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CANADIAN ARCHITECT AND BUILDER.

VOL. XII.—NO. 10. OCTOBER, 1899 { PRICE 20 CENTS. $2.00 PER YEAR.

—THE—

CANADIAN ARCHITECT AND BUILDER,

A Monthly Journal of Modern Constructive Methods,

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

PUBLISHED ON THE THIRD WEDNESDAY IN EACH MONTH IN THE INTEREST OF ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS, DECORATORS, BUILDERS, CONTRACTORS, MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

The C. H. MORTIMER PUBLISHING CO. of Toronto, Limited,
Publishers,
Confederation Life Building, - TORONTO, CANADA.
Telephone 2362.

Branch Office: NEW YORK LIFE INSURANCE BUILDING, MONTREAL.
Bell Telephone 2299.

SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for $2.00 per year. The price to foreign subscribers is $2.50. Subscriptions are payable in advance. The Journal will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, will be continued until instructions to discontinue are received and all arrears of subscription paid.

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

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The Passing of Mill Construction.

THE result of fires in several large buildings in Chicago constructed on what is known as the slow-burning or mill construction principle, is of such an unsatisfactory character, that a sub-committee of the Board of Fire Underwriters has been appointed to investigate and report on the value of this method of construction as a means of resisting fire. For years the Underwriters' Association have made a liberal reduction in insurance rates to the owners and occupants of such buildings, but the opinion is gaining ground of late that structures built on this principle are as incapable of resisting fire as are those of ordinary construction, and consequently that the lower insurance rates hitherto accorded them should be withdrawn.

The Destruction of New Westminster, B. C.

THE report of Judge Harrison, who was appointed a commissioner to investigate the causes of the conflagration which destroyed the city of New Westminster, B. C., concludes with the following statement: "Lack of funds, trying to economize, and the desire not to lessen the supply of water to consumers, induced the council to experiment with the waterworks system, contrary to the advice of the construction engineer, without finding out from some competent source whether he was right or not, and disabled the waterworks for fire protection, and want of funds and trying to economize led to the

failure to keep up in first-class efficiency the fire department and what other means they had for fire protection." The experience of New Westminster should be a sufficient warning to municipalities not to set in the scale the saving of a small yearly expenditure against the safety of millions of dollars worth of property. Any reasonable expenditure is warranted for the maintenance of an efficient fire department, more particularly in new centres of population, where wood construction chiefly prevails. We trust the time is not far distant when fire-proof materials will be employed to a much greater extent than at present. Should this occur, a less expenditure would perhaps be required for fire protective equipment.

The P.Q.A.A.

THE annual convention of the Province of Quebec Association of Architects, held at Quebec on September 23rd, was devoid of special interest, and was not largely attended. The most important matter with which the Association is called upon to deal, is if possible to enforce compliance with the Quebec Architects' Act, which provides that no person shall practice architecture in the province who is not registered under the Act as a member of the Association. The report of the Council states that the Association have experienced difficulty in securing the necessary legal proofs to enable them to proceed against offenders, and in dealing with this matter are being guided by the advice of legal counsel. We believe the Council to be fully cognizant of the important bearing of this question upon the future welfare of the Association, and that it will receive at their hands the most careful consideration. It is a vital point, and we trust means will be found to guard it. The officers for the ensuing year have been wisely chosen. Under their direction the Association will doubtless maintain its progressiveness and widen its field of usefulness. It was suggested by Prof. Capper that the Association might profitably undertake the publication of a volume to illustrate the old colonial architecture of Quebec. It was further suggested by Mr. Venne that an exhibition of building materials would form an interesting feature of the next convention in Montreal. No action was taken by the Association with regard to these proposals, but they will no doubt receive due consideration from the Council. It is proposed to formally open the new rooms of the Association on the 31st inst.

Architects' Fees.

THERE is needed in Ontario a standard of architects' fees which shall be recognized by the courts. Further than this, there is required on the part of the architects themselves a spirit of loyalty to one another and a determination to uphold as far as possible the generally nuderstood ethics of the profession. A case which recently came up for hearing in the courts serves to emphasize this contention. An architect sued to recover fees from a client at whose request he had prepared preliminary surveys, sketches and complete working drawings for a factory building, and sketches, working drawings, specifications and estimates for an associated building. For the first he charged 2 per cent. and for the second 2½ per cent. of the estimated cost. The defence brought as witnesses two architects who testified that their charge for similar work would hvae been one per cent. and one half per cent. respectively. The judge enquired of the plaintiff if there was any legal tariff of charges of fees for an architect's services, and was answered in the negative. He then asked on what ground the plaintiff expected to be paid a higher fee than other architects had stated they were accustomed to receive. The plaintiff, seeing that the case would go against him, took advantage of an opportunity which presented itself and secured a settlement out of court, under which the defendant paid a larger amount in legal expenses than the plaintiff would have been willing to accept in full settlement for his services, while the architect got nothing. It is to be regretted that architects should be found willing to go into court and give evidence prejudicial to the interests and rights of a member of the profession. The evidence given in this case was calculated to lower the standard of fees endorsed by the Ontario Association of Architects and other professional bodies—and there is the possibility if not the probability that the gentlemen who permitted themselves to be placed on record with regard to the value of an architect's services may some day find themselves in the unpleasant predicament of being confronted in the courts by their own testimony and asked to accept their own verdict.

Defective Construction.

The accident at the Coliseum building in Chicago, on the 28th of August, when twelve steel arch trusses erected to support the roof collapsed, causing injury and death to a number of the workmen, emphasizes the necessity for the exercise of exact knowledge and much care in large constructions such as are common in the present day. Many architects lack the knowledge of strains and stresses which is so requisite a factor in safe building. The disposition is too prevalent to depend upon printed calculations in hand-books. Much of this data was compiled a quarter of a century ago, and is altogether inapplicable to the changed conditions now existing. The architect should himself carefully figure out the requirements of each individual case with which he is called upon to deal, in order that the best and most economical methods shall be adopted. Our attention was recently directed to a building in course of construction in which the architect had used as supports on the four floors columns of exactly the same diameter and thickness of iron. The floors were required to carry a load of 150 pounds to the square foot, but proper calculation showed that provision had been made for a load of only 52 pounds. It therefore became necessary to replace the columns with others of varying diameter corresponding to the loads to be carried and also to considerably increase their number. Glaring defects are noticeable in some of the steel construction work erected during the present season. Instead of bolting the end of each iron beam directly to the upright member, thereby tying the structure together, the common practice is to place such beams on three inch angle irons attached by a couple of bolts to the vertical supports. Presumably this method is employed to save the cost of hand-drilling. It has been noticed that the architects of most experience with iron construction will not permit their work to be put up in this manner. The building by-laws in our leading cities are entirely out of date, and do not prescribe the manner in which modern steel construction work shall be carried out, nor is proper inspection made of such work. The only safeguard against accident is the knowledge and faithfulness of the architect. Under these circumstances it behooves every architect to study with greatest care this phase of his work, and neither permit himself nor those with whom he may be associated to employ half-hazard methods.

TORONTO CITY HALL.

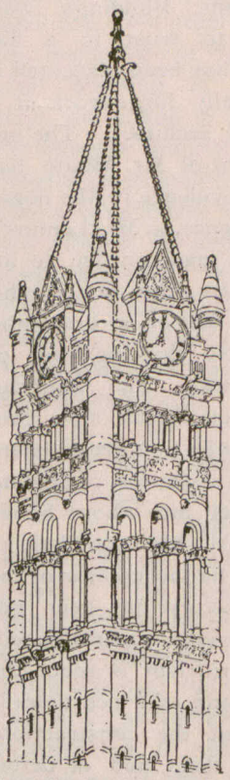
Golden key used by the Mayor at the formal opening of the new Municipal Buildings. Designed and Presented to the City by Messrs. Ryrie Bros., Toronto.

THE formal opening of the Toronto City Hall has at last taken place, and although after the manner of such buildings the carver is still at work and there is other work to do to make the building look complete, it is at least populated. The Toronto city officials have hitherto been painfully lacking in that luxuriousness of accommodation in working hours which is usually the fortune of civil servants. But all that is changed, and the clerk, who formerly spent his days in a low, dark and rather fusty room, with a prospect to one of the side streets below the market, and now finds himself in spacious and lofty quarters, with large windows looking to the genial south and the genial activity of Queen street, must feel all the fresh delight with which a convalescent, when he emerges from seclusion, looks upon the world. It has been questioned whether sufficient spaciousness and loftiness for the officials' needs, and sufficient splendor for the city's honour, could not have been obtained for the original estimate of $1,650,000. It certainly is a handsome sum ; but to judge fairly if less would do, and what less would do, and what less it would cost if it would do, is beyond an outsider, unless he is prepared to undertake labor about equal to that of learning a language. Nor has the history of the rise in cost been clearly given to the public, so that they may understand its reason and reasonableness. But the resulting structure is before us to judge of and calls for remark.

Whatever may be said in criticism of the work this must be said in its praise, that comparison with the Ontario Parliament Buildings, by Mr. Waite, of Buffalo, a work similar in size and character, disposes of the doctrine formulated when the Parliament Buildings were proposed—that it is not safe to trust to a Toronto architect work greater than has been executed in Toronto before ; that for unusually large work it is necessary to employ an American architect. The unfortunate result of the employment of Mr. Waite has been before us for some years as evidence in the negative, and we have now positive evidence, in Mr. Lennox's completed work, that a Toronto man can rise to an occasion. Mr. Lennox's work is the work of an architect, while Mr. Waite's looks like that of a draughtsman. Indeed it is exceedingly likely that the work of a draughtsman is what it actually was. The American work getter has no time to be given to the slow processes of design, and his mind must be to a great extent off that bent. We have little else to expect, in dealing with the class of American architect into whose hands promoters of new building enterprises here are likely to fall, than that a draughtsman will be the creator of the design. The City Hall on the contrary has been not only personally designed but personally superintended, and whatever we have to say in criticism is about the design, which is a matter of taste and of which there is more than one solution, not about the construction, which is a matter of attention to facts, and of better ways or worse ways ; of this it is the opinion of experts who examined the building in connection with the law suits with the contractor, that the work is done throughout in an admirable manner, and we may dismiss the question of construction with an expression of belief that about it nothing can be said but praise.

One fatal deficiency there is in the construction—that it is not fireproof. In the early stages, when it was discovered that economy was not going to have a voice in the matter, this necessary and repaying outlay should have been resolved on. It was not too late to make havoc of the architect's external treatment in order to meet this internal expense. Unrestrained lavishness is seldom as great a begetter of beauty as are limiting conditions. It is the necessity for making much of what he has that turns the designer's attention to concentration of effect which is breadth, the greatest quality in architecture.—This is lacking in the City Hall. There is too much on a facade, and the force of the design is somewhat weakened by it. The characteristic quality of the Richardsonian Romanesque is solidity of wall. Against this must be set the modern

THE OLD CITY HALL—1844-1899.



Sketch Showing Original Design for Tower.

desire for abundance of light, making it a question whether this style is really a suitable style for modern work. There is war between the need for windows and the need for wall. Richardson seems to have got over the difficulty by severe restraint in the use of ornament—not economy by any means, but such due restraint as not only carries out the maxim that ornament shall reinforce the design rather than attract attention to itself, but seems to go a step farther and subordinate the scale of the ornament to the scale of the constructive features and surface, so as to make the very most of the wall. As far as one can judge from photographic reproductions, the court house at Pittsburgh—the prototype not only of the Toronto City Hall but of American municipal buildings erected in the last ten or twelve years—presents an appearance of not severity only but extreme severity. The building is of light coloured granite throughout, from the base to the apex of the tower roof, all of granite and all of one color. There are no excrescences, and but slight projection to the cornice ; the mouldings and capitals are described as cut very flat, and what mosaic work there is consists of pattern stones defined by their joints merely, without color. The sootinesss of Pittsburgh as well as the nature of the material may have had something to do with the flat treatment of this building, but the small scale of ornament and the severity of wall are thoroughly characteristic of Richardson's highest development. Other work of his of the same period, such as the Marshal Field building and the residence of Franklin MacVeagh, at Chicago, have the same characteristics. If, therefore, the tendency to over-ornament, which Richardson's imitators seem to have extracted from his work, was ever to be found in his work, it was not to be found in its highest development. One cannot say with certainty that Mr. Lennox's work is over-ornamented, except in so far as it is over-windowed too. The gain to the front, if it could have less windows, may be seen in approaching it from the west, where the blank side of the tower and the side of the turret become prominent and blot out some of the windows. If reduction or compact grouping of the windows is impossible, the cue for the Richardsonian designer certainly seems to be a very careful and restrained use of ornament. Time will help the designer in this case. Age is a powerful harmonizer of wall surfaces. The process has already begun in the City Hall.

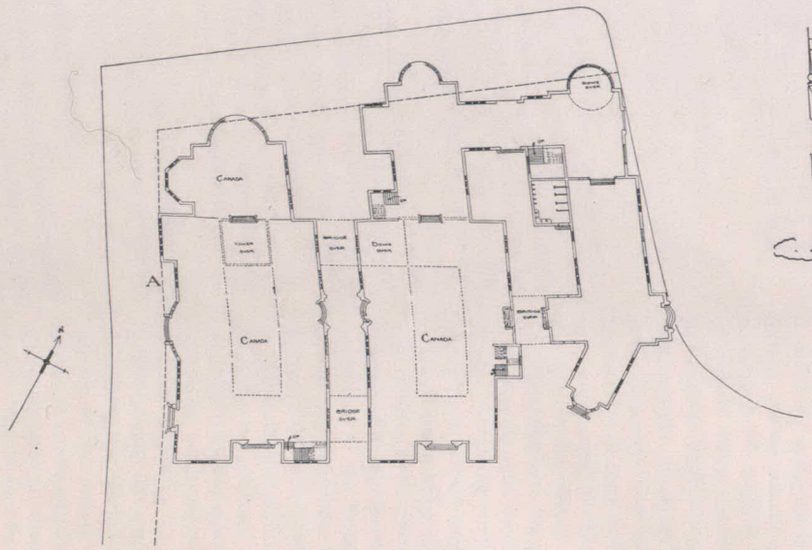
It would have simplified the composition of the front if it were not necessary for the tower to appear there, or if the tower could have been centralized so that the gable and repeating turret would not have been required. The governing necessity is of course the position of Bay street, down which the tower shows with a fine effect. But this off centre position of the tower has increased very much the difficulty of designing the front. The tower itself has been limited so that it is questionable whether, if the building could be seen from a point of view such as that from which the original perspective view was taken, the tower would not appear too slender for the mass of the building. This drawing, which is still perpetuated as an ornament for kalendars, etc., does little justice to the actual appearance. From any point from which the tower can be seen in connection with the building, or from distant points whence the tower is seen alone, its proportions are quite satisfactory. The only solution for a greater relief of the front from features, would have been to make the tower rise from the inner side of the building. Theoretically the position is a good one, giving an appearance of solidity of mass to the building: and the opportunity afforded for a broad treatment of the front would be tempting. But in practice architects prefer to make the most of the tower itself by showing it down to the ground. Richardson's competition perspective for the Pittsburgh Court House, shows the tower rising from the interior court ; but, in representations of the completed building it appears on the outside. The large clock face is evidently a late decision thrust upon the tower after it had been carried up to that point according to the original design with a small clock face. The result is a design somewhat disturbed, and one misses the reinforcement of angle above the springing line of the clock face. But the large face is fine in itself, and as it can be seen from all parts of the town, it has a practical reasonableness which makes it a satisfactory feature. It is probable also that the increased scale which it gives is an advantage to a tower which, as has been said, appeared in the perspective to be on the slight side.

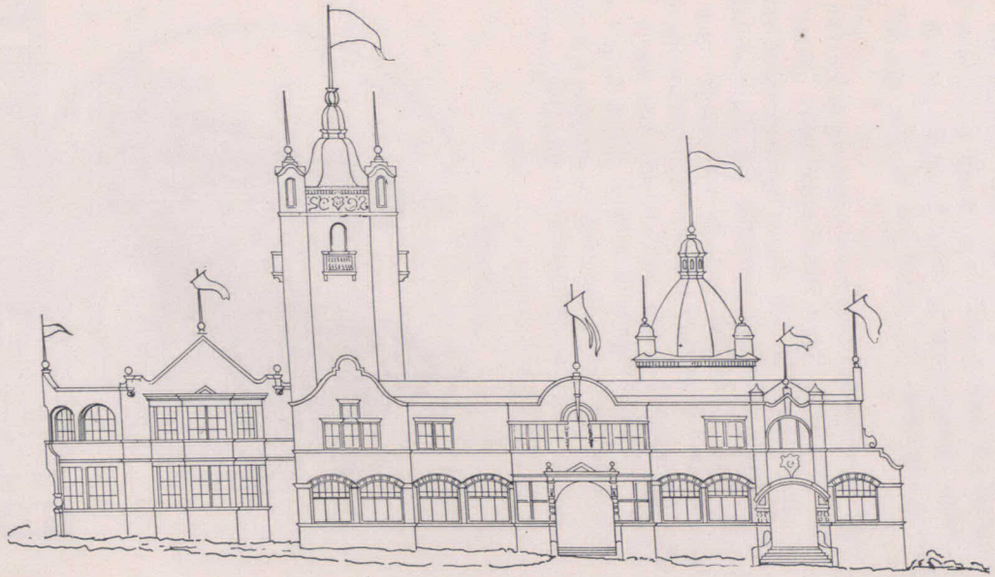
It is to be hoped that some day Mr. Alderman Hallam's proposition to insert musical chimes in the belfry will be carried out. The patriotic airs, which Mr. Hallam suggests for the repertory of the chimes, are however not the most suitable kind of music for the purpose. The music of mechanical chimes is essentially that of a musical box. It is the mistake of modern musical box manufacture to set the cylinders to popular music composed for songs and marches. It is for this reason that the grand modern musical box is on the whole so disappointing. The cylinder and comb, or cylinder and bells, are not suited for the production of orchestral and band music, or airs designed for the human voice ; the instrument has a genius of its own which is much better brought out in the early "musical snuff boxes," as they were called, in which the music is all of the running character, suited to the instrument, and seems to have been composed for the purpose. Even the bald octave chime of English churches is characteristic and fine in its way, and the wavering of the wind only adds to its beauty ; but the hymn tunes which we attempt in this country and the United States are bald affairs and apt to go out of tune with every gust of wind. The objection raised by some one, that chimes in the belfry would interfere with the deliberations of the city council below, would be answered if the objector should visit one of the belfry towns of Belgium and hear how light the chimes are in the air. Indeed it is only necessary to go to St. James' Cathedral in Toronto, where the chimes for the quarters and the hour go on all through the service without disturbing the worshippers.

Of the inside of the City Hall there is not much to say, and little to say in praise of the finish. Scagliola columns with plaster capitals are not worthy of the

NEW MUNICIPAL BUILDINGS, TORONTO.

E. J. LENNOX, ARCHITECT.





WEST ELEVATION.

NORTH ELEVATION

PARIS EXHIBITION 1900

SKETCH ELEVATION FOR BRITISH COLONIAL PAVILLIONS.

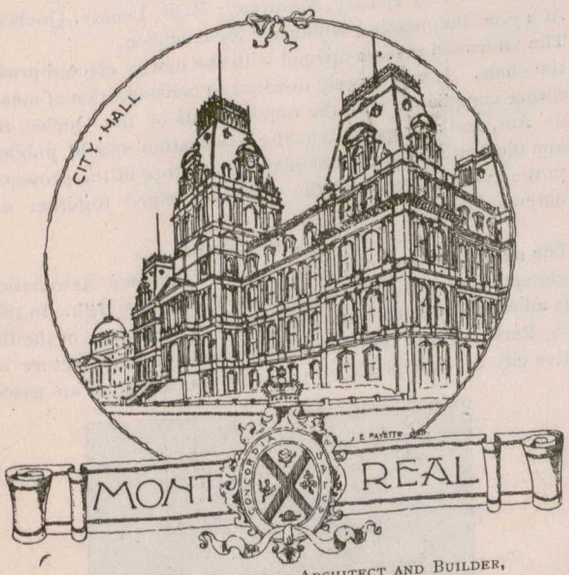
PARC DU TROCADERO.

$\frac{1}{16}$" SCALE.

SCALE 10 5 0 10 20 30 40 50 60 70 80 90 100 110 FEET.

occasion; but their attempt to appear as marble is almost a merit beside the downright vulgarity of the woodwork—large grained oak or ash, slash cut, filled with dark filler and varnished to shine. The scale of design of the wood-work is no better than its material and finish. Whether the architect is responsible for this or the modern and much mistaken system of handing over wood finish to the wood fitter we do not know. Feeling for wood work in monumental style is not to be got out of any hands but those of a good designer.

The interior at present shows cold and white in hard finish plaster. The value of Mr. Reid's wall paintings inside the entrance becomes all the more apparent. If the other panels in the entrance hall were filled in the same way there would be at once just such an immeasurable improvement as there is in the streets when the leaves come out in the spring. It is to be hoped that a small annual appropriation will be made for the purpose of decorating by degrees at least the entrance hall and the council chamber.



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New York Life Building, Montreal,
OCTOBER 13th, 1899.

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

The annual meeting of the above Association opened at 10 o'clock a.m. on September 23rd, in the City Hall, Quebec, and terminated on the evening of the same day. The City Council Chamber was kindly placed at the disposal of the Association by the Mayor of Quebec, the Hon. S. N. Parent, whose courtesy was acknowledged on the part of the Association by a cordial vote of thanks.

The attendance was as follows:—A. Raza, president; Prof. S. H. Capper, 1st vice-president, Montreal; G. E. Tanguay, 2nd vice-president, Quebec; Jos. Venne, secretary, Montreal; L. Z. Gauthier, E. Maxwell, G. A. Monette, A. H. Lapierre, Alcide Chausse, A. R. Decary, J. S. Archibald, Raoul Lacroix, Montreal; Thomas Raymond, J. H. Leben, Chas. Baillarge, Chas. E. Gauvin, F. X. Berlinguet, H. Staveley, J. E. Larochelle, J. P. E. Dussault, J. G. Bussiers, J. H. Peachy, A. H. Larochelle, R. P. Lemay, Quebec.

The meeting having been called to order by the President, the annual reports of the Council and of the Treasurer were presented, as follows:—

NINTH ANNUAL REPORT OF COUNCIL.

In presenting to you the ninth annual report of their proceedings, the Council of the Association have to call attention to the several projects which they have had under consideration during the year, rather than to the achievement of any special object, as last year, when the new charter was obtained from the provincial legislature. The work of the Council, however, it is hoped, will have tended to the prosperity and progress of the profession, and o the benefit, therefore, of the public generally, whose interests are necessarily identified with sound practice in architecture, both public and private.

As now organized the Association must aim at raising the standard of professional practice, not alone from the merely utilitarian standpoint, but also from the æsthetic; the history of architecture in the past demonstrates conclusively that the architect most worthy of the title joins artistic conception of the highest order to practical utility in his work; buildings artistically faulty are architecturally bad; for examples of this truth we have not (unfortunately) to go outside the limits of our province of Quebec.

During the past year an amendment to our new charter has been accepted. As originally proposed in the legislature, this would have compelled the Association to admit to full membership, without examination, all who had studied for three consecutive years (instead of four) in an architect's office. This the Council might have opposed outright, but it was thought better to propose an amendment allowing all students who were actually engaged in the study of architecture, on registering their names, the privilege of coming up for qualifying examination at the expiry of four years of apprenticeship (thus avoiding the preliminary examination). The amendment was passed and seven students have taken advantage of it.

At the January examination held in Quebec three candidates succeeded; at the examinations of July in Montreal one candidate passed the preliminary examination and one failed, while two candidates who took the final examinations failed partially.

In future the Council would urge that very special attention should be bestowed upon maintaining the high standard of these examinations; it must be borne in mind that they form the basis of our organization and that only by them can we ensure the fulfilment to the public of the obligations imposed upon us as a corporation by our charter.

The Council has devoted earnest attention to the question of instituting proceedings at law against those illegally practising as architects within the province. The Council is in receipt of communications and newspaper extracts pointing to such irregular practice, either on the part of citizens of other countries or of others who have neglected to conform to the different acts of the legislature relating to our Association, or who have not paid their dues to the Association, or who have not qualified by passing the requisite examinations.

In the opinion of our legal adviser we are not at the present moment in possession of legal proofs so convincing as to justify legal proceedings being taken. The Council accepts the opinion of its legal adviser that for a test case it is important to select one in which the evidence is abundantly clear and convincing; unless further powers are directly conferred upon the Council for this purpose at the annual meeting of the Association, the Council is of opinion that a suitable occasion must be awaited before instituting such legal proceedings.

Meanwhile, however, important preparatorv work has been done; circulars have been addressed to those suspected of irregular practice; a copy of the charter (as amended) placing on record the actual legal position of the profession in the province, together with the official list of members of the Association, has been distributed to the public.

Representations have also been made to the Minister of Public Works concerning public employees who assume the title of architect without having conformed to the requirements of the law.

The Council have again made a special effort to induce the government to recognize officially the modified tariff of professional charges as now in force within the Association. The government submitted to the Council an amended tariff, which the Council deemed unacceptable. In consequence the Council was received by the Ministers in Council, who, after discussion, appeared to be in principle favorable to our demand; no definite decision has, however, as yet been given us, though we are hopeful that we shall be accorded what we deem a measure of simple justice, not only to us, but even to those who haae occasion to utilize our professional duties.

The Council has appointed a Special Committee with a view to increasing the Library of the Association so as to render it of real service to the members. To the generous gift of one hundred dollars, as announced by the Secretary at last annual meeting, the Council added an equal amount to form a nucleus for the library fund. The money has been spent on the purchase of standard books. The Council, after a careful consideration of the financial position of the Association for the present year, has voted one thousand dollars to be expended upon the library.

In connection with the library, the Council has to acknowledge a government grant of copies of the statutes of the Province of

Quebec for the years 1890 to 1899 in Duplicate for the use of the Section of Quebec and for Montreal.

The Council has had the satisfaction of arranging that the books of the library shall be catalogued under a general scheme, now in course of development, by which the libraries of this Association and of the Art Association of Montreal, as also the Art and Architectural portions of the McGill University and of Westmount, shall all be grouped together. This comprehensive scheme cannot fail to be of advantage to all students : it will avoid unnecessary duplication of books and consequently husband the resources of the smaller libraries.

The Association was invited to take part in the French Universal Exhibition of 1900, and the Council on two occasions consulted the members of the Association by circular upon the subject. No encouragement whatever was received by way of answer, and the Council reluctantly decided to abandon the project, while feeling convinced that to have been adequately represented on so important an occasion would have been of great advantage to the profession.

The rooms of the Association are removed to a more suitable and agreeable locality, and the rooms have been suitably furnished with a view to their being more generally available to and by all the members of the Association. No formal opening has yet taken place, the rooms having been ready only somewhat late in the season. The formal inauguration may be suggested as a matter for the new Council to take up on its appointment.

Your attention is called to the suitability of the new rooms for special meetings, such as arbitrations, especially when these are of a private character or require considerable accommodation for large numbers. Members who approve of this suggestion and avail themselves of it can contribute a share to the prosperity and usefulness of the Association beyond the mere revenue accruing, which is necessarily small ; such use of the headquarters of the Association, it is felt, will tend to promote "esprit de corps" within the profession.

The Constitution is now printed and will at once be distributed to members. Considerable labor and time have been bestowed upon it.

We have had to record with regret during the past year the death of Mr. A. G. Fowler, who was among the founders of the Association.

The Association has 139 active members, of whom six were registered since last general meeting.

There was no general meeting this year ; there were 7 special meetings and 10 regular meetings of Council, at which the attendance was as follows:—

Alf. Raza,	President,	Montreal.	16
Prof. S. H. Capper,	1st Vice-President,	"	10
G. E. Tanguay,	2nd " "	Quebec.	0
Jos. Venne,	Secretary,	Montreal.	16
W. E. Doran,	Treasurer,	"	11
J. F. Peachy,	Counsellor,	Quebec.	0
E. Maxwell,	"	Montreal,	13
G. A. Monette,	"	"	10
M. Perrault,	"	"	9
J. S. Archibald,	"	"	14
A. T. Taylor,	"	"	4

Jos. VENNE, Secretary.

A. RAZA, President.

REPORT OF QUEBEC SECTION.

The undersigned, officers of the Quebec Station, "P. Q. A.A.," hereby have the honor to submit to the Council the annual report of said Section for the year 1898-1899.

The Quebec Architects have held monthly meetings, where were discussed local matters interesting the profession in general, and more particularly the Quebec members. On the 2nd of February, our members assembled to consider a measure brought before the Provincial Leglislature, as an amendment to our Charter, and report the case to the Council. Thanks to the combined efforts of all, we succeeded in preventing the passing of that amendment, as previously expressed, which was an attempt to lessen the privileges of the Architects, and more especially those who had acquired the title by undergoing the required examinations.

The Quebec Section has taken due notice of the accident that occurred to the Nicolet Cathedral and Montreal Civic hospital, and took advantage of those disasters to suggest that the Council representing to the Government the necessity of appointing as Inspectors of Public Buildings, only Architects, members of the Association, and duly qualified for such important functions, and to oblige the proprietors of such Public Buildings to have plans made by Architects (as the law requires.) For that purpose, we have suggested that the Council supply the Archbishops and Bishops of our Province, as well as the Archbishops of Ottawa, with an official list of the members of the "P. Q. A. A."

Our Section has also drawn the attention of the Council to the fact that, amongst others, two persons were practising as Architects in Quebec, and were advertising as such in local papers, without being members of Association,—asking the Council to take proceedings against those gentlemen,—which has not yet been done, for reasons given by the Council.

M. Tanguay, our President, has, in behalf of the Council, asked the Government for two series of the Revised Statutes of the Province, one for Montreal, and one for Quebec ; he has been answered favorably, and these series were sent recently.

The above respectfully submitted.

JOS. P. OUELLET, Sec. Q. S.

G. EMILE TANGUAY, 2nd Vice-President.

QUEBEC, August 12th, 1899.

On motion the reports were unanimously adopted.

Messrs. J. E. Larochelle and J. H. Lebon having been appointed scrutineers, the election of officers was proceeded with, the result being as follows :

President—Prof. S. H. Capper, Montreal.

1st Vice-President—G. E. Tanguay, Quebec.

2nd Vice-President—Jos. Venne, Montreal.

Secretary—G. A. Monette, Montreal.

Treasurer—W. E. Doran, Montreal.

Councillors—A. Raza, Montreal ; J. S. Archibald, Montreal ; E. Maxwell, Montreal ; H. Staveley, Quebec ; Alcide Chausse, Montreal ; A. H. Lapierre, Montreal.

Auditors—A. R. Decary, Montreal ; R. P. Lemay, Quebec.

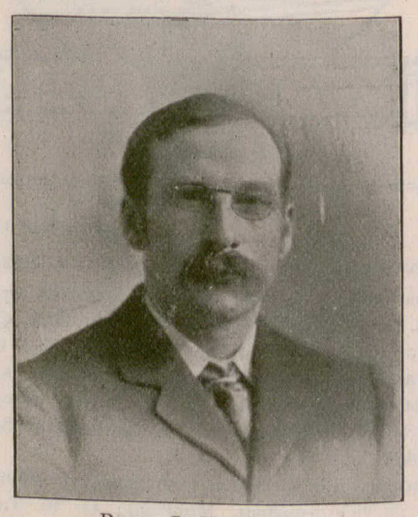
At 2 p.m. the meeting adjourned for luncheon.

The afternoon session opened with the newly elected president in the chair. It was largely devoted to consideration of means of securing compliance with the requirements of the Quebec Architects' Act, and a proposal that the Association should publish an album illustrating the old colonial architecture of the province.

In the evening some of the members dined together at the Frontenac Hotel.

PROF. S. H. CAPPER.

The new President of the Province of Quebec Association of Architects is a graduate of the University of Edinburgh. In 1887 he was admitted by examination a student of the School of the Beaux Arts, Paris. From 1887 to 1891 he practiced architecture in his native city of Edinburgh. In 1891 he was admitted an associate



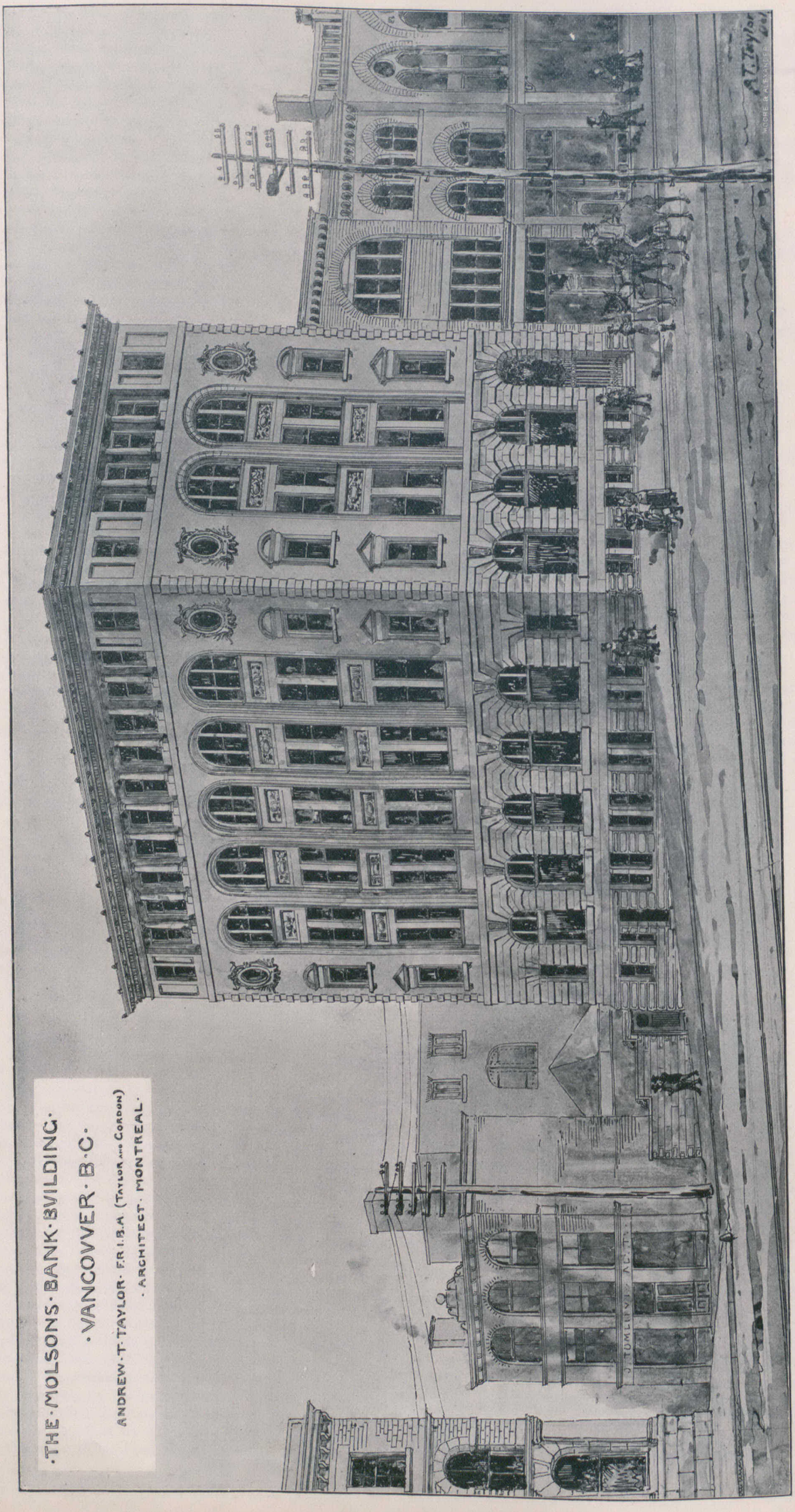
PROF. S. H. CAPPER.

member of the Royal Institute of British Architects, and shortly after became a university extension lecturer in connection with the University of Edinburgh. In 1896 he was appointed examiner in the Faculty of Arts for the department of archaeology and art history of this university. In the same year he accepted the position of Professor of Architecture in McGill University, which position he still retains.

ONTARIO ASSOCIATION OF ARCHITECTS.

Preparations are being made for the convention on January 16th. Members are invited to send in drawings or photographs of their year's work for a stereopticon exhibition, such as has been made in former years. If those who have photographic negatives of their work will send them, this will much reduce the labor and expense of preparing lantern slides. The registrar will receive, care for and return all contributions for this purpose.

There has recently been added to the library a practical treatise on plumbers' work entitled " Modern Plumbing, Steam and Hot Water Heating," by Jas. J. Lawler. An omission from the catalogue distributed this summer is, " Heating and Ventilation," by G. S. Billings.


THE MOLSONS BANK BUILDING
VANCOUVER B.C.
ANDREW T. TAYLOR F.R.I.B.A. (TAYLOR AND GORDON)
ARCHITECT. MONTREAL.

PROPOSED HARBOR IMPROVEMENTS AT VICTORIA B. C.

The scheme herewith presented for the reclamation and improvement of the harbor at Victoria B. C., has been evolved by Mr. T. C. Sorby, architect, of that city, and has met with the general approval of the citizens. The accompanying map clearly illustrates the character of the proposed improvements, the cost and particulars of which are set forth in the following extract from the Victoria Times :—

The greater portion of the harbor is at present neither land nor water, and the passage available for steamers is tortuous, never 300 feet wide, crowded with rocks and shoals on every side. The proposition is to remove all these rocks and shoals, and to use them in the reclamation of solid land and to deepen the whole area of the harbor, from the open at Maclaughlin Point to 30 feet at low water, and to increase its available width and area.

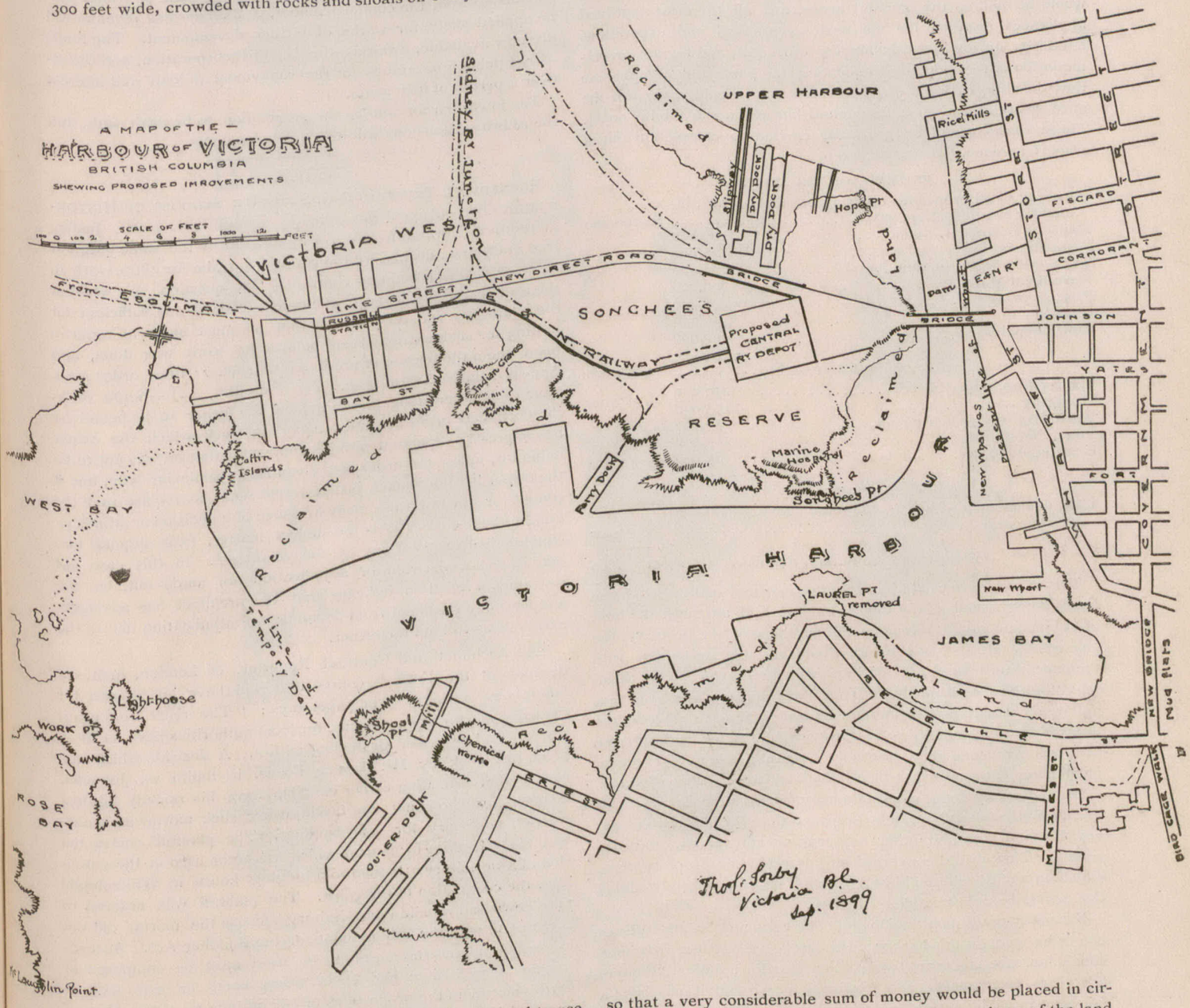
It is proposed to close the lower harbor by temporary dams, to pump out the water, hydraulic and excavate an area of about 167 acres to a depth of 30 feet, enclosing it with a wall built up of the rocks now impeding navigation, and filling in the balance behind with the waste excavated material, thus reclaiming about 122 acres of land that would become some of the most valuable property in the city. This reclaimed land in the upper and lower harbor will together have a frontage towards the water of about five miles. Very little material would be required in the construction of the work beyond that now actually lying at the bottom of the harbor. If the mud thrown out was found to be foul, a liberal but inexpensive use of quick-lime would remove all nuisance. There is enough rock and boulder now encumbering the harbor to build the most substantial walls round the lower harbor. There is enough sand, gravel and mud to fill in behind these walls to a height of about four feet above ordinary high-water mark. The granite for the coping is the only stone required to be brought from the outside, and this could be worked at the quarries and set from barges after the harbor was open.

The temporary dam at the mouth of the harbor would have an opening left in the centre about 85 feet wide, and could be completed without interfering with the shipping entering or leaving the harbor. The central opening would be closed by caissons during one tide, whenever all was in readiness. The dam with its extensions would form a temporary landing quay about 40 feet wide. These works and others of preliminary nature, as installation of pumps, etc., to the extent of possibly $500,000, could be proceeded with before the closing of the harbor. To this must be added the cost of expropriating the land abutting on the harbor, so that a very considerable sum of money would be placed in circulation in the city at an early stage. The purchase of the land would carry with it all wharfage dues (independent of all questions of ware-housing), from which an immediate income of about $150,000 per annum would be derived—equal to 7 per cent. on the total outlay to the date of closing the harbor.

When all the preliminary works were complete, and all in readiness for active operations, the harbor would be closed and the pumps started, and the water removed in ten days. All mud, sand and gravel would be hydrauliced and distributed over the reclaimed area (as successfuly done at Seattle and Tacoma) prior to or simultaneously with the emptying of the harbor.

In addition to these works pertaining to the construction of the harbor proper, inside a line drawn from Shoal Point to Coffin Island, there would be dredging from this line outwards, and deepening the entrance to 30 feet as far as opposite Maclaughlin Point, where the water shelves down rapidly to 40 feet at low tide.

It is only a matter of time when the railway offices on Store



street will be abandoned in favor of a more important and commodious terminal depot on the reserve. The old railway bridge would be removed, and a broad bascule bridge erected at the foot of Johnson street, with wide central opening, clearing the stream at its narrowest point of all impediment to navigation, and at the same time meet the long-felt want of a direct route from the centre of Victoria city to Victoria West and Esquimalt.

It is part of the proposition to connect the present V. & S. railway by a branch running along Work street and over the new bridge at Point Ellice, with the central station on the Indian reserve, and also to extend these joint railways by harbor tracks along the wharves as far as the outer dock; to construct coal bunkers in the lower harbor, and spacious dry-docks and marine ways in the upper harbor of capacity sufficient to take the largest ships frequenting these waters. The harbor tracks would be fitted with hydraulic cranes and capstans. Spacious warehouses would be built as the demand arose, and all the most approved appliances installed for the most economical and expeditious handling, storing and transhipping of freight, and for the accommodation of the shipping frequenting the port and at the same time the charges kept down to rates that should make this the most desirable and most frequented harbor on the Pacific coast. These works would be gradually carried to completion out of surplus revenue.

ESTIMATE OF THE COST.

Purchase of all properties abutting on the harbor, including compensation, say		$2,100,000
Dams and removal, about	$200,000	
Pumping out lower harbor	20,000	
Excavation and dredging	630,000	
Revetment walls	800,000	
Bascule bridge	200,000	
Overflow to Thetis Cove, say	50,000	
Contingencies, say	200,000	
Total works in lower harbor		2,100,000
Sheet piling, upper harbor	250,000	
Dredging	175,000	
Rock Bay bridge abutments	50,000	
Point Ellice bridge	200,000	
Contingencis, say	65,000	
Total works in upper harbor		740,000
Law, parliamentary, engineering and management for the four years' construction		350,000
Estimated total outlay, about		$5,290,000

This expenditure would be extended over four or five years, the bonds being issued as the demand arose, and although the bulk of the income would accrue on the purchase of the property, the charges for interest on the loan would rise but gradually, with the expenditure on works of improvement that would in themselves be revenue-producing. Thus the revenue during the first four years would, it is estimated, exceed $560,900; whereas the interest on the gradually issued bonds would not exceed $470,000 the surplus revenue being carried to capital account, thus reducing the amount required to be obtained on loan by about $90,000.

Instead of any direct grant of money from the city in aid of this great public undertaking, it is proposed that the city should convey the mud flats and other adjacent vacant spaces, that they could be filled up and converted into useful public property, from which an annual rent could be collected, which property would in due course become taxable to the city.

For many years past the Dominion Government has voted $10,000 to be spent in this harbor. It is proposed that the Dominion should increase this grant to $30,000 a year for a limited period of five years, commencing with the fourth year, that it may have a fair start in public usefulness.

The estimated revenue stands thus:

Rents receivable, about	$78,124	
Less taxes, etc	25,024	
		$52,500
Harbor dues from existing sources		95,000
Dominion grant in aid		30,000
Estimated average revenue from reclaimed land and harbor improvements, say		30,000
		$207,500
Interest on loan at 3¼ per cent., in the event of the full amount being expended continuously	$169,000	
Administration, maintenance, etc., say	30,000	
		$199,000

The exact results of the rate of interest and cost of work in the lower harbor would therefore determine the practicability of carrying out the work in the upper harbor contemporaneously or continuously with the lower harbor.

With reference to the repayment of the loan, the act provides that no surplus land shall be sold within ten years, but after that period, when prices may be considered established, any portion exceeding 60 feet away trom the water's edge may be disposed of, provided the proceeds are applied solely to the redemption of bonds. It would not be desirable to pay off any more of the loan than these circumstances may render necessary, as foreign money obtained at low rates and profitably invested in local improvements is better retained in the country, and the requisite powers to renew any outstanding balance of the loan are provided in the act.

The scheme is in no way a company or speculative matter—it is purely a public enterprise for the development of trade, self-supporting from the commencement, and all surplus revenue will be applied solely for works of further development. The funds are now available, awaiting the Act of Incorporation, and the required public guarantees for the repayment of loan and interest over a period of fifty years.

The lower harbor will be the proposition to be dealt with, and the railway extensions will follow developments.

LEGAL.

KENNEDY VS. TRUSTEES R.C. SEPARATE SCHOOLS OF HINTONBURGH, ONT.—Appeal was taken by plaintiff before Mr. Justice Meredith at Toronto from part of judgment by the same judge at trial at Ottawa, dismissing the plaintiff's claim for extra work in connection with a building contract. The question was whether the architect's certificate for the extras claimed was sufficient for the plaintiff's recovery or whether he must show an order in writing for such extras given before the work was done, and upon whom the burden of proof as to such written order was. Appeal dismissed with costs. Per Meredith, C.J.—Some cases have gone a very long way in holding the owner to be bound by the certificate of his architect to pay for work which the owner has expressly stipulated with his contractor that he was not to be liable for, unless the order was given in a particular way, but if the owner is to be bound, justice would seem to require that the contractor should furnish clear evidence of a decision or adjudication by the architect as to the subject matter, from inquiry into which he is to be shut out by the certificate. In this case not only is such a decision or adjudication not made out, but the instruments relied on indicate that the architect has advisedly and carefully refrained from deciding or adjudicating as to the extras so as to bind the owner.

THE Architect and Contract Reporter, of London, quotes a decision of the English courts that will have an interest for builders everywhere. The paper says: "The risks from using defective mortar are numerous, for local authorities have in most places absolute power for dealing with it. A decision which was given this week by Mr. Justice Bruce, in Smith vs. Johnson, reveals that a building owner can also have his remedy against a contractor who is not careful in using such mortar as is considered necessary for safe building. The plaintiff contracted with the defendant for mortar which was to be used in the extension of a dormitory attached to a lodging house in Whitechapel after the completion of the work. The plaintiff was ordered to take down and rebuild the dormitory because the mortar did not correspond with the requirements of the Building Act. According to the by-laws the mortar to be used must be composed of freshly burned lime and clean sharp sand or grit without earthy matter in the proportions of one of lime to three of sand or grit. The dormitory was rebuilt as ordered. Then the plaintiff sought to obtain from defendant the money expended on the work as well as a sum for loss of rent. It was maintained that the quality of the mortar could not be detected because it was in a wet state. Counsel for defendant maintained that when the contract was made it was not understood that if the mortar was unsuitable it would be necessary to take down and rebuild the dormitory. Besides, the plaintiff should have rejected the mortar when it was supplied. Plaintiff's counsel held that the defective quality of the mortar could not be ascertained until it was used, and as the rebuilding was the result of defendant's acts, he must be held liable for the cost of rebuilding. Mr. Justice Bruce considered that, according to the evidence, as that the mortar was in a wet state, no reasonable diligence on the part of the plaintiff could have discovered the defects until the mortar was used. The plaintiff was therefore entitled to recover the expense of pulling down and rebuilding, as well as damages. His lordship assessed the amount at £101.

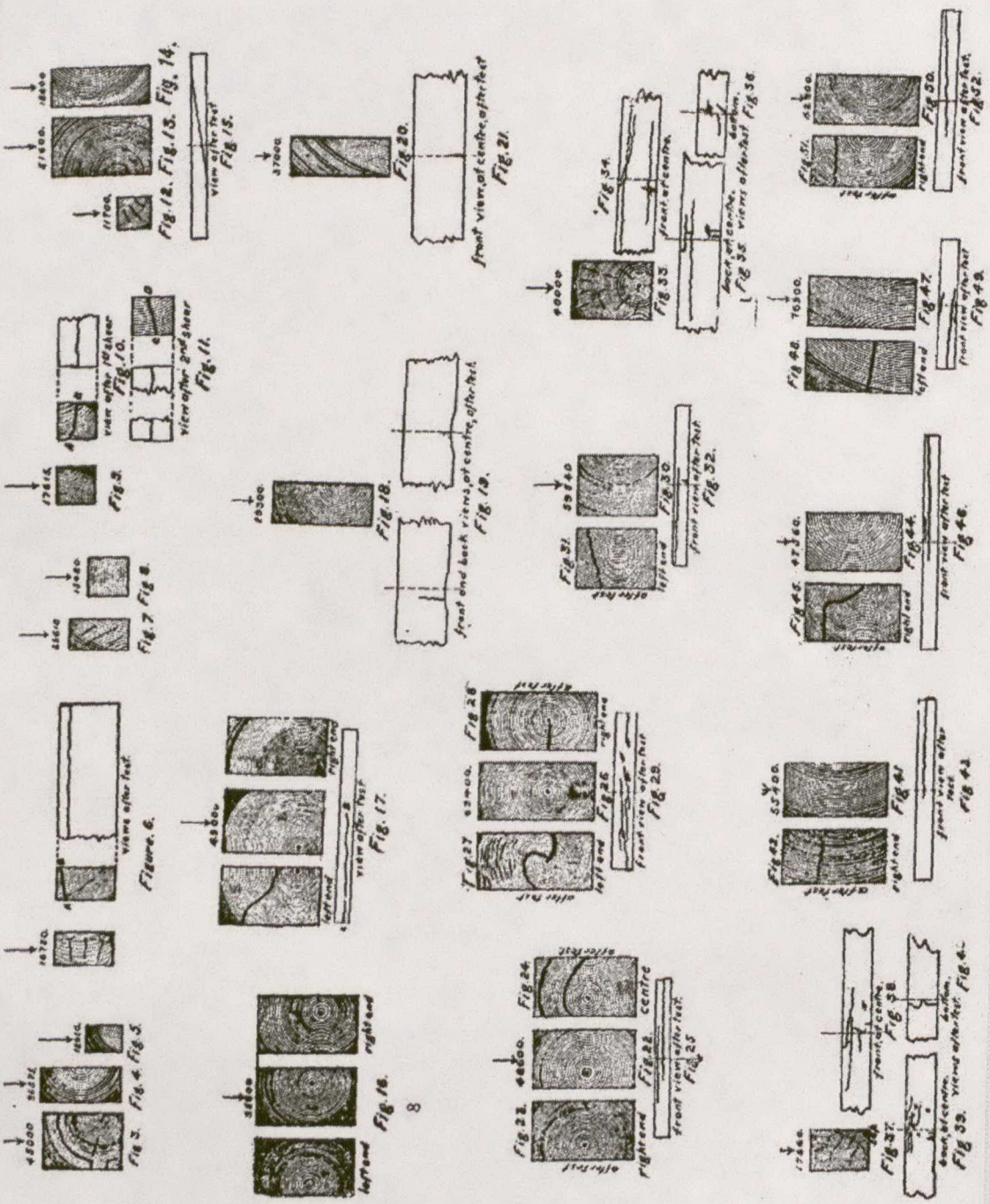
STRENGTH OF CANADIAN DOUGLAS FIR.

HEREWITH are given, in part, the results of tests made under the direction of Professor Bovey in the testing laboratory of McGill University, Montreal, to determine the strength of British Columbia Douglas fir. There were tested, in all, twenty-five beams, of which the following particulars and illustrations are given: Beam I was of good average quality, with annual rings as in Fig. 3. At 45,000 lbs. the beam failed by the tearing apart of the fibres on the tension face.

Beam II was of good average quality, with annual rings running as in Fig. 4. At 36,575 lbs. the beam failed by shearing longitudinally. After the fracture the load upon the beam was again gradually increased to 34,000 lbs. before a second failure occurred.

Beam III was of a specially excellent quality, with clear, close, parallel grain, perfectly sound and free from knots, with annual rings as in Fig. 5. At 12,950 lbs. the beam failed by shearing longitudinally.

Beams IV to VIII, sent to the laboratory by the British Columbia Mills, Timber & Trading Company, were cut out of trees grown on the coast section of British Columbia, and felled in the fall or during the



winter. They were free from knots, of good quality, and with the grain running straight from end to end.

Beam IV showed annual rings somewhat oblique, as in Fig. 6. At 16,720 lbs. it failed by shearing longitudinally along a plane A B at right angles to the annual rings. After the beam had sheared longitudinally the load was again applied until it amounted to 15,000 lbs., when fracture occurred by the tearing apart of the fibres on the tension face.

Beam V showed annual rings as in Fig. 7, and failed byt he tearing apart of fibres on the the tension face under a load of 23,610 lbs.

Beam VI showed annual rings as in Fig. 8. Under a load of 15,480 lbs. it failed in the same manner as beam V.

Beam VII showed annual rings as in Fig. 9. Under a load of 17,615lbs. the beam sheared longitudinally along the plane A B, Fig. 10, the distance between the ends of the portions above and below the plane of shear being 3-16 of an inch. The load was again applied until it amounted to 11,840 lbs., when there was a second longitudinal shear along the plane C D at the other end, Fig. 11. After this second shear a load of 8,990 lbs. was applied, when the beam was fractured by the tearing apart of the fibres on the tension face.

In Beam VIII the annual rings were oblique, as in Fig. 12, and at a load of 11,700 lbs. it failed by the tearing apart of the fibres upon the tension face.

Beams IX to XVI were sent to the laboratoryby Mr. P. A. Peterson, chief engineer of the Canadian Pacific Railway.

Beam IX was grown on the mainland half way between Vancouver and New Westminster, in a flat country not much above the sea level. It was cut from a log 26 inches in diameter and 34 feet in length, felled in the month of May. The log lay in fresh water for ten months. It was of first quality, with grain straight and running parallel to the axis. It contained a season crack on the widest face about 11 feet long, 3½ inches below the edge and about 1½ inches deep. Annual rings were as in Fig. 13, the heart of the tree being in one of the vertical faces. Under a load of 51,600 lbs. the beam failed at the support by the tearing apart of the fibres.

Beam X, with annual rings as in Fig. 14, was cut from a log 32 inches in diameter grown on the mainland 120 miles north and west of Vancouver, on a hillside about 100 feet above the sea level. The log was felled in the winter and remained in salt water six months. The grain in this beam ran crosswise, and it failed by a cross fracture along the plane A B, Fig. 15, under a load of 18,000 lbs.

Beam XI—History same as that of beam X. Timber was of first quality, and grain parallel with axis. The beam contained the heart of the tree, with annual rings as in Fig. 16. Under a load of 35,800 lbs. the beam failed by the tearing apart of the fibres upon the tension face.

Beam XII, with annual rings as in Fig. 17, was cut from the log 28 inches in diameter grown about 30 feet above the sea level about eight miles from Vancouver. Tree was felled in August and remained in salt water nine months, being alternately wet and dry, according to the tide. The timber was of good quality, straight grained, with several knots of medium size and a few season cracks; beam contained the heart of the tree. Under a load of 49,000 lbs. the beam failed by shearing logitudinally along the season crack A B.

Beam XIII History same as that of beam IX., with annual rings as Fig. 18. Timber of good quality, several small cracks along the back of the beam, and small season cracks along the whole of the front about three inches above the face in compression. At 29,300 lbs. the beam failed by the crippling of the fibres on the compression face, commencing at a small knot at the back (Fig. 19).

Beam XIV is in reality beam XIII re-tested. The beam was replaced in the machine with the crippled side reverse, so as to be in tension. At 17,600 lbs. it failed on the tension side by the tearing apart of the fibres along the surface at which the crippling took place on the previous test.

Beam XV, with annual rings as in Fig. 20, was timber of first quality, clear and straight grained, and free from knots, its history being same as that of beam XII. At 37,000 lbs. it failed by the crippling of the fibres on the compression face, Fig. 21.

Beam XVI is beam 15 re-tested. The beam being reversed, it failed under a load of 25,580 lbs. at the point at which the crippling had previously taken place. A load of 32,000 lbs. was then applied, when the beam fractured a second time on the tension side.

Beams XVII to XXI were sent to the laboratory by the British Columbia Mills, Timber & Trading Company, and were cut on the coast section of British Columbia.

Beam XVII was coarse grained, contained a number of small knots on the compression side, was cut from the heart of the tree, with annual rings as in Fig. 22. At 48,600 lbs. it failed by the tearing apart of the fibres on the tension face, which was followed immediately by a longitudinal shear coincident with the neutral plane at the centre of the beam and extending for a distance of eight feet from the end, Fig. 25.

Beam XVIII was cross grained, contained several knots, was cut from the heart of the tree, and showed annual rings as in Fig. 26. At 69,400 lbs. the beam failed by shearing longitudinally, the shear being immediately followed by the tearing apart of the fibres on the tension face, Fig. 27, 28, 29.

Beam XIX was of exceptionally good quality, with clear, close grain, no knots, and annual rings nearly vertical, as in Fig. 30. At 59,540 lbs. it failed by longitudinal shearing, followed by the splinting of the upper edges on the tension side, Fig. 31, 32.

Beam XX was cut from the heart of the tree, with annual rings as in Fig. 33, was coarse grained and contained a number of knots. At 40,000 lbs. it failed by the crippling of the fibres on the compression side in the neighborhood of a small knot 1¼ inches above the compression face, Fig. 34, 35, 36. The load was gradually increased to 49,600 lbs., when the beam again failed by tearing apart of the fibres and tension face.

Beam XXI—Annual rings as in Fig. 37. At 17,960 lbs. a sharp fracture took place by the tearing apart of the fibres on the tension side, accompanied by a simultaneous crippling of the fibres upon the compression side, Fig. 38, 39, 40.

OLD DOUGLAS FIR.

Beams XXII-XXV were four old stringerstaken from trestles. Beam XXII had been in position for nine years, in a dry country, with very little rain fall, and

subject to a hot sun in summer. The annual rings were as shown in Fig. 41. At 55,400 lbs. the beam failed by a longitudinal shear, as in Fig. 42 and 43.

Beam XXIII was taken from a trestle near Port Moody, and had been in position for a period of six and one-half years in a place subject to the heaviest rainfall in the province. Annual rings as in Fig. 44. At 47,560 lbs. the beam failed by the tearing apart of the fibres of the tension face, which was immediately followed by a longitudinal shear, as in Fig. 45 and 46.

Beam XXIV was cut from a log grown on a bench near Spuzzum, about 500 feet above the sea level, and had been in position eleven years in a district with a climate similar to that of Nova Scotia. Annual rings were as shown in Fig. 47, and the beam contained several knots and season cracks. At 41,000 lbs. material at one end of the beam was crushed in. The ends, partially decayed, were sawn off and the load increased to 76,900 lbs., when the beam failed by longitudinal shear.

Beam XXV had been in service on Kamloops Lake for a period of eight years. The annual rings were as in Fig. 50, with heart showing on one of the faces. At 42,900 lbs. a large splinter broke off on the tension face and the beam failed by longitudinal shear, as in Fig. 51 and 52.

The following table gives a summary of the results obtained:

Beam.	Dimensions in inches.	Weight in lbs. per cubic foot at date of test.	Maximum skin stress in lbs. per sq. in.	Co-efficient of elasticity in lbs.
NEW TIMBER, SPECIALLY SELECTED.				
	l d b			
III.	66 x 5.375 x 4.125		10,441	2,178,100
XIX.	138 x 12.1 x 9.1	41.21	9,043	1,934,300
VII.	69 x 6 x 5.8125	34.92	8,712	2,044,115
XV.	198 x 15 x 6.125	38.92	8,020	1,989,400
NEW TIMBER, FIRST QUALITY.				
	l d b			
X.	198 x 14.875 x 6	37.80	4,027	1,629,616
XI.	204 x 14.875 x 8.6875	36.99	5,698	1,770,563
IX.	204 x 14.875 x 9	35.76	7,694	1,764,939
VIII.	69 x 5.125 x 5.5	35.74	8,382	1,584,692
XVIII.	138 x 17.8 x 8.76	35.59	5,196	1,329,900
XVII.	138 x 15.125 x 9	35.17	4,907	1,259,600
XX.	138 x 12 x 8.88	34.92	6,559	1,571,150
XII.	204 x 14.875 x 8.8125	34.79	7,645	1,678,300
XIII.	204 x 14.75 x 6.6	34.13	6,912	1,643,193
XXI.	138 x 8.98 x 5.95	30.83	7,784	1,588,400
VI.	69 x 6.125 x 6	30.23	7,116	1,389,215
I.	96 x 12.125 x 9		4,897	1,138,900
II.	66 x 12.125 x 3.623		4,378	1,146,900
V.	69 x 9.125 x 5	29.18	5,869	946,270
IV.	69 x 9.125 x 5	28.27	4,156	926,560
OLD TIMBER.				
	l d b			
XXIII.	186 x 14.35 x 8.78	38.59	7,339	1,878,950
XXII.	162 x 15.6875 x 7.75	33.75	7,086	1,665,560
XXV.	144 x 15.63 x 8.2	33.11	4,613	949,720
XXIV.	132 x 16.2 x 7.75	32.8	6,135	1,201,620

VALUABLE ARCHITECTURAL BOOKS.

The Maharajah, of Jeypore, India, has presented to the Toronto Public Library ten beautifully illustrated volumes descriptive of the architecture of the temple and ancient buildings of India. They form valuable works of reference for students of architecture.

ILLUSTRATIONS.

NEW MUNICIPAL BUILDINGS TORONTO.—E. J. LENNOX, ARCHITECT.

RESIDENCE, WALMER ROAD, TORONTO, FOR MR. JOHN M'KEE.—F. H. HERBERT, ARCHITECT.

SKETCH ELEVATION WITH PLANS FOR BRITISH COLONIAL PAVILIONS AT THE PARIS EXHIBITION OF 1900.

THE WEILER BLOCK, VICTORIA, B. C.—THOS. C. SORBY, ARCHITECT.

The premises occupy the whole area between Government and Gordon streets, with a side frontage on Broughton. The basement floor is lofty, well drained and dry, and will be perfectly lighted by the Luxfer Prism Co., of Toronto, the first introduction of these lights into the province. This storey will be used for floor cloths and other similar heavy goods and covers an area of about 12,000 superficial feet. The ground floor will be used for crockery, etc., and here will be placed the offices of the firm. Two spacious entrances give public access from Government street and Broughton street, and two more are provided for the entrance and delivery of goods in Gordon street. This floor covers an area of about 8,000 superficial feet and is 17 feet high, lighted by immense plate glass show windows, the largest in the province.

A first-class Otis electric passenger elevator provides rapid and easy communication with the basement and the upper four floors. The elevator well is closed in with handsome metal grille work and is surrounded by a broad easy staircase. An electric freight elevator also communicates with each floor. This elevator was erected by the Fensom Elevator Works, of Toronto, who also fitted up the contiguous new post-office building. The six floors provide a floor area of about sixty thousand feet.

The building is lighted throughout with electricity, with Frinck's most recent introductions for show window illumination.

The premises are heated throughout with steam generated in water tube boilers.

The building is of mill construction, massive posts, beams and joists of fir, and extra thick double flooring being employed. The walls are also massive in construction. Selected local brick is used in the front. The stone is from Saturna Island, the piers being built of very large, heavy stones with thick beds of lead between. The arched window openings in the Broughton and Government street fronts are of unusual size and boldness, and are filled in with large sheets of plate glass in ornamental window frames of oak. The roof is covered with extra thick steel plates.

The contractor for the brick and stone work is Mr. W. J. Smith; for the carpenter work Mr. F. J. Sherbourne, and for the roof and galvanized iron work, Mr. H. Cooley, who have each done most excellent and creditable work. The joiner's work and finishings were done by Messrs. Weiler at their own factory. The electrical work was executed by Messrs. G. C. Hinton & Co. Mr. Bryden discharged the duties of superintendent of works. The architect is Mr. Thos. C. Sorby, under whose personal supervision the whole of the work was carried out. The cost of the building was about $60,000.

A ladder or scaffolding is no stronger than its weakest part; hence the discovery of a weak part should be immediately followed by an absolutely thorough repair.

CORRESPONDENCE.

CAN CONCRETE BE MADE ACID PROOF?

To the Editor of the CANADIAN ARCHITECT AND BUILDER:

SIR,—I beg to inform you that concrete is not acid proof, as stated in an editorial in your August issue. I have an example right here in my office. I placed a piece of concrete in a glass jar and poured in enough nitric acid to cover the concrete. In a short time the lump of concrete had turned into a soft slush about the consistency of mud.

N. T. GAGNON.

Montreal, Sept. 28th, 1899.

[The article referred to, is simply a quotation from "Specification" and is so stated. The article does not claim that ordinary "concrete" is "acid-proof," but that it "can be made acid-proof." "Specification" is an eminent English authority.—Editor C. A. & B.]

TECHNOLOGY AND INDUSTRIAL ART.

OTTAWA, September 24th, 1899

To the Editor of the CANADIAN ARCHITECT AND BUILDER:

SIR,—The letter to "A Manufacturer," which was published in your September number, containing my opinion of our Ontario Art Schools, has caused much indignation amongst other Art School teachers and officers, and I do not wonder at it, but shall be glad if you will let me make a little explanation to them through your journal.

This condemnation of the Schools has nothing whatever to do with the individuals at work in them; it is as impersonal as was Galileo's objection to the theory that the earth was stationary. During this year I have met many Art School officials and teachers, and know they are just as earnest workers as I am, but we see something different from that which they are seeing, and although we may stand alone for a while in the effort to prove whether or not we see rightly, we are content to do so. If we are wrong we shall simply fail to accomplish any good work and our ideas will reach their proper place—oblivion.

One other point; although I have not visited every school, I included all in that condemnation. The reason for this seeming inconsistency is this: We were advised to apply for the government grant to Art Schools. We read in the book sent us from the Department of Education, the Act of Parliament covering this field of work; nothing detailed was there in regard to subjects or methods of instruction, and thinking our school entitled to the grant, we made application for it. The reply sent us indicated, however, that our school-work must include the list of subjects covered by the departmental examinations. Although we are for other reasons not entitled to this grant, this part of its requirements we could not agree to at any time; this deflection debars us from it permanently; and we see that all schools which obtain it must follow a course of study demanded by these examinations, and therefore must contain that weakness which in your August number, Mr. T. S. Brown, says, leads to the stultification of skill and the recording "to future generations our utter sterility of imagination if not our want of common sense."

Again let us say, we do not blame those who arrange these examinations; they think them right, but we wish to work in a different way and the paper entitled "Metal Work," page 156, is (for us) most opportune, because a re-reading of it by those who have been shocked perhaps by my first letter, will give them some knowledge of our ideals, when we say that our deviation from the prevalent system is caused by our desire to apply to daily, hourly study, the principles so clearly stated by Mr. Brown.

In the meantime we are content to have our work stand the test contained in another statement of your August number. "In course of time the presence of the acknowledged good will drive out the bad." This same frame of mind makes us consider that the whole question of Industrial Art and Applied Design education is not so difficult of solution as many suppose.

Canadians can do anything they want to do, even if it be to work out the best industrial system in the world.

Respectfully yours,

MARION LEVING.

To the Editor of the CANADIAN ARCHITECT AND BUILDER:

SIR,—Following up my remarks of last month touching on "Schools of Industrial Art and Applied Design," another system of schools also suggests itself to me as of such importance that I trust you will pardon me for again trespassing on your time if I go a little into consideration of them.

I refer to Trade Schools, with the following for their objects: To teach a boy or girl a trade; to teach them in what class by physique, age and conditions they are most likely to be a success; to teach them the importance of knowing the importance of understanding the fundamental principles necessary to success—preciseness in execution, obedience, sincerity and integrity.

For the girls, sewing and cooking should have first position which could be supplemented by other trades to which female ability is best adapted, such as stenography, telegraphy, typewriting, etc.

For the boys, carpentry, plumbing, tinsmithing, sign painting, machine shop practice, cabinet making, upholstering, and in addition a fair department for the advancement of agriculture.

In these times when the greatest benefit to our country is the development of farms, would it not be fair to suppose if our youth were made better acquainted with what might be accomplished in the country, it would offer an occupation to many who now are only thinking of a situation in the city behind a counter, because they cannot afford to study for a profession? Botany is hardly deemed of any use to-day by most school children, except as an accomplishment to be classed with the use of the piano, singing, etc., and is not recognized as of untold value in a proper understanding of agriculture. Chemistry and physics are thought by boys and girls to belong mainly to drug stores and doctors, whereas their association with agriculture is all important.

It is within our recollection that when at school a particular study had our fancy; with one it was grammar, another geography, and so on. Would not a boy's future find a readier solution were he given a chance to elect what vocation he would follow, instead of being pitchforked into a job because he no longer could be kept at school, and after tramping the town and finding some one affirmatively answer the question "Do you want a boy?" finds himself as an apprentice in a machine shop when his instincts are for carpentry or probably the farm.

Could not this question be taken up by the school-boards, and having visited some of the trade schools, such as the Hirsch schools of New York, probably some of the monies now uselessly expended in the cramming system could be made to yield better and more lasting results.

Yours etc.,

"MANUFACTURER."

To the Editor of the CANADIAN ARCHITECT AND BUILDER:

SIR,—Allow me to applaud "Manufacturer's" letter, which appeared in your September issue, anent "Technology and Industrial Design." To all who are interested in the higher development of industrial art in Canada, it must be gratifying to hear that our government contemplates the establishment of schools for this important purpose. The founding of these schools, however, is one thing and their proper equipment and maintenance is another. It is to be hoped, before a definite plan is mapped out, that the question of equipment will be most thoroughly inquired into, and that only the best of the best will be sought after, because the result will be largely determined by the beginning. To this end a thorough inspection should be made of the leading English and Continental schools of industrial art, and instructors procured therefrom, or from other approved sources, to aid in establishing, on proper lines, this highly valuable branch of national education.

"Manufacturer" objects to the embryo school being termed "Technical," and suggests the more comprehensive name, "School of Industrial Art and Applied Design." I think such a name covers the ground more fully, as it not only embraces "technique," but includes therewith "application," and is altogether wider in its scope than the latter only. "What's in a name?" A great deal, I answer. I would go still further than "Manufacturer" by suggesting, "The Canadian School of Industrial Art and Applied Design," thus giving it direct national importance, so that whatever merit might ultimately accrue from its production, Canada would be recognized as its birthplace. But while there is much in a name, the possible achievements of such a school are of far greater importance, and that Canada is ripe for it is attested by the extensive importation of articles bearing the imprint of careful art training, thereby increasing the revenue of other countries at the expense of our own, for there is no reason possible to advance why we should not, under proper conditions, hold a high place in applied art work. Canada has long enough been regarded as a babe in arms, too young to venture out alone. She is now a vigorous child, full of pardonable ambition. Her blood, brains and energy simply require to be properly directed, and the result will, quite within a decade, prove to be a good national investment.

There is yearly, in Toronto alone, enough wealth expended on architectural monstrosities and meaningless objects of so-called art to make the city glisten with interest if the same were but invested in cultured design and craftmanship such as would eventually result from properly organized art training schools.

Our present art schools, in spite of the efforts of an occasional instructor and an odd piece of meritorious handicraft, are a mere apology for what our nation needs. The government cannot commence any too soon to provide in every leading centre of manufacture such aid as will tend to develop the talent which certainly awaits it. Every country under the sun possesses the germs of art and design and the inborn spirit to apply these gifts to useful purposes. That is God's universal gift to man, and it remains with man to develop it. Is it too much, therefore, to suppose that, under proper guidance, our sons and daughters may eventually aid in making our commercial art products things of beauty and joys forever?

In architectural design, construction in carving, decorating and furnishing, with their many profitable and alluring branches, there is rich food for our youth. Canada has reason to show right early that she is not only a land of lumber, grain and cheese, but one of science and art, which are so essential to the betterment of all communities.

"Manufacturer's" letter is along the right lines, and should tend to further the desired end.

Yours truly,

ROBERT MCCAUSLAND.

STUDENTS' DEPARTMENT.

THE MODERN PHASE OF ARCHITECTURE.*

BY MR. LOUIS H. SULLIVAN.

GENTLEMEN,—The Cleveland meeting of the architectural clubs of the country will mark, I believe, the auspicious opening of a new era in the growth of architectural thought. It should, in the nature of things, be of serious import to us of the present and active generation to know what the generation to follow thinks and feels. Its thoughts may be immature, its feelings vague and formless; yet, nevertheless, in them the future life of our art is surely working out its destiny and the sincerity of them is not to be denied.

Youth is the most ambitious, the most beautiful, but the most helpless stage of life. It has that immediate and charming idealism which leads in the end towards greatness, but it can know little of the sorrow and bitterness of the struggle for greatness.

Youth is ineffable. I have said good-bye to mine; with solicitude I welcome yours. Perceiving as I do the momentous sway and drift of modern life, knowing as I do that the curtain has risen on a drama the most intense and passionate in all history, I urge that you cast away as worthless the shop worn and empirical notion that an architect is an artist (whatever that funny word may mean) and accept my assurance that he is and imperatively shall be a poet, and an interpreter of the national life of his time.

Do you realize how despicable is a man who betrays a trust? Do you know, or can you foresee or instinctively judge, how acutely delicate will become in your time the element of confidence and dependence between man and man and between society and the individual?

If you realize this you will realize at once and forever that, by birth and through the beneficence of the form of government under which you live, you are called upon, not to betray, but to express the life of your day and generation; that society will have just cause to hold you to account for your use of the liberty that it has given to you and the confidence it has reposed in you.

You will realize in due time, as your lives develop and expand and become richer in experience, that a fraudulent and surreptitious use of historical documents, however suavely presented, however cleverly plagiarized, however neatly replaced, however shrewdly intrigued, will constitute and will be held to be a betrayal of a trust.

You know well what I mean. You know in your own hearts that you are to be fakirs, or that you are to be honest men. It is futile to quibble, or to protest, or to plead ignorance or innocence, or to asseverate and urge the force of circumstances. Society is, in the main, honest—for why should it not be—and it will not ask and not expect you to be liars. It will give you every reasonable and every legitimate backing if you can prove to it, by your acts, that artistic pretension is not a synonym for moral irresponsibility.

If you take the pains truly to understand your country, your people, your day, your generation, the time, the place in which you live; if you seek to understand, absorb and sympathize with the life around you, you will be understood and sympathetically received in return, have no fear of this.

Society soon will have no use for people who will have no use for it. The clairvoyance of the age is steadily unfolding, and it will result therefrom, that the greatest poet shall be he who shall grasp and deify the commonplaces of our life—those simple, normal feelings which the people of his day will be helpless, otherwise, to express—and here you have the key with which, individually, you may unlock in time the portal of your art.

I truly believe that your coming together will result in serious things. You have my sympathy. I am with you in spirit, for in you resides the only hope, the only sign of dawn that I can see, making for a day that shall regenerate an art that should be, may be, and must be the noblest, the most intimate, the most expressive, the most eloquent of all. Your youth is your most precious heritage from the past. I am with you.

* An address delivered at the National Convention of Architectural Clubs, Cleveland, Ohio.

EARLY ENGLISH CHARACTERISTICS.

ARCHES pointed, generally lancet, often richly moulded. Triforium arches and arcades open with trefoiled heads. Piers slender, composed of a central circular shaft, surrounded by several smaller ones almost or quite detached generally with horizontal bands. In small buildings the plain multangular and circular pier is used. Capitals concave in outline, moulded or carved with representations of conventional foliage, delicately executed and arranged vertically. The abacus always undercut. Detached shafts often of Purbeck marble. Base, a deep hollow between two rounds. Windows at first long, narrow and deeply splayed internally, the glass being within a few inches of the face of the wall; later in the style, less acute, divided by mullions, enriched with foliated circles in the head, often of three or more lights, the centre light being carried highest. Doorways often deeply recessed and enriched with slender shafts and elaborate mouldings. Shafts detached. Buttresses projection about equal to breadth, with but one set-off or without any. Buttresses at angles always in pairs. Fonts of various shapes, often ornamented with foliage in high relief or the tooth ornament, the stem surrounded by detached shafts. Mouldings bold and deeply undercut, consisting chiefly of pointed and filleted bowtells or rounds separated by deep hollows. Great depth of moulded surfaces generally arranged in rectangular planes. Hollows of irregular curves and sometimes filled with the tooth ornament or foliage. Roofs of high pitch, collar beamed, timbers plain and open. Early in the style, finials plain bunches of leaves; towards the close, beautifully carved finials and crockets were introduced. Carved foliage of conventional character. Flat surfaces often richly diapered. Spires broached.—The Architect.

LAND MEASURE.

The square foot contains 144 square inches.

Yard = 9 feet = 1,296 inches.

Rod pole or perch = 30¼ yards = 272¼ feet.

Chain = 16 rods = 484 yards = 4,356 feet.

Rood = 40 rods = 1,210 yards = 10,890 feet.

Acre = 4 roods = 160 rods = 4,840 yards.

Mile = 640 acres = 2,560 roods = 6,400 chains = 102,400 rods, poles or perches.

An acre roughly stated has four equal sides of 69½ yards, accurate measurement gives each side 208.71 feet.

The sides of a square half-acre would be 147·581 feet, and for a square quarter-acre, 104·355.

THE BUILDER

[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.]

Half Trussed Roof.

An excellent method of trussing and tieing a roof of moderate span, is shown in the accompanying diagram (Fig. 1). It is supposed that an attic, which may be made avoidable if desired, is provided above the regular upper storey; therefore the walls are carried a foot or more above the ceiling joists as shown in the diagram. On top of the wall, resting on band timbers, is placed a scantling, 2 x 6 inches—or of other suitable dimensions—on edge, with one end projecting over the building and forming a "lookout" onto which the soffit or planceer of the cornice may be nailed. The outer end of the "lookout" is cut off plumb, to the right length from the face of the wall. The inside end runs into the building far enough so that the end of it can be spiked to the stud as shown. These studs should form part of the side of the wall and should be well spiked to the ceiling joists and set plumb before the "lookout" is nailed to it. After the studs, "lookouts" and joists are nailed together, the rafters may then be raised in place and spiked fast to the "lookouts" and to the

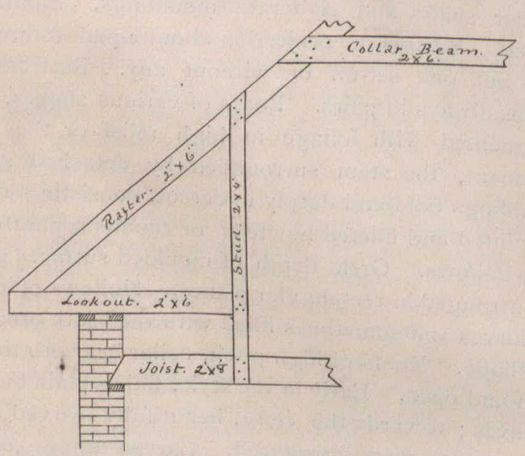


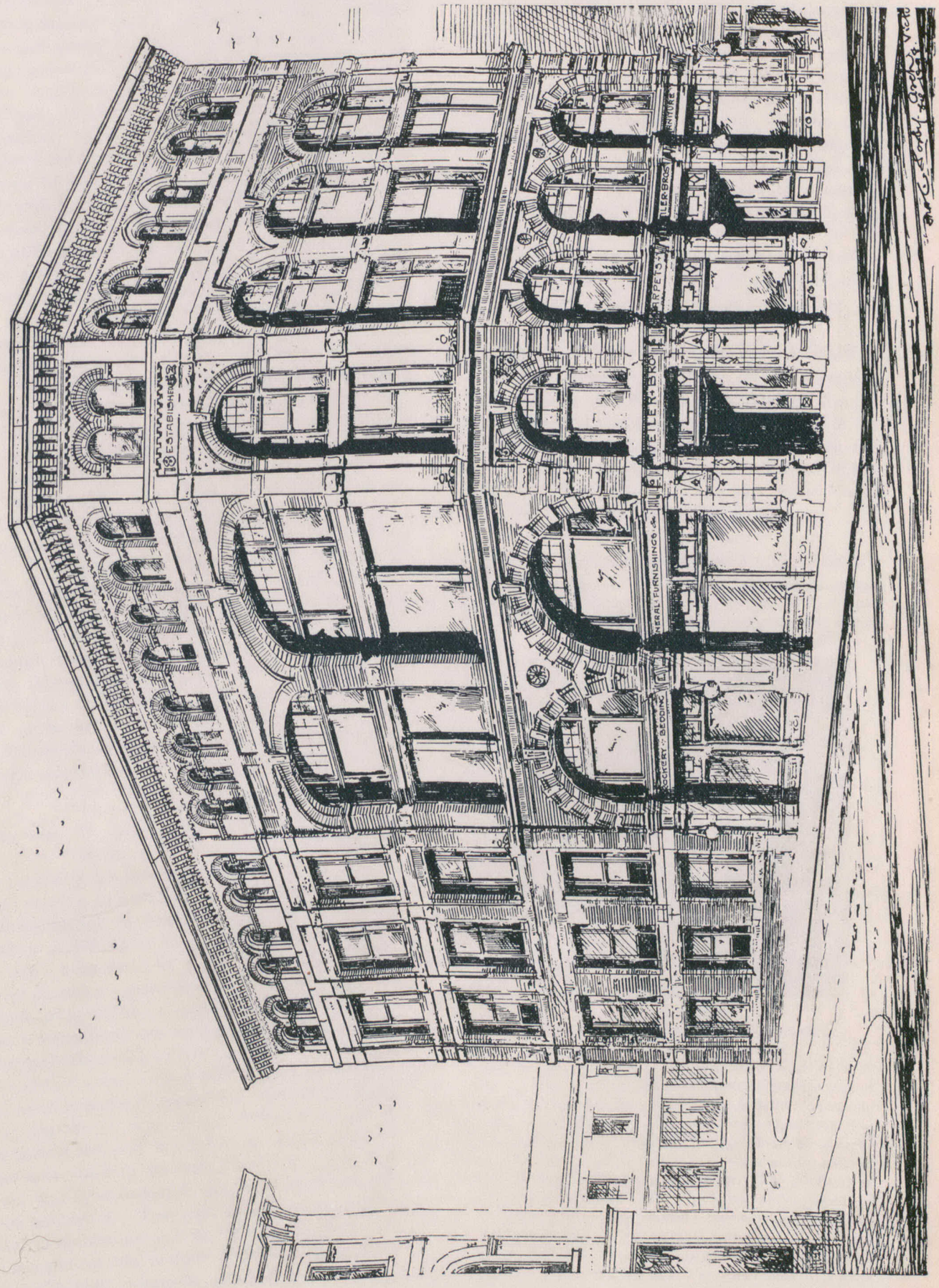
FIG. 1.—METHOD OF TRUEING A ROOF.

studs, after which the collar beams may be nailed to to the rafters, care being taken that they are placed to the right height to insure a sufficient space between them and ceiling joists to make a good room or rooms. The diagram is, to a great extent, self-explanatory, and is drawn to scale. The studding may be placed any distance from the wall, and if the building is of extensive span, the studding may also be attached to the collar beam as well as to the rafters. A roof built in this manner, if the work is well done, is very strong and is not likely to be affected by the winds or by any ordinary snow storm. If the roof is to be framed of heavy timbers, the same principles of construction may be adhered to, two joists being employed at the foot of the studs or struts, instead of one. The joists should be placed one on each side of the strut, and one or two bolts should pass through the joists and struts and the whole three pieces drawn tightly together.

Roof Gutters and Leaders.

Among the petty annoyances connected with buildings, is the freezing and bursting of gutters and conductor pipes in cold weather; or more properly speaking, the freezing of the slush which collects in them and which upon thawing cracks and bursts both of these fixtures. Scientists tell us that water is the one element which expands when congealing, and probably the initial injury is done at the moment of freezing, and is probably aggravated when the expansion and disturbance due to melting takes place. Formerly gutters were made of wood, and the leaders were attached to them in a very crude manner, and continual leaks and delay were chronic; the water was either discharged on the sidewalk or on the ground, thus undermining and destroying the foundations. Modern practice has substituted metal for wood in gutters, and corrugated and square pipes for leaders instead of the circular ones; and the conductor pipes are now connected with the soil pipes and thus affords an easy outlet for roof-water, besides being a convenient and safe ventilator for the sewer system. There are three methods of roof drainage ordinarily adopted: First, the metal gutter and leader, second, the parapet wall and box leader, third, the soil pipe roof leader. Each of these methods have their advantages and their failings. Let us deal with the first method: Flat roofs, of tin, or galvanized iron, generally have a metal gutter at their lowest end. This gutter is secured to the roof timbers by strips of iron, and soldered with a close joint to the tinning. At one end it is pierced by the leader, and the grade of the gutter is towards the leader; this leader should, and generally does, connect with the soil pipe and becomes the conduit for conveying the water into the sewerage system. This does very well during the mild seasons, but in a climate as uncertain and as variable as ours, the system speedily becomes unserviceable, defective and troublesome, often being the cause of great internal damage to a building. The trouble arises in this way: At certain seasons the melting snow is arrested in the gutter by a sudden change of temperature which reduces it to a viscid consistency, usually denominated "slush." As this hardens into ice, the gutter and leader become choked and obstructed. The expansion of the ice, and contraction of the metal will combine to warp, and finally rupture the joint between the roof tinning and the gutter, and the weight of ice firmly congealed in the gutter will have a tendency to break it away from its moorings under the tinning. Thus, a large gap is often made through which the water finds

RESIDENCE OF MR. A. MCKEE, WALMER ROAD, TORONTO.
F. H. HERBERT, ARCHITECT.



PREMISES OF MESSRS WEILER BROS.
CORNER OF GOVERNMENT & BROUGHTON STS.
VICTORIA, B.C.

its way into the building. This system is less objectionable in a southern exposure, and it may be made perfect if a steam pipe, through which exhaust steam escapes, be run along-side the gutter to keep it warm. The second method of meeting the roof-water difficulty is to carry the rear wall a foot or two above the roof timbers and cope it the same as the side walls. Form a valley against this wall to act as a gutter, which will lead the roof-water to a sluiceway or opening in the parapet wall, in which is firmly secured a spacious box-head attached to the leader, the opening in the wall being protected by lattice guards to prevent the washing down of cakes of ice. This method dispenses entirely with the metal gutter, although it still adheres to the metal leader. This system also requires a tight system of flashings in the brickwork near the valley in order to prevent the water from soaking into the walls. The third method of conveying the water from the roof differs but little from the second. By this method, the soil pipe, which is inside the house, is made the leader, and the water is carried directly from the roof to the sewer, without being exposed to the outside temperature, and is therefore not likely to freeze. The warmth ascending the soil pipe in an occupied building, is generally sufficient to keep the mouth of the pipe from freezing, and when a suitable cage or trap is placed over the orifice of the pipe, no ice will be able to enter it and thereby reduce the temperature. We have seen this plan put into practice with very satisfactory results. The apprehension of any possible freezing of the water in this soil pipe is a perfectly idle one, because the pipe is too far removed from the action of the frost, and the gases of decomposition within the pipe generate heat enough to keep the temperature of the pipe considerably above freezing through its whole line to within a foot or two of the roof. Roofs drained in this way are subject to fewer accidents, and the tinning as well as the rear brick wall are exempted from the trying effects of a cracked gutter and a bursted leader.

Retaining Walls.

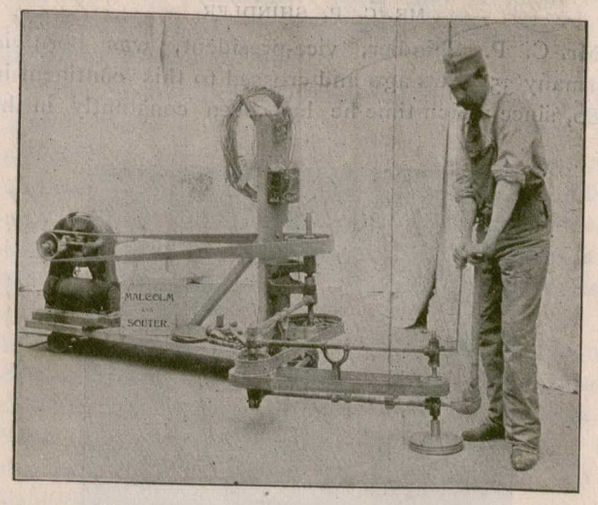
It is not often the Canadian bricklayer is called upon to build retaining walls, but, sometimes there are occasions on which his services will be required for this purpose ; and it is as well for him to be armed with the required knowledge in order to properly execute the work when called upon to perform it. Earth, when thrown into a heap assumes a conical shape, the slope or slant of the sides—ordinarily—forming an angle with the horizon of 45 degrees ; which inclination may be taken as a mean slope into which earths newly thrown up will arrange themselves ; and from this fact, it may be gathered that a very strong wall will not be required to retain earth in position where the slope of the bank is only 45 degrees or less steep. When the earth is replaced behind the wall it should be firmly tramped down and made to hug the wall closely, as the wall is carried up, that in settlement it may not leave hollows behind the brickwork. The wall should be built on a solid concrete foundation and be furnished with ample footings in good set-offs, and be battered towards the bank which it is built to keep in position in proportion to the height to which it is intended to rise. It may be stepped or diminished in thickness as it ascends. If the bank is very steep and the pressure against the wall likely to be great, the wall may be strengthened by the addition of buttresses placed at intervals, and built in with the wall as the work progresses. There should be left in the wall at frequent intervals "weep-holes" to allow the ingress of air and escape of moisture from behind the wall. These "weep-holes" may be formed by leaving out headers in the brickwork or by building in common drain tiles of small bore, and letting their outward ends project somewhat over the face of the wall. This latter method is preferable, as then any drainage that may flow will be carried to the outside, where if only headers are left out, a portion of the water will soak into the lower brick and eventually damage the wall. In the construction of buttresses, or "counterforts" as they are called in England, the wall should be well bonded into them, and the top of the buttresses should be sloped off along with the wall and finished, or coped off, with stone or Portland cement. All bricks used in the building of retaining walls, should be hard and well-burned. Soft or clayey bricks should never be used near earth contact, or when exposed to the weather.

THE HAMILTON BUILDERS' EXCHANGE.

We are advised by the secretary of the Hamilton Builders' Exchange that there is no foundation for the statement made in a paragraph recently published in the daily papers that it had been decided to close up the organization. The secretary suggests that the statement was probably the outcome of the fact that no meetings were held during the summer months.

MACHINE FOR POLISHING PARQUETRY FLOORING.

Herewith is illustrated a machine for polishing parquetry flooring, designed by Messrs. Malcolm & Souter, of Hamilton, Ont., and which was used to good advantage on about 20,000 feet of parquetry flooring laid in the new Royal Hotel in that city. Being unable to obtain men to plane and scrape such a large quantity of flooring, Messrs. Malcolm & Souter overcame the difficulty by inventing this machine. They found that the work was done better than by hand, as no plane or scraper marks were left. The machine is a regular disc sander erected on a platform and driven by an electric motor. The platform is on four wheels covered with rubber ; the two under the motor are on a centre with handle attached for moving about, and the two under the machine are parallel with the platform and keep the machine steady. The motor is two horse power. The only objection met with was the dust, and this was overcome by hanging cotton sheets on all the openings. This machine can only be used profitably on large contracts, but should they have occasion to use it again, the inventors state that they would attach a small fan on one end of the motor and connect it with the disc, and blow all the dust out with a flexible exhaust pipe of canvas. The machine polished about 36 square feet per hour.



Machine for Polishing Parquetry Flooring.

THE VANCOUVER BUILDERS' EXCHANGE.

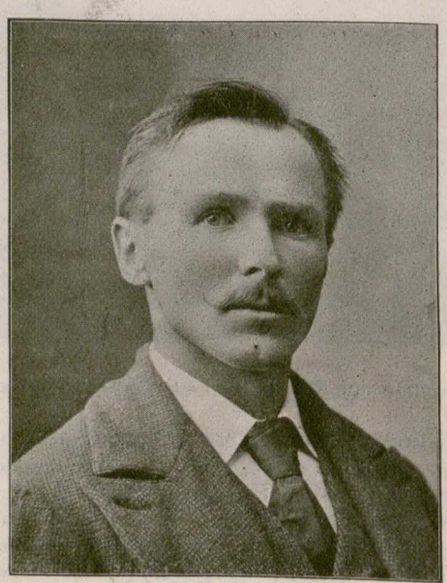
We have the privilege of presenting herewith the portrait of Mr. C. P. Shindler, who has been elected vice-president of the Vancouver Builders' Exchange, vice Mr. Mitchell, resigned—also brief personal sketches of the other officers, whose portraits appeared in our August issue.

MR. EDWARD COOK.

President the Vancouver Builders' Exchange, was born at St. Mary's, Ontario, 1853. After having received a commercial education he served an apprenticeship as stone cutter, mason and bricklayer. He was afterwards two years under instructions in engineering bridge and building construction in connection with N. Y. state works at Buffalo, and the International bridge. Returning to Canada he carried on a general contracting business under the firm name of Cook Bros. for ten years, in the towns and country between St. Marys, Sarnia and Goderich. He followed the tide westward when the contract was let for the building of the Canadian Pacific Railway—arriving in Winnipeg in '79—and at Vancouver in March, 1886. Since that time he has been identified with the upbuilding of Vancouver, and is one of the city's leading contractors, and has confirmed his confidence in the city's future by investing in central business property. He is a strong advocate of the best methods and principles in the conduct of business, and conjointly with the board of directors and members of the Builders' Exchange, is doing much to improve business relations in the building trade, as it affects the owner, the architect, the material supply dealers, employees and contractors.

MR. C. P. SHINDLER.

Mr. C. P. Shindler, vice-president, was born in Germany 35 years ago and crossed to this continent in 1880, since which time he has been constantly in the



MR. C. P. SHINDLER.

building business. He received his early training with the firm of Kuppler & Keifer, of South Bend, Ind. With this firm he succeeded in making himself so useful that in 1886 he was admitted as a partner. Two years afterwards he withdrew and went into the contracting business on his own account, gaining a wide experience by working for ten years in the states of Indiana, Florida, Oregon and Washington.

In 1890 Mr. Shindler came to Vancouver, and excepting a few vacations spent in his native land, he has since been constantly engaged in building up that city. The Hudson Bay building and the De Beck block are two of the many structures, large and small, that he has erected.

Mr. Shindler is known as an all round man in the business, and his wide experience renders him a very capable member of the Exchange.

MR. A. E. CARTER.

Mr. A. E. Carter, Secretary, is a builder by birth and association, being the son of the late John Carter, builder and brick manufacturer of St. Catharines, Ont. He was educated in the St. Catharines Institute, then served an apprenticeship with his father. Before reaching his majority he left home and widened his knowledge and experience in the trade, by working as a journeyman stone-cutter and bricklayer in New York, Pennsylvania, Florida and other States. Returning to Canada, he first went into business as a contracting builder at Niagara Falls, the brick and stone memorial church on the historic Lundy's Lane battlefield, being one of the marks he has left in this locality.

In March, 1889, Mr. Carter decided to take Horace Greely's advice and came west to Vancouver, where he was soon afterwards joined by his brother, the late S. B. Carter. Together they carried on an extensive business as building contractors, replacing with substantial brick and stone structures, the giant stumps which were so conspicuous until recently on even the main thoroughfares of the city. Since his brothers' unfortunate death, which was caused by a fall from a building in December, 1897, Mr. Carter has been alone, and is one of the busiest men in the busy city of his adoption.

MR. H. A. BELL.

Mr. H. A. Bell, Treasurer, is a well known builder and contractor of Vancouver. He was born in Northumberland, Ontario, served his apprenticeship as carpenter at Belleville, and then entered the employ of Messrs. Shaunbergers of Pittsburgh, Pa., for eight years. After successfully carrying on contracting at Winnipeg for five years, he removed to Victoria in 1885, and commenced business as builder and contractor in Vancouver in the fall of the same year. Many of the prominent buildings have been erected under his management. He has also been entrusted with important contracts in British Columbia for the Dominion and Provincial Governments.

Mr. Bell has suceeded well in his undertakings, is the owner of considerable real estate in Winnipeg and Vancouver, and in a general way deserves credit for energy and ability. He is much respected as a citizen and known as a man that will carry out his undertakings.

The organization of the Builders' Exchange has resulted in bringing into pleasant acquaintanceship, the leading contractors of Vancouver, many of whom were previously strangers to one another, notwithstanding that some had been in business in the city for ten years and upwards.

The principal business which at present engages the attention of the Exchange is the preparation of a code of rules to govern the relations between the architect and contractor.

Business in Vancouver is reported to be as brisk as ever, but it has been somewhat retarded by the difficulty of obtaining stone-cutters. There are plenty of men in other trades.

LOW PRESSURE HOT WATER AS A HEATING MEDIUM.*

LOUIS F. PEARSON.

IN comparing low pressure hot water with other forms of heating apparatus, let us first consider what are the vital and most necessary qualifications of a heating installation.

First—I think above all things it should be efficient, that is, capable of maintaining a natural and equitable temperature.

Second—It should be neat, and not occupy too much space.

Third—It should not give off any smell or products of combustion into the building to be warmed.

Fourth—It should not be liable to reach a temperature that is likely to burn either children or the feeble-minded who may happen to fall upon it, or be the cause of setting the building on fire.

Fifth—It must be cheaply constructed if it is to command a large sale, which we all look for but do not always realize.

Sixth—It must be fitted in such a manner that it can be attended to by the latter class of individuals mentioned in paragraph 4, as unfortunately the person chosen to attend to the heating apparatus, in both public and private buildings, seems generally to be selected because he is fit for no other purpose.

Seventh—It should, if possible, assist ventilation.

Eighth—It should be easily controlled.

Now, taking the first of these necessary qualifications, I think it will be generally conceded that a low pressure hot water apparatus, when properly fixed, gives a more natural, equitable temperature than any other form of heating medium, for I think that those who have had their offices heated with either steam or high pressure would give them a very secondary position; while under this head I consider any form of hot-air stove can scarcely be entered for competition.

Looking to the second qualification, we do not find low pressure hot water takes such a good position, as undoubtedly both steam and high pressure water are neater in appearance and take up less space; though since the introduction of radiators, where they are carefully fixed with the mains under the floor, the unsightliness of the low pressure apparatus has been greatly changed for the better, as undoubtedly the old-fashioned 4 in. pipe coils were both unsightly and occupied far too much space.

When we come to the third qualification, I think low pressure is still to the front, for though we know that if steam and high pressure pipes are kept perfectly clean the smell from them is very slight, yet how often are they kept clean? And there is no doubt that if the pipes are not kept free from dust, the hotter they become the worse they smell. I think the hot air stove is also the worst offender in this respect, for the difficulty of cleaning the flues thoroughly, and of keeping the stove itself from cracking, makes it extremely difficult to have this form of apparatus working any length of time without either an unpleasant smell or sulphur fumes being introduced into the building.

My fourth qualification is that the apparatus shall not be hot enough to burn either the inmates or the building itself. Now, here again I must place the low pressure first, steam second, high pressure third, and stoves last, and by far the worst; for though they are generally placed in the basement out of the reach of children, there is no doubt in America, where they are largely used as a cheap form of heating, they cause more fires than anything else; and though no doubt, as Mr. Ginrod has told us, high pressure apparatuses, when fixed by a competent firm, are innocent of this charge, yet there is no denying the fact that many fires have been caused by the high pressure system, and both these and steam pipes are not pleasant to fall against, and when protected by grids we get back to another form of the coil case with all its disadvantages.

Number six qualification is a very difficult one to arrive at, and I am sure there are many of our members who have often been annoyed by being sent for to an apparatus that was left working satisfactorily a few months previously, and told that "they could not get any heat." My opinion is that we can again put low pressure hot water first, as being the most difficult apparatus to put out of order; for a steam boiler is certainly not so easily attended to, and though low pressure steam boilers have been immensely improved and simplified during the past few years, yet they are still far more complicated than hot water; and though high pressure is very simple in its working, still it requires periodically overhauling and refilling by a competent man, which in country places is both expensive and inconvenient.

Number seven qualification is another difficult problem that a heating engineer is confronted with, viz., how to both heat and ventilate buildings successfully with one and the same apparatus. For this purpose low pressure steam has been very largely and successfully used for both indirect and direct-indirect radiators and coils, but personally I think that all forms of indirect heating have one very weak point, that is the difficulty of cleaning them.

Take, for instance, the American pin radiators; they always appear to me more as if they had been constructed to catch fluff and dust than to be readily cleaned. Of course, the "Plenum" system, when fitted up with glazed brick flues and water screens for washing the air, may be very successful, if—and here is the difficulty—these flues and screens can be kept perfectly clean. I think that ventilating radiators for small and medium-sized buildings form the cheapest and most efficient combined ventilating and heating apparatus, though, of course, unless very carefully fixed, these are liable to give trouble with dust and dirt blowing into the rooms through the radiators; and there is also the liability of them freezing in severe weather, when the inlet has been left open or the fire has been let out.

But this system has one great advantage, and that is, it can be readily cleaned, which, to my mind, covers a multitude of sins.

As to paragraph eight, I think there is no doubt that low pressure hot water is more easily regulated and controlled than any other form of apparatus. If steam radiators are fitted with two perfect valves, of course they cool quicker after they have been shut off than hot water (which is often a great advantage), but how often are valves perfect when they have been at work some years? We often hear American heating work very highly praised, and no doubt there are many fine installations in the States, but I can truthfully say that while I was there I scarcely ever found a steam radiator in the hotels that I could entirely shut off, and as the bedrooms are often over 80 degrees, I suffered great

*Condensed from a paper read at a meeting of the Institution of Heating and Ventilating Engineers, held at Stourbridge, England, July 18, 1899.

discomfort in consequence. I remember after passing a very uncomfortable night with the temperature of my room something nearer 100 than 60 degrees, I told one of the leading New York engineers that "I supposed that I was very old-fashioned, but I had yet to discover that steam was superior as a heating medium to hot water." His reply was, "You never will discover it in this world, and especially for the English climate."

He went on to tell me that there was more hot water work being done in the States than ever there had been, though, of course, with the winters being so severe, they have to put in a very large surface compared with what is necessary in England.

While comparing the two systems, I think the fact is well worthy of consideration that plant life thrives much better with hot water than with steam, as any good gardener will tell you. The Americans do use steam largely in their greenhouses, but they find that, to obtain good results, there must be very careful watering and vaporizing; and, where the plants have to be kept in the houses all the year, they are not so healthy as where the houses are heated with hot water.

MANUFACTURES AND MATERIALS

THE GEORGIAN BAY PORTLAND CEMENT COMPANY.

On the site of the old Polson ship-building works, alongside the harbor of Owen Sound, the Georgian Bay Portland Cement Company have erected and equipped extensive works. The company was organized at the commencement of the present year with a capital of $95,000. The officers are: President, Mr. M. Kennedy, of the firm of Wm. Kennedy & Sons, Owen Sound; vice-president, Mr. H. B. Harrison, Owen Sound; secretary-treasurer, Mr. J. W. Maitland, of the lumber firm of Maitland, Rixon & Co., Owen Sound. The additional directors are Messrs. Samuel Lloyd and A. G. Mackay. The manager is Mr. W. J. Budd, formerly of the Cassadaga Cement Works, New York.

The company have utilized only one of the buildings formerly occupied by the Polson Co., but have erected four new ones specially adapted to the requirements of the business. The group of buildings, as has been stated, is situated close beside the harbor, and the company have a private slip and dock at which vessels can deliver fuel or receive consignments of cement. The works are also connected by a spur with the Canadian Pacific and Grand Trunk railways.

The marl, which comprises 75 per cent. of the manufactured product, is obtained from Williams Lake, near Holland Centre, 14 miles distant. In order to drain this lake and obtain dry marl throughout the year, the company have dredged a channel 3 000 feet long, 20 feet wide and 9 feet deep. They have also constructed and own two miles of railway connecting the marl deposit with the Canadian Pacific Railway, over which the material is conveyed to the works. An analysis is said to have shown the marl to consist of 95 per cent. of pure carbonate of lime.

The company own three different deposits of clay, some of which is adapted to the manufacture of slow setting and some to quick setting cement. The bulk of the clay required will be brought across the head of the bay. At present it is being hauled in carts, but a less expensive method will be employed. The experiment will be tried of bringing it across on the ice during the winter, and should this not prove satisfactory, scows will be used.

The character of the clay combined with the marl from the Williams Lake deposit is shown in recent tests, which give 200 pounds in two days, 440 in four days, 525 in five days, 640 in six days, 675 in eighteen days, and 750 in thirty days.

The works consist of the main building (260 × 60 feet), the dryers building (140 × 100 feet), and the kiln building (78 × 70 feet and 65 feet high), in the centre of which are the four kilns, which stand 100 feet high. Besides these there are the office buildings and a number of outbuildings. The C.P.R. have laid down about 2,000 feet of sidings in the yards, while ample fire protection is supplied from the town system, the two hydrants being covered by hose houses in which the hose reels stand ready to attach. The water supply for mechanical purposes is drawn from the bay. Foundations are down for a large storehouse to the immediate north of the main building near the railway tracks, the capacity of which will be 40,000 pounds.

The marl, on arrival at the works, is shovelled into self-dumping trucks, hauled up to the second floor, and tripped into hoppers, the spouts from which run into the mixers on the floor below. On the second floor are also the bins holding the clay, which is also hauled up on trams, weighed, and fed into the mixer hoppers in proper proportions, both forming the paste which gives the process the name of "semi-wet." From the mixers the paste goes into a long iron trough, where it is thoroughly kneaded and passed on to the compressing machines, where all the moisture possible is squeezed out. The bricquettes are pressed and placed on steel shelves, which fit into steel trucks. Rails lead from the pressing room across to the big drying house, in which are located the dryers. Fourteen tracks 114 feet in length run through the chamber, which is heated to a high degree by an enormous furnace located at the south side. The drying rooms are thoroughly fire-proof, the floors and roofs being constructed of brick and iron. No smokestack runs up from this furnace, but smoke and heat are driven through various compartments into the section in which the briquette trucks are run, by two gigantic fans creating a draft which keeps the furnace at a white heat. After it has served its purpose, the hot air, made moist by the evaporation of the briquettes, passes out through ventilators in the roof. After the briquettes are passed along the tracks of the dryer, the truck loads are run along on a transfer track and up the elevator to the fourth floor of the kiln house, in which are located the bases of the four big Alborg kilns. The kilns are fired from the third floor, coal chutes for the purpose being placed all round the kiln, thereby securing uniform heat. Each of these kilns has a capacity of 75 barrels per 24 hours, and requires re-lining only once in eighteen months. The fuel used is Virginia slack coal, costing about $2.25 per ton, of which 9,000 tons per year will be consumed. The clinkers are drawn out on the ground floor, and thrown into pan conveyors, which carry them up to the grinding rooms, which are located in the centre of the main building, where are two ball mills of 300 barrels capacity and one tube mill of equal capacity. Here the briquettes are fed into hoppers and drop into the two enormous revolving grinders, in which the heavy steel balls crush them to coarse cement. This falls into a bin below, and is then carried by bucket elevators to the second floor again and fed into the finishing pulverizer, a huge cylinder in which have been placed barrels of flinty pebbles, which grind to the finest powder the cement as it revolves. From this machine the finished article is elevated and carried into the receiving room, afterwards being bagged or barrelled as the orders require. The process is most complete, a strong feature being the small amount of labor required for handling during the process of manufacture.

The works are operated by a 360 h.p. Brown compound horizontal engine, carrying an 18-feet fly-wheel and pulley, supplied with steam from a bank of three boilers. These boilers also furnish steam for heating the offices and works and for driving a 40 h.p. engine used to operate the blowers, the self-fueling machinery and fans for the furnaces, the dynamo which will supply the buildings with 125 incandescent lights, as well as an arc light in the yards. The boilers are fitted up with blowers operated by small independent engines, which will give a forced draft and for which a saving of fuel is claimed.

The works were put in operation for the first time last week, and are said to have started off without a hitch.

It is the intention of the company to send an exhibit of their product to the Paris Exhibition.

A letter was received by them recently from Lord Kitchener, making enquiry with regard to the capacity and cost of construction of kilns. The letter stated that the Sirdar contemplates the early construction of cement works in the far East.

The city of Winnipeg owns and operates a large quarry at Stoney Mountain, employment being given to about one hundred and fifty men. On an average twenty car loads of stone per day or 8,000 tons per month are shipped out from this quarry. The stone is employed in street making in Winnipeg, and for this purpose passes through a crusher at the quarry. The quarry has been excavated to a depth of 20 feet, and is equipped with railway tracks converging to a turntable in the centre, from which the stone is lifted into a chute and dumped into the crusher. An electric drill is also employed. The quantity of stone is said to be almost inexhaustible.

BUILDING MATERIALS OF TEXADA ISLAND, B. C.

In an article recently contributed to "Mines and Minerals," Mr. Alfred Raper describes the character of the deposits of stone, marble, slate and lime on the above named island as follows :

Texada Island is situated on the Gulf of Georgia, in about 50° north latitude, about 120 miles from Victoria, 50 miles from Nanaimo, about 75 miles from Vancouver, and 18 miles from the coke ovens of Union. The island has a population of about 400, a postoffice, and money order office ; three wharves, and the government of British Columbia has, during the past year, completed a trunk road across the island from the west coast to the east coast. The island is about 33 miles in length, bearing south-east and north-west, and about five to seven miles wide. The waters of the Gulf are generally of great depth along the rocky shores of the island which is on the direct route to the great gold fields of Northern British Columbia and Alaska.

The general formations of the island are granites, porphyrites, and limestones. The granites are chiefly found on the east coast and from the finer textures of many of the outcrops may be classed as syenitic, though we occasionally find the biotile granites intruding through the limestones. The east coast, next to the main land at its southern extremity consists chiefly of porphyries along the coast line, but a short distance back from the shore is an extensive body of limestone near to the foothills of Mount Shepard, our highest mountain, which is about 3,000 feet high. One portion of this limestone deposit is epidotic in character ; each red blotch in the rock has a white center giving it a "bird's-eye" maple appearance. Between this epidote marble and the blue-gray limestones, a narrow belt of shist occurs. Northerly, along the coast an outcrop of biotite granite appears, while the interior hills are porphyries and limes, amongst which deposits of magnetic iron ore occur. Going northerly towards Marshall Point is one continuous body of limestone, with a few minor intrusions of porphyries and it is in this particular part of the island that most progress has been made in mining.

Passing along the northern end of the island the Texada lime works are seen, where the celebrated "snow-flake lime" is made from the dark blue granite limestone which is so extensively distributed over this part of the island.

Passing westerly from the lime works at a short distance the limes give place to the dioritic porphyries varying from a fine-grained porphyrite to what is classed here by our miners as a "snow-flake porphyry." This is found usually a short distance back from the beach, assuming a remarkable block cleavage, with peculiar "stars of feldspar" over its surface. It is an orthoclase feldspathic rock, or felsite porphyry. It is in this rock that some of our richest specimens of free gold have been found ; also some good deposits of copper and gold are being worked, with a very encouraging outlook. Over this lie the heavy deposits of lime before mentioned. About one and a half miles from the beach are found beds of the blue gray limestone lying between the porphyries. These limestone strata generally dip into the porphyries at a slight angle here and it is amongst those heavy lime deposits that the richest copper deposits, so far opened, are located.

Deposits of slate are said to exist in the center of the island. A remarkable thing is that no claim has yet been abandoned upon which a reasonable attempt has been made to prospect.

The major portion of the island is yet a "terra incognita" to prospectors. In the valleys of the center of the island some deposits of clam shells are found embedded in fine sands and gravels in a remarkable state of preservation. The writer collected sixteen varieties of the limes varying in color from white to black, one specimen of which, when polished, resembles hailstones. The greater portion of the limes are susceptible of very high polish. The Sturt Bay Company has during the past few weeks had a force of men building wharves and preparing the ground for excavating the marbles for sale, while the fine pieces and culls will be burnt in the new kilns into lime and sent to Vancouver and adjacent cities. In several places in conjunction with the limes a ferro-oxide occurs, assuming a spongy shape, the base of which is silica.

RECONSTRUCTED GRANITE.

The Street Railway Journal describes a new fireproof material. It is made of granite chips, pulverized, moulded into form and fused together at a temperature of 3,000 degrees Fahrenheit. It can be heated red hot and thrown into cold water without being injured. It resists the action of acids and alkalies and is frost-proof, having been tested by liquefied air at a temperature of 350 degrees below zero, without injury. Its crushing strength is very high. Two moulded forms are shown : One is the sectional insulator block used between the sections of the third rail system at Manhattan Beach ; the other is used on the Brooklyn elevated railway. At Niagara Falls a test showed that it required 56,600 volts to penetrate about one-half inch of this material.

The Stanstead Granite Quarries Company was recently incorporated at Toronto, with a capital of $130,000, to operate granite quarries at Stanstead and Mount Johnson, Que. The following persons compose the directorate : W. R. Brock, president, Toronto ; Hugh Elder, Stanstead Junction ; Duncan McIntosh, Toronto ; John McIntosh, vice-president, Toronto ; John W. Elder, Stanstead Junction ; D. Taylor McIntosh, managing director, Stanstead Junction.

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EXPERIMENTS ON THE STRENGTH OF GLASS.

THE extensive use of glass in construction renders definite information about its resistance under various conditions of stress desirable, but with the exception of the ultimate strength under direct compression, but little has been known about the subject until recently, says the Engineering Magazine.

A series of experiments upon the resistance of glass to tension and to flexure has recently been made by M. Grenet under the auspices of the Societe d'Encouragement pour l'Industrie Nationale, the details and results being published in the Bulletin of the society. The glass tested was of two varieties, manufactured by the well-known works at Saint-Gobain, one being the grade known as No. 4, and the other the so-called "cathedral glass," and there being but little difference between the two shown by chemical analysis.

In the flexure tests the specimen was placed as a beam, supported on knife edges and with the load applied in the middle, the weight being a bucket suspended from a cross bar and arranged so that water dropped regularly into it from a separate vessel. The load could thus be applied at a uniform rate without the possibility of shock, and the rate of application kept under perfect control. By applying the usual formula for rectangular beams loaded in the centre, the tensile strength per unit of cross section was determined.

The most interesting feature which was developed by these tests was the marked effect produced by variations in the rapidity with which the load was applied. It is well known that for nearly all materials a rapidly applied load will show an apparent resistance much greater than appears when the stress is applied more slowly, but in the case of these tests upon glass the effect is especially marked. Thus the tensile strength of a number of specimens averaged 6,000 to 7,000 pounds per square inch when the load was applied at a rate which caused the rupture to occur in 15 to 20 minutes, while when the duration of application was increased about three times, so that rupture occurred in about 45 minutes, the strength ranged between 5,000 and 6,000 pounds per square inch. When the water-dropping device was arranged for very slow loading, and the breaking load was attained in 10 to 12 hours, there was a marked diminution in strength, the resistance per square inch being only about 4,200 pounds.

In order to show the reverse effect, some tests were made with loads applied very rapidly, and the effect was most marked, the mean of three trials giving an apparent strength of 10,000 pounds per square inch.

A number of flexure tests were also made by M. Grenet upon glass rods, and these showed the same general results as regards the effect of rapidity of application of load. The actual strength of the rods, however, was higher than that of the plates, which was probably due to the difference in the method of manufacture. Thus, when the rupture was produced in about 15 minutes, the strength was nearly 11,000 pounds per square inch, while when the time was extended to 45 minutes the resistance fell to about 9,000 pounds, and for the 12-hour tests the breaking strength was but 5,700 pounds. In order to carry this feature of the tests to an extreme limit, M. Grenet suspended various weights to rods and allowed them to remain for a number of days. The result showed that for loads of 3,000 to 3,500 pounds per square inch no rupture occurred even after the expiration of three months, but when the loading was increased to about 4,000 pounds, rupture took place in one or two days.

PAGES

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