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 SATURDAY 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.

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

EDITOR'S ANNOUNCEMENTS.

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

The "Canadian Architect and Builder" is the official paper of the Architectural Associations of Ontario and Quebec.

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

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THE chief of the fire department in Montreal is urging the council of that city to pass an ordinance disallowing the practice of filling hollow walls of buildings with sawdust. Sawdust appears to have been extensively used in this way by Montreal builders as a means of deadening sound. Besides being deprived by more modern materials of any advantage it might once have possessed for this purpose, its combustible nature should alone be sufficient to preclude its use. The chief of the Montreal fire department is doubtless justified in asserting that many large conflagrations in that city have resulted from the employment of this material.

THE adaptability of women to the profession of architecture has been discussed from time to time of late in the professional journals. Probably as a result of this discussion prizes of $1,000, $500 and $250 respectively, were recently offered for the three best designs submitted for a Woman's Building for the World's Fair, the competition being restricted to female designers. As a result of this experiment a number of creditable designs have been received. The successful competitors in order of merit are: Miss Sophia G. Hayden, Boston, a graduate of the Massachusetts School of Technology, Miss Lois L. Howe, also of Boston, and Miss Laura Hayes, of Chicago. In the field of domestic architecture woman will in future be likely to find wide and profitable scope for her abilities.

WE print elsewhere a communication from Mr. Victor Roy, of Montreal, one of the judges in the late Quebec City Hall competition. We would be sorry to think that our comments in our March issue should be construed as throwing any doubt on the competence of the judges in this instance. We were endeavoring to impress upon Canadian architects the folly of entering competitions when proper conditions were lacking. The words "and competent judges appointed" were not intended as applicable to this specific case but to competitions in general. At the same time we hold it to be the duty of self-respecting architects who desire to see all competitions placed upon a fair basis, to refuse to act as referees unless the code be drawn up in accordance with the best practice of the day. The scrupulous observance of this point would rapidly educate the public, perhaps as quickly as the refusal of architects to enter competitions without a proper code and satisfactory judges.

THE Public School Board of Kingston having decided to erect a new building, and being desirous that in it should be exhibited the most approved principles of design and equipment, appointed a committee of its members to visit the schools in Toronto, Hamilton, and elsewhere in quest of information. The committee on their return from a pleasant outing, announced that they were in a position to furnish the architect with such information as would "enable him to put up the building on the most modern principles." The question suggests itself, why was not the architect commissioned to obtain the necessary information? His knowledge of building would surely better qualify him to place a proper value upon what he should observe than a committee of persons desitute of such knowledge. Apart from this important fact is the consideration that information obtained at second-hand is less distinct and more difficult of application than when personally acquired. From an economical standpoint the interests of the taxpayer, which are professedly of paramount importance to the civic representative, would have been better served by sending the architect instead of the committee as the deputation. To employ an architect and then to appoint a committee to instruct him in the duties of his profession seems to be a trifle inconsistent.

WE desire to draw the attention of Canadian quarry owners to the announcement addressed to them by the Ontario Association of Architects, which appears in our advertisement pages. We would also request builders doing business with quarrymen, to bring the advertisement to their notice. We have in Canada sandstones and granites of first-class quality, and such a series of tests as the Ontario Association of Architects propose to make could result in giving widespread prominence to the fact, and afford to quarry owners such a valuable advertisement as they could obtain in no other way. The publication of tables resulting from these experiments would be likely to open up markets beyond the boundaries of the Dominion. Such tables would be of great advantage to architects and engineers, enabling them to obtain at the School of Practical Science full information with regard to any stones in use in the Province. The testing apparatus just erected at the School of Science, proposed to be made use of for the purpose of these tests, is the most perfect of its kind. The committee of the Association having the matter in charge is composed of men eminently qualified to perform the duty in a thoroughly impartial and satisfactory manner. The Council of the Association is assuming a considerable amount of expense in connection with the matter, and the owners of quarries will be consulting their own interests by giving the undertaking their hearty co-operation.

IN addition to the general regulations proposed by the joint Committee on Building Ordinances, noticed in our issue for April, the following specific regulations were suggested as of the highest importance :

(a) "In all buildings of every kind, the space between the stringers of wooden stairs, if plastered or boarded underneath, should be stopped by filling with incombustible material at three places at least in every flight of stairs.

(b) All hearths in buildings with wooden floor beams should be supported by trimmer arches of brick or stone.

(c) In every building, the space between all studding and furrings, both of inside partitions and outside walls, in the thickness of the floor, and for 6 inches above, should be filled with incombustible material. Also that the continuous space between the joists of every floor, ceiling and roof shall be effectually cut off at every point where the joists are supported.

(d) All brick party walls and brick outside walls adjoining neighboring property, should be carried up above the adjoining building.

(e) At least 4 inches of brick should intervene between the ends of wooden floor beams entering a brick party wall from opposite sides.

(f) The walls of brick buildings should be tied at intervals by the floor beams, which, if of wood, should be so anchored to the walls that, in case they are burned off, they will not, in falling, overthrow the walls."

The careful observance of these points in the construction of the ordinary type of building would result in a great reduction of fire loss, and if municipalities cannot be made to move in the matter of more advanced regulations for safe building, we imagine it would be in the direct interests of the insurance companies to draw up such a code, upon the observance of which they would agree to so materially reduce the rate of premium that it would become an object with builders to conform to it.

WE must confess to considerable chagrin at the result, or rather non-result, of our proposed competition for bills of quantities. The time given was ample and the prize as great as the average draughtsman would earn as salary in a fortnight, and yet no one has, apparently, thought it worth an effort. Perhaps our young architects and the draughtsmen and students have already reached a high point of excellence and do not need any exercise. But even if they have, it would be an act of charity to help some of our builders. We saw a list of tenders this week where the amounts varied from 25 to 100 per cent., indicating that the estimates were simply guesses. Two competitions instituted by the Ontario Association of Architects have likewise been barren of results. The first, a competition for the Association seal, did not produce a single response. The second, a competition for mission chapels, under the auspices of the Presbyterian Church, resulted in the sending in of designs by two competitors. The committee having the matter in charge were not satisfied with the designs, deeming them unsuitable. Both these projects will be again advertised for competition. With regard to the seal, it should be a competition entered into with enthusiasm. This seal, if of meritorious design, would probably be permanently retained and would become historical. It should be a case of earnest effort on the part of our younger architects or senior students, to win this coveted distinction. The prize winner in the mission church competition may look forward to considerable work arising out of it. Here, surely is an opportunity for young men desirous of gaining a connection and making a start in life.

THE engineers appointed to examine the Y.M.C.A. building at Montreal, Messrs. Peterson and Keefer, have reported regarding the second question submitted to them, which was "Whether there are any defects in the design or construction of any of the parts of the building which require to be remedied in order to make it absolutely safe and strong." They expressed it as their opinion, from such examination of the structure as they were able to make, that the work generally was well done, citing the fact that in the tearing out of the beams caused by the late accident, the damage to the walls was entirely local, being confined to holes in the walls where the anchors had been pulled through. The composition of the mortar was, according to the inspector, one part Portland cement, two parts common lime and six parts sand. This, the experts report, would not be considered by engineers a good mortar for foundation work, although usual in the practice of Montreal architects. Five piers around the swimming bath, in addition to the one which failed, and which also bear concentrated loads, were reported to show signs of weakness, the cap stones and corbels being too thin, less than thickness specified, not parallel in the dressing, and consequently imperfectly bedded. In two cases the cap stones were much smaller than the piers ; these piers were built in lime mortar and the heart was much slower in setting than the outside, the concentrated load from the columns thus coming upon the weakest part. The experts recommended the rebuilding of about three feet of these piers in cement mortar, and the substitution of larger and thicker cap stones. The iron beams were reported to be amply strong and the iron work generally well designed, although some of the details of execution were defective, such as beams with too little bearing, and in one case, lack of filling-pieces where it was necessary to have an equal bearing on a pair of girders. The report concludes by stating that when the foregoing defects have been remedied, the building will be amply strong.

INFORMATION WANTED.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—I want to remedy a chimney from leaking soot. Please state general causes and remedy. Is a house veneered with brick safe in case of fire? Are they warm? Tell me what you know of them. What is the best way to treat a hardwood kitchen floor? Will coal oil stop dry rot in timber? I would very much like to see the correct estimate and all other estimates you will receive on the $20 competition.

B. F. KEIZAR,
Stanstead, Que.

[The first question of our correspondent was fully covered in answer to a similar question in our February number last year, but lest he has not that number we repeat it : "The discoloration on outside of the flue is caused by the condensation of the wood smoke. The wall of flue being probably only 4½″ thick, absorbs the dampness from the exterior atmosphere or from a driving rain, is always cold and damp in weather cold enough to need artificial heat. The smoke striking this cold brickwork, is condensed, forming the well-known inky fluid, which is often seen dripping from the stove pipes when of great length. The burning of green wood would probably aggravate the trouble. A flue on an outside wall should have at least 7″ thickness on exposed side. An absolute remedy would be to build into the flue 9″ glazed drain pipes, if special flue pipes are not obtainable. The brickwork could be cut out from the exterior, and pipes inserted if the chimney-breast inside is of sufficient size to allow of it."

2nd. A veneer house is no safer from an internal fire than a frame one ; it would be as safe externally as any ordinary brick building. A brick cased house is warmer than a frame house only when erected on a solid stone or brick foundation and the walls thoroughly lined with felt behind the brick casing. The cost if carried out in this manner (in localities where brick is easily obtainable) will be nearly as great as if the wall was solid 9″ brick. This, if roughly plastered on the brick before strapping, makes a fairly warm and comfortable house.

3rd. Two coats of raw linseed oil well rubbed in.

4th. We have had no experience in regard to the treatment of dry rot with coal oil—ventilation is the prime requisite.

5th. We have received no estimates or bills of quantities in response to our invitation.—EDITOR C. A. & B.]

OUR ILLUSTRATIONS.

ST. PAUL'S CHURCH, WINGHAM, ONT.—MESSRS. STRICKLAND & SYMONS, ARCHITECTS, TORONTO.

MONTREAL BOARD OF TRADE BUILDING COMPETITION.—DESIGN SUBMITTED BY J. RAWSON GARDINER, MONTREAL.

TORONTO ARCHITECTURAL SKETCH CLUB COMPETITION FOR "AN ENTRANCE TO A PARK—DESIGN AWARDED FIRST POSITION, BY "TURNSTILE," (MR. T. A. JOHNSTON).

STONE MANTEL IN RESIDENCE OF MR. P. LYALL, MONTREAL. JOHN JAMES BROWNE, ARCHITECT.—EXECUTED BY MR. H. BEAUMONT.

CODE FOR THE REGULATION OF TENDERING.

THE Buffalo Builders' Association Exchange have issued a code for the regulation of tendering for work in architects' offices, and we note that it is reported to have the approval of the Buffalo Chapter of the American Institute of Architects. The following is the code:

Whereas, the manner of receiving bids on work prepared by architects and others has varied, and to make a uniform and fair method of the practice, now, therefore, be it resolved, that on and after this date we, the members of the Builders' Association Exchange, decline to submit bids for work unless the following code is used and adopted:

RELATING TO PROPOSALS AND AWARDS.

Just and proper methods which should prevail when estimates are solicited from *contractors* in the building trades.

PLANS.

1. Drawings prepared for final or competitive estimates must be sufficient in number and character to represent the proposed work clearly, and shall be to a scale of not less than one-eighth of an inch to the foot (except block plans), and be rendered in ink, or some permanent process, colored, figured, and otherwise marked in such a manner as to clearly show all kinds of material to be used, thickness of walls, etc., in the construction.

DETAILS.

2. Proper details must be furnished for work that is not otherwise sufficiently shown.

SPECIFICATIONS.

3. Specifications must be in ink. They shall be definite, where the work is not clearly shown by drawings. Every distinctive class of work to be included in the contract must be mentioned and placed under its appropriate heading.

RESTRICTIONS AS TO SUB-CONTRACTORS.

4. Contractors must be notified at time of estimate, if they are to be restricted in the employment of sub-contractors.

NOTICE FOR OPENING BIDS.

5. Before opening bids, the bidders shall be notified of the time when and the place where the bids will be opened, and in the presence of the attending bidders.

PERCENTAGE ON SUB-CONTRACTS.

6. Contractors shall be allowed a compensation of 5 per cent. on all sub-contracts, which at the time of estimating are "reserved," or not called for in their portion of the specification, but which may be assumed by them by request of the owner or architect, after the bids have been received and opened.

Contractors shall not be denied contracts upon the work covered in their original estimate, on account of declining to assume the aforesaid reserved sub-estimates.

SUB-CONTRACTS.

7. A contractor who may refuse to become a sub-contractor shall not thereby forfeit his right to the award.

AWARD.

8. When work is to be let for which estimates have been solicited, unless previous notification to the contrary has been given, the lowest invited bidder shall be entitled to the contract, and all minor charges shall be agreed upon with him, provided his prices are equitable. Should the prices for changes made by the lowest bidder not be deemed equitable, it shall be settled by arbitrators, one of whom shall be appointed by the owner and the other by the bidder, they to appoint a third if necessary, and the majority decision shall be final.

If radical changes are made, the whole competition may be re-opened.

Bidders must not be allowed to amend their estimates after the bids have been opened and before the award.

9. Bids shall be binding upon the bidders for not more than sixty days.

10. No payments on contracts shall be less than 90 per cent. of the value of work done; the remaining 10 per cent. to be paid within thirty days after the completion of the contract. Sureties will be furnished by the contractors, if so required by the owner; and in such case the payments shall be 100 per cent. of the value of work done.

11. The uniform contract adopted by the American Institute of Architects, the Western Association of Architects and the National Association of Builders is recommended.

COMPENSATION FOR ESTIMATING.

12. Should all solicited bids be rejected, or the owner refuse to contract with the lowest invited bidder within sixty days from the date on which the bids are submitted, or refuse to abide by a decision of a majority of the arbitrators, then the said owner shall compensate the lowest invited bidder as follows:

For all cases where the bid does not exceed $1,000. $10.

For all cases where the bid exceeds $1,000, and does not exceed $5,000, one-half of 1 per cent. upon the excess over $1,000, and $10 added.

For all cases where the bid exceeds $5,000, and does not exceed $20,000, three-eighths of 1 per cent. on the excess over $5,000, and $30 added.

For all cases where the bid exceeds $20,000, and does not exceed $40,000, one-fourth of 1 per cent. on the excess over $20,000, and $86.25 added.

For all cases where the bid exceeds $40,000, one-eighth of 1 per cent. on the excess over $40,000, and $136.25 added.

FAILURE TO CONTRACT.

13. Should the lowest invited bidder, at any time within sixty days from the date on which bids are submitted, refuse to contract at his bid, or to abide by the decision of a majority of the arbitrators, the said bidder shall pay the owner liquidated damages (not a penalty) in the same amounts and ratio stated above for "compensation for estimating."

Clauses 1 to 4 are such as should be and are, as a rule, carefully observed in the office of any just and self-respecting architect.

The observance of clause 5 would in most instances be surrounded with difficulties. We have known of instances where upwards of one hundred tenders were received for a single job in Toronto, where separate tenders are usually taken for each trade. In such a case the architect would be compelled to hire a hall or have the meeting on the sidewalk in front of his office. The inference might be drawn from the regulation that Buffalo contractors lacked confidence in the architects, and that they and their clients needed careful watching. The proposition seems to our mind about as possible as it would be were a possé of wholesale merchants to accompany a retail buyer in his visits of enquiry and pricing at their various establishments. If a contractor has not sufficient confidence in an architect to trust him with a tender, he had better not run the risk of working for him but leave him severely alone. There are times also in the opening and consideration of tenders when it would be extremely awkward and inconvenient to have any person but the client present.

Clause 10 would only be practicable in the case of thoroughly reputable contractors of means. The 100 per cent. proposition would necessitate a most carefully detailed estimate at the granting of each certificate, and in the case of extras, an adjustment at each payment, an arrangement which would only be possible in large work where certificates are given at longer intervals than is the custom with ordinary work which forms the bulk of general office practice.

Clauses 12 and 13 are suitable and fair, and would tend to make, 1st, the architect more careful in his preliminary estimate, 2nd, the client sure of his own mind in regard to his project, and 3rd, the contractor more careful in making up his tender.

The sins cannot all be laid at the door of the client in this matter. In the experience of many of the profession in Toronto there is a woeful lack of integrity amongst some builders in this matter. A careless tender is put in; when it is accepted, the tenderer immediately begins to enquire of his competitors the amount of their figures, and if he is considerably below them he "discerns an error in his calculations" and cooly withdraws his tender. The architect is often glad to be rid of him, knowing it to be impossible to do good work at the figure; at the same time, this very leniency intensifies and spreads the evil.

QUEBEC CITY HALL COMPETITION.

MONTREAL, April 16th, 1891.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—My attention was called by Mr. Staveley, architect, to an article on the competition for the City Hall at Quebec, published in the CANADIAN ARCHITECT AND BUILDER, March number, page 29.

Mr. Staveley, Mr. Baillairge, of Quebec, and myself, were the judges to decide on the merits of the plans submitted, in which we claim to have done justice to their merits.

By your last paragraph you seem to put a doubt as to our competence. I have every reason to believe that it has been published unseen by you, therefore I and my collegues will be very much pleased if you would correct that article in your next number.

I will furthermore state that if the architects who received no premiums consented to hand over their plans for the sum of three hundred dollars, the judges had nothing to do with the matter.

The following is a table showing the way the judges proceeded to award the prizes offered for designs of the proposed new city hall:

	Cost.	Elevation.	Fire Brigade.	Police.	1st Floor.	2nd Floor.	3rd Floor.	Construction.	Total.	Cubic feet.	Price per foot.	Total cost.	Class.
Stadacona	5	2	4	3	3	2	3	2	24	1.796.760′	12c	$215.611	1
Escutcheon	4	3	1	4	1	2	3	3	21	1.916.800′	12c	$230.016	2
Fides	1	0	3	2	4	2	3	1	16	2.736.000′	12c	$328.320	3
Olbany	0	1	0	0	0	0	0	1	2	2.805.440′	14c	$392.761	4
Fideas	0	0	2	1	1	4	0	2	10	3.322.880′	13c	$431.974	5
Olma	0	4	0	0	1	0	1	1	7	3.058.560′	15c	$458.784	6

First prize to "Stadacona"; second prize to "Escutcheon"; third prize to "Fides."

The judges were: Mr. Tache and Mr. H. Staveley, of Quebec; Victor Roy, of Montreal.

Hoping that the above will suffice to prove our competence,

Yours very truly,

VICTOR ROY.

The Chemical, Mining and Manufacturing Company of Ontario has been formed with a capital of $100,000, with headquarters at Owen Sound, Ont., for the purpose of manufacturing Portland cement from the deposits of clay existing in that locality. In addition to Owen Sound parties the following Toronto gentlemen are interested in the company: Messrs. Thos. Bryce, W. H. Pearson, Ald. Lucas, Wm. Hill, S. Wood, Geo. J. Foy, Powell & Parkinson. Mr. R. P. Butchardt, who is the manager of the company, in England for the purpose of purchasing the necessary plant.

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

At a general meeting held on May 1st to receive progress report from the Council, and other business, there were present: Mr. J. W. Hopkins, President, in the chair; Mr. V. Roy, 2nd Vice-President, and Messrs. A. C. Hutchinson, A. Raza, A. T. Taylor, A. F. Dunlop, members of Council; W. E. Doran, Treasurer; Messrs. G. E. Tanguay, J. H. Bowe, J. R. Rhind, W. McLea Walbank, Theo. Daoust, A. Gendron, J. J. Browne, W. H. Hodson, J. A. P. Bulman, J. Venne, J. Wright, Geo. W. Wood, J. H. Bernard, J. Perrault, C. Clift, Secretary.

The Secretary read the following report:

This meeting has been called that your Council may report on the work done by them since the formation of the Association last October. Since our first meeting of Oct. 10th the Council have held thirteen meetings. As you are aware, it was decided at the meeting of Oct. 10th to apply for an Act of Incorporation. On the 14th we were informed that all applications for Acts of Incorporation had to be in before the 15th of October if required to be dealt with that session, so application was made at once through Mr. Prefontaine. The preparation of the Act was left to a committee of four, and they reported to the Council on Nov. 14th, at which meeting, after being slightly amended, it was decided to give it at once to Mr. Prefontaine, he to have it printed and laid before the House of Assembly.

On the 5th of December a telegram was received from Quebec saying "Bill nearly killed, arrange for deputation." That same day the Secretary saw Mr. Prefontaine, and he advised the Council to send down a strong deputation. Eight members of the Council and four members of the Association left Montreal on Dec. 9th for Quebec, and on arriving next morning went to the House of Parliament with a large number of our Quebec confreres.

On the 10th the Bill was dealt with, and after some considerable opposition, was passed. The Council and members having seen it through so far, the Montreal contingent left Quebec that same day. The Council had been advised to have Mr. Delisle, a lawyer of Quebec, to represent the Quebec contingent. He attended with Mr. Prefontaine and Mr. Langelier with the deputation before the Private Bills Committee.

On Dec. 18th the Secretary received a telegram asking some of the Council to go down at once. That evening six members and the Secretary went down to Quebec, On arriving they went with our Quebec confreres to the House and found the Bill would not come before the Legislative Council Committee before the early part of the following week. But they found out where the opposition to the Bill lay, and it was deemed advisable to have Mr. Resther and the Secretary remain in Quebec, they with the Quebec members to use every endeavor to have the Bill pushed through, as the session was drawing to a close. The Bill went through the Committee of the Legislative Council on the 22nd, and next day was read in the Lower House and finally sanctioned on Dec. 30th, 1890.

The Bill as sanctioned has been printed in English and French, and a copy sent to each member of the Association.

On Oct. 10th, the By-laws and constitution of the Association were adopted, then partly printed, but were stayed until the Bill had passed, as it might affect them. After the passing of the Bill your Council held a meeting on Jan. 15th to reorganize under the Act. The Council organized, electing the same officers as were elected by the members at the meeting of the Association last Oct. 10th.

The by-laws were then taken in hand and left to a committee of three to look over, they to lay them before the Council at an early date. This committee reported on March 16th. After being further amended, the by-laws were adopted and sent down to Quebec for approval. On their return they were printed in French and English and a copy sent to each member of the Association.

The Council took up the matter of the competition for the new Board of Trade building. That body (the building committee of the Board of Trade) not acceding to the reasonable requests made by your Council, members were requested to refrain from entering the competition. The Ontario Association also had some correspondence with the building committee of the Board of Trade and took similar action to our own.

A Board of Examiners has been elected to prepare papers for the forthcoming examinations should any wish to present themselves. The Board consists of Messrs. Berlinguet and Baillairge, of Quebec, and Messrs. Roy, Thomas and Taylor, of Montreal.

At our first annual meeting, 35 enrolled themselves as members of the Association. Since then 14 have joined, making a total of 49. One of our members, M. Laurent, we are sorry to say, died shortly after joining.

We shall as soon as possible get rooms for the Association, one of which will be given up to the students.

The works which the Council are prepared to go on with immediately are: The engaging and furnishing of rooms, forming of a library, framing of a tariff, preparation of a form to guide competitions, papers or classes or other means of instruction for the students.

The Board of Examiners undertake the preparation of papers for examinations. All these and more we hope to accomplish before our next annual meeting in October.

It was moved by Mr. J. Wright, seconded by Mr. Bulman, that the report be received and adopted. Carried.

It was moved by Mr. Browne, seconded by Mr. Walbank, "That each member be assessed the sum of $5.00, so that the Council may meet expenses incurred by procuring the Act of Incorporation." Carried.

It was moved by Mr. Browne, seconded by Mr. Bulman, "That a vote of thanks be given the President and officers and Council of the Association for having the Bill passed through the House, and for the time and trouble they have given for the benefit of this Association." Carried.

There being no further business the meeting closed.

At a Council meeting held on May 4th to receive applications for membership, &c., there were present: Mr. J. W. Hopkins, President, in the chair; Mr. V. Roy, 2nd Vice-President; and Messrs. A. C. Hutchinson, A. Raza, A. F. Dunlop, M. Perrault, A. T. Taylor, W. E. Doran, Treasurer; C. Clift, Secretary.

A letter was read from E. Colonna, in which he asked for the withdrawal of his application for membership. It was accepted.

A letter from J. A. M. Beaudry was read, and the Council decided to accept his application for membership, leaving the establishing of date of practice to a committee that will be appointed for the purpose.

A letter from Mr. Venet was read in which he asked for information re examination. The Secretary was instructed to send him a copy of the by-laws.

Applications from the following were received and passed for membership: John Esinhardt, 379 St. Hubert street, James Smith, 557 St. Lawrence street, and G. A. Monette, as a student. Applications for membership were received from J. A. Thibaudear and Messrs. Joseph and H. M. Perrault.

It was unanimously decided to hold a meeting of the Council every fortnight.

PERSONAL.

Mr. John Herbert, the builder of several well-known public buildings in the city of Toronto, died in that city on the 11th inst.

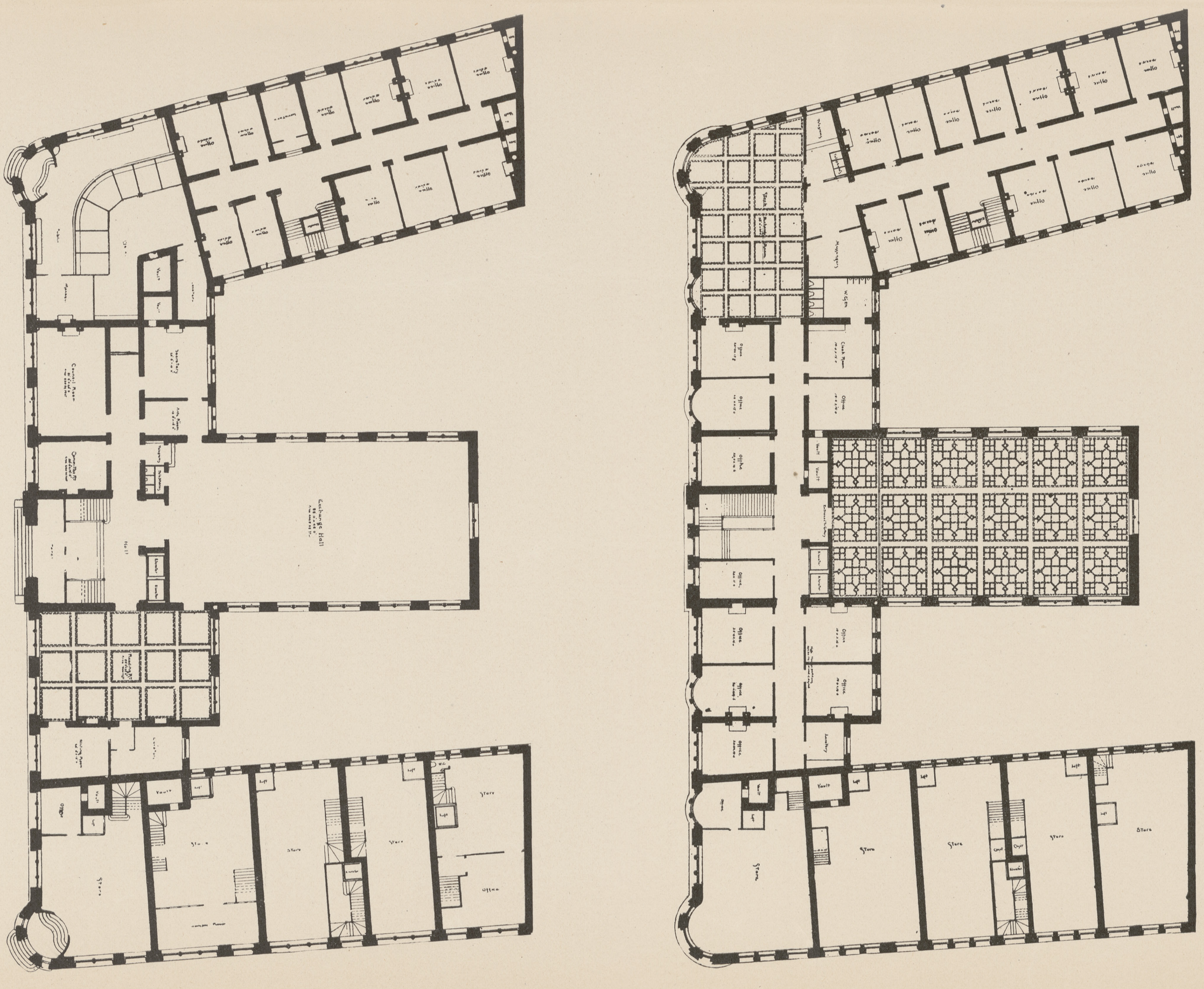
The recent death of Mr. T. J. Hibbard, of the firm of H. & T. Hibbard, stone cutters, Toronto, caused widespread regret among members of the building trades throughout the city, by whom he was held in universal respect.

By the resignation of Mr. Tracy, City Engineer, the city of London has lost an official whose place it will be difficult to fill with equal ability. Mr. Tracy has accepted the position of City Engineer of Vancouver, B. C., and will doubtless leave the impress of his skill upon the future development of that rapidly growing and already important city.

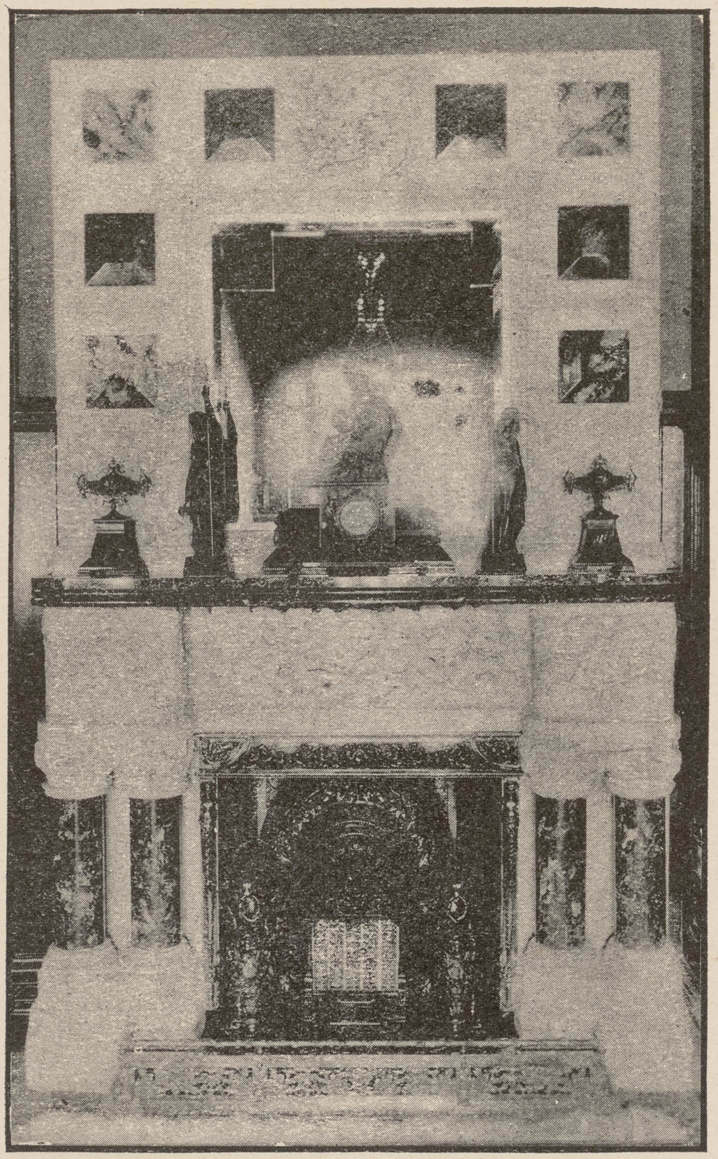
It is a somewhat peculiar circumstance that within a period of two years the principal contractors in the erection of the two most important buildings under construction in Ontario should have been forced at the call of death to leave to other hands the completion of their undertakings. Last year the community was startled by the sudden death of Mr. Lionel Yorke, the contractor for the new Legislative building. During the last month Mr. Elliott, the contractor engaged in the erection of the new Toronto municipal buildings, succumbed to an attack of la grippe. Mr. Elliott was for thirty years a resident of Brantford, Ont., during which period he filled with much ability and integrity several positions of public trust and responsibility. He removed to Toronto last year, to be the better able to give his personal supervision to the great undertaking which he had assumed. Mr. Elliott was 69 years of age at the time of his death. The fulfilment of his contract has been assumed by his sureties.

The Toronto Master Carpenters' Association has elected the following officers: John J. Withrow, President; Richard Dinnis, Vice-President; J. C. Scott, Treasurer; Wm. Simpson, Secretary; Committee, Messrs. W. Simmons, Geo. Moir, Douglas Scott, Wm. Power and Wm. Forbes.

Montreal Board of Trade Building Competition.
Design Submitted by Mr. J. Rawson Gardiner, Montreal.



Floor Plans.



Stone Mantel in Residence of Mr. P. Lyall, Montreal.
John James Brown, Architect.

ST. PAUL'S CHURCH, WINGHAM, ONT.

MESSRS. STRICKLAND & SYMONDS, ARCHITECTS, TORONTO.

Toronto Architectural Sketch Club Competition for "An Entrance to a Park."

Design by W. R. Johnston, Awarded First Position.

BUILDING MATERIALS.*

THE consideration of the subject of building materials for any structure naturally suggests three departments of investigation, viz. : 1st, The question of structural suitability ; 2nd, The subject of artistic suitability ; and 3rd, The matter of expense. All of these must necessarily receive some attention, and each in its relative importance.

Experience and observation seem to declare that in far too many cases their order of importance is reversed, and the financial aspect of the subject receives more than its due share of consideration. Instances are by far too common when the ingenuity and thought of an architect are unduly taxed to accomplish with a cheap and inferior material, an effect which should only be sought by the use of something more expensive. The financial interest of a client is often so unduly pressed that an architect is led to use a material which, were he untrammelled in regard to cost, would not find a place in his building. It will be found, however, that a client's best interests are frequently served by the use of a more expensive and durable material, even though at the outset his limited views may cause him to protest against such an expense. Certainly there can be no question that an architect's reputation depends largely upon the quality of materials used in his buildings, as well as upon the skill with which they are disposed. So it cannot be amiss to emphasize the need of placing the most important aspect of the question first, viz., structural suitability, then artistic effect, and then cost. In the first of these matters the architect's decision should be so intelligent and definite that no interference will be attempted by a client. Of course there are always half informed men of positive opinions, who, because they have to pay the bills, insist upon their views being carried out. But when met by a well informed architect, whose views are positive because he knows whereof he speaks, such clients are usually found amenable to what in the end is for their best interests. Certainly the opinion of an architect who has studied the structural suitability of building materials is entitled to be received as final ; and no client should be allowed to overrule the best judgment of his professional adviser, when all the facts have been considered. Concerning the subject of artistic suitability, a somewhat similar attitude should be assumed by the architect. Courtesy, however, is due to the pronounced tastes of the man who is not only to pay for the building, but also perhaps live in contemplation of it day by day. Even then, however, it is a question whether the architect should not insist upon carrying out his view and provide a structure which may perhaps have an educative influence upon the uncultured taste of his client.

Whatever may have been our experience in the past or resolutions for the future in regard to these matters, our position must be greatly strengthened by an intelligent and comprehensive knowledge of both subjects. This, as you are well aware, can only be attained by constant study and observation. It is to briefly direct your attention to one of these branches that I now present this paper. The field is too large to even cursorily touch upon its various departments, so I must content myself with a few generalities upon some of the more common building materials.

First in order are the natural products. Stone occupies a front rank in natural building materials, because of its durability and other excellent qualities. Building stones are subject to two methods of classification, viz., according to their chemical composition, or their mechanical structure. The consideration of both of these is necessary to determine the suitability of a building stone.

Mechanically considered, stones are either simple or compound. Those composed of the same substance throughout are simple, as for instance pure limestone. Compound stones are an aggregation of simple minerals, which in their final formation have been either cemented or simply aggregated. In cemented stones the particles are cemented together by another substance, and their strength and durability largely depend upon the nature of this cementing substance. If it be pure silicious cement, the stone is very durable, provided the matter so cemented is itself durable. If the cement be aluminous, the cohesion will be much less ; more especially when the alumina is mixed with iron, in which case the stone is subject to chemical disintegration. If the cementing substance be calcareous, the action of heat, rain or frost is liable to produce either chemical or mechanical disintegration. In aggregated stones the simple minerals are immediately connected together without any other cementing materials. These stones may generally be classed as granular, slaty or porphyritic. When the stones of simple material or mineral are of nearly the same size, length and breadth and thickness, the stone is called granular, such as granite. When the constituent elements are thin and flat, the stone is called slaty. Where one of the constituent elements forms a basis in which the other parts are imbedded, the stone is called porphyritic.

The principal chemical elements of most building stones are silex, alumina, lime and magnesia. The preponderance of any of the first three leads to the classification of the stone under the head of either silicious, aluminous or calcareous. As, however, aluminous stones nearly always contain a mixture of silex, they are more generally termed argillaceous. Silex or the earth of flints being nearly insoluble, forms a very important element in producing a strong, compact and very enduring stone. The two great classes of siliceous stones are granites and sandstones—the former being aggregated and the latter cemented.

Granite and gneiss are composed of quartz, feldspar and mica. The best stone is that in which the particles are fine and uniformly distributed. If the quartz predominates, the stone will be hard and brittle; if the feldspar is in large quantity, chemical decomposition may take place ; if the mica is in excess, the stone will be soft and subject to mechanical disintegration.

Sienite, which is classed under the general term of granite, is composed principally of horneblend and feldspar. Sandstones are composed of small particles of quartz united by a cement, which is either siliceous, argillaceous or calcareous in nature. The best sandstones are usually those where the cementing substance is siliceous. The worst are those where it is argillaceous. The grains of sandstones being comparatively indestructible, the durability of the stone depends upon the cementing material. Chemical action which might affect the calcareous cementing material, or both chemical and mechanical action affecting the argillaceous or aluminous cementing material, must always be taken into consideration when dealing with the suitability of sandstoue. From the mode of their formation sandstones are frequently laminated, more especially when the thin plates of mica have been deposited in planes parallel with its bed. Hence the necessity for placing sandstones on their natural bed ; otherwise, if the planes of lamination are in a vertical position, the decomposition of the laminæ will cause the stones to fall off in flakes.

When the mechanical structure of the stones is good, siliceous stones are the best possible material for foundations, piers, bedding plates or any position requiring great strength, hardness and durability. Pronouncedly siliceous stones, however, have this great drawback, that they are very hard to work with the mason's tools.

Argillaceous stones, like common clay, are a mixture of alumina or pure clay and silex. In most instances there is a further mixture of metallic oxides and other earths. Nearly all the stones known to builders as slate belong to this class. The most deleterious substances found in these stones are iron and its sulphurets. Iron in the form of pyrites or in a state of oxide is frequently found in slate. When exposed to moisture, the pyrites become decomposed, and the iron still further oxygenized, the surface of the slate peels off or falls into powder. In proportion to the amount of silex held in chemical combination, will be the strength and hardness and enduring qualities of argillaceous stones. The action of water and vegetable growth upon aluminous stones is very considerable, hence those that contain the most silex aud absorb the least water are generally the most serviceable.

Calcareous, or limestones, cover a large range of our available building stones, from pure chalk up to marble. They are composed principally of carbonate of lime combined with metallic oxides. They may be divided into three classes, viz., the simple, the oolite, and the magnesian. The simple limestones are very durable, but they are difficult to work owing to their tendency to splinter. The stone in which the structure is the most crystaline is the best for cutting.

The oolite limestones are composed of oviform bodies cemented by calcareous matter. They are very various in texture aud durability, according to whether the oviform bodies and the cement are coherent or not. The limestones which are usually termed shelly, from their being formed of broken or perfect fossil shells cemented by calcareous matter, suffer decomposition in an unequal manner in consequence of the shells offering the greatest amount of resistance to the decomposing effects of the atmosphere.

The magnesian limestones constitute a very valuable class of building material. The addition of carbonate of magnesia gives them a more or less glossy lustre. It is sometimes difficult to distinguish between fine grained sandstone and crystaline limestone. The application of sulphuric acid to the surface will produce effervescence on the limestone, but will not affect the sandstone.

Carbonate of lime being the predominant chemical element in all limestones, the action of water, acids and heat require to be carefully considered. Pure lime, as you know, is produced by the action of heat freeing the carbonic acid gas. The action of fire upon limestone buildings is well known, hence the care that should be observed in keeping such material away from fireplaces, flues or other positions exposed to heat.

Many grey limestones when exposed for a few years become almost white ; in this case the chemical change is going on slowly, but the ultimate decomposition of the limestone is none the less sure. The action of water in conjunction with the atmospheric chemical influence, causes a disruption of the exposed particles on the face of the stone. Thus buildings will be found to suffer most decomposition on the surfaces exposed to the rains or driving storms.

It may be well to repeat a few general deductions : 1st, Apart from the questions of cost, color or artistic effect, siliceous stones are the best for general building purposes. They are usually the strongest and also the least affected by the natural elements, care being observed to avoid in one direction, very hard or brittle stone ; and on the other hand, sandstones which are cemented by inferior substances. 2nd, For purposes of footings, lintels, templates or other positions requiring great transverse strength, the best qualities of argillaceous stones are very valuable—care being taken to avoid stones containing iron or other convertible materials. 3rd, Simple crystaline limestones and those containing carbonate of magnesia form very useful buildings—care being exercised to not expose them unduly to the action of water, frost, smoke or heat. Two general principles applicable to all stones are : 1st, That the greater their specific gravity, usually, the greater their crushing strength ; 2nd, The less water they absorb, the more they are to be trusted.

I must conclude these remarks upon building stones by the following quotations from the report of the Commission appointed to investigate into the causes of decay in the stone of the English Houses of Parliament :

"Regarded from a purely chemical point of view the difference in the resisting power to corrosive agents of different building stones, would appear at first sight to depend entirely upon their *chemical* composition ; but even a moderate acquaintance with the properties of the components of such building stones demonstrates that there are other conditions at least equally instrumental in determining the degree of permanence of different stones. It is a well established fact that the *same* chemical substance exhibits in different *conditions* a great variation in its behaviour with chemical agents. Thus marble and chalk are chemically identical, but owing to the difference in their physical structure, the one being crystaline and the other amorphous, the former is much less readily acted upon by acids than the latter. Carbonic acid in the presence of water is a powerful solvent ; it not only corrodes the calcareous and magnesian carbonates, whether they form the principal constituents of the stone or are only present as cementing materials, but is capable even of attacking and gradually decomposing the hardest and most indestructible rocks. In the case of the calcareous and magnesian constituents of stone, carbonic acid acts by transforming the insoluble earthy carbonates into soluble bicarbonates, which are thus removed from the surface of the stone ; whilst its influence on siliceous rocks consists in the elimination of the alkaline bases in the form of carbonates, and the separation of the silica in a more or less friable condition. The weathering of granites and their gradual transformation into the several varieties of porcelain clay affords an interesting illustration of the latter kind of action."

In the changes just mentioned, the carbonic acid and water are equally concerned, the water serving not only as a vehicle for the introduction of the carbonic acid into the pores of the stone, but also as a solvent for the products of its action. There are changes, however, to which building stones are subject in which water is the sole agent, and which are more of a mechanical than of a chemical character. The expansion which water undergoes on freezing, and the irresistible force which it then exerts are well known. It is obvious that water freezing within the pores of a stone must exercise a disintegrating action not less powerful than those above referred to. Chemically, therefore, the more calcareous and magnesian the stone, the more rapidly it will be destroyed ; and mechanically, the more readily it gives admission to the vaporous or gaseous sulphur acids and water vapor, the faster it will be disintegrated.

Closely allied with stone in most of our structures are the artificial products of clay and sand in the shape of bricks and terra cotta.

In order to secure the best bricks, attention must be paid to the kind of earth, the method of working it, the form into which it is moulded, and the manner in which it is burned. The best brick earth is composed of a mixture of pure clay and sand. Care should be taken to eliminate all pebbles, especially those of limestone formation. These pebbles act as fluxes in burning, and weaken the brick by leaving cavities or causing cracks. If limestone, the burning reduces them to lime and the action of water will afterwards destroy the brick. If, however, small grains of pyrites or other metallic substances be present in small quantities and equally distributed throughout this earth, they assist the vitrification of the brick and are an advantage. Good brick earth is frequently found in a natural state. When it is necessary to mix the clay and sand, experiment alone will determine their relative proportion. If the clay is in excess, the temperature required to semi-vitrify it will cause it to warp, skrink and

* Paper read before the Toronto Architectural Sketch Club by Mr. H. B. Gordon.

crack. If there be an excess of sand, too strong vitrification may ensue.

The quality of a brick depends quite as much on the skill used in its manufacture as in the quality of the earth. After the particles are fully disintegrated, and they have been sifted so as to remove pebbles, they may be either moistened for ordinary brick making or passed on to the press for dry press work. The quantity of water required for tempering will depend on the quality of the earth. The general rule is the less used the better, or just enough to make it so plastic as to be easily shaped. If too much water be used, the brick will not only be very slow in drying, but it will in most cases crack, owing to the surface becoming completely dry before the moisture of the interior has had time to escape.

Too little attention is paid in Canada to the drying of our common brick before burning. Placed as they are in the open air, exposed to the full action of the wind, and to some extent also exposed to the sun, one part dries quicker than the other and the bricks are full of cracks and unequal skrinkage. Here, too, the presence of too much clay will cause cracking, while if there be too much sand, the brittle nature of the brick will cause the arrises to suffer. Plastic bricks should be slowly dried in a shed so protected that the action of wind and sun may not affect one part to the detriment of the whole. It is in this process that the superiority of the dry pressed brick is very apparent. As no water is used, save the moisture contained in the disintegrated earth, no preliminary drying process is needed, the bricks are immediately placed in the kiln, their arrises are not subjected to two handlings nor their surfaces distorted by unequal drying.

In the burning of our ordinary bricks greater care might well be observed in many instances. Whether wood or coal is the better fuel is not so important a matter, although no doubt the sulphurous fumes of coal may produce after results in the color of the brick. The great question is how the heat is applied. My impression is that in many cases it is at once too strong and too short. Were several days added to the time of burning and cooling, and the process not so intense, we would have stronger and better formed bricks.

Another matter that might well receive the attention of architects and brickmakers, is the form of the bricks. Heretofore the bricks have been made to suit the quick handling of them by the bricklayers when laying, without considering specially the best form to obtain a strong and durable brick. Those of us who have seen the thin square bricks of the ancient Roman buildings that have stood the exposure to wind and rain for two thousand years, have perhaps been set thinking whether after all our form of brick is the correct one. Roman bricks are from $1\frac{1}{2}''$ to $1\frac{7}{8}''$ in thickness and from $7\frac{1}{2}''$ to $12''$ square. The squareness possibly would be an objection to the efficient bonding of our comparatively narrow walls, but surely the question of thickness is one that should receive consideration? The German and Flemish bricks are about 2″ thick, and no better bricks are made anywhere.

Good bricks ring with a metallic sound when struck, and will bear a smart blow without breaking. Generally speaking, the denser and heavier a brick is for its size, the stronger it is for general use. Also the less water a brick will absorb, the better it is.

The crushing weight that can be sustained by ordinary bricks is very various; varying from as low as 500 lbs. to the square inch up to 10,000 lbs., while the best pressed brick will sustain a crushing weight of 12,000 lbs. With ordinary brickwork the strength greatly depends upon the cementing material. It is not well to calculate upon more than 500 lbs. to the square inch as the crushing weight of good ordinary brickwork, and an outside limit of 1,000 lbs. for select brick built in cement. Kidder's experiments give a range extending considerably higher than this, while Trantwine is considerably below these figures in his estimate. No brickwork should be planned to sustain more than one-fifth of these crushing weights; that is from 100 to 200 lbs. to the square inch of safe load, according to the quality of the brickwork. When we remember that the crushing weight needed to reduce some granites, and even limestones, is over 20,000 lbs. to the square inch, the disparity between them and even the best brickwork is apparent.

The use of brickwork for the foundations of very heavy structures may well be questioned. Also in view of its absorbent qualities it should not be used where dampness and frost may combine their destructive agencies upon it. The strength and properties of mortars and cements require even greater consideration than those of brick and stone, for upon them largely depends the strength and durability of the walling. They are usually the weakest point in construction, and the ultimate strength of the whole wall is dependent upon that of its weakest element.

Limes may broadly be divided into ordinary and hydraulic—the former having its divisions of rich or fat limes, and poor or meagre limes; the latter having three divisions according to their hydraulic qualities. The rich limes are the purest metallic oxides of calcium we possess, and the purer the carbonate of lime from which they are obtained, the richer or fatter they are. When slacked, they swell to twice their original bulk. They never harden when placed in water, and if continuously exposed to the action of water will be entirely dissolved. The best limes are obtained from the closest grained and densest limestones. The poor limes are those which swell but little when being slacked, are soluble in water but do not set, and leave a residuum after dissolution.

For the purposes of making a good mortar, lime should be completely slacked. A few days submission to the action of water would be beneficial in the case of fat limes, so that a complete hydrate may be formed. The old Romans had a law that lime must be three years under the water before being used. While of course this is extravagant exaggeration of the benefits of complete saturation, the idea intended to be conveyed may well be pondered. When we remember the expansion of lime while slacking, the necessity for having that swelling fully accomplished before it is placed in the joints of masonry is worth remembering.

Again, it is well to guard on the other hand against having too much water in the mortar, as in the case of thick walls the drying out of the lime is a problem of importance. A fact to this point is cited by General Treussart who had occasion to demolish in the year 1822 one of the bastions erected by Vaubau in the citadel of Strasbourg in the year 1666. In the interior the lime after these 156 years was found to be as soft as though it were the first day on which it had been made. The difference between the manipulation of ordinary and hydraulic limes is seen when it is remembered that the slower the manipulation of the former and the quicker that of the latter the better.

Concerning the quantity of sand to be mixed with lime to make a good mortar, the amount largely depends upon the richness of the lime. Good fat lime will take as much as two and a half times its slacked bulk of sand, or about five times the dry bulk. This is an outside limit, but observation of the ordinary mortar beds of builders seems to prove that they love to keep close to or beyond this limit. For ordinary purposes one and a half times the slacked bulk or three times the dry measure of the lime is a fair guide. A much greater quantity of lime is rather a weakness than an advantage. For hydraulic lime or cements, however, the proportion should generally be less. When more sand than double the amount of cement is used, the cohesive power is likely to be weakened.

One point of vital importance is to have the mortar thoroughly mixed and of a uniform consistency. Extra good results may be obtained by first working up the lime into a paste in a mill, and then mingling the sand and lime in a pig mill. But all precautions in other matters will be in vain unless the quality of the sand is correct. The general terms "clean and sharp sand," which find place in most specifications, may cover a great variety of useful or comparatively worthless earths. Sand of irregular sized grains is best—the smaller ones filling up the interstices of the larger. Where sand is very coarse, it is better to mix some of finer grained structure with it. The grains should be sharp so as to better adhere to the lime. For this reason lake or river sand is usually better than that obtained from pits. The cleanness of sand should not necessarily imply the complete absence of other earthy matters. If the sand be free from alumina or clay and vegetable deposit, the purpose of cleanness is satisfied. The presence of particles of calcareous matter is generally helpful. The sand produced by the disintegration of quartz, schiste, mica and feldspar is one of the best. It is supposed that the presence of potassa in the decomposing feldspar influences the setting of the limes mixed with such sand.

Of the hydraulic limes or cements, much may be written. Chief among them is Portland, so called, which is manufactured from the diluvial clay in the valleys of rivers mixed with certain proportions of chalk, ground in mills with water, and after settlement and drying, burnt and ground to a fine powder. It is very various in quality, as your experience has no doubt found. This is often owing to the imperfect calcination of some portions and the over burning of others. If these be ground together, when the cement is used their differing qualities will be sadly apparent—the one setting quickly and the hard burned cement setting slowly. More frequently, however, at least in this country, Portland cement is spoiled by the careless way in which it is stored and the length of time elapsing between its manufacture and use. It readily absorbs moisture, and consequently should be kept in a dry place. It forms one of our most valuable building materials, and if the reports and expectations concerning the deposits in the bed of a dried up lake in Grey County are realized, I trust we may soon have a superior Canadian Portland cement.

An eminent German chemist, Dr. Pettenhoffer, accounts for the hardening and non absorbent qualities of Portland cement by showing that the structure of the cement is laminar, whilst that of other cements is globular; the result of this being that the Portland cement particles touch at all points, and therefore admit of no interstices for the lodgement of water so as to promote disintegration.

The strongest Portland cement is heavy, and of a blue-grey color. The lighter cements set more quickly than the heavy, and are brownish in color. The standard quality should weigh about 110 lbs. per bushel, and it should stand a tensile strength of 500 lbs. after the cement has been made and set for 7 days under water. A simple test can be made by making up a small cake of cement and placing it in the water. If there be an over-proportion of clay the cement will become buff. If too highly burned, or if having too great a proportion of chalk in its composition, little cracks will be formed all around the edge of the cake.

The base of all our ordinary hydraulic cements is a carbonate of lime combined with a silicate of clay. Generally the cement stones are burned as found, and the resultant cements vary much in quality. Some very valuable kinds of cements are those known as Magnesian, and made principally from dolomite. These stones when calcined and powdered, form a cement which, when set in water, forms a stone of extraordinary hardness.

In 1882 a series of tests of the strength of brick piers laid with various mortars was made at the United States Arsenal at Watertown, and the following table will show the results upon the 8″x12″ piers built of common brick. Those in lime mortar cracked under 833 lbs. to the sq. inch; those in lime mortar 3 parts, and Portland cement 1 part, cracked under 1,875 lbs. to sq. inch; those in lime mortar 3 parts, and Newark and Rosenda cements 1 part, at 1,354 lbs. to sq. inch; those in lime mortar 3 parts, and Roman cement one part, 1,041 lbs. to sq. inch; those in Portland cement 1 part, and sand 2 parts, 1,302 lbs. to sq. inch; those with Newark and Rosendale cements 1 part, and sand 2 parts, only 708 lbs. to sq. inch; and those in Roman cement 1 part, and sand 2 parts, 1,770 lbs. to sq. inch.

From these it would seem that the strongest mortar for crushing weights is that composed of 3 parts of lime mortar and 1 part of Porland cement; while that with 1 part of Roman cement to 2 parts of sand was nearly as strong up to the cracking point, but its ultimate strength was much less than that with Portland cement 1 part, and sand 2 parts.

The consideration of wood as a building material opens up a wide range of investigation and judgment. In deciding upon the use of any wood for construction or decorative purposes, three principal matters demand consideration. 1st. Its intrinsic character; 2nd. Its suitability for the position proposed; 3rd. The best method to secure its preservation. As to the character of wood, a few general elementary matters may bear repeating. Observing the cross sections of any of our exogenous trees, there is revealed the outer bark, the liber or inner bark, the cambium or transitional fibre from which is developed both the liber and the wood fibre, the alburnum or undeveloped wood, the true wood and the central pith.

One good token of sound servicable wood, is the clearness and firmness of the bark and the small quantity of alburnum. Another is the uniformity and depth of color, for if the wood lightens rapidly to the alburnum, it is a likely sign of disease. Another good sign is the fresh and agreeable odor it exhales when cut, for diseased sap will make itself known by its unpleasant smell. Another desirable feature is equality in the size of fibre, and a uniform growth and development as evidenced in the concentric rings.

Good wood is elastic, tenacious and solid, and emits a sonorous sound when struck. It cuts clean with the saw, and is bright in color and has a silky lustre when planed. Diseased wood, on the other hand, emits a dull sound when struck, leaves a wooly edge when saw cut, and is dull and flat after the plane. Unfortunately now that so much of our timber has been cut, much that formerly was passed by as inferior, is now resorted to by the lumberman. Trees are cut up for timber which are either diseased or have been subjected to adverse circumstances, and in many cases are partly dead. When from disease of the sap, a portion of a tree becomes dead, the fibres lose flexibility and strength, and are easily subjected to rot and decay. Among other diseases of the sap is that called plethora, which by reason of the over abundance and irregular supply of sap causes the fibre of the wood to be of unequal texture, and consequently untrustworthy for constructional purposes. The action of frost frequently causes defects in the wood by hindering the transformation of the alburnum into solid wood, causing division of the concentric rings and producing shakes. When growing timber has been subjected to alternations of strong frosts and thaws, the wood is often part live and part dead, and filled with small clefts. Twisted fibres, caused by the mechanical action of the wind on growing trees, renders much wood unfit for transverse strains. If a tree be grown in swampy ground, the continual saturation of the roots does not give the sap those essential qualities necessary for the production of good strong wood. Generally speaking, the woods grown in good soil, where there is not too much moisture, are the best. Trees growing in the open, or at the edge of a wood, where the influences of sun and wind are most felt, usually furnish better timber than those growing in the dense forest. The heaviest wood usually the strongest of its kind. The presence of knots weakens strength of a timber, not only by reason of their own area, but also because of the cross grain thus formed. Black or dead knots form an additional danger by reason of their decay and the possibility of its transmission to the rest of the wood. I need hardly add that the white wood or alburnum of trees should be rejected in all cases, it being imperfectly formed fibre without strength or lasting qualities.

The next consideration is as to the kinds of wood most suitable for different building purposes. For positions where durability is the principal consideration, such as piles, foundation planking or other substructure, the decision will largely depend upon whether the place be wet or dry or subject to alternations of the same. In positions constantly wet, oak has been known to remain perfectly sound for hundreds of years, whereas if it be exposed to alternations of wet and dry, a few years will accomplish its destruction. Chestnut, while not as strong as oak, stands variations of damp and dryness very much better. This is especially the case with timber cut from comparatively young trees. Wood of this description has been known to last in trying positions over 50 years. Pitch pine also is very valuable for such positions, its highly resinous nature forming an excellent preservative. The larch is exceedingly durable, and is very valuable as post piles or sleepers. But probably the prince of woods for such positions is the red cedar, when cut from a healthy, live tree. If the purpose be simply for piling or hydraulic works constantly subject to water, the elm will be found very durable.

When the strength required is largely compressive in a transverse direction to the grain, such as in templates and other bearings, the relative value of our more common woods may be placed in order as follows: Black and yellow locust; sugar maple; ordinary scrub and swamp oak; hickory and ash. While lower down in the scale of value are birch, sycamore, cherry, elm, ordinary maple and Georgia pine. Where, however, these templates or bearings are exposed to the adverse action of damp and dryness, or where they are built up in a wall, the permanent properties of the woods need quite as much consideration as their sustaining strength. Where the properties required are mostly of compressive strength in the direction of the grain of the wood, such as in posts, the relative values of the woods in order is about as follows: Locust, Georgia pine, birch, live oak, beech, sugar and black maple, cherry, ash, rock elm, ordinary oak, pitch pine, white and red maple, red cedar, white pine, spruce and hemlock. The degree and manner of seasoning will, however, determine the relative values of some of these woods. Well seasoned woods resist crushing strains nearly twice as well as green woods. Where the strength needed is transverse, such as in beams and joists, from conflicting authorities I have endeavored to arrange the following list in their order of merit, viz: beech, Georgia pine, ash, oak, birch, hickory, maple, spruce, elm, yellow pine, white pine and hemlock. In such positions the straightness of grain, the uniformity of fibre and the freshness and density of the wood, form very important factors. Where the force applied is a shearing strain, such as in roof framing, trussing, &c., the more valuable woods are white oak, pitch pine, spruce and resinous pine. Where the weight is supported by tensile strength, such as in king posts, locust, ash, birch, alder, chesnut, elm, beech, hickory, maple and oak. Where wood is exposed to twisting or torsion strain, hickory, locust, white oak or ash. Besides these considerations of purely constructive strength, there are the effects of wear and tear to be considered, such as in floors, &c. Here a close grain as well as a hard texture is desirable hence the valuable properties of maple, tamarac, birch and Georgia pine. Also the avoidance of those woods that splinter or raise in the grain such as hemlock, and others that decay rapidly when alternately wet and dry, such as oak and ash. Then, again, it is very necessary in exposed positions to avoid woods that curl and warp or are subject to great alternations of contraction or expansion. Some woods by reason of their non splintering qualities are very useful and may be relied upon for sink cappings, counter tops, and such places, ranging from the soft popular up to the sycamore and walnut. Others again are valuable for their insect resisting properties, such as red cedar for shelving, closets, &c. Indeed there is hardly any special position or requirement about a building, but demands the special allocation of some wood best adapted for the purpose.

In conclusion I might briefly refer to the very important subject of the preservation of timber. Of course the first requisite is thorough seasoning, as without this the application of any preservative is useless. The removal of the sap from the wood in order to prevent its fermentation and the consequent destruction of the fibre is the matter of most importance. Mere drying, particularly if it be done quickly, will not accomplish this, but may merely dry up the vegetable matter held in solution in the sap, and leave it there for future action in case of dampness or atmospheric influence. The lumberman's method of floating his logs to the mill has greatly assisted in the seasoning of our timber; the action especially of running water being very useful in washing out the sap. Continued saturation, however, has a tendency to greatly weaken the constructive strength of timber, so for carpenter work the wood should not be left long in the water. After the water has gradually dried out of timber, it may be subjected to the dry kiln; but wet or green lumber submitted to such a test warps and cracks in a discouraging manner. One disadvantage of kiln dried wood is the avidity with which it afterwards absorbs dampness from the air; so that where at all practicable, the old fashioned method of long stacking under cover but exposed to the free action of the air is to be preferred. Where possible, kiln dried stuff should be treated to a coat of paint or some other preservative immediately upon its being removed from the drying pile. The use of preservatives to timber is two-fold, viz., either by their presence to arrest and retard the fermentation and putrefaction of the natural juices, or granted the natural juices have been expelled by thorough seasoning, to so close the pores of the wood as to prevent extraneous action; or in the case of protection against ants and worms the coating with some antagonizing substance. The chemical solutions most generally employed to saturate wood for its preservation are: corrosive sublimate, in the system called "kyanizing"; chloride of zinc according to Burnett's method; sulphate of iron and muriate of lime, and also sulphate of zinc in combination with other substances. Each of these has some special feature of value, but along with it some serious objection. A Committee of the American Society of Civil Engineers after collating a large number of experiments, recommended Burnettizing for damp exposures and Kyanizing for comparitively dry situations. The best known all round preservative is creosote oil; it fills the wood vessels, coagulates the albumen, prevents the absorption of moisture, is fatal to animal and vegetable life and so repels the attacks of insects or the growth of fungi. Unfortunately, however, its smell is so nauseous that its use in a dwelling house is practically impossible. A weak solution of lime has a decidedly preservative effect upon timbers, and may advantageously be used when the work treated is not exposed to the action of rain. For exposed unpainted work, resins dissolved in essential oils render wood impervious to water. For preservation of the surface of woods against the action of sun and rain, nothing perhaps is more valuable than alternate painting and sanding for two or three times; care being taken that a purely siliceous sand, clean and dry, is used. In conclusion I might reiterate the necessary caution, that wood should be perfectly dry before being treated with paint or any other preservative.

ONTARIO ASSOCIATION OF ARCHITECTS.

A FULL meeting of the Council was held in the rooms of the Architectural Sketch Club on May 7th. The proof of the By-laws, as revised, was submitted, and after some emendation was approved of in full. The By-laws will shortly be published. The curriculum and examinations for students were definitely settled. The following text books were approved:

1. HISTORY OF ARCHITECTURE STYLES AND ORDERS.
   Gwilt's Encyclopedia (edition 1888) Fergusson's "History of Architecture," Stewart and Rivette's, Bohm's Edition, Chamber's "Civil Architecture"; Rickeman's and Bloxam's "Gothic Architecture"; Parker's Glossary; Parker's "Introduction to Gothic Architecture."
2. MOULDING AND ORNAMENT.
   Paley's "Gothic Mouldings"; Brandon's "Analysis of Gothic Architecture."
3. DRAWING.
   Architectural Perspective—F. A. Wright.
4. ELEMENTS OF CONSTRUCTION AND MATERIALS.
   Reid's "Cements"; Clark's "Building Superintendence"; Wightwick's "Hints to Young Architects."
5. GRAPHIC STATICS, ETC.
   Stoney's "Strains"; Kidder's "Architects' and Builders' Pocket-Book."
6. SANITARY SCIENCE, HEATING AND VENTILATION.
   Baylis "Plumbing and House Drainage"; Baldwin's "Steam Heating"; Parke's "Manual of Practical Hygiene"; Billing's "Ventilation."
7. ARCHITECTURAL JURISPRUDENCE.
   Gibbon's "Law of Contracts" (Weales series).

A copy of each text book will be deposited in the library of the Association. The following books were also recommended to be purchased for the library:

Stevenson's "House Architecture"; Viollet Le Duc's "Discourses on Architecture"; Viollet Le Duc's "Habitations of Men in all Ages"; Pugin's "True Principles of Gothic Architecture"; Pugin's "Apology for the Revival of Gothic Architecture"; Ricker's "Roof Trusses"; South Kensington "Notes on Building Construction"; Vignole's "Five Orders"; Parker's "A. B. C. of Gothic Architecture"; Osborne's "Notes on House Planning"; Jenkins' & Raymond's "Architects' Legal Hand-Book"; Taylor & Creasy's "Italian Architecture."

A Committee was appointed to select and purchase additional books for the library. Mr. W. A. Langton was appointed librarian.

It was decided that since at the last Convention a by-law was passed making the Association year begin on the 1st of January, and as many of those who registered prior to the passing of this by-law expected their registration fees to cover all dues to the 1st August, therefore these members who paid the fee for the year 1890 shall be required only to pay three-fifths of the annual fee for 1891.

At the last Convention of the Association, a resolution was passed requesting the Council to endeavor to ascertain the nature of the building stones in the Province, Prof. Galbraith having volunteered to co-operate with the Association in this matter by giving them the use of a testing machine at the School of Practical Science, a Committee was appointed to obtain the necesary specimens and conduct the experiments and to publish the results for the benefit of the Association.

A letter was read from Vancouver, B. C., requesting a copy of the By-laws and Act of Incorporation to assist in the formation of a similar Association in British Columbia.

The time for sending in designs for the Association seal was extended to July 1st, 1891, and the premium was fixed at $25. Only registered architects are invited to compete, and no premium will be given unless the designs are approved by the Council.

In the matter of the Presbyterian Church Competition, as only two designs have been submitted, neither of sufficient merit to justify the Council in appointing a Committee to judge the designs, it was thought best to confer with the Board of the Presbyterian Church before taking further steps. There will probably be a new competition, which it is intended shall be brought to the notice of every member of the association by the Committee having the matter in hand, so that the competition may be taken up in a manner more worthy of the object.

It was decided that as the time for registration of practising architects has been already twice extended by the Council, no further applications for registration will be received unless accompanied by a certificate showing the applicant to have passed the examination required by the Act, The students who have registered will shortly be graded according to the length of time of service and every student will be notified of the examinations necessary to be passed by him and on what dates. A circular containing the curriculum, text books and other information necessary for students preparing themselves for examination will be sent to all students.

A Committee was appointed to draft conditions of competition acceptable to the Association, as was requested by the Council at the last Convention.

Mr. Wright, the lecturer on Architecture at the School of Practical Science, sent a communication requesting that members of the Association would send drawings to the school, each to remain some time so as to establish a permanent exhibition for the instruction of the students in architecture. The Council appointed a hanging committee, consisting of Messrs. Connolly, Darling and Langton, to select from drawings submitted such as they may think suitable for hanging upon the walls of the School and for the use of the students.

THE POINTED OR ENGLISH STYLE OF ARCHITECTURE.

By "H. B."

[*Concluded from January Number.*]

THE Order of Decorated English Architecture may be said, in general terms, to be distinguished by the following marks: The expansive scale of its windows, which in the best ages of this style display the pointed form in most just and beautiful proportions, and, under all its variations, are divided into several lights, having the heads adorned but not crowded with tracery work; the unity of its columns, which in earlier ages consisted of many slender, detached shafts; the increased richness of the vaulting, which important part of the interior retained, as we have seen, much simplicity even in the most dignified buildings of the preceding class; the introduction of tabernacle work, and plentiful, but not superfluous, ornaments, comprising various graceful, but in many instances, nameless particulars of embellishments on those parts of the inside and exterior which were left plain by the architects of the previous era.

The arches of this order exhibit a considerable degree of variation, but are less acute and more open. That which approached the nearest to perfection of any pointed arch and which prevailed in many buildings constructed during the sway of the three Edwards "being formed by segments of a circle, including an equilateral triangle from the impost to the crown of the arch." In subsequent reigns the arch becomes lower, and consequently loses a portion of symmetry and beauty. In the fourteenth century, arches of the ogee shape, formed of four segments of a circle contrasted, were very common, and are said to have prevailed especially in the tombs of the crusaders. The columns, Mr. Bentham states, were not now detached, or separate, from the body of the column, but made part of it; and being closely united and wrought up together, formed one entire firm, slender, and elegant column. Mr. Essex states that marble was almost universally employed in the construction of pillars in great buildings until the latter end of the reign of Edward the Second, but was only partially used by the architects of Edward the Third's time, and was quite rejected before the termination of that historical era.

In regard to the roof, the vaulting, in common with every other part, became greatly decorated. The ribs branched out into a kind of tracery work, and divided the vaulting into numerous angular compartments, ornamented at the intersections with carved heads, foliated orbs, and various devices having an historical or legendary allusions.

To use the words of Dr. Milner, the window no longer consisted of an arch divided by a mullion into two, and surmounted with a single or triple circle, or quatrefoil, but was now portioned out by mullions and transoms, or cross-bars, into four, five, six and sometimes into nine bays or days, as the separate lights of a window were called; and their heads were diversified by tracery work into a variety of architectural designs, and particularly into the form of flowers. In these windows we behold, disposed with lavish magnificence, the attractive and appropriate splendor of painted glass, conducive to the intended object of the structure by illustrating passages of sacred history, revealing tales of saints and martyrs and perpetuating in the rude portraiture of the times the effigies of kings, prelates, and founders.

The adoption of eastern windows appears to have first occurred in the thirteenth century, and led to an alteration in the form of that part of the church; but the practice of constructing windows of large dimensions, both in the more sacred part and in the western extremity, obtained so much esteem in the early part of the era now under notice, that we find them frequently introduced as alterations of ancient structures, which were otherwise allowed to remain in their original state.

The capitals of the clustered columns were often richly foliated, and the arches of windows were invariably adorned with one or more casps on each side of the head, so as to form trefoils, cinquefoils, &c.

Where pediments were raised over arches they were uniformly purfled or adorned with those representations of foliage termed crockets. The arches, thus surmounted with architectural decorations, were also accompanied by pinnacles constantly purfled and crowned with a finial or flower. Many new mouldings occur in this Order, and rows of small ornamental arches are frequently seen. The niches which remained plain, or subject to little ornament in the previous mode were now richly embellished, and together with tabernacles (or niches of a more elaborate display) were constructed with an unsparing hand, and filled with statues, in many instances executed with considerable spirit.

Spires grew into frequent use in the early years of this era. Well calculated for popular admiration from the subject of wonder connected with their aspiring height, their introduction was hailed with enthusiastic applause. The retired village church enwrapped in woodland, or situated amongst soft rural scenery, acquired a pleasing and consonant addition in the light, unassuming proportions of this new feature; the sacred structure of the city or great town was perhaps more suitably adorned by the less elevated but commanding tower.

The rise of every architectural style is so entirely progressive that although the date of its perfection may usually be ascertained with sufficient certainty, it is often difficult to distinguish the exact years of its commencement. Thus the early part of the reign of Edward I, 1272 to 1307, has a great similitude to the architecture of the reign of Henry III. Structures erected in this reign: Several parts of Exeter Cathedral, Devonshire—the transepts were formed in the early parts of this reign—the choir (begun in 1138) was finished in 1309; St. Ethelberts' Gatehouse, in the precinct of Norwich Cathedral, Norfolk, erected about 1275; the cloisters of Norwich Cathedral, Norfolk; the Lady Chapel; Lichfield Cathedral, Stafford; the nave of York Minster, Yorkshire, begun in the year 1290, and completed in the next reign. The style of the architecture throughout the reign of Edward the II, from 1307 to 1327, was the same in its leading features as in the latter years of King Edward I.

In the reign of Edward the III, from 1327 to 1377, Mr. Carter observes that the architecture of this bright era was in its highest degree of perfection. The plans and elevations were on the grandest scale, the proportions just, the decorations ample and majestic, and the enrichments splendid. The mullions and tracery of the windows ran out in the most delightful and elegant manner. The buttresses became one of the principal features from their infinity of parts and high embellishments. The parapets or breast works on the walls are changed into battlements with perforated compartments. The cluster of columns to all situations are masoned in one solid mass in their several courses, without bands, the shafts rising from base to capital in a clear and uninterrupted line. The groins present tracery compartments. Structures erected this reign: The octagon and lantern of Ely Cathedral, Cambridgeshire, completed 1342; the St. Mary Chapel, of the same building, erected between 1321 and 1349; choir of Carlisle Cathedral, Cumberland; part of south transept, parts of the north transepts, choir and cloisters Gloucester Cathedral; parts of the nave, side aisles, &c., of St. Alban's Abbey Church, Herefordshire; parts of the Church of St. Mary, Redcliffe, Bristol, Somersetshire; choir of the Church of St. Mary, Warwickshire; St. Stephens' Chapel, now the House of Commons, Westminister, and deprived of its ancient architectural character. It was was begun in 1348. In the reign of Richard the II, from 1377 to 1399, the pointed arch began to drop in height, or depart from those regular triangular proportions which constituted its purest and most beautiful form. Structures erected in this reign: Wykeham's work, comprising great part of the nave, Winchester Cathedral, Hampshire; college at Winchester, founded by Wykeham; nave, chapter house, and part of the cloisters, Canterbury Cathedral, Kent; the tower and spire of St. Michael's Church, Coventry, Warwickshire, begun 1373, completed 1395. No variation in ecclesiaasitcal architecture requiring notice are distinguished in the martial reigns of Henry the Fourth, from 1399 to 1413, and Henry the Fifth, from 1413 to 1422. In the reign of Henry the Sixth, from 1422 to 1461, the decorated style of English architecture proceeded to the verge of that redundance in embellishment, which constitutes a new era. Structures erected in the reign of Henry the Sixth: The Chapel of Kings' College, Cambridge, Cambridgeshire; Beauforts Chantry, Winchester Cathedral, Hampshire; the Chapel of the Virgin, Canterbury Cathedral, Kent; the Divinity School, Oxford, Oxfordshire; the Beauchamp Chapel, Warwick, Warwickshire.

The Florid, or highly decorated English style, is chiefly marked by the depressed obtuse form of its arches; its large, wide windows, divided by numerous mullions, and ornamented with an intricate redundance of tracery, the inexpressible richness of its vaulting, over which the most delicate fret-work is thrown like a "web of embroidery," interspersed with ponderous and highly wrought pendant capitals, and by the profusion of tracery-work, sculpture, armorial devices and other ornamental particulars which embellish every part of the structure. The arches, as has been mentioned, are wide and flat or obtuse. The roof has been briefly noticed as displaying a scene of unparalled splendor and delicacy. The ribs of the vaulting which had before been large and apparently intended to add to the strength and support of the groins, were now divided into numerous parts and enriched with a profusion of armorial cognizances, badges, rebuses, and various sculptured devices; clusters of pendant ornaments resembling stalactites, or to use the words of Mr. Bentham, "the work Nature sometimes forms in caves and grottos," hang down from these elaborate roofs and impart to them an air of imposing beauty.

The point of the window arch was flat, the window extremely wide and descending low, the mullions numerous and the upper division of the windows filled with many small compartments, often having trefoil heads. The great multiplication of windows afford a prominent characteristic of this style.

The ornaments of this architectural class were distributed in gorgeous profusion. The most estimable consists of numerous statues of kings, queens, saints, prelates and other persons. The abundant niches, tabernacles, canopies, pedestals, tracery faciae, and pendants are of the most elaborate workmanship, and are usually finished with exquisite delicacy. Painting and gilding were frequently employed to heighten the magnificent character of the whole. In the unique instance of Henry the Seventh's Chapel, the ornaments of the exterior are almost as plentifully disposed as those of the interior.

The most splendid examples of the structures erected in the reign of Edward IV, 1461 to 1483, is afforded by St. George's Chapel, Windsor. This structure is the work of several reigns, but the design and greater part of the present edifice are generally attributed to Richard Beauchamp, Bishop of Salisbury, who was appointed master and surveyor of the work by King Edward the IV; Church of Honiton, Devonshire, greatly enlarged and ornamented by its curious screen; parts of the Church of Charing, Kent, including the tower; Church of St. Lawrence, Norwich, Norfolk; Chapel on the bridge of Wakefield, Yorkshire, built by King Edward the IV in memory of his father and those of his party who fell in the battle at that place.

Reign of Edward the V, 1483, and reign of Richard the III, from 1483 to 1485, were too short and troubled to afford any distinguishable change in the national style of architecture.

During the reign of Henry the VII, from 1485 to 1509, the Florid style in the plentitude of its costly and elaborate characteristics is chiefly exemplified in chapels, regal, mortuary and attached to churches; and in porches, monuments, screens, thrones and stalls. It is remarked by Mr. Dallaway that "there is, perhaps, no parish church which exhibits a complete specimen of this style in all its parts."

Structures erected in the reign of Henry the VII: Bishop Alcock's Chapel, Ely Cathedral, Cambridgeshire; Church of Walden, Essex, finished in the reign of Henry the VII; the Lady Chapel, Gloucester, Gloucestershire, cathedral built in 1499; parts of the Church of Cirencester, Gloucestershire; Chantry of Bishop Waynflete, Winchester Cathedral, Hampshire; St. Mary's,—the University Church—Oxford; Church of Dunster, built by Henry the VII, Somersetshire; the Chapel of King Henry the VII, Westminster, commenced in this reign and executed according to the design then formed; Church of Great Malvern, Worcestershire.

After the reign of Henry the VII, the pointed style of architecture declined rapidly in excellence, and soon fell into entire disuse. With the dissolution of religious houses was rejected the mode in which it had been so long customary to erect the buildings appertaining to such foundations. The Italian artists, whose prejudice against this style has been already noticed, were unquestionably instrumental in accelerating its downfall, by incongruous mixtures of irregular and ill-executed imitations of the Grecian orders with the declining English, a proof of barbarity in taste. This base comixture, and degradation even of the relics of a fine and venerable mode of architecture (further polluted by the addition of numerous absurd devices) remained in practice until the Grecian style, in its purity was revived by the mature judgment of Inigo Jones, in the time of Charles the I.

One of the last buildings, approaching to the character of pure English, that was erected in the time of Henry the VIII, is the Abbey Church of Bath, completed in 1532. Lord Oxford observes that he recollects no later instance of the unmixed Gothic, than the tomb of Archbishop Warham, Canterbury This monument was constructed soon after the year noticed above as that in which the Abbey Church of Bath was finished.

Mr. Samuel Cabot, of Boston, the well-known manufacturer of exterior stains, has sent us a finely engraved and printed illustration, which happily suggests the pleasing effects attainable by the tasteful use of exterior coloring.