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CANADIAN ARCHITECT AND BUILDER.

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—THE—

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Prices.

PRICES of many lines of building materials continue to advance. Recent increases include tin plates, galvanized sheets, window glass for future delivery, varnishes, linseed oil. In sympathy, prices of heating furnaces have also been advanced 10 per cent. Prices have not advanced in Canada in nearly the same degree as in the United States, nor to an extent which should put a check on building enterprise. It is to be hoped that the limit of advance has almost been reached, and that those who have the intention to build the coming season may not find in the prospect of increased cost cause for hesitation and postponement of operations. It seems reasonably certain that no decline in prices of materials is likely to take place for at least six months to come, and probably not then. Therefore buildings which are to be erected this year should be commenced as soon as possible.

Canadian Society of Civil Engineers.

A NEW and commendable departure was made in connection with the annual convention of the above society this year. The convention opened in Montreal, where the usual routine business including the election of officers took place. This was all disposed of on the first day. The remaining three or four days were spent in Boston in inspecting important engineering works and in fraternizing with the engineers of that city. It is gratifying to note by the address of the retiring president that the membership of the society is rapidly advancing and that its surplus funds have already reached the sum of $10,000. The society is asked to consider ways and means for the profitable expenditure

of this money, failing which a reduction will be made in the fees of members. This is a somewhat extraordinary as well as most satisfactory state of affairs. The retiring president dwelt strongly upon the advantages which would follow the closing of the profession to all but qualified engineers. The presidency for the present year has fallen into the hands of Dean Bovey of McGill University, who may be relied upon to maintain at the highest point the progress and usefulness of the society.

The School Art-League Movement.

Two very interesting lectures on architecture were recently given by the Rev. Mr. Shortt, under the auspices of the Art League of the Huron street Public School, Toronto. In the first of these, entitled "How to Read Architecture," the leading characteristics of the different periods of architecture were clearly explained. By means of lantern slides there were thrown on a screen charming illustrations of historic buildings embodying these characteristics. Thus was traced the rise and decadence of the forms of construction and decoration which serve to distinguish one period from another in the history of architecture, and the audience, composed largely of pupils and teachers of the public schools, were taught how they might distinguish to what period the design of a particular building belonged, and also in what degree a right use had been made of the elements of the design. It was gratifying to hear the remark from the chairman, Mr. J. L. Hughes, Inspector of the city schools, that it had come to be recognized that education should mean more than cramming the head of the pupils with arithmetic and such like subjects—that ability to appreciate beauty of form and color was even more important—and that school buildings should not only be structurally secure and planned to meet the requirements, but should also within and without be in keeping with established canons of good taste. Art Leagues have already been organized in twenty of the public schools of Toronto, and the movement is rapidly extending. If carefully guided, it will do much for art and architecture in the years to come. The movement is under the direction of an Advisory Board, composed of artists, architects and other qualified persons, who will decide in what manner the funds of the Leagues shall be expended. These funds are raised in a variety of ways, such as by voluntary subscription, membership fees, public entertainments, etc. It is gratifying to learn that the new school buildings and additions to school buildings to be erected in Toronto this year, will be carried out in accordance with the views of the Advisory Board of the School Art Leagues. There is also the possibility that the designs for public school buildings to be erected in the future may be thrown open to competition among the architects of the city. Such competitions would also be conducted under the direction of the Advisory Board. The Superintendent of Buildings is understood to be in full sympathy with the proposal.

St. Lawrence Market Improvement.

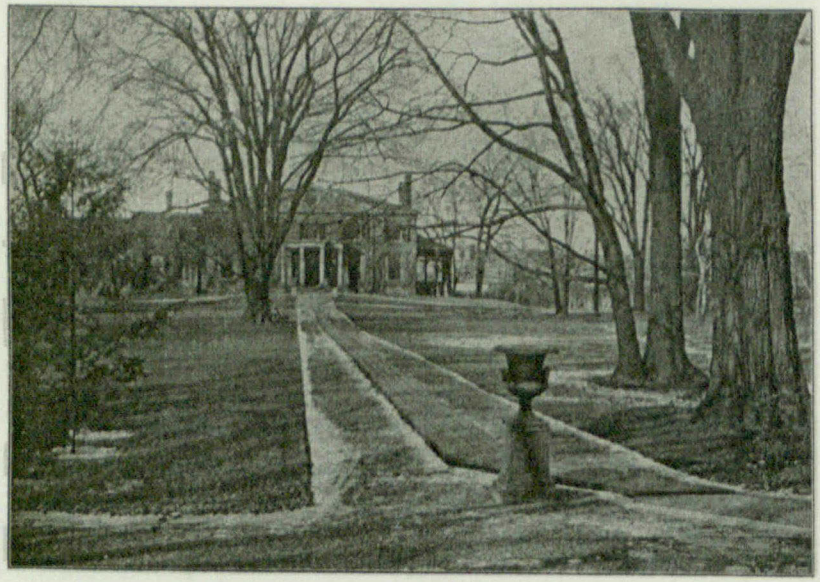
An unfortunate condition of affairs has developed in connection with the St. Lawrence market improvement in Toronto. The Dominion Bridge Co., of Montreal, contractors for the steel work, including the immense roof, recently declined to proceed unless the strength of the supporting brick piers was increased. Their contention, based upon calculations, that the piers were incapable of withstanding the combined pressure of the roof and wind, was disputed by the architect. The City Council then appointed as experts Messrs. J. Wilson Gray and the City Engineer to examine and report upon the construction and strength of the piers. The Dominion Bridge Company engaged for the like purpose Prof. Galbraith and Mr. J. A. Duff, of the School of Practical Science, Toronto. These gentlemen all declared as the result of their calculations and examination of the work that the piers were not strong enough for the duty which they were intended to perform. Against these unfavorable reports Mr. Siddall submitted the opinion of Mr. David Ogilvie, of Montreal, to the effect that the piers would safely carry the pressure to which they would be subjected. After hearing these conflicting reports and the statements of the architect, the Council decided to appoint an associate architect, who should be held responsible for the proper completion of the work and be paid by the Council out of the original architect's fees. This adjustment of the difficulty, while not as satisfactory as could be desired, is, considering the circumstances, perhaps the best that could be made. Prior to the commencement of the work Messrs. Lennox and McCallum, two of the city's experts appointed to examine the plans and specifications of the competing architects, concluded their report in the fellowing words :—"Your experts are also of the opinion that there has not been money enough provided for the erection of a substantial building of such dimensions as are asked for under the suggestions contained in the report of the market commission, and your experts further take the liberty of stating that in their opinion your Board will gain the desired end much more satisfactorily by either having plans prepared on a much less extensive and expensive scheme, or by providing sufficient funds to have the large and present suggested scheme carried out." This opinion was reiterated and emphasized in a subsequent report after the experts had by direction of the Council consulted with the authors of the various plans submitted. Mr. C. H. Rust, another of the city's experts, in his minority report to the Council, thought the work might be carried out within the limit of cost of $150,000, but suggested that "It might be advisable before tenders are called for to engage a consulting architect to advise upon the amended plans and to see that they comply with the alterations and additions as suggested." These recommendations of the experts were disregarded and the work proceeded with, with the above mentioned result.

The Toronto Public School Board has appointed a special committee on heating and ventilation for the purpose of obtaining information which will be valuable in considering any question in this connection. The committee have decided to make inquiry of the school boards in about forty Canadian and American cities as to their experience and opinions of the different systems in use. They will also endeavor to get the advice of the experts associated with the provincial and city medical health departments.

Mr. Howard T. Barnes, of Montreal, Joule student of the Royal Society of Canada recently dellvered a lecture at Cornell University on the specific heat of water. The lecture was illustrated with lantern slides of apparatus used in experiments on which Mr. Barnes has been engaged for three years past.

THE GRANGE, TORONTO.

The confidence with which the early settlers in Ontario built for the establishment of a family surprises us later inhabitants who have seen the constant change that is going on in the character both of towns themselves and of the localities within towns. In England, from which most of these early Canadians came, the uncertainty of site had not then become recognized. Provincial towns had hardly begun to spoil the country surrounding them, and London had not yet drawn to itself the people of leisure in the county—the junior members and spinsters of the county families who used to live in those simple but dignified residences which we see, now too often in a state of reduced respectability, in the county towns of England. The family residence, occupied from generation to generation, was a familiar idea in England; and when young Englishmen of family came to Canada to establish themselves they took it as a matter of course that in founding a family they should also build a home.



THE GRANGE, TORONTO—WINTER VIEW.

Among residence in Ontario built with this idea the most fortunate is The Grange, Toronto. Its neighborhood is still a good residential quarter of Toronto; it is still surrounded by ample grounds, and is still kept up in perfect order as a residence in the estate of the family for which it was built.

The Grange was built in 1817 by D'Arcy Boulton, eldest son of the Hon. D'Arcy Boulton, at one time Solicitor General of Canada and afterwards Justice of the King's Bench, who was the original Englishman in this case. Judge Boulton himself lived in the house and it is most likely from the style of the building that he had a good deal to say about its design.

The house is said to have been named after a family estate in England. The model was evidently one of those Georgian residences of the English county towns, to which allusion has just been made. It was the first brick house built in its neighborhood, and its cost, $4,000, must have been unusually great. The bricks were made on the spot. One of the moulds was preserved until it was destroyed by mistake a few years ago.

The main part of the house was first built. The first wing was added soon afterwards. The wing to the extreme left was originally a grapery, but was converted, not many years ago, into a library by Professor Goldwin Smith, the present occupant. The ground floor is now given up to living rooms with the exception of a couple of service rooms to the north; but it is likely there were two or perhaps three bedrooms on this floor at first. There was originally a room where the stair case now stands and the stair; a narrow circular stair, such as was common at the time when the house was built, was advanced to the line of the central passage and must have been lighted only from the hall door lights. The beauty of the present hall is due to the Hon. William Cayley, who planned it. The hall is carried through the house and lighted over the stair by a large north window filled with stained glass. The stair is massive and dignified in detail; the color of the stairs, doors and other wood work is black—the beautiful warm black of black walnut, supported by several black walnut cabinets and contrasted by white fluted columns which divide the stair case hall from the front hall.

It is worthy of note that the service department remains in its original position in the basement. It is no doubt to this that is to be attributed the entire freedom from damp and decay which makes the Grange as fresh and as fit to live in now as when it was first inhabited. There is no doubt that a return to the basement kitchen would not only free house planning from much embarrassment and afford commodious service rooms at little

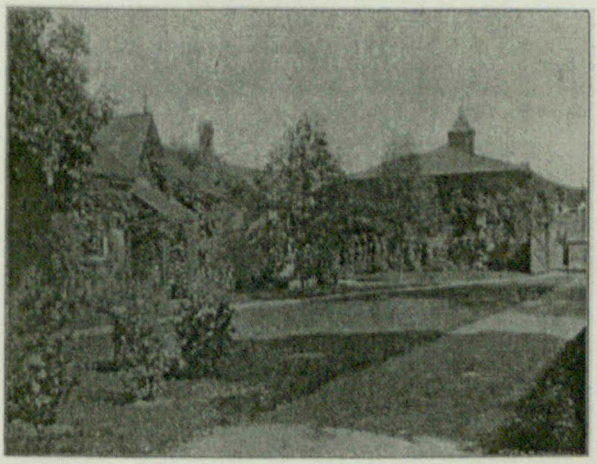
expense, but would greatly improve sanitary conditions of the dwelling.

The excellence of the external design is no doubt to be accounted for by the fashion of the times, which made a knowledge of architecture as it was practised then a

THE GRANGE, TORONTO—AUTUMN VIEW.

usual accomplishment for a gentleman. The design is simple enough—a well spread front with a symmetrical and even arrangement of window openings and wall surface; a hipped roof brought to the front in a wide pediment of a Greek pitch, relieved from dullness and combined with the lower part of the front by a circular window in the centre; and all adornment concentrated at the middle of the front in a grey stone portico which, though not very well planned itself, is as a mass well proportioned to the front. The portico was originally of wood but Mr. Goldwin Smith has had it taken down and replaced by an exact copy in stone. The satisfaction conveyed by the presence of stone, where stone ought to be, is great. The stone portico is reinforced by stone steps flanked by large stone flower pots. These steps both give emphasis to the terrace, on which the house stands, and connect it with the level of the lawn.

It is this lawn with its trees which is the great glory of the Grange. By good fortune or good management the grounds about the house have not been cut down too much in the process of trimming the estate as the city grew round it. When the house was built the estate was a farm property extending from Queen street, which was the main east and west high road, half way to Bloor street. The entrance was on Queen street near McCaul. From this a drive swept up to the house. Stories that have been handed down—of an English officer who lost his way in the Grange woods; of an Indian appearing suddenly in Mr. D'Arcy Boulton's room; of a bear being driven off the pasture near the house by Judge Boulton's pair of carriage horses striking at it with their fore feet—all indicate a state of wildness far removed from the cultivated beauty of the present lawn. Yet this lawn must have been planted long ago to judge from the size of the elms. The largest is eleven feet in circumference. The present arrangement of the grounds in front must have been made some time before 1844, when the land for Saint George's Church, just outside the gate, was given by Mr. D'Arcy Boulton. The grounds were no doubt laid out under the direction of Mr. Cayley who is known to have planted the elms. The gates are directly in front of the entrance and are connected with it by a wide gravel walk, 300 feet long. The carriage drive approaches the entrance by a circular sweep of a diameter the same length as the walk. Outside the circular drive and its connections with the rear are plantations along the boundary fences on the East and West. The plantations have the effect of a screen; but the trees are set very open, so that grass grows underneath. The area bounded by the drives is kept in turf. There is ample room for tennis lawns in the segments between the straight walk and the circular drive. The elms give shade without being an obstruction. They



THE GRANGE, TORONTO—SERVANTS' COTTAGES.

are arranged in clumps around the drive at fairly even distances; but no two clumps are alike in number or arrangement of trees. Any appearance of formality is upset by the group of two near the centre of the circle, on the opposite side of the central walk to the large group near the lodge. The effect is one of park like beauty which we may hope will long be preserved to Toronto. It is an example of what may be done with fifteen or twenty trees to create a beautiful place; requiring neither the great first cost nor so great an outlay in keeping up as the formal garden.

The grounds at the back contain the necessary garden, conservatory, yard and stable arrangements, and the residence is completed as a self contained establishment by a row of servants' cottages at the Beverley street entrance, which, with their flowers and creepers and the trellised vine over the stable yard behind, make a pretty group.

There was at one time a race course on the Grange property behind the house. This ceased to exist about 1850. All that remains of it is a portion of the grand stand, forming part of a green house in the garden.

ONTARIO ASSOCIATION OF ARCHITECTS.

Two meetings of the Council have been held since the annual convention. Mr. W. R. Gregg, 66 Victoria street, has been appointed registrar, and Mr. C. H. Bishop, auditor. The several committees appointed for various purposes were not in a position to report yet, but are at work.

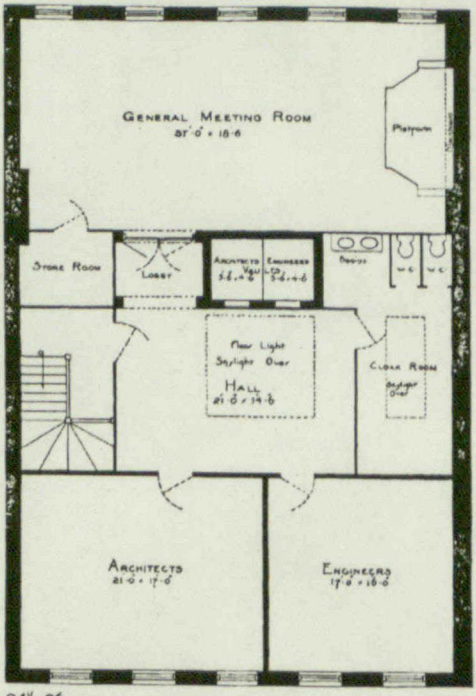
It has been decided to lease the rooms at No. 94 King street west in accordance with the following recommendation contained in the report of the consulting committee presented at the annual convention, viz.: "They have procured an option upon rooms suitable for the uses of the Association. The rooms are situated at 94-96 King street west, Toronto, between York and Bay streets. It is proposed to arrange them as in the accompanying plan, so as to share the premises and cost with the engineers. The rooms will occupy the second floor, but will have a separate entrance from the street, and every member should have a key to the door. The rent for each of the societies associated as tenants will be $150 per year. The alterations necessary to arrange the floor as planned will be made by the landlord. Heating and caretaking will be provided, but not light." Some slight alterations to the arrangement of the rooms as shown on plan will be made.

It is intended that the examinations shall be held in March. Students wishing to enter for the examinations should send in their names to the Registrar, Wm. R. Gregg, 61 Victoria street, Toronto. The following gentlemen compose the Board of Examiners: Prof. Galbraith, (chairman), Messrs. C. H. C. Wright, S. G. Curry, R. J. Edwards, W. R. Gregg, Grant Helliwell, S. H. Townsend, E. Burke and J. Wilson Gray.

A full meeting of the Council will probably be called within a few days to consider other matters in connection with the various schemes suggested for the improvement of the Association. In next issue further particulars will be given.

THE CHICAGO ARCHITECTURAL CLUB EXHIBITION.

The Thirteenth Annual Exhibition of Works of Architecture and the Allied Fine Arts, will be held at the Art Institute, Chicago, under the auspices of The Chicago Architectural Club, from Tuesday, March 20, to Monday, April 2nd. The Exhibition of original works, not previously shown in Chicago, will include: Architectural Drawings, and Sketches in Plan, Elevation, Section, Detail and Perspective, in all renderings; Projects for Public and Monumental Work; Interior Decorations and Furnishings (Sketches and Samples); Architectural and Decorative Glass and Mosaic Work; Architectural Metal Work; Sculpture—Architectural and Decorative—Models, etc.; Landscape Architecture.



94½-96 KING ST. WEST TORONTO. SECOND FLOOR PLAN

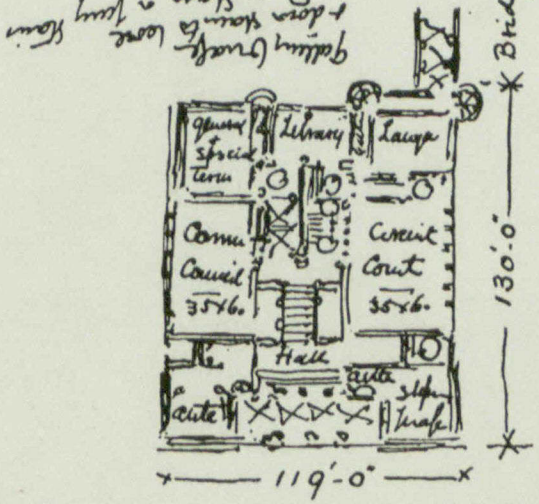
If necessary, in order to complete an exhibit, a drawing previously exhibited, will be accepted.

The official Bulletin of the National Master Plumbers Association has ceased publication.

The world's progress for 100 years is the best recommendation for advertising; as a lesson well learned recommends its teacher. A century ago business was largely a matter of local exchange; a manufacturer in the east having to deal in the east because the west was to a great extent a stranger, unacquainted with eastern products. The evolution of newspapers and magazines has leveled all commercial barriers. The man in the east advertises and the advertisement does the duty of a traveling salesman in every town that is reached by its publishers. The inventions of a century, quick and satisfactory systems of printing, and facilities for transportation, have evolved a practical art that has a monument in every successful business the world over.

ON THE ARCHITECT'S PART IN HIS WORK, AS EXEMPLIFIED IN THE METHODS OF H. H. RICHARDSON.

When an architect sues for his fee and his drawings are brought into court as evidence of the work he has done, the opposing counsel at once proceeds to make the discovery that the drawings have not been made by the architect at all but by a draughtsman. Investigation of the draughtman's salary and estimation of the length of time taken by him to make the drawings which are shown in court reveals what seems like a scandalous disproportion between the cost of the drawings and the fee that is asked for their use. To the jury it appears as if the man who made the drawings did the work and the time he took to make the drawings represents fairly well the time that should be charged for; nor are they disposed to be at all indulgent in a matter which appears to them perilously near a system of sweating the draughtsman.



PLAN OF CITY HALL, ALBANY.
(Autograph Sketch by H. H. Richardson.)

Both counsel know better; but they are not so sure about it that the opponent's counsel need feel any scruple about raising the objection for the chance of what there may be in it, or that the counsel for the architect can clearly explain to the jury that there is nothing in it; that an architect's work is not to be measured in that way.

I propose to illustrate the architect's position by an account of the method of work of H. H. Richardson, an architect who collected $50,000 in fees in a year, and who never made one stroke of the drawings upon which these fees were based.

In taking Richardson as an example I am taking a man who was par excellence an architect. His office was, above all things, a place where original work, or to use his own phrase, his "own work" was done. From the beginning, in the plan which was his conception of the idea contained in the problem, to the details of finish which were in accordance with his taste, it was his own—so much his own that when the rush of enthusiasm for his work produced imitators all over the country, though it was thought at first that the American style had been founded, it was soon seen that the charm was in a personal quality that could not be caught and that the style apart from the man was nothing.

How were these designs produced? One would suppose that he must have drawn everything himself; to the extent at least of the essential proportions and features, if not the mouldings and ornaments.

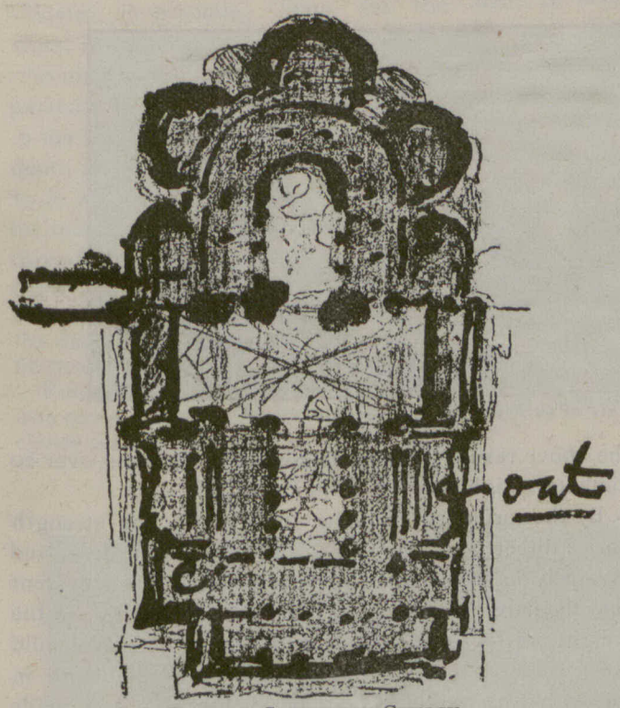
The extent of his drawing was a plan scribbled on a sheet of note paper; often done in bed, where the state of his health obliged him to spend much of his time, and where he had the best opportunity for thought. A plan two or three inches square embodied his idea. The ultimate result of his study was inked in over the mass of soft pencil marks with a quill pen; and sometimes principal dimensions were figured. That was usually the end of his work on paper.

There is in Mrs. Van Rensselaer's Life a sketch for the Harvard Law School which shows an elevation also, but I do not think that he often defined the elevation in this way.

This note went to the head draughtsman who worked in a room apart in constant consultation with Mr. Richardson. The nature of that consultation was to a great extent criticism merely and the suggestion of leading ideas; but never, I think, so definite as to supersede thought on the part of the draughtsman. The first criticism of the kind that I heard has remained in my memory. It was just after some big works had possessed the mind of the head draughtsman with ideas of grandeur. He was at a table near me designing the entrance to a house at Albany when Mr. Richardson passed and, after looking over his shoulder for a moment, said, "C'est la delicatesse qu'il faut maintenant mon ami," (it is refinement we want now) and went away. It was delicatesse he got. The fenestration of this house was in charge of another draughtsman whom Mr. Richardson kept rubbing out his windows all morning until they came right and were accepted with the remark "there is nothing like rubbing out." The only case in which I worked from one of these sketches was a sketch plan for a large apartment house. The sketch came to me on a piece of note paper showing two large bays in front running through all floors. This was the design. The living rooms connected with the front were indicated clearly; an interior court yard was shown and the living rooms connected with it but the back was a mere scribble with "service" written across it, and as far as I recollect, such guides as "lift," "dust" and perhaps one or two more hints of the peculiarities of the service department of a flat.

Usually these original notes did not appear in the office but were guides for the head draughtsman alone, who made from them small scale sketches for the client. When the matter was settled the small scale sketches were put into the hands of one or more draughtsmen; usually a pair, one in charge, the other assisting. When the actual work was done many hands might ink and trace; even better hands than the original men who did the drawing (as we understand the word) sometimes dropped their work, if it could wait, to take a hand in wiping off a job which could not. The specification was usually written by the senior of the responsible draughtsmen, and one of this pair often acted as superintendent while the work was in progress, especially if the work was out of town. For larger work there was a larger gang than two, but the principle was the same: everybody was responsible. Mr.

*Paper by Mr. W. A. Langton, presented at the annual Convention of the Ontario Association of Architects, January, 1900.



PLAN OF CATHEDRAL CHURCH.

Richardson designed, the head draughtsman or draughtsmen executed his design and the junior draughtsmen made from it the working drawings and specifications. There was, of course, much mutual consultation, criticism and advice; but Mr. Richardson himself was usually away most of the day, when in town, and was half the time out of town ; and the final authority in construction, who was called the foreman, was away for months together superintending the erection of the largest work. So it was a school of artists or art students of all grades all helping one another in that mutual agreement which came from their having but one aim and one idea—to carry out Mr. Richardson's design. When it came to details there was even more apparent freedom from the fact that a design would be from beginning to end a draughtsman's own work ; but it was not his own in the sense of being a departure in any way from Richardson's recognized feeling. Where, when or how he stated his ideas about detail it was not always easy to trace, but all the office knew what he liked. He did not fail to praise what had turned out to be successful and in course of time the tradition of what pleased him was established, for detailers were particularly keen to have their work approved as it was in a real sense their own though it was designed to meet his views.

The conclusion which, I think, we may draw is that Richardson's very method of work had much to do with the ideal character of his design. It was to the idea he devoted himself entirely and it was the essentials to its expression that he looked for in the drawings and succeeded in bringing out of the draughtsman. So that to return to the juryman's point of view I think we may say that not only was he entitled to his fees without having made any drawings himself, but it was the very fact of his not having made drawings himself that gave his work that quality which made the public glad to give him the large fees he asked.

ENGINEERS' CLUB OF TORONTO.

The annual meeting of the above Club was held on the 13th inst., when the following officers were elected: President, Kivas Tully; vice-president, Prof. John Galbraith; directors, C. H. Rust, R. W. King, T. R. Rosebrugh; treasurer, T. B. Speight; secretary, Willis Chipman.

In the evening the annual Club dinner was held at the Rossin house. Upwards of thirty members and guests sat down to the temptingly spread tables. The venerable president of the Club, Mr. Kivas Tully, presided, the vice chair being occupied by Prof. Galbraith. Among those present were: T. S. Speight, C. M. Canniff, J. G. Ridout, H. F. Duck, C. E. Cooper, W. A. Clement, Geo. Mickle, A. M. Wickens, E. J. Philip, Jno. Williams, Fred. G. Durnford, R. F. Tate, R. J. Parke, Maj. Gray, Geo. Hanning, W. A. Johnson, Geo. White-Fraser, T. S. Scott, W. M. Brodie, R. A. L. Gray, J. A. Ellis, C. H. C. Wright, Jno. A. Duff, J. E. Maybee, R. W. King, C. H. Rust.

Following the toast to Her Majesty the Queen, and the singing of the National Anthem, the chairman proposed a toast to "Canada," to which fitting response was made by Messrs. J. G. Ridout and Henry F. Duck. "Engineering," proposed by Prof. Galbraith, drew forth a series of interesting remarks from Messrs. C. H. Rust, R. W. King, Geo. White-Fraser, E. J. Philip and A. M. Wickens, the two latter gentlemen representing more particularly the Canadian Association of Stationary Engineers.

The proceedings were enlivened by instrumental music and a number of excellent songs.

Already sixty persons have joined the Club and paid the yearly fee of $5, so that its success would seem to be assured.

PERSONAL.

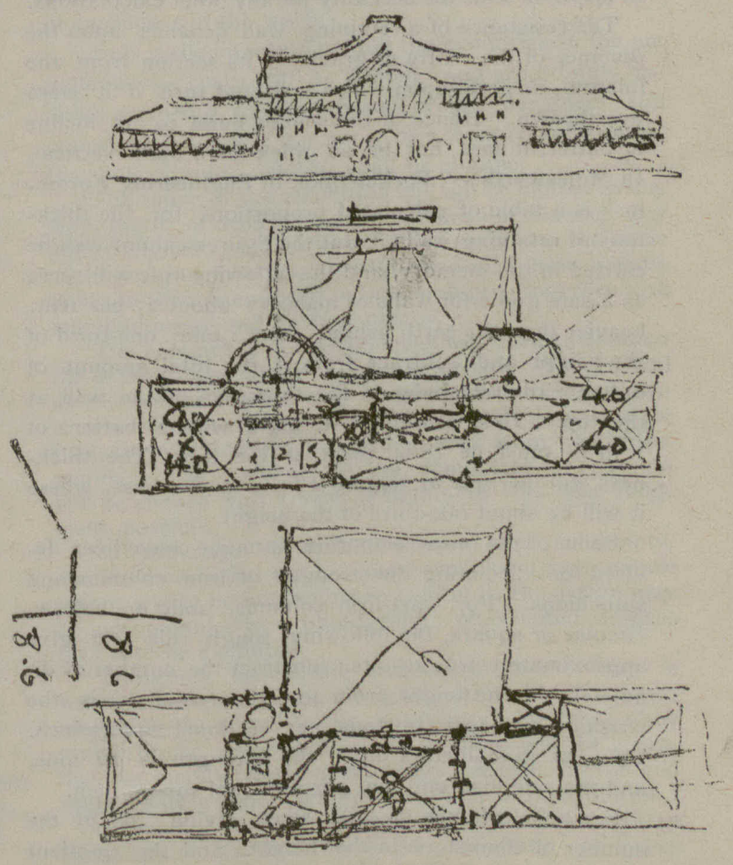
Mr. Willis Chipman, the well known civil engineer, left Toronto a few days ago on a visit to Europe, where he proposes to spend two months in the study of engineering works.

Mr. Philip C. Palen, formerly of Toronto, has recently opened an office for the practice of architecture in Collingwood, Ont., and would be pleased to receive from manufacturers and supply firms copies of their catalogues, etc.

The death is announced at Stratford, Ont., of Mr. Jos. G. Kirk, C.E., who was one of the oldest and best known members of the profession in Canada. The late Mr. Kirk was born in Londonderry, Ireland, in 1809, and came to Canada in 1829, and for some years thereafter practised at Ottawa.

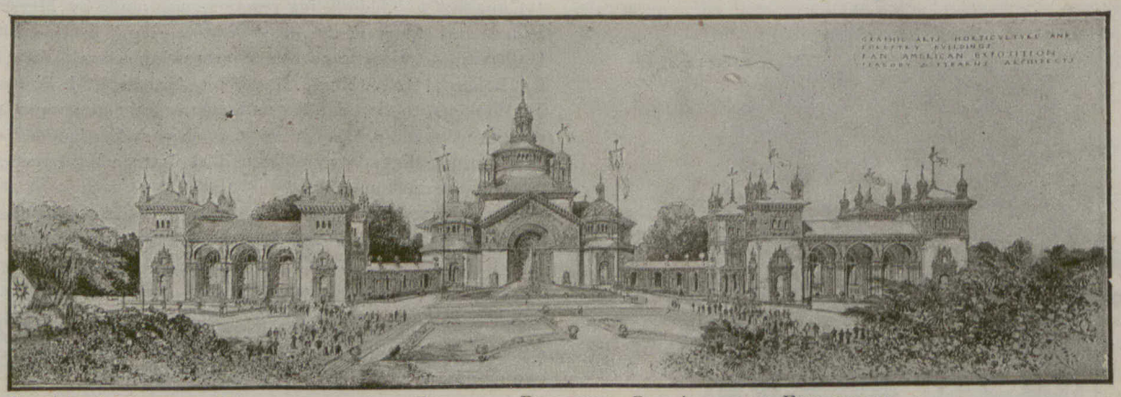
We regret to chronicle the death, at the age of sixty-five years, of Mr. Duncan McIntosh, President of the McIntosh Marble and Granite Co., of Toronto. The deceased was a native of Perthshire, Scotland, had been engaged in business in Toronto since 1871, and as a citizen was highly esteemed.

Mr. W. E. Doran, the well-known architect of Montreal, is receiving the well deserved congratulations of his friends in and out of the profession, on his splendid run for the mayoralty. Without the aid of the usual election machinery he secured the support of 8,492 electors. In his election address he said: "I would use my influence in regard to enforcing the by-laws on sanitation, and to bettering the sanitary condition of the city. For a long time the aldermen have pigeon-holed a proposed by-law that would make much improvement in the conveniences of houses erected in the city; this is a great shame, especially to the masses who cannot afford to build houses and put sanitary arrangements in them which they would like. A mayor who had the interests of the city at heart would not permit of important by-laws being pigeon-holed in any such manner; he could keep calling meetings till action would be taken upon them."



LAW SCHOOL.

(Autograph Sketches by H. H. Richardson.)



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SHORT FORMULAE FOR ARCHITECTS.

BY GEORGE H. BLAGROVE.

THE scientific formulæ in use for calculating the conditions of structural strength in buildings are generally found too complex to be worked out at short notice. It is now proposed to mention a few short rules, which easily remembered, which involve only such simple calculations as are readily performed, and which will give sufficiently accurate results for practical purposes. We have, of course, no wish to supersede the use of proper scientific formulæ, but only to furnish the architect with rules that can be applied in briefly examining structural conditions when on the works, in drawing out preliminary sketches, or in any circumstances under which elaborate calculations are hardly practicable.

One rule of the kind to which we refer is Brown's formula for finding the horizontal thrust of a segmental arch. The radius of the arch, multiplied by the thickness at the crown, and by the weight of the masonry in hundred-weights per cubic foot, gives the thrust in hundredweights, the arch being presumably 1ft. thick. After a comparison of results, it may be mentioned that this formula is so nearly true for flat segmental arches as to dispense with the necessity for any other calculations.

The resistance of a retaining wall depends upon the distance of the centre of gravity of its section from the fulcrum, or point upon which it would turn if it were overthrown. Hence, if the wall be build to an incline or batter, it need not be so thick as if built vertical. In Molesworth's "Pocket-Book of Engineering Formulæ" is a table of calculated proportions for the thickness of retaining walls. But the figures cannot well be carried in the memory, and the following rule will serve as a safe guide for walls of masonry about 27 per cent. heavier than the earth behind them : take one-third of the height and subtract from it the total amount of batter ; the remainder is the thickness of the wall at the top. Thus a wall 9 ft. high, with a batter of 1 in 6, must be 18 in. thick at the top. The thickness will increase by regular offsets to the base, where it will be about one-third of the height.

Some of the most elaborate formulæ have been devised for calculating the strength of iron columns and stanchions. For cast-iron columns, solid or hollow, circular or square, the following rough rule will give approximately true results ; substract the number of diameters in the height from 40 ; the remainder is the crushing strength in tons per sectional square inch. Thus, at 30 diameters high, the strength is 10 tons, and the safe load one ton, per sectional square inch.

For built columns of mild steel, divide 400 by the number of diameters in the height, and the quotient will give the crushing strength in tons per sectional square inch. For wrought iron, take three-fourths of the above result. This rule applies to columns over 20 diameters high.

By the ordinary formulæ for girders, the strength varies directly as the depth and the flange area, and inversely as the span. In rolled joists, it is evident that the flange area bears a pretty constant ratio to the weight per foot run. Hence, for rolled joists of mild steel, we have the following rule : multiply the depth in inches by the weight in pounds per foot run, and divide by twice the span in feet ; the result gives the safe distributed load in tons, three-fourths of which will be applicable in the case of rolled iron. But when a constant ratio is preserved between the depth and the span, it is evident that the safe load will bear a constant ratio to the weight of the joist per foot run. Suppose, for example, that we agree to have the depth of a rolled joist one-twenty-fourth of the span, then for rolled steel one-fourth of the weight in pounds per foot run will be the safe distributed load in tons, three-fourths of which will apply in the case of wrought iron.

The following is an instance of what might occur in working out a warehouse floor constructed with rolled-steel joists. The span is 12 ft., and the load four tons. The depth must he one-twenty-fourth of the span, and the joists must therefore weigh $4 \times 4 = 16$ lb. per foot, and be 6 in. deep. In a manufacturer's list we find steel joists 6 in. x 3 in., 16 lb. per foot. Could the result have been attained more quickly ? Applying a similar principle to a cast-iron girder of Hodgkinson's pattern, of which the depth is to be one-sixteenth of the span, we double the safe distributed load in tons to obtain the area of the tension flange in square inches. For a riveted steel girder of the same proportionate depth we could take one-seventh of the above result or about one-fifth for wrought iron.

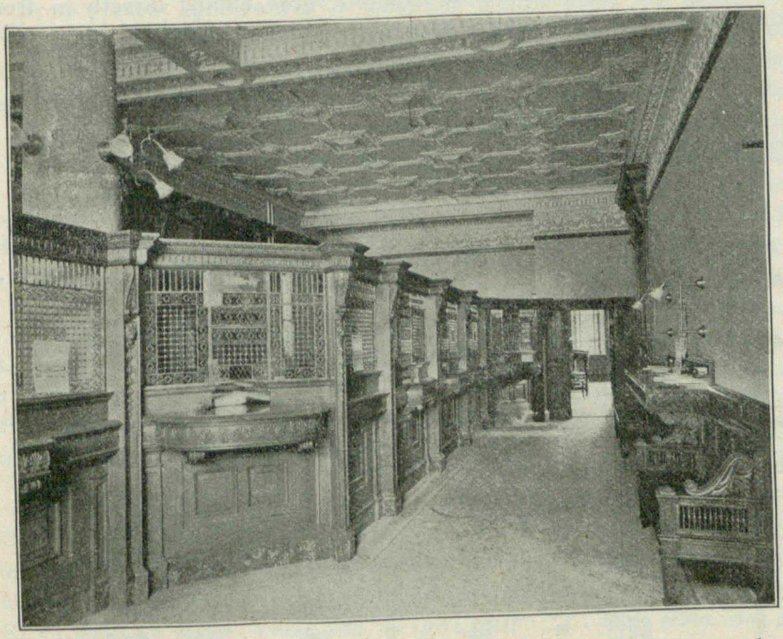
If we wish to find the approximate strength of a fir post, we divide 15 by the number of diameters in the height, and the quotient is the crushing strength in tons per sectional square inch. Double this, and we have the safe load in hundredweights per sectional square inch. With fir beams, the sectional area, multiplied by the depth in inches and divided by the span in feet, gives the safe distributed load in hundredweights, taken at one-fifth of the breaking weight. This rather high safety factor would enable us to make the depth about one-twentieth of the span. Here again, if we adopt a fixed ratio of depth to span, we can simplify the calculation. If, for example, we agree to make the depth one-twentieth of the span, we can take three-quarters of the sectional area in inches for the safe distributed load in hundredweights.

Many rules in use for finding the scantlings of roof and floor timbers are not founded upon scientific principles, although they give results which may be safely

followed in practice. Thus, for the depth of floor oists, in inches, add 2 to half the span in feet. For trimming joists, add 8/in. in breadth for each joist supported by the trimmer. For common rafters, add 1 o the bearing, in feet, and take half the sum, for the depth in inches. For purlins, when the trusses are 10 ft. apart, add 3 to the depth of the common rafter, for the depth of the purlin, and make its breadth about three-fifths of its depth. For the tie-beam take one-third of the span in feet and add 2 to the depth in inches, making the breadth about half the depth. Make the depth of the principal two-thirds of the depth of the tie-beam, and its breadth about four-fifths of its depth.

Rules of the kind quoted could not be formulated for iron roofs, because the nature of the material requires closer accuracy in computing its section.

ILLUSTRATIONS.



OFFICES OF THE IMPERIAL BANK, SUN LIFE ASSURANCE COMPANY'S BUILDING, HAMILTON, ONT.—WM. AND WALTER STEWART, ARCHITECTS.

BRONZE GRIFFIN AND ELECTRIC FIXTURE, AT FOOT OF MAIN STAIRWAY, SUN LIFE ASSURANCE COMPANY'S BUILDING, HAMILTON, ONT.—EXECUTED BY MESSRS. CHADWICK BROS., HAMILTON—MESSRS. WM. AND WALTER STEWART, ARCHITECTS.

COMPETITIVE DESIGN FOR METHODIST CHURCH, VANCOUVER, B.C.—ARNOTT WOODROOFE, ARCHITECT.

THE GRANGE, TORONTO.

SUN LIFE ASSURANCE CO. OF CANADA — HAMILTON BRANCH—WM. AND WALTER STEWART, ARCHITECTS.

This building has been erected on the site of the old post office building, James street north, the old foundation walls being used to a great extent. The old part was faced with Amherst freestone, and this was all re-used in the new front after being re-dressed.

The interior of the building has been finished in a very elaborate manner. The wood-work throughout is of quarter cut golden oak, supplied and erected by J. Hoodless & Son, of Hamilton.

The halls are finished in Numidian marble, with dado panels of Mexican onyx. The staircase is of Tennessee marble, with an ornamental dull brass railing, and the floors throughout are of marble mosaic.

The Forsyth Marble & Granite Co., of Montreal, were the contractors for the marble work.

The ceilings are of ornamental staff finished with a wiped effect, and were modelled and supplied by W. J. Hynes, of Toronto.

ARTS AND CRAFTS EXHIBITION.

The Ontario Society of Artists announce an exhibition of applied art to be held at their galleries 165 King st. west, Toronto, during the month of April, 1900.

This being the first exhibition of this nature to be held in Toronto, the committee of arrangements have deemed it advisable to make the following statement of the objects to be attained and to make an appeal to intending exhibitors for a high standard of excellence in the work.

"As it is the intention to hold the exhibition in the art galleries the space will be limited, and accordingly exhibits are being solicited from Toronto designers and manufacturers only ; it is not to be a strict rule, however, that only Toronto exhibits shall be eligible.

"The scope of the exhibition will not be limited in any way, merit of design and workmanship making any object eligible. All works exhibited shall have the name of the designer, and such workmen as contribute artistic value to them mentioned in the catalogue, together with manufacturers' and owners' names.

"The committee of arrangement will seek to conduct the exhibition so that it will be an artistic success, and as this will be secured only by good work being shown they reserve the right for committees of selection to select from the work offered that which they deem of highest quality. The members of the committee of selection will be chosen with a view to obtaining the best judgment possible.

"All drawings should be framed, if ever so simply, and in cases where the executed work is of such nature that it would be impossible to exhibit it, the design may be accompanied by a photograph ; unexecuted designs may also be exhibited.

"Designers have entire freedom as to the form in which they may show designs, either by drawings, models or the actual works, but it is expected that some notion of the completed article or thing will be given, and not merely working drawings, which, useful and appropriate in their place, are unsuitable in an exhibition."

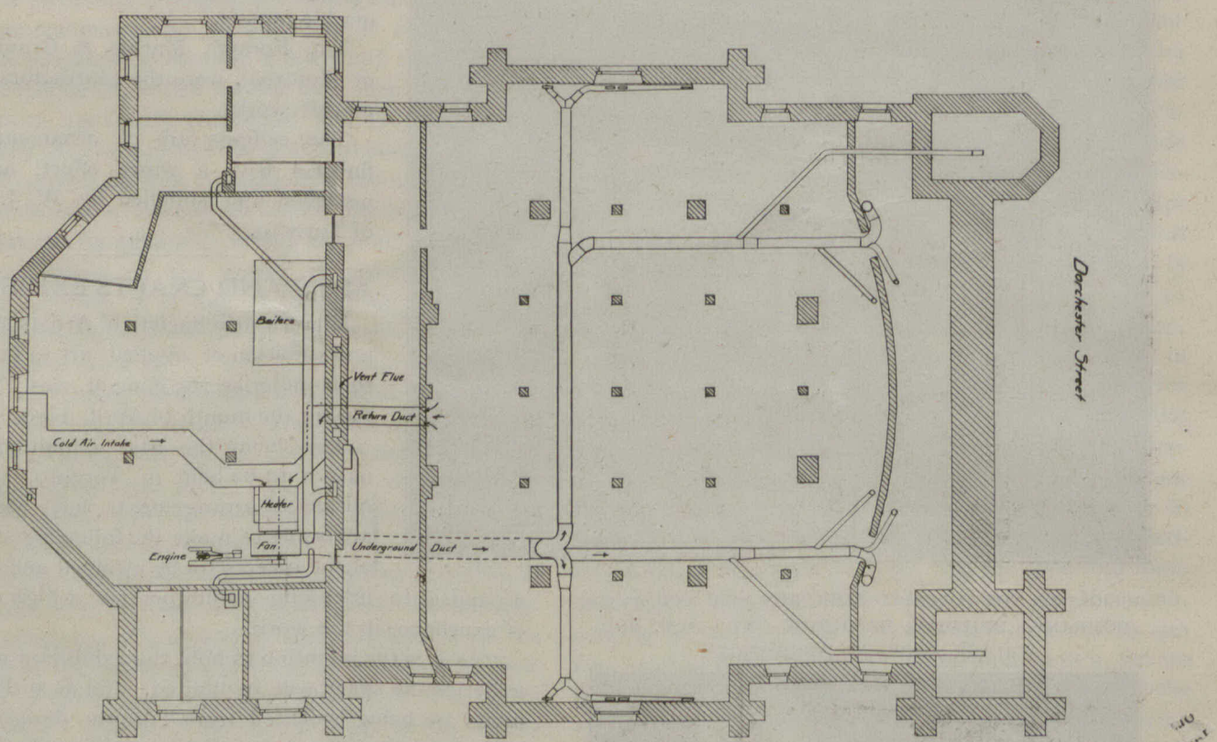
All communications regarding this exhibition should be addressed to Mr. Robt. F. Gagen, secretary, 90 Yonge street, Toronto.

A METHOD OF HEATING AND VENTILATING CHURCHES.

So little attention is, as a rule, paid to ventilation in our churches and public halls, that we are always glad to notice any successful attempts at a solution of the problem. That it would be a great boon to the public, all acknowledge ; practical experience however, often makes one fear that its realization cannot be looked for at present.

One of the latest attempts in this direction is to be found at the Crescent Street Church (Pres.) of Montreal, where a complete hot blast or fan system of heating and ventilation has been installed during the past season.

We give a sketch plan to shew location of plant, conveying pipes, &c. The church is a large one, containing some 385,000 feet in the main audience room, and about 128,000 feet in the lecture and Sunday school rooms, the latter situated in the extension, which has two storeys.



METHOD OF HEATING AND VENTILATING CHURCHES.

Entering the basement, we find the boilers, heating coil, fan and engine, located in the extension, and directly under the lecture room. As there is a heavy division wall between this and the main church, this arrangement brings all the machinery directly under the eye of the engineer, and at the same time secures quietness for the main audience room. We find here two boilers of 25 h.p. each, arranged to be used separately or in combination, and ordinarily run at about 60 lb. pressure. The heating coil, encased in a jacket of steel, contains 5,350 ft. of 1" steam pipe, and owing to the increased circulation by this system, is equal to about three times that amonnt when arranged in the ordinary way. The air ducts are so connected with the heater that air from the church, or fresh air from outside, can be drawn through it in any proportion desired.

The fan has a capacity at 300 r.p.m. of 24,000 c.f.m., and is capable of changing the entire air in the church every 15 minutes, but during the services is slowed down to about ⅔ speed. The engine is one made by the Laurie Engine Co., with cylinder 6"x 9", the exhaust steam going directly into the outside sections of the heating coil.

The fan, of the ¾ housing type, is set directly over a Portland cement duct, some 35 feet in length, before connecting with the galvanized iron piping. By this means much of the trouble from vibration is avoided, and a permanent connection secured. Branch pipes lead to the lecture room directly above, and the school rooms on second floor. The arrangement of piping for the church proper is shown on the plan, and it will be seen that the front porch and towers are provided with a moderate amount of heat, thus preventing extremely cold draughts when the inner doors are opened.

Proceeding upstairs, we notice that the air enters the body of the church at twelve points, only two of which are at the floor level and these almost directly in front of the doors into the vestibule. Two openings with diffusers are placed just under the gallery at the front corners, and one large register each side of the pulpit and some 30 ft. from the floor. The special feature of the plan, however, is the provision for a curtain of hot air 4" thick in front of the large windows at each side, and the front of the church. With the old furnaces, great trouble was experienced with currents of cold air from these windows that could be felt even to the centre seats, but the new plan has proved a great success. This method has not disfigured the windows, and it will take a close examination to discover how the air is admitted.

Passing on into the extension, we find the registers so arranged as to blow the air against the outside walls above the heads of the audience, with the return flow along the floor. In the main church the registers formerly used for the furnaces have been utilized for returning the foul air to the ventilating flue.

The plan of operation generally followed is, that while the church is being heated, the air is returned continually through the heater, it being perfectly fresh and pure. This is continued until just before the audi-

ence assemble, when the dampers are changed, fresh air from outside brought in, and the return air sent directly into the ventilating flues.

Perhaps a few facts as to results will be of interest. A short time ago the mercury on Saturday marked 5° below zero, with a high wind blowing. Steam was raised after dinner, and the fan started at 2.15, the temperature in the building being 25°. At 3 o'clock, or forty-five minutes later the mercury had risen to 58°. The heat was kept on until about 10 o'clock that evening, when fires were banked and left until next morning, when a two hours run raised the glass to 72°, and the speed was reduced. Under ordinary circumstances the school room is left until the close of the morning service, as a two hours run is sufficient to bring it to any desired temperature.

From present appearances it looks as if this plant should be placed in the front rank of modern heating and ventilating outfits, and it reflects great credit upon the contractors, Messrs. Geo. W. Reed & Co., of Montreal.

BY THE WAY.

A four years course in landscape gardening has recently been established at Harvard University. It will include the study of architecture, the artistic treatment of natural forms, practical horticulture and aboriculture.

× × ×

The City Solicitor of Toronto has stated that the City Council have power to appoint an inspector of elevators, under sub-section 6 of section 541 of the Municipal Act. He suggests the importance of also passing by-laws to regulate the construction and use of elevators.

× × ×

The Ontario Society of Artists have selected for the Ontario Government the following paintings by Ontario artists to be placed in the halls of the Legislative buildings at Toronto : T. M. Martin's "Blue Grouse" ; R. F. Gagen's "The Vanguard of the Coast" ; C. M. Manly's "The Valley of the Teigh" ; F. S. Challeners' "A Fisherman's Home," and W. A. Sherwood's "The Morning Paper."

× × ×

The Assessment Commissioner reports that the number of vacant houses and stores in Toronto is less than one-half the number recorded a year ago. During 1899 there were erected factory buildings valued at $1,000,000, dwellings valued at $800,000 in addition to repairs and alterations costing $300,000. This is a good showing.

× × ×

The measure which is now before the Dominion Parliament providing for government regulation of the sanitary conditions surrounding workmen employed on railways and other public works ought to have the support of members on both sides of the House. This measure may be regarded as the result of the recent disclosures concerning the conditions attending the construction of the Crows Nest Pass Railway.

× × ×

Considerable interest will be taken in the doings of the Commission to whom has been entrusted the expenditure of the grant of $60,000 per year by the Dominion government for public improvements at Ottawa. The first step has just been taken in determining to establish a number of handsome boulevards. King street, from North of Rideau street, to the river, is to be improved in this manner. The beauty of Nepean Point will, I fear, be seriously marred by the excavations now being made for the railroad roadbed connecting with the Interprovincial Bridge which is to span the Ottawa river at this point.

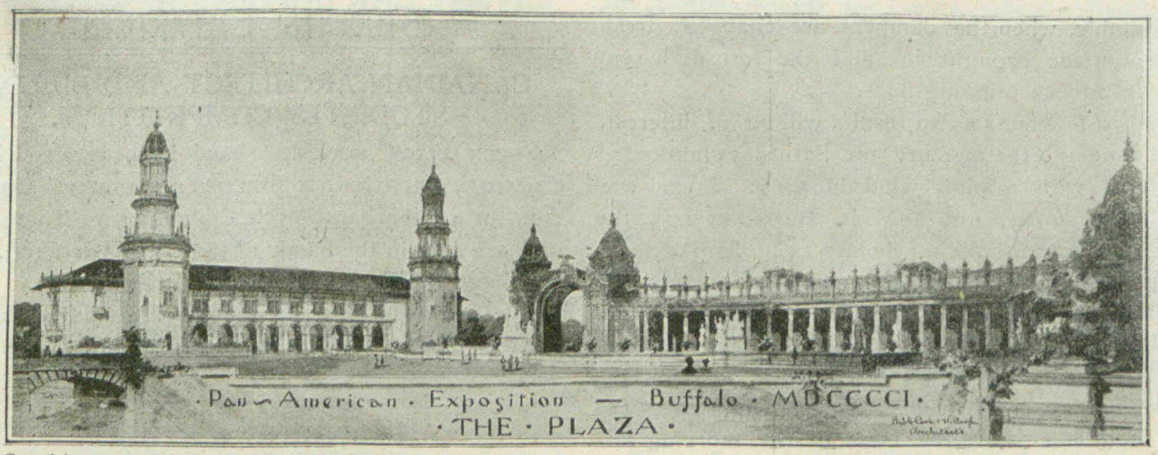
STUDENTS' DEPARTMENT.

CANADIAN ARCHITECT AND BUILDER STUDENTS' COMPETITION.

SEVEN sets of drawings have been received in the CANADIAN ARCHITECT & BUILDER'S STUDENTS' COMPETITION for a Suburban Bicycle Club House. These drawings are now in the hands of the Committees of Award appointed by the O. A. A. and the P. Q. A. A. At the time of going to press the report of the judges had not come to hand ; but it will appear in our March number.

PLANNING A STABLE.

IN considering a few main points in stable planning, says a writer in the National Builder, the thing of most importance would seem to be that a stable should be planned with respect to the points of the compass, the same as a house and for the same reasons. Sensible people like to live on the sunny side of the house. Horses and cows like it as well, and it is positively cruel to animals to locate the stalls on any other side but the south, for it is always possible to do this much. How careful some persons are about selecting a site for the house where it will be dry and sunny, and why should they not be just as careful about selecting a site for a barn? Badly constructed stables are never economical, and in many cases a little extra money spent on them will repay itself in the better condition of the animals that have to inhabit them. I have always held that a barn poorly ventilated will cause the loss of more money in a few years, by the poor health of animals, than it would cost to build a dozen ventilators. I have not built a single stable for the past fifteen years without putting in one or two ventilators. There should be a ventilator from the stable, and where possible, one also from the hay loft. The best way to arrange the stable ventilator is to inclose the shaft from the loft door up to the roof outlet. I am at work at the present time on a stable in which I am placing two ventilators. In this stable I have built the ventilators from the loft floor up to the roof, with an opening into the shaft from the loft by means of a door about four feet from the floor, which, when opened, will afford loft ventilation as well as stable. Under the shaft I will place in the loft floor a trap door on hinges. In the floor I am using 2 inch matched yellow pine. Under the stalls the beams will be blocked for a fall of 2 inches to gutter, and a ⅞-inch matched floor laid. This I intend to have covered with coal tar and lay oak strips cut from 4x4 timber, by one sawing to make two pieces 3x4 at one end and 1x4 at the other. These strips I will lay about ⅜ of an inch apart, with the 3-inch end towards the gutter, so that the horses will stand on a level space. By this method the stall floor will be elevated 2 inches above the stable floor ; the gutter is sunk so that its top is only 1 inch above the beams. This gutter will lead to a manure pit, which will be located convenient to the stable door, and be constructed water tight. The stall partitions are to be made of 2-inch plank let into the grooves cut in the stall posts. The partitions will be 5 feet high, with iron guard to keep the horses from annoying one another. There are many more points that ought to be given in this letter, as I have not covered half the ground I intended when I started out ; but I am making this too long, so will close and give the rest some other time.



COLOR IN ARCHITECTURE.*

By John Gemmell.

When our Registrar suggested that I should give a paper on color in building materials at this Convention, there ran through my mind some random readings I had done in chromatics. My first thought was to attempt with the aid of books a learned inquiry into the theory of light and color, and the laws which produce harmony or the reverse, and applying these to the prevalent building materials, get some idea which to combine and what to reject. On second thoughts, however, it seemed to me that an architect was more in the position of an artist, with perhaps his pigments more limited.

Much as the world owes to the patient labors of science, it may well be doubted if these are of help in the domain of art which has to do with the external appearance of things earthly.

Great artists were great colorists from intimate study of nature seen by the naked eye. Indeed, is it not probable that the artistic sense of form may be coarsened by the deeper insight of the anatomist about the framework on which is hung the beauty of a "Venus" or an "Appolo"? I can well believe that Raphael knew less anatomy than Michael Angelo.

Beauty of form in objects, blending and contrasting of color in an autumn landscape or the glory of a setting sun, are appreciated by the artistic temperament perhaps much more intensely than by the learned philosopher discoursing by his side on the complete mathematical precision and proportion of the wave theory of color. It is not to belittle this trend of our time to attain to the Genesis of all things, but to make the claim that the highest skill in arrangement and disposition of color in art is quite possible with no other guides than observation and God-given instincts, which are above rule, and that appreciation of color may in no way be enhanced by a knowledge of the laws of chromatics. If the artist is faithful to catch the changing face of his mistress, Nature, this will be to him a royal road to perspective, color and other sciences.

But what, say you, has the architect to do in common with the landscape painter? Are not his aspirations very much curbed by e limitations of his materials? True! yet is it not most essen_ial that he should have as much as possible of the artist's eye for the beauty in nature, that his work may not prove the discordant note in its surroundings? He it is who rears that which marks the advent ot the living and receptive soul on the scene, and it surely were a great pity if his building became a blot and excrescence—spoiling a spot that it may be dear to many—when by more feeling for and study of his site, it might have become the one thing that was necessary. How often have we seen vulgar ostentation think it has achieved fame by painting a whole house in colors that nature uses for her smallest flowers!—brilliant red brick, lilacs, olives, blues and yellows! You remember how the Americans were emulated in their use, speaking of the Canada drab with much scorn. Which of you now, granting your house were good architecturally, would not rather paint it drab than say, pea green? For a country house, therefore, where the beauties of Nature are the chief attraction, and means very rarely forthcoming to build a stone or marble mansion to dominate the scene, the best solution of the color problem is to make the house subordinate and a complement to the landscape. If brick is used, let the mortar joint be honest and very perceptible to tone down the color in mass. But perhaps the best mode of construction for such a building is the entirely shingled house, the staining of which affords facility in carrying out color schemes that with difficulty can be made vulgar.

It is in the cities and towns, however, that unbridled liberty in the use of various colored building material and coloring of buildings is likely to render any broad and harmonious whole impossible. What should be the prevailing color of a city seen as a whole approached from the water front or from points of vantage in the surrounding landscape, and which architects should, by their individual efforts, endeavor to control?

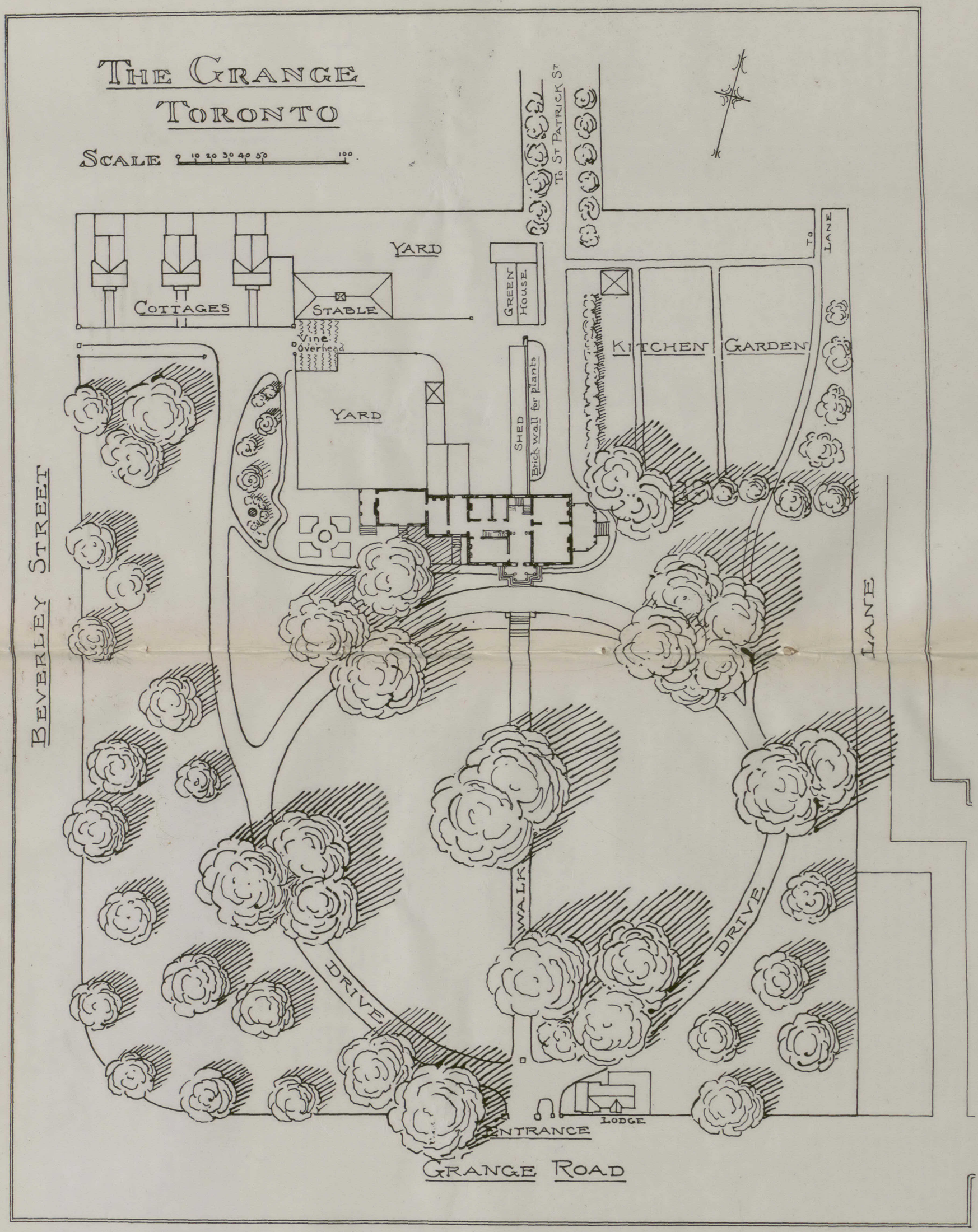
I may as well here state that in my opinion the palette prescribed by good taste, at least for the exterior of buildings is extremely limited, and that the building material used on this continent has been generally of too positive a color, and it would have been vastly better if no material darker than Ohio stone (which is about the darkest of natural stones) had been used. I think I am justified in saying this, as it is now being found out that the varieties of brown stones are or perhaps should be soiled and spoiled products of nature, taking their color from oxidation of iron, and this oxidation going on more rapidly when exposed to the air, destroys the stone in less than a generation. There is now arisen a craft in New York depending on its skill in restoring lost angles, moldings, etc., to brown stone buildings not thirty years old yet, in a state of decay.

Architecture is a plastic art, concerning itself with outline, light and shade more than color, is akin to sculpture more than painting. Now just think how all the beauty of a piece of marble sculpture would be lost if reproduced in commercial brown stone. If Lily Langtry or others of the world's beauties, with all their perfection of feature, were of Ethiopian complexion, would we still see their loveliness?

Does not nature suggest in the large and clumsily modeled features of the negro that the material was unpromising and fitted for nothing better than a charcoal sketch of humanity? The only virtue I could see lately in the once vaunted brown stone fronts of New York was that this color to a large extent obscures the wretched bad detail of their period, and now when a great deal of their architecture is following better and purer models, New York has for building materials pinned its faith to Bedford limestone, a light grey Buff brick and a brick almost white with a black speck running through it, giving texture. As a result I assure you that city has taken on a smiling look which was not there a few years ago, even from the harbor, but especially in the direction of the river drive, which is the hope of New York, where is to be seen their best in architecture—Columbia College, St. Luke's Hospital and other buildings whose authors with their increased knowledge of true architecture seem to believe also that this is best embodied in materials of light color. In Washington, viewed as a whole, we have perhaps the best example of a beautiful city on this continent and the only one I know of that has a just arrangement of buildings in order of their importance. The capital on a hill dominates the whole, the minor buildings of government surrounding, and all built with some dignity, and best of all, none of the dwellings or mercantile buildings are of that exceeding size which renders a harmonious whole impossible in other American cities, and makes all attempt at temple or public monument futile. The capital library, Washington monument, and the city generally is of light colored material with more than one dome in gold.

To uphold my contention that good architecture should never be clothed in dark materials perhaps it is better to go back to the ancients for the color as we had to for the forms. I do not think they used dark stone. When we conjure up the classic buildings of Greece and Rome, it is I think, of a gray hue we imagine them

* Paper presented at the annual convention of the Ontario Association of Archi cts, T oronto, January, 1900.



THE GRANGE, TORONTO (ILLUSTRATING ARTICLE IN THIS NUMBER).


PLAN.
COMPETITIVE
DESIGN
FOR
PROPOSED
NEW METHODIST C.H
VANCOUVER
ARMOTT WOODROOFE
ARCHITECT VANCOUVER

—perhaps because our best reproductions of them are of this hue —yet you know the Elgin marbles which formed the Typanum of the Parthenon's pediment are of that ivory yellow which white marble takes on by lapse of time, and the whole building was no doubt of the same material. Wander among the ruins of that centre of the world's civilization, the Forum of ancient Rome, and we can no longer speak of them as cold grey stones. If I remember rightly the pavements, steps, pedestals and bases were of white marble, and by the remains of broken shaft, capitals and cornice the superstructures had been of the many colored marbles of Italy. Recalling your knowledge of Roman costume—the togas of red purple and fine linen—you must imagine a much more glowing picture of ancient Rome than its distance from us is apt to call up. May we not then from the fragments left us conclude that the ancient classic art so true and beautiful in form, believed that this form was best displayed by materials of lightest shade of color. This, if true then, is true to-day. Perhaps Paris the beautiful is so more from the use of the light Caen stone than from its architecture, which is somewhat flat, and certainly monotonously alike.

There is one little town that lives in my memory—often called up, though I never knew its name—but which I think was an object lesson in color. My train stopped for about five minutes on the Italian side of the Alps; about half a mile from the tracks there lay a lovely placid blue lake; on the other side of this, with its reflection in the water, built up the mountain side, appeared a small town, the walls of yellowed white stucco, projecting eaves of the roofs, deeply revelled windows, open inviting galleries and many a natural addition of gable and lean-to; all the walls were one color—all the roofs of low Italian pitch and red tiled with that half round tile that makes so exceptionally fine finish at the eaves; the spaces were made up either by the grey tone of the roadways or the green of the vines or trees. Illumined by the morning sun of a spring day one could trace the soft green foliage up the mountain till it merged into the glittering white and blue peaks of eternal snow which crested the scene, against the deepest of blue sky.

I cannot help thinking how much of the brilliancy the whole would have lost if the houses of that mountain village had had walls of dark brick and its roofs had been dark slate. In passing. is it not aggravating that so complete light and durable a roof as our Canadian slate, gives so little satisfaction in point of color with its staring unchanging black.

Getting nearer home in this matter of color in architecture, some of us remember the advent of red brick inculcated by the lectures of Oscar Wilde and the example of our continental neighbors, who more than once have had a malign influence on our tasks when we were following the traditions of the old country—our legitimate inheritance—leading us astray into abominable practices of galvanized iron, clapboard and the like, and later the worship of the prison-like Romanesque, a style which can only now be admired in a few of the works of the leader of that movement, and these more as the energetic struggles of a vigorous mind shaking itself free from a very chaos of debased architecture.

But I am degressing. The red brick period came and to a large extent is with us yet. It was hailed as a Renaissance in our architecture, and we out-Heroded Herod, making our walls a mass of red with no evidence of construction, obliterating the mortar joint, which is not honest. Properly laid walls with mortar joint large enough to bed and point the brickwork properly, result in a very different tone of color in mass.

Has then color to be entirely eschewed on the exterior of buildings? No, but I hold that color is somewhat as Tallyrand said of speech, that it was a gift given to enable man to conceal his thoughts. In true architecture the massing and outline should attract, but also its details should hold and give study to the eye. Now is it not true that in a building of dark stone or brick one is conscious of its color above everything else? Has it not about the same relation compared to a light building that a silhouette holds to a portrait—striking outline at the expense of expression and detail?

This use of dark colors for building allows no field for that mellowing and blending effect of time to do its best work. Look at the stone work of St. Andrew's Church or that of the University, and you will see what is meant, and I think you will also be convinced that these effects are never produced with a groundwork of dark stone; and the same can be said of the inferior material, brick. I believe from the weathering qualities of some examples of our old Yorkville white brick, that had we been less of faddists and persistently improved our architecture in that material, we would now be further advanced in the direction of good architecture in individual buildings, and the general effect immensely better.

I have frequently noticed the east end of Holy Trinity Church —it is a delightful specimen of old white brickwork which time has only ripened and not much injured. The firm of Darling & Curry some time ago erected a school house to this church, and wrongly, I think, following the fashion of the times, it is of red brick. I would like you to compare the two, and without saying anything in disparagement of its architecture, I believe we would all agree that there is no hope that the school house walls will ever acquire the interest of those of the older building.

With the glamour of red pressed brick, brown stone, brilliant stained glass and the like, we will never gain the repose and dignity of great or even good architecture. Color does to a certain extent attract the senses, but in the artificial surroundings of the interior of buildidgs will be foudn its more congenial sphere. On the exterior it is more a substitute for than an essential in architecture—whereby we can say "be ye warmed and filled," and yet refrain from giving thought, research and patient working up of details necessary to give permanent interest to any building.

Is it then my contention that the buildings of a city should be one uniform color? Perhaps this would flavour too much of dogma to suit the artistic mind, yet worse things could happen. I have instanced Paris and Washington, and might refer to the clean light granite cities of the north of Scotland—Aberdeen and its neighborhood—as being peculiarly satisfactory to all who have visited them, and certainly much more satisfactory in point of general effect to, say, that dreary monotony of red brick to be seen in a Philadelphia street.

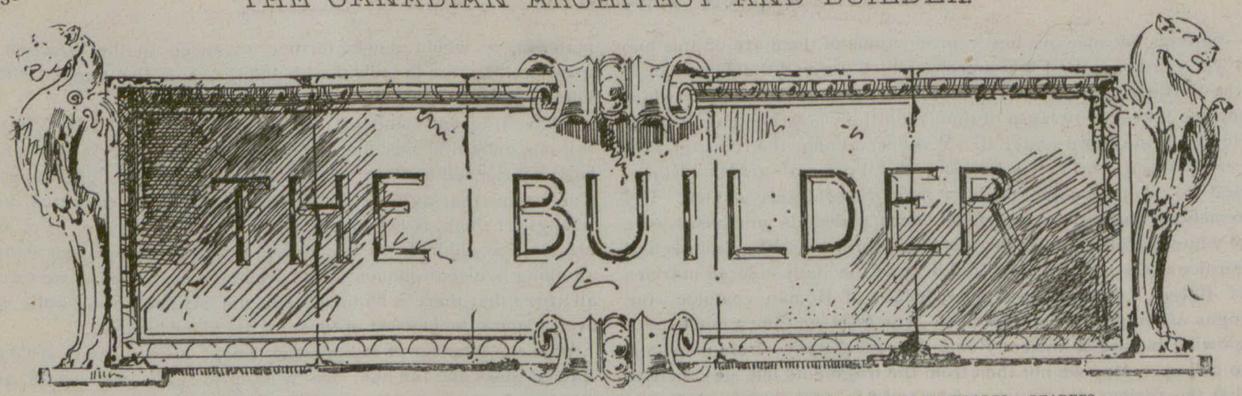
I would remind you that Nature never indulges in chequer-board work. Broadly speaking, varying greens for the earth, grey for her cliffs and rocks, blue for water and sky—her efforts are gained by infinite gradations of these, with the aid of sunshine and shade, but how seldom and in what small quantities are the bits of color the artist speaks introduced, like accents in music. What extenuation, then, have streets to be seen whose buildings alternate in color like Joseph's coat?

There is none of you now would revive that style of building which, from its regular disposition of red brick and white stone, gained the cognomen of streaky bacon, and you are right in this, for nothing more certainly destroys the unity of a design than separating the cornice from its frieze, the architrave from its pillars, and otherwise breaking into fragments, by strong contrasts of color, that which should be viewed as a whole. Now, if the separate building has gained by this grasp of the necessity of unity in a building before it is to be considered worthy of criticism, why not apply the principle to the whole street or the whole city? To me it seems if this could be accomplished, there would be enough of color element introduced by the discolorations of time, by minor bits of detail, and the drapings of windows, which would suggest to the outside the warmth and hospitality of the interior.

As a last illustration to enforce the argument that materials of light shades of neutral color are best adapted for the building of an ideal city, I would ask you to look at the picture of old Venice on the wall to your left. Let us imagine that the government of that sea-girt city, attracted by the fame of a certain architect—one Signor Waite, of Palermo—they had on his advice at great expense changed thn material of that beautiful church across the Lagoon, "St. Maria del Salute," and it was constructed of a sombre brown stone. Do you not think as you look at the picture that this would have been a frightful mistake, and the artistic sense of the Venetians would have been bitterly regretting it these many centuries?

The formation of a local Master Plumbers' Association at Victoria, B.C., is reported. Messrs. Barr and Rose, of Vancouver, assisted in its organization.

The creation of a prestige in business is sometimes the result of small things. We know of a plumber who distanced all his rivals by furnishing his workmen every morning when they went out of his store with clean overalls and jumpers. He provided these himself and kept them clean, and he found it to be the cheapest and most effective advertising, because all the housewives appreciated it so much that they told all their friends, and everybody in their immediate neighborhood sent for this particular plumber when they needed a plumber.—Advertising Experience.



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

REGARDING STAIRS.

A GOOD house," says Ware in his "Complete Body of Architecture," "should always have two staircases, one for show and the use of company, and the other for the domestics. This latter should be thrown behind, but the other is to be shown, and upon the proper placing of it depends in a great measure the judicious disposition of the rest of the house."

This quotation, of course, refers to houses of the better sort, and carries weight when so applied, but, unfortunately, our social conditions are so cast that the greater mass of humanity is compelled to live in houses where one flight of stairs has to perform the double service referred to above ; and this condition renders it necessary to make the single flight as efficient and easy-going as possible, and to this end the following suggestions are offered.

In planning a building it is usual to place the stairs as near the main entrance as may be, a practice that is not always to be recommended, as the domestics, who are obliged to use the stairs daily, are generally farther away from the main entrance than the family, and therefore compelled to perform a great deal of useless and wasteful labor, and the treads from frequent use, soon become shabby looking and care-worn, and if covered, the carpet soon exhibits signs of wearings and decay. For a private house where only one flight is indulged in, it should be placed somewhere near the centre of the building and be accessible from any part with the least outlay of travel. This may easily be accomplished, and the stairs may be constructed between two walls, thus saving hall room below, and, where possible, the entrance might be covered with a door, to prevent heat from escaping from below, thus economizing in fuel, a matter of considerable importance in this country.

Stairs of this sort may be very cheaply constructed, as they will be closed in on both sides, and only a single rail, void of balusters, will be required. Where it can be done, it will always be wise to break the stairs about half-way up, by placing a landing or "rest," at least three feet square—more if it can be done. When occasion requires, the stairs may start from this landing in any direction ; they may go forward, turn to the right or to the left, or return on the direction of the first flight. If the latter method is adopted, the landing must be at least twice the length of step, in order to accommodate the last step of the first flight, and the first step of the second flight.

These suggestions hold good for the back stairs when two or more flights rise from one floor, but in all cases care should be taken that the stairs intended for the domestics be easy to travel and as free from turns as possible, and sufficiently wide to allow of two persons passing each other without being cramped or crushed. The custom of crowding the stairs into any out-of-the-way corner, and twisting them like a corkscrew, is wrong and inhuman, and has much to answer for.

With regard to the main stair in a fairly equipped house, the circular model should be avoided, for, while a grand stair or a circular or elliptical plan, is "a thing of beauty," when generously treated, it is sadly out of place when introduced in an entrance hall not more than six or eight feet wide. Winders are always objectionable on a small scale, and should never be employed where a landing or "fliers" can be substituted, though, of course, the writer is well aware that there are cases where winders are a necessity, but in a majority of cases they may be dispensed with.

A very important matter in designing stairs is their proportionate disposition, so as to obtain the utmost facility of access to the various storeys with which they communicate without a wasteful sacrifice of either space or material.

It may be well perhaps to notice two or three general considerations applying to all cases of good stairs and stairways. These are :

First, that every stair should have sufficient headway to allow a tall man wearing a tall hat to pass easily, and this may be put down at about 7 ft. 6 in., between the trimmer at the well-hole and the head directly under it. If there is any difficulty about this, the trimmer should be made to suit.

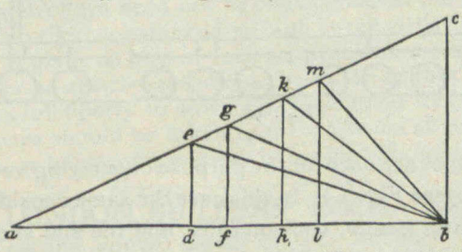
Second, no stairs should be less that 2 ft. 6 in. wide, even back stairs from the kitchen should be at least 2 ft. 10 in. in width, and main hall stairs in private houses should measure not less than 3 ft. 4 in. from outside to outside of string. In public buildings, the least width permissible is 4 ft. 4 in.

The third element in the proper proportioning of stairs is the angle of ascent, which is necessarily dependent upon the dimensions of the rises and treads of the stairs. As this is a point of much importance in rendering a stairway easy of going, considerable attention has been given to it by practical stair-builders as well as by eminent architects, who together have evolved certain fixed rules from the relations subsisting between the height and width of steps. In this regard the same rules apply, with but little modification, to all stairs, of whatever material they may be made—wood, stone or iron.

It may be taken as a general maxim that the greater breadth allotted to the tread of the step the less should be the height of the riser ; and that this is a common-sense view is evident from the consideration that, in walking up inclines or hills, we find that the steeper the ascent the shorter are our steps, or vice versa. Experience has shown that a step having a tread 12 in.

in width and a riser 5½ in. high is convenient and well proportioned. Seventeen and a half inches then may be taken as a standard from which the dimensions of others may be deduced, so whatever may be the width of the tread, that sum should be supplemented with a sum—the height of the riser—so that the sums combined, will make a total of 17½ inches. Of course, this rule cannot always be followed, but it should be kept to as close as conditions will admit.

A very good way to determine the width of tread, or height of riser is by making a right-angled triangle a b c, as shown in the figure. Suppose a b equal to 24 inches, and b c equal to 11 inches, which makes the standard proportion of tread and rise; then to find the riser corresponding to a given tread, from b set off on a b the width of the tread as at b d, and through d draw the perpendicular d e, meeting the hypothenuse in e; then d e is the height of the riser, and if we join b e, the angle d b e is the slope of the ascent. In like manner, where b f is the width of the tread, f g is the riser, and b g the slope of the stair. The width of tread b h gives a riser of the height of h k, and a width of tread equal to b l gives a riser equal to l m; and b d gives a riser of d e; and so on, the tread governing the height of riser as shown,



Diagrams for Proportioning Stair Treads and Rises.

but, the rule may be reversed and the height of riser may be made to govern the width of tread.

Another system is to set down two rows of figures, each in arithmetical progression; the first set showing the width of treads, ascending by inches, and the other showing the height of riser, descending by half inches. It will readily be seen that each of these steps and risers are such as may suitably pair together.

As before stated, it is very seldom that a hard and fast rule will apply to the proportioning of stairs, so all that can be done in the matter is to offer a standard, which it is desirable to approximate.

Treads, Inches	Risers, Inches
5	9
6	8½
7	8
8	7½
9	7
10	6½
11	6
12	5½
13	5
14	4½
15	4
16	3½
17	3
18	2½

In better class buildings the number of treads is considered in the plan, which it is the business of the architect to arrange, and in such cases the height between the top of the lower floor and the top of the next floor above is divided into as many parts, less one, as there are treads shown on the plan.

The method of construction of stairs is a matter of great importance, and will be discussed separately later on.

HOW TO CARRY A LONG GIRDER.

Thousands of tons of long girders to be used for bridges and for buildings are carried on our railways and roads every year. A very slight error or want of foresight in the handling of these girders during their carriage may severely damage them, and, in fact, it is quite possible to strain (the word being used in its proper sense of deformation) the flanges or web with rough or unskilled handling more seriously than the girders would be strained under their intended load. A girder laid on its side, when it is never intended or designed to be placed in such a position, may have its effective strength very easily deteriorated, and it is even possible that in some cases a permanent strain due to stress beyond the limit of elasticity may be forced into the girder whilst under handling, lifting, or transit.

Fig. 1

The writer has seen long deep girders of very narrow flange, the very narrowness of the flange probably intended to be met in fixing the work by some cross-bracing or ties, very severely treated by temporarily resting the girders on supports at each end, their own weight alone whilst in this position deflecting the girder several inches, and then, added to this deflection due to their own weight, several men with loads may have walked along the web of the girder from end to end, every step swaying and bending the girder several more inches up and down. This kind of sideways stress was of course never anticipated by the designer of the iron-work, and should never have been allowed to occur.

Then there is the danger of careless handling and lifting when loading and unloading the girders on and off the vehicles carrying them, whether these be railway waggons or road trucks, from the makers' yard to the site of erection. The writer has known many instances of girderwork being much injured by this treatment, and in several cases, parts of work that should have travelled safely have had to be partially cut to pieces, certain parts heated and made good and straight, and then re-riveted into its position.

As a matter of fact, the loading and unloading of long heavy and (under certain conditions) unstable girders, is generally left to a foreman who possesses no knowledge of stresses or strains, and who probably does not know the difference between tension and compression, or shearing or torsion. Such a man may easily injure the girderwork with the powerful cranes or lifting appliances which are under his control. It is something analogous to a battery of artillery being placed in the charge of a corporal who has never been through a

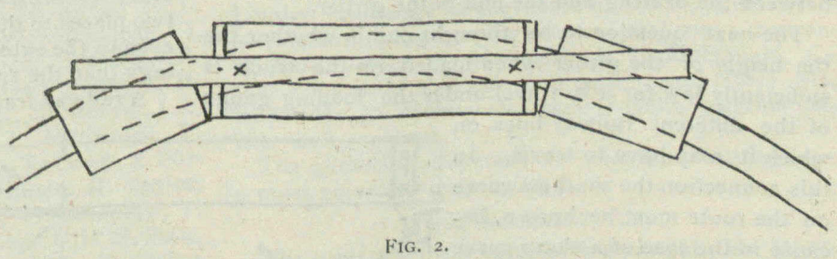


Fig. 2.

military school. He may do a great deal of harm in a very short time.

The writer once had a terrific struggle with one of this class, a "loading" foreman employed by one of the

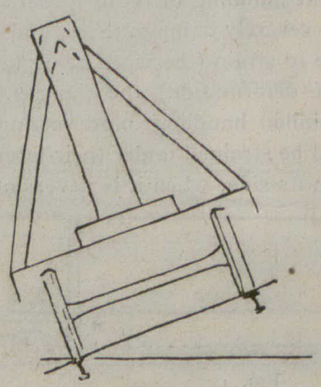


FIG. 3.

large railway companies. The foreman or "inspector" insisted that certain girders that had to travel several hundred miles should be loaded on their sides, whilst the writer equally insisted on the girders travelling in a vertical position, or in the position in which they had been designed to carry their own weight. In the end the foreman was defeated, but not before the writer had undertaken to take sole responsibility during transit.

METHOD OF CARRIAGE.

There are two methods of carriage of girders over railways. One is with fixed bearings such as the case when the girder is loaded on to a boiler-truck in which the frame and supports are rigid. (Fig. 1.)

In this case, the question must be considered whether

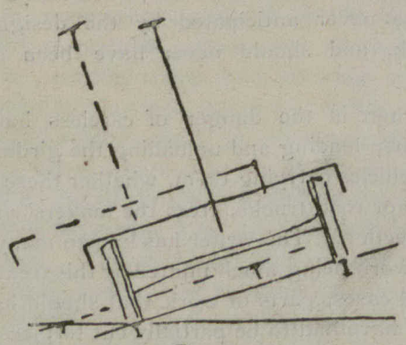


FIG. 5.

the girder is of requisite strength to act as a cantilever between the bearing and the end of the girder.

The next question to be thought out is whether the the height of the girder when loaded on the truck is sufficiently low for it to travel under the loading gauge of the different railway lines on which it may have to travel. In this connection the sharpest curve on the route must be known, because in the case of a sharp curve the loading gauge follows the curve, whilst the girder is straight and does not curve with the track. Plan Fig. 2 will show this.

It will be seen that the centre of the girder is to one side of the centre line of the rails, and the ends of the girder are to the other side of the centre line of the rails. This makes the virtual width of the load much more when travelling over curves.

The cant of the rails where curves occur is also worthy of consideration. In some cases of 4in. or 6in. cant or superelevation, the leaning over of the girder towards the low rail must be provided against by stiff struts of timber on the one side and efficient chains on the other side, and as the vehicle will have to go over curves both right hand and left, the struts and chains must be provided on both sides equally. A further consideration is the endways bumping of the vehicle when the train is suddenly stopped and started on the journey. This will occur at all stations and signals at which the train will stop, and may occur when the engine driver is descending a gradient and shuts off steam and applies his brake, or when the guard in his own van applies his brake. This endways bumping is to be met by chains fixed at an inclination to the vertical, and at both sides of the top of each strut. Fig. 3 shows the load when travelling over a curve with superelevated outer rail.

The second method of carrying over railways is with movable bearings or bolster waggons. It is not often that timber bolster waggons can be used for carrying girders as they are not sufficiently strong for very heavy loads; but sometimes special rail trolleys that are not in use at the time for transporting the long rails of our railway

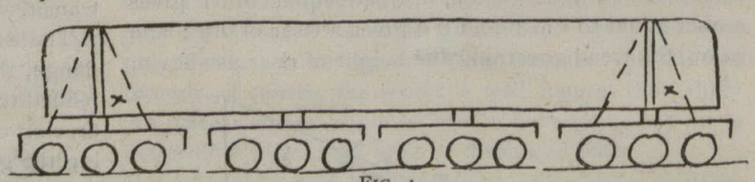


FIG. 4.

companies are used for the purpose of carrying very heavy girders (see Fig. 4.). In this case the same considerations of loading gauge, cant on rails, and the end shocks will have to be made; but the case becomes much more complicated.

It is well known that when felled trees are carried on bolster waggons, and firmly chained down to three or four of the waggons—the load being too long to be carried on ocly two bolster waggons—that, in such cases, the travelling of the combination will in such cases, either break the timber log, or, what is more probable, force the leading or trailing wheels off the road when passing over curves, and so derail the vehicles, or some of them. In this case the load is rigid, and the vehicle is movable with disastrous results.

If a load of timber logs should not be treated in this manner, much less should our girders be so dealt with. The result must be that either the stiff girder will force the vehicle off the road, or the vehicle when going around curves will damage the girder. But there is another reason why our girder must only be attached in two places to the vehicle, and why it should be well clear even to the extent of several inches from all other fastenings than the two referred to.

A railway track is a thing both of curves and also of

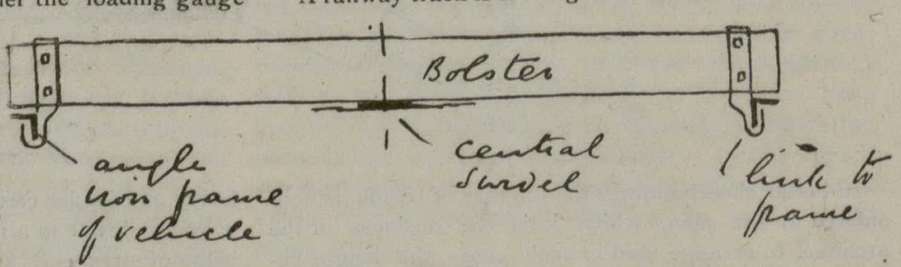


FIG. 6.

gradients. Whenever a change of gradient occurs, and the changes of inclination are many, either a salient or a re-entrant angle (in a vertical sense) has to be passed over. At a salient angle or angle greater than 180°, if the girder were resting on four points the load would be resting on the two inner points only with a tendency to

lift the two end vehicles off the road, and on the other hand, at a re-entrant angle or angle less than 180° the two end vehicles would be supporting the load, and the girder would be actually lifting the two inside vehicles off the road, and of course in this case the weight of the vehicles lifted off the rails would be added to the weight of the girders or the load carrying trucks, which would be overloaded and disaster ensue.

Further, there is the consideration of the three or four-truck vehicle when travelling over a curve with super-elevated rail. Take a case of a rigid girder, when travelling on a four-truck vehicle, when passing over such a curve. It is assumed that the girder is supported and fastened at the two centre bolsters only, but that it is simply resting on the two end bolsters.

Fig. 5 will show the position, the full lines showing the inner vehicles, and the dotted lines the end vehicle. The centre lines are shown of both sets of vehicles, and as the center line of the girder is rigidly straight, it will be seen at once that the end vehicles will lift the ends of the girder, together with the inner vehicles, every time a curve with canted rails is passed over.

Further, there is yet the consideration that the connection of the bolster to the waggon is only at its centre or point of swivel, and at no other place. If the wind is taken into account together with a large cant in the rails, a considerable overturning tendency has to be dealt with. For this the sole connection at the swivel is not quite satisfactory, and some holding down link at the ends of the bolster should be made, at least in the case of very deep girders. The case of the usual load of rails on these trolleys need not be considered, as the rails are neither so rigid nor stacked so high as the girder on edge.

Fig. 6 gives an idea of such an attachment ; of course the links or attachment should be made so that the bolster has full liberty to move sideways upon its bearings. Great care should be taken to oil or grease all parts that require it before the journey is made.—Building News.

LONDON BUILDERS' EXCHANGE.

The second annual dinner of the London Builders' Exchange, was held at the City Hotel, London, on the evening of the 7th inst. The occasion was marked by a large attendance, much enthusiasm and good fellowship. The newly elected president, Mr. Wm. Tytler, presided. Occupying places of honor beside him were his worship, Mayor Rumball, Colonel Holmes, Colonel Culver, United States Consul, Captain Robson, M. P. P. for East Middlesex, Colonel W. M. Gartshore, E.A. Roberts, secretary of the Cleveland Builders' Exchange, Wm. Jeffrey, ex-president of the local exchange, H.C. McBride and Thomas Jones. Among those present were noticed : W. Chamberlain, A. Stewart, W.P. Brown, J. Young, G. Craddock, W.T. Pace, L. Boss, C.H. Gould, J.S. Lunley, D. Ferguson, C. Ferguson, W.D. Willis, H. Edmonds, S. Willis, R.G. Wilson, I. Quick, R.H. Berry, C.T. Element, J. Adair, T.A. Parkinson, E. Fritzgerald, G.L. Gould, F. Martyn, J. Logan, J. Calhoun, A.M. Legg, R.H. Hessel, John Bryan, J.J. Foot, R.H. Pring, H. Sing, J. Sullivan, S. A. Thompson, J.H. Ryan, W.T. Hayman, A. Dowell, H. Hayman, J.W. McIntosh, J. Fenn, A. Irwin, G. Fox, C. Percy, Geo. Everette, R. Waide, W. B. Walker, D. J. Cowan, Geo. Buskard, H. C. Simpson, S.M. Stewart, T. Burnett, S. Stevely, J.A. Stewart, W.H. Angus, E. Kerrigan, J. Whittaker, T. R. Wright, F. D. Macfie, T.W. Copp, T. Gerry, J. Purdom, J. Burnett, R. Skelly, W. H. Winnett, G. Taylor, H. Stratfold, G. Howe J.W. Tucker, T. Robinson, T. A. Jones, T.R. Howard, George Mortimer, G.H.H. Platt, D.H. Gillies, A. Burnett, A. Nobbs, W.E. Tambling and G. Trambling. Regrets were read from Henry Martin, president of the Toronto Exchange ; the president of the Cleveland Exchange ; and John M. Moore, H. Matthews and F.H. Farncombe, of London.

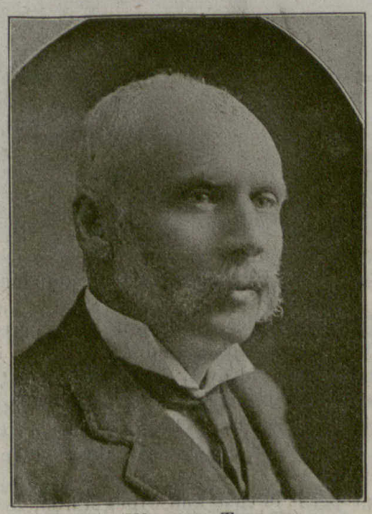
In rising to propose the toast to Her Majesty the Queen the president expresses his pleasure at witnessing so large a turn out, not only of builders but of citizens in other walks of life. He referred also to the success which has attended the organization of the London Builders' Exchange and the benefits accruing therefrom. The new form of agreement which has been adopted has been found to be very satisfactory and present relations between the architects and contractors were of a cordial character. The year 1899 had been a fairly prosperous one for the building trade and the outlook for the present year was promising.

Following the singing of the National Anthem, Col. Culver, U. S. Consul, responded on behalf of "The president of the United States."

The toast to "The Legislative Assemblies" was coupled with the names of Capt. Robson, the newly elected member for East Middlesex.

Col. Holmes replied on behalf of the "Army and Navy" Col. Gartshore for "Our Boys at the Front" the Mayor for "Our City," Ald. Winnett for "Our Mercantile Interests" and Messrs. H.C. McBride and Geo. Craddock for the "Ontario Association of Architects."

After Messrs. S. Stevely, J. Burnett and J. Jones, had spoken briefly for the local Exchange, Mr. Roberts secretary of the Cleveland Builders' Exchange was called upon to respond to the toast to the "Sister Exchanges." In doing so he gave a very interesting account of the progress of their Exchange which numbers about 260 members and has an exchange hour every day from 11 to 12. Reports for the whole state of bids wanted, bids received, and the amount of the bid when it can be got are bulletined daily. Another feature they have lately introduced is a monthly dinner for the members of the Exchange and invited friends at which they make a point of having some interesting question relating to the building interests discussed in a vigorous manner and it has had the effect of bringing out some good debaters. He gave a very pressing invitation to the president and officers of the London Exchange to attend the banquet and ball of the Cleveland Exchange to be held on the 23rd inst., and said they were also anticipating with pleasure the return visit of the London Exchange to Cleveland in the summer. At intervals during the evening some capital songs were sung by Messrs. John W. McIntosh, H.R. McDonald, Captain Robson, M.P.P., H. C. Simpson, and Harry Stratfold. Mr. D. Murray also gave a violin selection which was well received.



MR. WILLIAM TYTLER,
President London Builders' Exchange.

The gathering dispersed at midnight, having spent a most enjoyable evening.

MR. WILLIAM TYTLER.

The subject of the accompanying portrait, Mr. William Tytler, of London, Ont., has just been elected president of the Builders' Exchange of that city. Mr. Tytler is a native of Aberdeen, Scotland, where he served his apprenticeship and gained a thorough knowledge of his trade. Some years ago he came to Canada and commenced business as a contractor in London, where he has established for himself an excellent reputation for good workmanship and upright dealing. The London Builders' Exchange have wisely recognized his abilities, and will benefit by his services in his present capacity as president of the Exchange.

CORRESPONDENCE.

DESIGN OF KIOSKS ON DUFFERIN TERRACE, QUEBEC.

To the Editor of the CANADIAN ARCHITECT AND BUILDER;

SIR,—Having in the past and lately again been several times asked by architects and others from the Maritime provinces and elsewhere for plans of the kiosks designed by me, now some 20 years ago, and since erected, five in number, along the 1500 feet

KIOSKS ON DUFFERIN TERRACE, QUEBEC.

frontage of Dufferin terrace, Quebec, it has occurred to me to have one of them photographed, and if reproduced in your paper it will thus reach the world over.

Our band stands are structures of the same design mounted on a substructure or basement of a height sufficient to answer as a resting place for the bandsmen to enjoy their smoke and glass of beer.

The kiosk proper is of cast and wrought iron, 20 feet in diameter, while the roof, for protection against sun and rain, extends to some 30 feet, or 5 feet further all around. The roof, little of which is seen in the photo, is of an ogee or of double curved profile reducing to a straight slope over its salient portion.

CHAS. BAILLARGE,
Architect and Engineer.

QUEBEC, February 29, 1900.

SOME NOVEL ARCHITECTURAL FEATURES.

To the Editor of the CANADIAN ARCHITECT AND BUILDER:

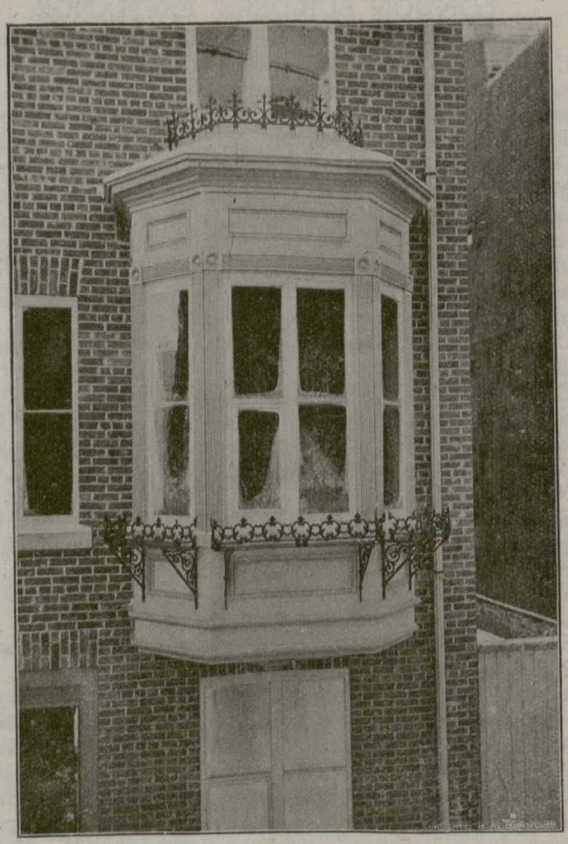
SIR,—As spring will again soon be to hand when ladies will be anxious to give their wintered flowers an airing your readers will perhaps be interested in the accompanying engraving, illustrative of a novel and desirable feature introduced to public attention by the writer, in the facade of a new house now being built by h m in Ursuline street, Quebec, at corner of Ursule street.

The house itself is an example of what may be done on a narrow lot of ground (some 20 feet or less) when a porch or carriage way is to run through it to rear of house on opposite street. This is brought about by making the house a few feet deeper and locating the stairway to the several stories across or crossways of the building, or parallel to the front and rear walls, instead of, as usual, parallel to the gable or party walls, thus leaving space for two good rooms: a kitchen and an office on the first or ground level, with cellars below for coals and provisions, and on each of the other floors and in attics four good sized rooms of 11 x 9 feet respectively by 15 to 18 feet according to depth, with folding doors between those front and rear on 2nd floor for an extensible dining room with sliding cupboard above kitchen and allowing of throwing the parlor and boudoir into one on the front of the house, with portiere hangings or screen between them as may be required. This arrangement leaves, opposite to the stairs, ample space for closets and wardrobes, and between the two a spacious passage or landing on each floor amply and efficiently lighted through the well hole of the stair case by a skylight over center of depth of building.

Porch ways for vehicles are generally made some 7 to 8 feet in width, but 6½ feet is sufficient, as vehicles do not generally exceed 5 feet 9 inches to 6 feet 3 inches from out to out of hubs, while by laying a continuous curb all along both sides of the passage way, wheels are confined in them in a manner that the hubs cannot reach or abrade the parallel walls of the porch way. Thus when land is scarce or lot confined, every inch must be carefully considered to meet requirements. Returning now to the novel feature alluded to at the beginning of this article, it consists of an ornamental cast iron (or it may of course be wrought, or both combined) open or trellis work stand for flowers on a wooden or metallic box to suit size of stand or in earthenware or other pots of the ordinary size and shape. These stands are placed under the outer window sills, supported on ornamental work and cast iron brackets, two or three to a stand as may be desired or required, according to length of stand, for windows of all sizes, from one of only a few inches in width with room for one plant or pot to windows of 3 to 6 feet or more with space for from three to a dozen pots or plants according to size.

Wire stands or of wicker work have been made and can be purchased attachable to window sills, or suspended therefrom; but as a rule they are trashy things liable to get crooked and bent out of all semblance to a thing of beauty. These stands, as now proposed, are executed and to be seen in size and situ under the sills of a bay window, or rather an oriel (the "bay" being so called when originating at ground level while the "oriel" is higher up) of the house herein above alluded to. Moreover the roof of the oriel or bay is at its apex made flat for a space of some 2 to 2½ by 5 to 6 feet, this being hemmed in by a balustrade of low and appropriate iron cresting, affording space for flowers for the bed room above the parlor.

To render the improvement a practical or practicable one in any and every case, the supporting bracket is of inch by quarter inch wrought iron or steel on edge in pieces solidly rivetted to



gether. The triangular space enclosed by the structural portion of the bracket is filled in with ornamental cast or wrought iron scroll work. This construction while so cheap as to be within the reach of every proprietor, allows of the portions entering the walls being forged or cut off to a point, and of driving the bracket into the wall, whether of wood, brick, rubble masonry or cut stone; and if there be not found in the brick or stone work a mortar joint sufficiently near the ends or centre (when three

brackets are used) to receive the bracket it becomes a simple matter, one in fact of a very few minutes work to cut or drill a hole for the purpose, thereafter filling the same with a wooden plug or wedge prior to driving the bracket home ; or, of course, for greater security in the case of heavier stands, the ends of the bracket bars entering the walls could be fish-tailed into an inextricable "lewis" by being driven in (as with a "lewis" for suspending a heavy stone) against a previously introduced iron wedge to cause the fish tail to open or expand.

C. BAILLAIRGE,
Architect and Engineer.

QUEBEC, January 29, 1900.

LAYING CEMENT WALKS.

To the Editor of the CANADIAN ARCHITECT AND BUILDER :

SIR,—In your January issue I read the account of what a gentleman had to say about putting down cement sidewalks in frosty weather, and I thought I would give your subscriber my own little experience along that line.

A gentleman came to me knowing that I had put down a few cement cellar floors, and asked me if I would put down two flights of cement steps, of about five steps each, in front of a pair of houses that he had built. This was about the latter part of October. Being afraid of frost I told him I would not, on that account, guarantee a good job. However, the gentleman said that he could not wait till spring to have the work done, but told me to go ahead and he would run chances of the frost coming before the work was finished. So I went to work at it, the weather being quite open when I started to dig out and get my rock foundation in. Just as I was about to finish it commenced to rain and get quite cold. I got some carpets, canvas, etc., and covered the work for the night, not letting any of the covering touch, as the cement was soft, and there being such a bulk of concrete together it would be slow to set. About midnight it stopped raining, and by morning quite a frost came as I had feared. When I went to see my work I found that the rain had dripped through my covering, had formed quite a frozen skin, and had lifted the top dressing of cement, that I knew if I left it untouched would peel off when dry. I began to think that my job was spoiled after all the pains I had taken with it, and decided whatever was to be done must be done quickly as the bottom layer of concrete would soon set. I took off the covers and let the sun take out the frost, and then took my trowel and gave the work a thorough good hard trowelling, making it smooth. Fortunately the weather kept favorable till all danger of frost was past. I have seen the steps after two hard winters and they are all right. I had this bit of experience in a town about seventy miles north of Toronto.

In building the steps I put in a good rock foundation and shaped the steps roughly with coarse concrete, 6 to 1, then put on ¾" coat over same to the exact shape of steps with crushed granite and sand, 2 to 1 of cement, finishing same with a sprinkling of fine sharp sand and cement mixed ½ and ½, and trowelled to smooth finish, which dried out nice and white like free stone. I used best Portland.

I have seen very bad effects from building steps by forming them in brick and then facing over same with say about ⅜" cement finish. The dampness and frost will be almost sure to peel off the cement. If it does not peel off it will be sure to crack, which is alone enough to condem it.

I might here mention for the benefit of interested subscribers that a gentleman of my acquaintance thought he could improve the tar and gravel walk in front of his premises by a surface layer of cement. He asked the council to furnish the labor for putting it down and he would furnish the material. The council consented and the work was done under the supervision of a civil engineer. I was not asked my opinion about it although I felt interested. I went around and watched results. The experiment was a perfect failure. In the spring following the fall when the work was done I found nearly every bit of it had lifted. I think they put too thin a coat on, also that the lack of suction in the old walk prevented a solid job, and the unevenness of the old walk made the top layer thin in some places and thick in others.

Referring back to the article in your November, 1899, issue, in which the suggestion is made to keep all cement walks damp for two weeks after being laid, this is a good idea for warm weather, but rather risky in frosty weather, as the moisture and coldness of the atmosphere causes the cement to set more slowly, which I think would be equal to putting on wet sand or other means of dampening. I would use covering all the same. I cannot understand why the cement walk your correspondent spoke of was so soft after being thrown open for traffic, because about three days in summer and say about four days in the fall is enough to keep traffic off if good cement is used and mixed in proper proportions. Your correspondent says that it was after the rain came that the walk was soft and showed foot prints. The only way I can account for this is that one may chance upon a bad barrel of cement or that loam sand may have been used near the surface which would check setting ; also too much water mixed with cement will kill the quick setting of it. That has been my experience with cement.

SUBSCRIBER.

"BAY" AND "ORIEL" WINDOWS.

QUEBEC, January 29th, 1900.

To the Editor of the CANADIAN ARCHITECT AND BUILDER :

SIR,—There is an article in your last issue explanatory of the difference between a "bay" and a "bow" window. Will you please state in your next what the difference is, if any, between a "bay window" and an "oriel?"—the former, as I understand it, originating at or from below level of public highway or so low as to prevent the possibility of passing beneath it ; while an oriel is at such a height (say at level of second or third storey) as to offer no impediment to pedestrian or vehicular traffic of any kind.

The law reads that there are to be no projections on ("sur' in the French) any street beyond the line of frontage of the property. Now that this cannot mean over (audessus) seems evident from the fact that if it did, then would it be also illegal to have any eaves or other cornice or even a cornice or entablature or projecting pediment over any door or window ; which no one has ever thought of objecting to.

An oriel to be sure may or might be objected to by a neighbor whose unobstructed view of the street or sidewalk it would interfere with, but so might the projecting eaves of a one or two storey house intercept the view from a window on the same or at a higher level.

Oriels are certainly or can be made very ornamental features by breaking the monotony of an otherwise plain and straight row of buildings and it would be a pity to suppress them. Are you then of opinion that such a salient feature as an oriel can be objected to by the general public or the municipality when it does not trench upon or on the public highway and is at such a height as to offer no impediment to traffic.

In other words can the expression "on" be construed at the same time to mean "over" or should there not be the same distinction as there is in the French version between the words sur and audessus ?

This has been a much mooted question of late years in Quebec where oriels are getting into favor and the legal aspect of the question is becoming very pertinent.

CHAS. BAILLAIRGE,
Architect and Engineer.

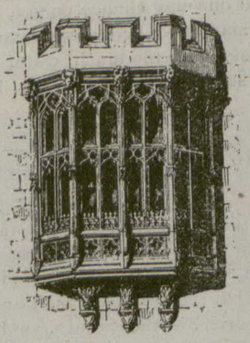
ANSWER.—Authorities differ as to what is a bay window and what is an oriel window. Gwilt intimates they are one and the same thing if they have right lines on their sectional plans. If circular, semi-circular or elliptical on their plans they may be called bow-windows or oriels. Newlands, who is pretty good authority, says, "A bay-window is a projecting window from the ground or basement on a semi-octagonal or some other polygonal plan, but generally understood to be straight-sided. When a projecting window is circular in its plan, it is a bow-window ; when it is supported on a bracket or corbel, and is circular or polygonal, it is an oriel. These distinctions are too little attended to in practice, the terms being often used synonymously."

Describing an oriel the same authority says, "An oriel window is a large bay or recessed window in a hall, chapel, or other apartment. It usually projects from the outer face of the wall, either in a semi-octagonal or semi-square plan, and is of various kinds and sizes. When not on the ground floor it is supported on brackets or corbels. Some writers restrict the term oriel window to such as project from the outer face of the wall and are supported on corbels, and apply the term bay-window to such as rise from the ground."

Nicholson gives nearly the same definition of the term.

Garnsey, in his American glossary of architectural terms, says, "An oriel is a projecting or overhanging architectural structure of any external form divided into several window openings." Garnsey is not to be relied upon as an authority, as he simply reproduced what had gone before. The Century Dictionary, which was compiled by the best authorities attainable, says of the oriel, "It projects from the outer face of the wall, being in plan

semi-hexagonal, semi-octagonal, or rectangular, etc., and is supported on brackets, corbels or corbeling. When such a projecting feature rests upon the ground, or directly upon the foundation of the building it is called a bay-window, or a bow-window." This definition is the one generally accepted, and is no doubt the surest one. Hence, it may be considered that any window, regardless



ORIEL WINDOW, BALIOL COLLEGE, OXFORD.

of plan, that projects from a wall beyond its own foundation is an oriel, while a window having its base on the foundation wall in the ground may be termed a bay-window or a bow-window according to its horizontal section. Usually the base of an oriel is formed with brackets, corbels, or continuous rings of masonry of a more or less ornate character. The French for this window is fenetre en saillie d'oriel, and the German, eckenfenster, which means literally a corner window, the oriel being often placed at the corner or the meeting edge of the two walls. The derivation of the term oriel still, after all the discussions about it, remains shrouded in obscurity.

THE TORONTO TECHNICAL (?) SCHOOL.

To the Editor of THE CANADIAN ARCHITECT AND BUILDER:

SIR,—Now that the Toronto municipal elections are over and the various boards have been formed at the City Hall, perhaps it will be permitted to criticize that of the Technical (?) School.

Looking at the personnel of the newly appointed board of management we find:

An arbitrator on agricultural disputes.
A collector of debts on sewing machines.
A journeyman painter.
A foreman in a book binding establishment.
A couple of architects.
A man in charge of a stationary engine.
The head of an engineering company.
A boiler and engine builder.
Two professional men.
Two tailors.
A clerk and two seekers after fortune apparently without a trade or profession.

Out of the whole board the only ones of use to the right kind of a school would be the foreman, the architects and the boiler and engine builder, and possibly the head of the engineering company —that is to say, five out of fifteen. The other ten are shoved in to fill up, and as rewards for lodge work, jobs for aldermen, sop to defeated candidates and to pander to labor.

Did this aggregation have the faintest knowledge of the class of schools required it might be fair to give them a chance, but while they label the school "technical" they have decided that it is to be "technological."

Pupils will be taught everything by theory but nothing by practice. That is what labor wants. The use of the chisel, hammer or square; the method of tanning or dyeing; the use of a turning lathe; carding, spinning or weaving; paper making or any known use for manual work, would be distinctly opposed to labor principles, and why? Because labor is opposed to their field of work being encroached upon. To-day an apprentice in a shop has to learn what he can, the best way he can, because those above him wish to hold their knowledge, thinking they will not give freely to others what took them so many years to learn themselves.

There are certain interests which should be represented on a board of a school having for its object the technical education required by those who intend following a manufacturing career.

Primarily there are but two interests—capital and labor.

Capital is, necessarily, continually moving for improvements in methods, and were it not for this where to-day would be all the wonderful accomplishments of the last half of this nineteenth century?

But history points out that labor is ever opposing capital. Labo eyes askance any new machine that reduces cost and it is labor's business to prevent improvements being adopted.

Labor says, "Public opinion is so strong that technical schools are bound to be adopted. So we must also adopt them, but we will get control of them and run them as we deem in the interests of labor as it strikes us."

And so capital, which could very materially contribute to make the schools of infinite value to the country, is boycotted, and any person who has any idea of recognizing capital is boycotted; with the result that terror is instilled into the hearts of would be independent aldermen, most of the newspapers, and such other influences as are supposed to be for the best government of the people.

Labor has an individual vote as well as capital, but capital may employ enough labor votes to ruin its own business. (It is wonderful how quickly an employee changes his views about capital and labor when he becomes an employer.)

The great movement for a series of properly equipped technical schools, inaugurated by the Board of Trade,—at which meeting other boards of trade had their presidents, the premier of Ontario and other would be enthusiasts—is all dwindled away, as the brilliancy of the rocket darkens into oblivion when the stick falls to the ground useless.

Why is this? Well, labor in Toronto says no, and some people having a sort of ambition to be shapers of the destinies of this country are afraid to come under the ban of labor, so the end of it all is a continuation of the useless institution for which the whole city is taxed to supply situations for nominees of labor.

The recent meeting of the architects of Ontario would have been an occasion when an expression as to the kind of schools needed could have been given, and it is to be regretted that a matter of so much importance to them should not have received their consideration.

Had the government a spark of independence over the labor people, it would use the old Upper Canada College buildings for a combined school and museum of the right kind.

They sent Mr. McEvoy to learn the class of school needed. His report is in and is on the right lines.

The country now waits to see how far the Hon. Mr. Ross will back up the statements he made at the Board of Trade meeting that was called to consider this question.

Yours truly,
AN EMPLOYER of LABOR.

FACTORY CHIMNEYS.

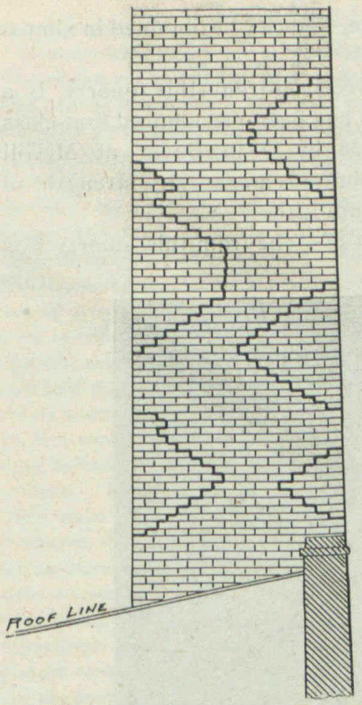
To the Editor of THE CANADIAN ARCHITECT AND BUILDER.

SIR,—I would like to ask through your Journal if anyone could tell me the cause of cracks appearing in a large chimney that is between 60 and 70 feet high. It is situated between the boilers and the engines, and there is other powerful machinery also close to its base. I was asked by the foreman of the works what I thought was the cause, but gave a doubtful reply, for the cracks appear the same on all four sides. The foreman thought iron bands placed around it would help to remedy the defect. I told him I thought vibration was the cause, but since then I had occasion to cut a hole into the flue, and found there was no air chamber built in the walls of the chimney, so thought the heat had something to do with it. Then again a wall, which is part of the boiler-house, runs up to the chimney on two sides, the chimney forming part of the wall below. Being thus tied in by the roof and braced by those two walls, the oscillation would be kept from going clear to the base, and I thought that was the cause of the checks appearing just above the roof and walls. I send a little sketch showing the character of the cracks as they appear for about 14 feet up from the roof. The cracks do not exceed ¼ of an inch in the worst places. From the roof to the base of chimney or foundation I suppose would be 30 feet or more —I did not measure it.

I would like to hear from some one what they consider to be the cause of the cracks, and also to be told something about building good chimneys of various heights for factories, etc., with an explanation of air space.

YOUNG BRICKLAYER.

[As our correspondent does not give us the thickness of walls of the chimney, or its sectional area, it is impossible for us to give



any more than a conjectural reply to his query regarding the cause of the cracks mentioned. We do not think they are the result of oscillation as only, at most, about forty feet of the shaft is above the building to which the base of the chimney is attached. Doubtless the cracks are the result of unequal expansion and contraction, the greater bulk of brickwork below expanding much more than the bulk above the building, and the greater mass retaining heat longer allows the upper part to cool and shrink long before the lower. One remedy would be to cut the shaft clear off from the building and reinforce it one brick thick to the cracked zone and finish off with offsets. If the walls of the chimney are two or more bricks thick in the zone of cracks perhaps a good repair could be made by raking out the joints clean, wetting the bricks well, and pointing the joints with good strong Portland cement mortar. This might be effectual, if not, the former suggestion might be adopted.

With reference to making hollow walls in factory chimneys, which is frequently done, there is no trick about it. Sometimes the lower corner of bricks are made from fire-clay, particularly when great heat is to be generated in the furnace, and the wall is carried up vertically and bonded here and there to the main wall as the brickwork progresses. The hollow does not usually run up to top of chimney, but dies in the batter of the shaft. For a scientific treatise on the building of factory chimneys we refer our correspondent to "Chimneys for Furnaces, Fireplaces and Steam Boilers," by R. Armstrong, C. E., D. Van Nostrand, Publisher, price 50 cents. This little work contains much information concerning factory chimneys.—EDITOR C. A. & B.]

Mr. George Simpson, formerly assistant civil engineer of the Northern Pacific Railway, has accepted the position of chief engineer of the Province of Manitoba.

The N. T. Lyon Glass Company, of Toronto, have recently been appointed sole agents for Canada for the Solar Prism Co., of Cleveland, Ohio, manufacturers of glass prisms for the refraction of light into dark interiors.

There is nothing magical about advertising. It is one of the tools of trade, just as a chisel is a tool of carpentry. The man who handles the chisel properly can do many useful things with it. If he is careless and awkward he is likely to cut himself.—C. A. Bates.

The annual meeting of the Winnipeg Builders' Exchange was held a fortnight ago when the following officers were elected: President, A. McDonald; first vice-president, A. G. Akin; second vice-president, A. Sutherland; treasurer, J.G. Latimer, re-elected; secretary, H. Elliott, re-elected.

MANUFACTURES AND MATERIALS

PICKARD'S BROWN STONE QUARRY, SACKVILLE, N. B.

THE accompanying illustration shows a view of a brown stone quarry at Sackville, N.B., the property of Mr. C. Pickard. This quarry is situated three-quarters of a mile distant from the Intercolonial railway. The road slopes down to the railway from the quarry, so that a team of horses can handle from six to eight tons at a load.

The deposit of stone extends over 15 to 20 acres of Mr. Pickard's farm, at a depth of 3 to 15 feet from the surface. The beds, which lie in a horizontal position, are from 4 to 9 feet thick, so that unlimited quantities of the stone are available, and can be obtained in almost any length or size.

The sample of stone received from this quarry is a rich shade of brown and has been pronounced first-class in quality. A test made by Dean Bovey at McGill University, Montreal, showed a crushing strength of 9,130 pounds to the square inch.

Over 15,000 cubic feet of stone from this quarry was supplied in fifty days during the summer of 1899, for use in the Methodist College residence at Sackville.

Mr. Pickard is now adding the latest and best machinery for handling heavy stone, by means of which the shipping capacity of the quarry will be largely increased.

VIEW IN PICKARD'S BROWN STONE QUARRY, SACKVILLE, N. B.

Mr. Alex. Bremner, importer of builders supplies, Montreal, is sending out an attractive calendar for 1900.

LEGAL.

An interesting case was recently decided in England, involving the question of the validity of a contract consisting simply of an offer and its acceptance. A certain owner wished to make additions to his house, and had plans and specifications drawn up, and invited certain builders to bid on them. One of the firms of the builders, after examining the plans and specifications, sent to the owner the following letter: — "Our estimate to carry out the sundry alterations to the above premises according to the drawings and specifications amounts to the sum of £1,230." The day after receiving this letter, the owners wrote to the builders, saying that he accepted their "offer to execute for the sum of £1,230" the work specified. After a time, he received another letter from the builders, saying they had made a mistake in their figures, and withdrew their estimate. The owner then had the work carried out by another builder, at a higher price, and subsequently sued the first contractors for the difference between their estimate and what he had actually been obliged to pay, as damages for breach of contract. The builders fought hard, and the case was finally decided in the Queen's Bench Division of the High Court of Justice. Of course, the effort of the defendants was to show that the estimate and its acceptance did not form a binding contract, and that they were therefore not liable for damages for withdrawing from it. They brought several builders, who testified that it was a custom of the trade to give estimates in the form which was used in the present case merely as a sort of expression of opinion, while a definite proposal would have been made in such words as "we offer to execute the work"; and they further contended that, as the clause in the specification stipulating the time within which the additions should be completed was left blank, the owner could not have understood that he was making the final bargain for the work. The court, however, rejected both these contentions. In regard to the omission of any stipulation as to the time of completion, it said that this simply left it to be implied that the work should be finished within a reasonable time; and as to the claim that the estimate of the defendants was, in accordance with a custom of the trade, merely an expression of opinion, and not a definite offer, it said that there was no such custom, and that if there were any it was contrary to the law. The question was not one one of customs, but of what each party intended that the other should understand by his letter. In the opinion of the court, there was no doubt that the builders intended the owner to understand their letter as an offer to do the work for the sum mentioned; and that the owner intended his letter to be taken as a definite acceptance of a definite proposition. These two things were all that was necessary in law to form a complete contract, to which either party could hold the other, and if the builders had made a mistake in their figures they must abide by the consequences; and judgment was accordingly given in favor of the plaintiff for two hundred and fifty pounds, and the costs of the suit.—American Architect and Building News.

The Blacksmith and Wheelwright, of New York, celebrated its 20th anniversary by the publ cation of a special number of more than 70 pages, filled with interesting matter and illustrations pertaining to the ancient craft.

PAGES

MISSING