two or more suitable designs are not submitted. The right is also reserved to publish any of the designs submitted.

NOTE.—This competition is announced with the object of testing somewhat outside the lines of their every day work the artistic skill of Canadian students and draughtsmen. It is hoped that the response will be generous and earnest, and the result satisfactory.

PERSONAL.

James Hobbs, a well-known builder of Hamilton, Ont., is dead.

Mr. Kivas Tulley, chief architect of the Public Works Department of Ontario, has been succeeded by Mr. F. R. Heakes, formerly assistant architect. Mr. Tulley has been retained as consulting architect and engineer.

Mr. J. B. Resther, senior member of the architectural firm of Resther & Sons, Montreal, and a leading member of the Province of Quebec Association of Architects, died on the 14th inst., after a brief illness. He was sixty-six years of age, and had been a resident of Montreal for many years.

The death occurred in Toronto, on the first of May, of Mr. William Hynes, at the age of 69 years. In his earlier days Mr. Hynes was a prominent contracting plasterer, being a member of the firm of Hynes Bros., who carried on business from 1840 to 1875. During that time contracts were executed in many of the best buildings of the city, among which were Osgoode Hall, Toronto Insane Asylum, Customs House and R. Walker & Son's store.

ELECTRICITY IN STONE QUARRIES.

IN Europe electricity is being largely used in the operation of stone quarries, and is claimed to have many advantages over steam power. A French writer has recently made comparisons showing the efficiency and economy of the two systems. Concerning the steam plant he says: Suppose we have a boiler evaporating 8.5 kilograms per kilogram of coal. A good machine of 300 horse power requires not more than 6.5 kilograms of steam per horse power indicated. This will give an additional horse power for every 765 grains. The transformation of mechanical into electrical energy means 6 per cent. loss; add to this 7 per cent. lost in conductors, and absorption in receiver of 7 per cent., and there is a total loss of 23 per cent. Suppose we have a stone saw motor of 20 horse power, the central machine will develop 30 effective horse power, or about 33 indicated horse power. The consumption of coal then will show a total of 610 kilograms per 24 hours.

In the old method condensation was responsible for much loss of valuable power, and the great item was the enormous consumption of coal in comparison with the amount of work done.

On the other hand, with electrical apparatus the principal generator only absorbs an amount of energy proportioned to the work. Other advantages are fewer employees, and consequently a smaller percentage of accidents, the prevention of many breakages, while the speed of the machinery is more readily controlled.

The electrical system of operating their quarries was adopted about two years ago by the Hainaut Quarries Company, at Soignies, Belgium. The quarries of this company cover an area of 96 acres. For the handling of immense blocks a travelling crane of 60 tons capacity is actuated by an electric motor. A second motor is at the bottom of the quarry for drawing the blocks away from their bed. A travelling crane of 10 tons capacity is moved by a third motor. All the machines are shunt wound and have reversing rheostats. The system is said to have given entire satisfaction.

ILLUSTRATIONS.

ONE-ROOM SCHOOL, PORTAGE LA PRAIRIE, MAN.,—GEO. BROWNE, ARCHITECT, WINNIPEG, MAN.

HOUSES ON EMSLEY PLACE, TORONTO—LANGLEY & LANGLEY, ARCHITECTS.

STAINED GLASS WINDOW, ST. ANDREW'S CHURCH, BELLEVILLE, ONT.—BY N. T. LYON, TORONTO.

"ROBERTSON MEMORIAL WINDOW," SICK CHILDREN'S HOSPITAL, TORONTO—BY WM. HALLIDAY, LONDON, ENG.

SOLAR ROOM, STOKESAY CASTLE.

NOTE.—The design for a summer hotel, by Mr. G. A. Monette, architect, published in the ARCHITECT AND BUILDER for April, is to be built shortly at Grosbois Island, opposite Boucherville, Que. The building has a frontage of 120 × 100 feet, and will contain about 120 bed-rooms, with all modern conveniences. It has been so planned that a part of the hotel may be used in winter and the other part closed. The exterior will be clap-boarded and shingled, with panels in rough-cast work.

The James Smart Manufacturing Co., of Brockville, Ont., in their advertisement in this number, print some particulars of the Kelsey Warm Air Generator, of which they are the exclusive manufacturers for Canada.

MANUFACTURES AND MATERIALS

CANADIAN SLATE—ITS FORMATION, EXTRACTION AND USES.*

THE growing importance of the slate industry of Canada demands a consideration of the utility and value of the mineral, its occurrence and distribution, especially in the province of Quebec. and the method of extraction and usage. The subject is so comprehensive that adequate justice cannot be given to it in a short paper of this kind. I find nothing written upon the subject except the meagre references made in Geological reports of Sir Wm. Logan and others. Therefore, as no thorough examination has been made of the slate formations of this province, our knowledge of the same must be limited. No clay slate of any value is found in the Laurentian range nor anywhere in the Province of Ontario. In coming east through the Province of Quebec, we find the first slate formation near Stanbridge, and this appears to be a continuation of a similar slate found in an island in Lake Champlain, and also in Hatch Hill, south of Whitehall, in New York State. No work has been done on this vein except on the island above mentioned. Then farther east we strike purple and green slate in Missisquoi county, and at Granby, where some small openings have been made. This formation continues to the north-east to Actonvale, where a quarry was opened and operated by Mr. Rankin, of Montreal. Then we come to the Kingsby formation, which is a very wide purple and green belt. A quarry was opened on this vein at Trenholmville, but the slate that was produced was of poor quality. This formation is different from all the others, it being a laminated formation, the bedding about one quarter inch and more apart, and not capable of being split between the beddings. A slate of similar character is found in Birds-Eye Mountain, near Castleton, Vt., which possibly is a continuation of the same formation. East of this are the Melbourne veins, upon which several openings have been made, to wit, Melbourne quarry, the New Rockland quarry, which is now being worked ; the Steele quarry in Cleveland, and the Danville quarry in Shipton. Slate of excellent quality is being produced from this vein. The next formation east of this is found near Windsor Mills. It is an extensive deposit, but owing to its ribbony character, the ribbons in it being hard and occurring at intervals of only a few inches, renders it unworkable and of no value. Next we come to the Brompton formation, upon which two openings were made near Key Brook, about thirty-four or thirty-five years ago, but this also is full of ribbons, which unfit it for the production of roofing slate. Slabs for sidewalks and cellar bottoms have been taken out of it at several places which at a greater depth would be good for that purpose. This formation is very extensive, being about a mile in width at Brompton. It is identical with the beds at Montpelier, North Johnsbury, and also Guilford, south of Brattleboro, Vt. Quarries have been opened in each of these places and were wrought for many years, the Brattleboro or Guilford quarries being undoubtedly the oldest on this continent. They were worked as far back as 1812. This vein runs south of Guilford for about ten miles when it is pinched out by the granite. Then we come to the information of East Angus and Garthby and several veins of different colors in Beauce county. From the number and variety of the slate deposits of Quebec, it would appear that many remunerative quarries might be opened.

The main ingredients in the composition of slate are silica and alumina, which show it to have been at one time ordinary clay. Blue (of different shades), purple red and green are the ordinary colors met with. The blue color is derived from the presence of protoxide of iron, or iron and oxygen mixed in the proportion of one part of the former to two of the latter. The red and purple varieties take their color from iron in the form of peroxide, two parts of iron combined with two of oxygen. Into slate of a green color, which is the best common variety, iron less largely enters, and in combination with magnesia, gives them a greenish hue. The clay beds were deposited in ages long past, in the bottom of the sea, and in process of time they have been hardened into stone, and lifted up so as to form dry land. That these beds were originally deposited in the sea, geological authorities mention among other reasons the fact that they contain abundantly the remains of former sea life, which lie along the planes of the bedding, such as zoophytes, mollusca and crustacea. The fossils of these strata may be studied from Sedgwick and McCoy's "Palezoic Rock and Fossils," and other works. The presence of soda and potash in the slate deposits, being the record of the saltness of those ancient seas, is an additional proof of the beds of clay in the sea. It can be well imagined how when this deposition was made that it went through a process of sorting. The heavy, coarser material would be deposited first near to the shore ; the finer matter would be carried farther to the sea, and the lightest portions of all would be held longest in solution and would reach the farthest from the shore line. We can well understand then that the variations we find in the quality, color, consistency and thickness of the strata, etc., are all due to the disturbance of the water, caused by oceanic and tidal currents, as well as by storms, which then as now occurred periodically. As a result of these storms we might naturally expect to find, even in the finest deposits, layers of coarser material.

From these simple statements relative to its formation it will readily be seen that in a slate bed which extends over miles of country, a great variation in consistency and color will be found. The deposition of the coarser or finer portions will determine the former, while the latter is dependent on the presence in the water of the different oxides of iron in combination with carbon, when vegetable growth has occurred, magnesia and other elements, it will be seen also that it is fallacious to suppose, that because a vein has been proved good or bad in a certain portion, that it must necessarily continue the same throughout its entire course. Each particular portion must speak for itself only. In all slate veins, lines, or bands, sometimes wavy, but oftener straight, will be seen crossing in. These are lines of bedding, and it does not follow that the lines of cleavage will coincide with them, as it can only be supposed that the phenomenon of cleavage resulted from an action which occurred long subsequent to the deposition of the muddy layers in beds. There is some difference of opinion among those who have given attention to the subject as to the manner in which this slatey cleavage was produced. It is explained by some to be the result of a crystallizing action; by others to be due to magnetic currents, while others, again, claim it to be the effect of mechanical forces that compressed the sediment at right angles to the direction of cleavage always at right angles to the dip of the vein.

The occurrence of joints, such as floor or foot joints, face or side joints is accounted for by the mass slowly hardening and consolidating by pressure as well as heat. Lifted out of the water it cracked and split in various directions in drying, and, influenced by the law of crystallization, it assumed definite shapes, being split into rough and rhomboidal masses. Had our original deposition been homogeneous and subsequent action constant and uniform our present slate veins would all have been practically perfect ; as such, however, was not the case we have to contend against many conditions which determine its possibility of being worked to advantage. The presence of dykes, posts, wavy cleavage, impure beds, etc., we find in all slate formations, and it is only after a careful and intelligent study of the conditions that we are enabled to know of its value.

The industry in the Province af Quebec is at present confined to the workings of but two quarries. One operated by the New Rockland Slate Co., at New Rockland, and the other by the Danville Slate Co., near Danville. Both these quarries are located on what is known as the Melbourne vein, previously mentioned. The former is the most extensively worked of any that has been opened in Canada. Here the rock stands nearly straight, having a dip of 80° to the southeast. The slate is of excellent quality, being hard, tough and strong, and blue-black in color, which is unfading. It is of compact and close grain, admitting of no soakage of water, making it very durable.

The first workings were opened about 1865, on what is known as the west bed, lying in the serpentine rock. Operations were entirely confined to this bed until the year 1881, when a cutting was made through a hard bed, and a body of slate found which was equal in quality to that of the other vein. Operations have continued in this new vein up to the present time. This vein is very regular in formation, not being intersected by any foreign rocks, but parts of it are very subject to chicks, or an unsoundness known as slants by quarrymen, which chicks, running at an angle with the cleavage renders it unworkable for roofing slate or slab work.

A very extensive quarrying and milling plant is in use. The Salmon river here affords a very excellent water power, which is conveyed to the hoisting engines and mills by means of wire rope transmission. Cable derricks of the Blondin system are extensively used. A large mill, 100 × 60 feet, thoroughly equipped with all modern milling machinery, produces slab work of all descriptions. A narrow gauge railroad, about five miles in length, connects this quarry with the Grand Trunk railway, at a point about five miles east of Richmond.

At the Danville quarry the vein is intersected by a series of hard ribbons, which, however, are at a sufficient distance apart to enable slate to be made from between them. The equipment here, though on a much smaller scale, is similar to that at New Rockland, except, that the power used is steam. In addition to their roofing slate and slab work, school slates are manufactured.

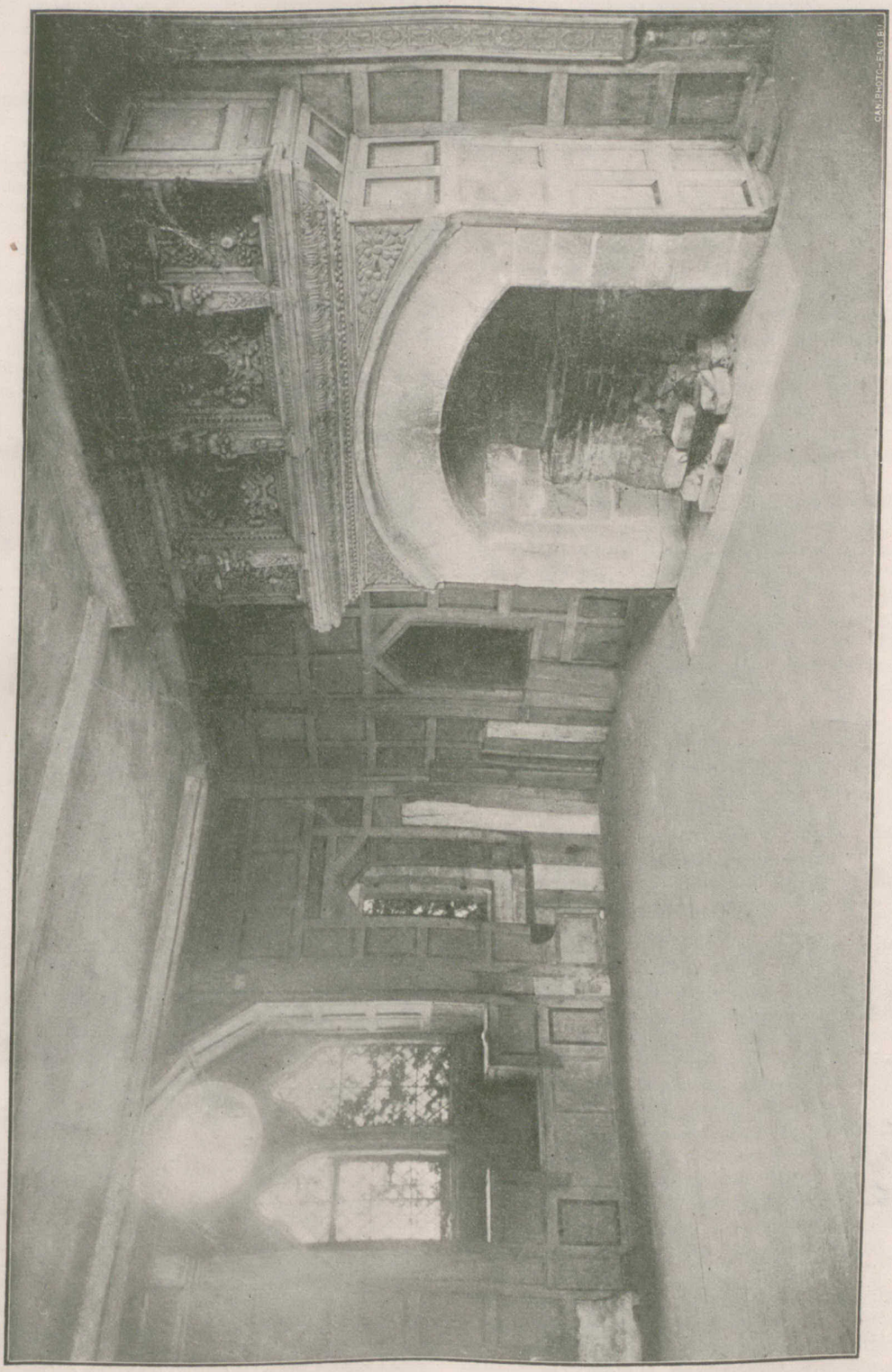
Owing to the private character of the companies operating I am not able to give satisfactory statistics of the industry. The trade, however, has grown to be a very important one. This has been due principally to the efforts made by these companies to introduce slate, by the opening up of the country with railroads, and by the protection which the government has seen fit to bestow upon it. So rapidly has the trade grown of late that the demand is far in excess of the production, and with the extensive deposits of slate that we have in this country, there is every inducement for a thorough examination of the various veins, which I do not doubt would lead to the opening up and working of several remunerative quarries. And I look forward to the time, in the near future, when slate quarrying shall have become one of the principal industries of the province.

* Abstract of paper by H. J. Williams before the General Mining Association of the Province of Quebec.

GRANITE CUTTING APPARATUS.

IT is necessary in order to lessen the cost of production and withstand the inroads of competitors, that manufacturers of materials should employ such machinery as will produce the maximum of results at the minimum of cost. That Messrs. McIntosh & Sons, of Toronto, fully realize this is shown by the introduction, in connection with their granite and marble works, of what are said to be the first pneumatic hammers in use in Canada for dressing purposes. The apparatus, although simple, is quite expensive, which, together with the fact that it is not generally known, no doubt largely accounts for the fact that its adoption has not become more general.

A Northey pump forces the water up from the well to a compressed air pump, the power being supplied by a 15 h.p. engine. From this pump the air is forced through a common iron pipe to



SOLAR ROOM, STOKESAY CASTLE.

an overhead reservoir, from which the pipe extends around the building in which the carving is executed. Dropping from this pipe at different points are lengths of common garden hose, through which the compressed air passes to the pneumatic hammers. These hammers are of the most delicate mechanism, being only about one foot in length, and are controlled by the workmen in the same manner as ordinary hand work. The air operating on the hammer forces to and fro a pinion in the centre at the rate of 250 strokes per minute.

Five of these hammers are in operation at the works of the above company, the cost being about $100 each. The compressed air pump cost upwards of $300. All the apparatus is of American manufacture, having been purchased in Illinois. It is claimed that by the use of one of these hammers a workman can accomplish three times as much as by the old hand method, while the work is also of a much finer quality. In the United States these hammers are being extensively used, but they have only recently been adopted in Great Britain.

A company has been formed at Chatham, Ont., with a capital of $300,000, to manufacture a patent elevator.

The Crown Pressed Brick Company are building another patent dry kiln at Ormstown, Que., for burning dry pressed brick.

Messrs. Seaman, Kent & Co., Toronto, have recently had printed an attractive illustrated catalogue relating to their sliding and venetian blinds.

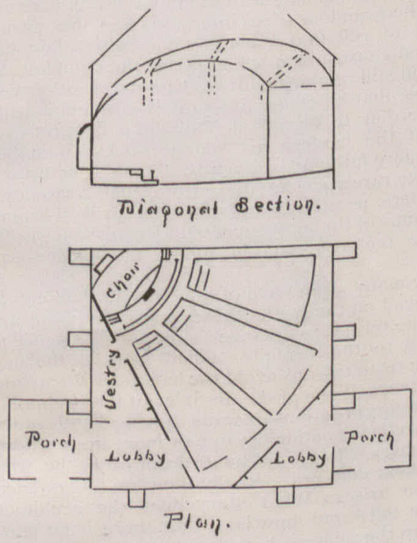
During the year 1895 there were received at the port of Montreal by vessel 146,971 barrels of cement, showing an increase of 4,599 barrels as compared with the previous year.

Arrangements are being made for the transfer of the pottery works at St. Johns, Que., to a French company, known as the Comptoir Ceramique Francais. This company controls all the pottery works in France.

The Diamond Brick and Tile Company, of Kansas City, U. S., have been experimenting with Manitoba clays for the purpose of ascertaining their adaptability for the manufacture of vitrified brick for street paving purposes. The tests thus far have not been satisfactory.

SOUND IN ITS RELATION TO BUILDINGS.

THERE is, perhaps, no subject connected with building on which so little exact knowledge is obtainable as that which forms the title of this article. The experience of architects and builders in past ages seems not to have evolved fixed laws by which the designer of a building may certainly know what its acoustic properties will be. Only to a limited extent is the operation of sound understood—beyond that all is guesswork, and the individual designer must choose his own theory and experiment for himself. It is not surprising that under such conditions, failure is more often achieved than success.



Two years ago, at the annual convention of the Ontario Association of Architects, Mr. D. G. Baxter, of Stratford, presented a paper on this subject, in which some original theories were advanced and evoked favorable comment. Our readers will doubtless be interested to learn that Mr Baxter proposes to put these theories to a practical test in connection with a Methodist church to be erected at Wellburn, near London, Ont. The auditorium of this church will be funnel shaped with the object of securing the best acoustical effect. The interior will be like the accompanying sketches, while the outside will not be noticeable from the added wings. We invite an expression of opinion from our readers concerning this new departure in church design. Indeed, a statement from a number of our readers of their experience in this direction, would prove an interesting and helpful feature.

The Royal Institute of British Architects are showing recognition of the importance of this subject by instituting a series of enquiries with a view to collect and record fuller information than is at present obtainable. The enquiries are as follows :—

1. PLAN.—Give a general plan, with elevations and sections of the interior of the building.

2. MATERIALS.—Describe the materials of which the building is constructed, carefully noting the finish of the interior surfaces and the disposition of carpets, hangings, or other similar fabrics.

3. CONSTRUCTION.—The construction of the building should be described as fully as possible.

4. SEATING.—Illustrate the method of seating by plan and section.

5. SPEAKERS, ETC.—Show position of speakers or musicians in relation to the audience.

6. EFFECT OF AUDIENCE.—The effect of an audience should be carefully noted. State if the room is better if partially or entirely filled.

7. VENTILATION.—Describe in some detail the system of ventilation. If possible, note the mean and extreme temperatures and the effect of the variation produced by it and by changes in direction of the ventilation. State the position in which the thermometers are placed.

8. KEYNOTE.—If the keynote of the building is known, state it, and say whether or not, if the voice is pitched in this key, any improvement in sound is noticeable.

9. QUALITY OF SOUND.—(a) State what is the general reputation of the building for (1) Music ; (2) Speaking. (b) State what the quality of the sound is—full and resonant, &c., and note any peculiarity of effect, such as echoes and the like. (c) If defective, state the nature of the defect as carefully as possible.

10. REMEDIES.—If remedies have been tried to obviate defects, state them, and the result obtained. The precise nature of the remedy should be fully detailed.

11. ADDITIONAL PARTICULARS.—Add any particulars not above scheduled which may be considered necessary or desirable, and state age of building.

12. REFERENCES.—Give references (if any) to published descriptions of the building, especially those dealing with its acoustic properties.

13. AUTHORITY.—Give the names of the experimenters and date of experiments.

BY THE WAY.

A CORRESPONDENT sends the Inland Architect his impressions of Canada and Canadians. Much of what he writes can be classed as "rubbish," inaccuracy of statement being a conspicuous feature. As an example of the latter the following will suffice : "The Canadians are rather slow in adopting novelties. Their elevators are few and far between, and are looked at askance by many yet who would as soon attempt to walk upon the waters, as did Peter of old, as to trust their precious lives in one of those "bird cages." I admit that with most of these elevators it would be a saving of time for a busy man to walk, even leisurely, up or down stairs."

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ARCHITECTS and builders were among the first to avail themselves of the advantages in the way of convenient and rapid local transit afforded by the bicycle. By means of the wheel, the expense of keeping a horse can, in many instances, be saved, while those who formerly went about on foot are effecting a large saving in time and strength. I wonder how many architects and architectural students have made a sketching tour on the bicycle. An opportunity is now afforded in this direction which every architectural student, in particular, should be quick to recognize and take advantage of. The officers of the Toronto and Montreal Sketch Clubs should endeavor to organize a series of short sketching tours during the coming summer.

TRUTH IN ARCHITECTURE.*

By W. E. Doran, Architect, Montreal.

"Magna est Veritas et prevalebit."

Architecture is capable of expressing truth in various forms. Firstly, from an historical point of view, it reveals with a veracity not to be found in written records the state of civilization, the manners, customs and intellectual life of peoples. "By their works ye shall know them." Without these records of imperishable stone, much of written history would, if it were not entirely incomprehensible, at least lose half its light and meaning. The character of a people is in no way more truly exemplified than in its architecture, and religion of all kinds has ever found in this art its highest form of appeal to human sympathy and worship. To illustrate the truth of these propositions it is sufficient to glance at a few of the leading historic styles and the stories they convey. Leaving aside the architectural remains of earlier peoples, and commencing with the Egyptian, had we never read a line of their history, their architecture tells us of mysteries, a learned few, an ignorant mass, a history of work achieved by automatons in the hands of a priesthood which ruled by mystery, and pretended to occult powers.

Turning to Greece we find written there freedom and enlightenment, the expansion of the human mind keeping progress with the appreciation of the beauty of nature, and its reproduction in art. Greece discovered that there was no straight line in Nature, and she proceeded to apply the principles of curves so well that she exhausted all the higher orders of them. Everything was done intellectually, and so much so that even now we can discover new beauties in which to revel amidst her antiquities.

Rome became the ruler of the world and art had to serve the mighty mistress, but the character of the work betrays itself—her architects and artists were slaves. Mighty are her monuments; building skill existed; everything that could wait on luxury is to be found—palaces, baths, aqueducts, triumphal arches; fora—all tell their tale—a people ruled first by demagogues and then by tyrants, all the world subject at her feet, all that could tend to greatness except freedom.

In the earlier periods of Christianity we can read the history of the church in its architecture, first in the catacombs and then emerging forth triumphant at Rome seizing boldly the Pagan temples, and transforming them into places of Christian worship —consequently no marked change of style was developed.

In the east a more determined attempt was made to free Christianity from all influences of Paganism, and to create a style for itself. The result was the Byzantine; however praiseworthy the motives, the best that can be said of it is that it came as nearly as possible to success, and served to prove the impossibility of any sudden creation of a style in architecture, and to illustrate one of the greatest truths of the art, viz., that all its best results must flow from patient study of certain needs and conditions and the gradual unfolding of the best and most appropriate structures to meet those conditions; insensibly, therefore, a new style will develop, but it can never be launched forth a full-fledged creation of one man's brain, or indeed as the concerted effort of any number of men.

It remained for the incursions of the barbarians to overthrow the last vestiges of Imperial Rome in Italy; when Christianity in turn succeeded in subduing these fierce tribes unto herself, there commenced a simpler and ruder architecture, that of Northern Italy, which to my mind contained elements of great merit, but which, however, were arrested before arriving at their full development. What with the incursions of Byzantine architecture from the East, and later of Gothic architecture from Germany, the Lombardic style met with an untimely death. It seems to me much might be done by modern architects beginning where they left off, instead of following a debased Renaissance of later periods.

Passing over the Norman and other transition periods, we come to the real development of Christian architecture in what is miscalled Gothic. When the church was everywhere triumphant and faith ruled supreme, there dawned this glorious triumph of the mind, aye, and of the soul of man, because, although the term Gothic comprehends so many different styles peculiar to the various countries of Europe, there was to be found everywhere a certain development, though not contemporaneous, still resulting always in three marked periods, viz., early or simple, middle or perfect, and highly florid or debased. It is of the middle period generally that I speak, and I think of that middle period in all lands it may safely be said that it exemplified all that was spiritual in our nature, not merely copied, as was the beauty of the ancients, from the book of Nature, but founded on geometrical truth and associating therewith Christian symbolism and mysticism. The Gothic architects succeeded in raising to God temples, built, it is true, by human hands, but one of these grand old cathedrals, with its misty heights, its spires and pinnacles, its niches and saints, might be easily associated with the New Jerusalem coming down from heaven.

In juxtaposition the Moslem on the ruins of the Byzantine constructed an architecture embodying all his ideas of a sensual heaven.

Leaving aside for the moment the historical view, there is another form in which architecture is capable of expressing truth, and one which concerns us more particularly as practitioners of the art, it must be based on the principles of truth. In the first place, a building or structure of any kind must adequately serve the purpose for which it is intended, and must to a certain extent be indicative of that purpose; all its parts must be harmoniously blended together, and each part must have the relative importance to the whole which its rank or office demands; thus, although there are certain established proportions which are or should be applicable on general principles, each structure also has particular proportions which depend on the skill of its designer and his perceptions of this law of truth which should govern.

In the hands of a master the observance of this rule will probably develop a new type or style, more particularly when the conditions under which the structure is to be erected, the materials to be used, or the climatic influences it may encounter are altogether novel, but more frequently the case is that this consideration leads to expression in some existing style more or less modified according to circumstances. It follows that the choice of style should never be arbitrary, and that some at least of the conditions under which it was originated must be existent in the structure which we wish to clothe with its features.

Unless an architect reads aright the story told by a certain style, and be familiar with its origin, he cannot intelligently use it. Having stated that perfection existed only in two historic styles, viz: Pagan or Natural in the Grecian, and Christian or Mystic in the Gothic, you might, at least, if you were not architects, expect me to denounce all others as vain and unprofitable, and declare that the battle of the styles should rage round these two alone, but the history of the Renaissance delivers me from this seeming dilemma.

As the cause of the Renaissance so called is a very much debated question, and would in itself require a lengthy research, I will only touch on facts which are generally admitted. That it had its origin in Italy was natural, as its people having the old monuments before them, though never studied, and serving rather as quarries for their new buildings than any other purpose, still insensibly their minds must have been affected by these remains, so much so that their Gothic work is, no doubt, mostly foreign, and in every example of native Italian Gothic some traces of classicism still remain. On account of its mis-nomer "Renaissance" or "Revival," this modern Italian misled enthusiasts who, leaving the beauties of classic literature, came to the conclusion that all perfection existed in the works of the ancients, and that art of all kinds should return to its fountain head for inspiration. But that it should have been universal, displacing all national styles, and spurious as it was, conquered, the world argued that this style contained in itself something that met the wants of men, and which could not be so suitably met by any other. I think the key is in the building of edifices of several stories. The previously considered historical styles had their development mainly in temples and monuments, churches, shrines and cloisters. Architecture had not occupied itself in habitations for man, save in the palaces of Rome, and these were on a par with its temples, or at any rate never exceeded one-story; the castles of the nobility were military strongholds rather than residences. I would therefor ascribe the success of the Renaissance to the ease with which it lent itself to the dividing of buildings into stories, marking them with external orders and balustrades. It has since been demonstrated by the failure of the Greek revivalists that anything like pure classical forms would be unsuitable for modern habitations. It is true also that England for a long time successfully resisted the invasion, and sought to create in the Elizabethan an adaptation of the Gothic to modern habitations, producing certainly a picturesque effect according well with sylvan beauty, but there as elsewhere the Renaissance came to stay. Another cause of success (though this ought to have condemned it in the mind of any person with a true feeling of the grandeur of architecture) was that every detail was so reduced to rule that most any one with a fair knowledge of drawing and construction could learn the complete art. In fact the tradition still remains with a great many otherwise well educated people that all of architecture is contained within the five orders according to Vignola or Palladio. I regret to say that the tendency of the modern art school seems to confirm this, for although more latitude is given to the skill or want of it in the designer, we rarely see anything from their graduates but variations of orders, pediments and porticos; it is a remarkable fact also that many of the most successful Renaissance architects were attracted to the profession in middle life, and were in reality amateurs.

Certainly many architects of the present day can lay claim to have improved on the work of their predecessors in this particular style, but the term Renaissance is too comprehensive, and is applied equally to the carefully studied work of the man who with true classic taste tries to avoid the errors of Vitruvianism, to the mediocre compositions of the disciples of that school, and also to the meanest aggregations of walls having band courses dividing them into sections containing one or more lines of badly proportioned openings with or without decoration, the whole finished with or without cornices. Really the term has no meaning. But the question arises: What story does the architecture of the present day tell? and how is it that there is no particular style belonging to the ninteenth century, a century so prolific of improvements, the century of steam and electricity, the century of triumphs in surgery and in all that pertains to progress, and in war and destruction. Is architecture alone stationary or retrograde? Has engineering, which was formerly only a branch of architecture alone the power to advance? My answer is that the architecture of to-day reflects all these conditions of life In this century of steam and electricity. It is all high pressure—no time for calm study, no time for experimental advance; everything must go up by magic as it were. The architect must know everything, must be equally at home in all styles, be able to use all methods of construction, attend to the most trifling matters of detail, please all tastes, be an artist, a man of business, financier, lawyer, electrician, tradesman, all in one. There is no such thing as human perfection, yet the law says his work must be perfect—not only his own work, but he is obliged to see that the work of

(To be Concluded in June Number.)

* Paper read before the Province of Quebec Association of Architects.

CONTRACTORS' ESTIMATES.

Omission of items in figuring contracts is probably the most common cause of disaster prevalent in building contracting, and many a good man who has intended well enough has been brought to grief because of having left out some things in his bill of estimates that ought to have been figured on. Every man who is desirous of succeeding as a contractor, should prepare a complete and minute schedule of all the items that could possibly be included in any manner of building construction. These should be classified and arranged under sub-heads, according to the different building industries or trades, and prices, where possible, should be added. By having a schedule as suggested, and consulting it closely when making up an estimate, the possibility of an omission would be reduced to a minimum.

Many careful contractors follow some such system as this in estimating, but the majority fail to see just where it would be to their interest to assist in educating other contractors to greater accuracy in figuring. It is forgotten that a contractor's ignorance or mistakes are a thousand times more to be feared in a bidding competition than accurate competency in making estimates. We know of a case in point. Bids were asked for an ordinary building. A half dozen bids were grouped closely together, varying only from $3,500 to $4,000. Then came in a bid for twenty-eight hundred dollars. In the language of the architect, "that fellow probably left off the roof, and forgot there were any floors in the building." More than one fellow has actually done such things.

If the architect could convince the owner of the advisability of rejecting such bids, when the possibility of an error is so very obvious, the demoralizing element might be thus removed, but the owner is usually hot on the trail for a bargain. He can see nothing but the price on the paper, and he thinks if the contractor has blundered that that is not his affair, and it will give him an opportunity to get something for nothing, which is generally a great mistake on his part, for in nine cases out of ten the owner gets mulcted in one way or another before the work is completed. Even when slight omissions are made in figuring the result is very unsatisfactory, for special orders for extras must be added, and these are not usually obtainable at the same rates as is paid on the main contract, and all this leads to confusion and bickering. There should be a uniform system of figuring adopted by builders in every community. Its main object should be to avoid the omission of items in figuring, and to prevent such glaring discrepancies in contractors' estimates.

Tenders for work that are not based on correct quantities, or where omissions exist, do infinite harm in many ways, and this is one reason why men who have not the requisite knowledge, should refrain from tendering for work of which they have had no previous experience. In country places, and in our villages, there are very seldom works of such magnitude that the local builder cannot encompass, but he should not forget that even in buildings of similar size, and built of similar materials, the style of finish may cost anywhere from ten to fifty per cent. more or less, so that the method of estimating by "comparison" is no more reliable than estimating by cubing, unless the estimator has a thorough grasp of all the conditions surrounding the work. There are instances, however, when estimating by "comparison" may prove fairly correct, but they are few, and in any case where one building should be contracted for at the price that a former and similar building was completed for, we should prefer to figure up the cost of the new building, item by item. There never was, there never will be, any "royal road to estimating," and the successful contractor is the man who figures up everything, and figures them up correctly.

ERRATA.

In the sketch of Mr. John Aldridge, president of the Toronto Builders' Exchange, which appeared in our last issue, it should have been stated that Mr. Aldridge was a native of England, instead of Scotland, having been born at Brockenhurst, County of Hampshire.

A BOND OF UNION.

Mr. Jos. Greenfield, architect, Winnipeg, in renewing his subscription to the ARCHITECT AND BUILDER, writes: "Permit me to express my appreciation of the value of your publication as a means of information and a bond of union between the members of our profession in this Canada of ours."

PAGES

MISSING