

PAGES

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—THE— CANADIAN ARCHITECT AND BUILDER, *A Monthly Journal of Modern Constructive Methods.*

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

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TO ADVERTISERS.

For the benefit of Advertisers, a copy of this journal is mailed each week to persons mentioned in the CONTRACT RECORD reports as intending to build, with a request to consult our advertisement pages and write advertisers for material, machinery, etc.

IRON, which of late has so largely superseded brick, stone and wood in the construction of public and business buildings, is now finding its way into the construction of churches. The frame work of an Episcopal church now in process of erection in New York City and of a Jewish Synagogue at St. Louis,—the latter including a central dome,—is composed of structural steel. Some months ago it was recorded that a residence was also being built in New York by this method.

In glancing at the various buildings in progress in the city and at those recently completed, where carving to any extent has been indulged in, it is a little surprising to find how very greatly the grotesque predominates. We might almost say that there is no attempt made to produce a beautiful face; for instance, on caps or string-courses, wherever there is a face it is sure to be one with a grin or a squint, and though these are perfectly admissible, yet the endless succession of them becomes wearisome. The grotesque is, of course, very easy to draw and takes little time or study, but comparatively few can draw a good face. What a pleasure it would be to have a few to look at, and what a satisfaction to the artist it would be to produce them.

A REMARK was recently made in one of our daily papers that the institutions of Toronto could not be complete until there was numbered among them a museum. A museum is a very important educational factor, and we quite agree with the statement. In this country (and it must be the same in every "new country") the establishment of a museum is necessarily a very difficult thing. Very few real antiquities or original old works of art are likely to find their way into our collections. Efforts of the most praiseworthy character have been made to establish something of the kind in Toronto, and great success has attended these efforts so far as they have gone. If any one body of educated men can do more than another towards making a museum useful and interesting, that body is the Association of Architects. They must know the immense value as a practical educator of the few casts of Egyptian and Assyrian work that are to be found in the museum of the Ontario Department of Education, and if individual architects would show their appreciation of these things by taking

interest in the collection of photographs, examples of colour decoration, sculpture and so on, and occasionally adding thereto, some gift, however small, a great deal would soon be accomplished and the public interest would be aroused. Students certainly cannot complain of lack of subjects to sketch in winter or whenever the weather is bad. There are in the present collection casts of well-known statues and groups and we have no doubt that permission might be obtained for students to go there with their sketch books and spend a few profitable hours. Might not the Architectural Association interest itself in this matter and thereby accomplish a very useful work?

Derrick Marks in Stone.

WE should like to call attention to what seems to be an oversight on the part of both architects and engineers as well as contractors. Why should stone cutters or aborers allow the claws of the derrick which is to raise a heavy stone to grip the stone on the face, instead of at the sides? The marks of the iron claw is visible to-day on the surface of stones in many buildings and will be there for all time. It seems a small matter, perhaps, but it creates an eyesore and could easily be avoided. The worst specimen of the kind is the stonework of the King street subway, where nearly every stone has had a small circular sinking cut on its face, to enable the claw to get a firm grip, and every stone so treated is disfigured for life and the general effect is marred.

Penalty for Black-Listing.

FOR refusing to obey the command of the trades unions to discharge two of their employees, a firm of contractors in London, Eng., were recently black-listed. The unions posted up throughout the city upwards of seven hundred copies of a poster, having a black border, headed "Trollope's Black List," and bearing the names of the two obnoxious workmen. The firm appealed to the courts, and were granted a perpetual injunction restraining the unions from issuing any additional copies of the poster, and £500 damages for injuries sustained as the result of the copies which had been printed and circulated. A few decisions of this character would do much to check the tyrannical practices to which the trades unions are prone to resort for the accomplishment of their purposes.

Sketching by Students.

WE wish that it were possible to impress upon students the immense importance of sketching. Too little attention, by far, is given to this, which ought to be a very important feature in the self education of would-be architects. Nothing impresses a detail on the mind so well as to make a sketch of it, and an intricate detail cannot be thoroughly learned unless it is sketched. To say nothing of the facility in the use of the pencil, the lissomeness given to the fingers, the training of the eye acquired by constant sketching, to be able to draw freehand any subject that chance may present is as important to an architect as fluency of speech to a public speaker. We published last month a measured drawing of an old English castle—measuring and drawing from such measurements is the constant practise of students in Europe, to which is added the freehand sketching of the details. This may well serve as an example to our students. A great deal has been said from time to time of the necessity of this kind of thing

for students; now is the season when they should put it in practise, and surely one who appreciates his profession will find this work a delightful recreation.

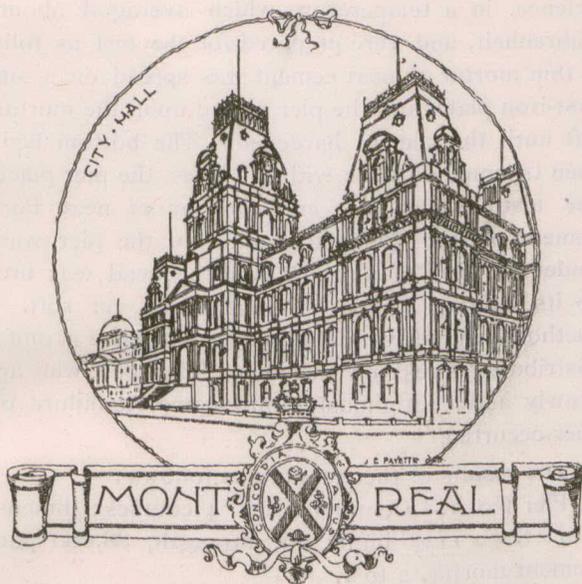
The Omission of Design in Examinations.

THE question has been raised as to whether the subject of design should be omitted in examinations of students in architecture, or whether it would not be advisable to curtail examinations on that point for the reason that design cannot be taught. No man who has not "got it in him" by nature, can have it "put into him" by any amount of instruction. The subject occupies an important place in the curriculum of architectural schools, and this argues that it should not be left out in examinations without serious consideration. It is true no one can design unless he has a natural gift, but like all gifts, unless of the very highest order, the "heaven-born spark" requires cultivation, and it is only by study that the gift can be developed. If a man is to pose as an "artist in building" there can be no possible objection to his shewing by examination how far he comprehends the "principles" upon which the art is based, and it is upon the "principles" of the art of design that the examination should be set. A man may, if his genius bends in that direction, design for his pleasure or for the benefit of his clients any kind of conglomerate structure, and if he is a true artist—one who has developed his natural instinct by the study of the art in all ages—the principles of the art will be found in all his work, and there will be in his designs the sense of proportion and the feeling of repose. The questions set or the work asked for at an examination should not be so much a test of artistic ability as for the purpose of ascertaining whether the candidate knows anything of the principles of his art. The scientific or more practical part of an architect's work is getting more and more intricate every year entailing continual study in new methods of construction, new materials and so on, to enable him to keep abreast of the times. Certain new methods or requirements may and probably of necessity must be in the hands of the specialist, but the architect must before long know all about everything that has to be introduced constructionally into his building or that has to appear on the surface and therefore be a matter of design; and in this case it is certain that he needs to have the "principles" of design at his fingers ends for he will certainly spoil his work unless he can apply these principles to every detail.

GURNEY FOUNDRY COMPANY'S EXCURSION.

THE fourth annual excursion of the employees of the Gurney Foundry Co., of Toronto, was held on the 27th of June at Lake Erie Park, near Port Colborne. The excursionists, numbering about four hundred, sailed across the lake on the steamer Empress of India to Port Dalhousie, where the train was taken for their destination. At the park an enjoyable afternoon was spent in various games, one of the special features being a baseball match between the Gurney Foundry Company and representatives of the retail stove trade, the latter winning the honors.

Mr. T. B. Alcock represented the company, the president, Mr. Edward Gurney, being unable to be present. Among the architects present were Messrs. Edwards, Brown, Siddall, and Bradley.



(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

ARCHITECTURAL EXHIBITION.

It has been definitely resolved to hold an architectural and arts and crafts exhibition in connection with the annual meeting of the Province of Quebec Association of Architects.

The principal committees are organized as follows:

General committee—A. C. Hutchison, A. T. Taylor, Jos. Venne, Jas. Nelson, E. Maxwell, J. Z. Resther, F. H. Berlinguet, R. Findlay, A. F. Dunlop, A. Raza, Chas. Baillarge, W. E. Doran, J. F. Peachy.

Reception of Drawings Committee—E. Maxwell, R. Findlay, Jos. Venne.

Arts and Crafts Committee—Jas. Nelson, J. Z. Resther, A. C. Hutchison.

Loan Exhibit Committee—A. T. Taylor, W. McLennan, R. Findlay.

Printing, Advertisements and Reception Committee.—A. Raza, J. W. Hopkins, Jos. Perrault, G. W. Wood, R. Findlay, Jos. Venne.

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

At a special meeting of the above Association nearly all the members were present. Resolutions of condolence were passed at the death of Mr. J. B. Resther. On motion by Mr. V. Roy, seconded by Mr. W. Hopkins, it was resolved:

That the members of this Association have learned with deep regret of the loss they have sustained in the death of the late Mr. J. B. Resther, one of its most devoted members and founders. That the Association presents to his bereaved family its most sincere sympathies, and that a copy of this resolution be presented to the family and to the newspapers, and that communication of same be given to the members of this Association throughout the Province of Quebec.

THE NOTRE DAME STREET BRIDGE.

The conflict between the city and the C. P. R. regarding the construction of the bridge on Notre Dame street, at the east end station, is far from being settled, the superior court having not yet rendered judgment. It will be remembered that the C. P. R. Company were to have charge of the excavation work, but owing to the different manner of interpreting the contract between the two parties, the City Council resolved to do the work, estimated to cost \$35,000, awaiting the decision of the superior court as to the meaning of the terms of the contract. The city solicitor has been consulted on the subject, but refuses to make known his opinion before the court judgment.

ARCHITECTURAL TERMS EXPLAINED.

A RECENT issue of the Brickbuilder contains the following explanation of the various phrases used by architects and not generally used by the mechanic, which may prove beneficial to many. The front, or facade, made after the ancient models, or any portion of it, may represent three parts, occupying different heights; the pedestal is the lower part, usually supporting a column, and its place supplied by a stylobate; the stylobate is either a platform with steps or a continuous pedestal supporting a row of columns. The lower part

of a finished pedestal is called a plinth, the middle part is the die, the upper part the cornice of the pedestal or surbase. The column is the middle part, situated upon the pedestal or stylobate. It is generally detached from the wall, but is sometimes buried in it for half its diameter, and is then said to be engaged. Pilasters are square or flat columns attached to walls. The lower part of the column when detached is called the base; the middle or longest part is the shaft, and the upper or ornamental part is the capital. The swell of the column is called the entasis. The height of columns is measured in diameters of the column itself, taken always at the base. The entablature is the horizontal continuous portion which rests upon the top of a row of columns. The lower part of the entablature is called the architrave, the middle is the frieze, while the upper or projecting part is the cornice. The pediment is the triangular face produced by the extremity of the roof. The middle or flat portion enclosed by the cornice of the pediment is called the tympanum. Pedestals for statues erected on the summit and extremities of the pediment are called acrosteria. An attic is an upper part of a building, terminated at the top by a horizontal line, instead of a pediment.

The different moldings in architecture are described from their sections or from the profile which they present when cut across. Of these the torus is a convex, but its outline is only a quarter of a circle; the scotia is a deep concave molding; the cavetto is also a concave and occupying but quarter of a circle; the cymatium is an undulating molding, of which the upper part is concave and the lower convex; the ogee, or talon, is an inverted cymatium; the fillet is a small square or flat molding. In architectural measurement a diameter means the width of a column at its base. A module is half a diameter, and a minute is a sixtieth part of a diameter.

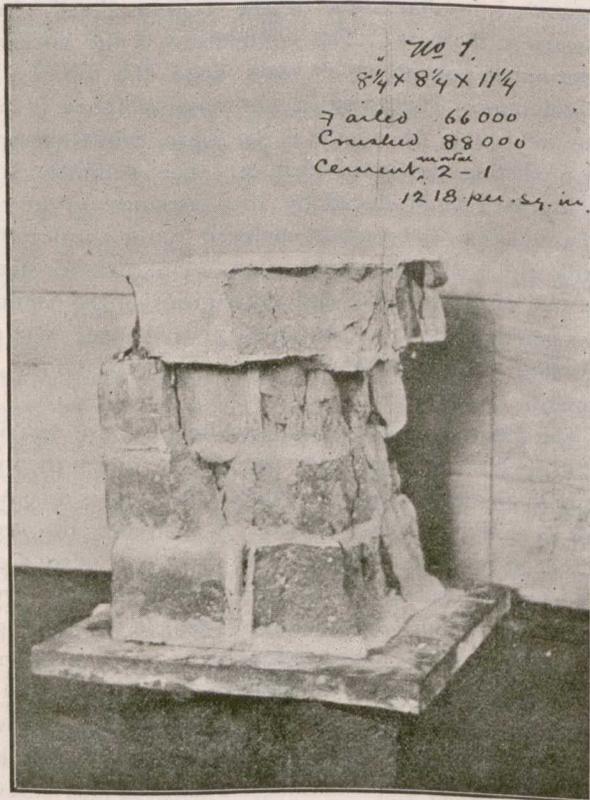
The effect of sunshine was gained in a living room that only had a north light by having the woodwork painted with white enamel, the upper part of the windows set with panes of pale yellow glass and the windows themselves beneath the glass hung with curtains of pale yellow silk.

When will builders understand that brickwork may very well be painted to great advantage? In some districts the bricks, though hard and durable, are of a poor colour, an insipid variety of salmon being perhaps the most objectionable. Two or three good coats of paint finished flat would greatly improve the appearance of buildings erected in such bricks, and the mortar joints may be painted in white or black.

The following is extracted from specifications for the preparation and use of cement mortar for the Sanitary District of Chicago, natural cement being used:—“(a) Measure sand proportion in dry mixing box. (b) Measure cement on top of sand. (c) Overcast twice with shovel, or more often if necessary. (d) Cast dry mixture of cement and sand through No. 5 sieve or screen. (e) Be sure incorporation is fully accomplished before adding any water. (f) Add water at part of wet mixing box remote from screen. (g) Add water slowly and gradually to prevent washing. (h) Hoe dry mixture slowly into water, avoiding any stirring further than to uniformly wet the mixture. (i) Conform mortar mixing to progress of the work so no mortar goes into the wall after having been wet 15 minutes.”

TESTS OF CANADIAN AND ENGLISH BRICKWORK.

CANADIAN architects and builders in common with manufacturers and dealers, have been placed under obligation to the authorities of the School of Practical Science, Toronto, and the School of Technology in connection with McGill University, Montreal, by the series of tests of native constructive materials which in recent years have been successfully carried out in the laboratories of these institutions. As a result of these tests



there is now available considerable detailed information regarding the variety, character and strength of British Columbia timber, Canadian native and Portland cement and Canadian building stones the tests of the latter having been carried out and the results published under the direction of the Ontario Association of Architects.

In a recent number of this journal was published a table showing results of tests by the Public Works Department of Ontario of the absorbent properties of pressed bricks from the various manufactories throughout Ontario. In this number are given illustrations and some particulars of tests of common brick conducted by Mr. C. H. C. Wright and his assistants at the School of Practical Science, Toronto, at the commencement of the present year. The bricks employed in the tests were procured from four different brick yards in the neighborhood of Toronto, viz., the Kingston road, the Humber, Yorkville and Carleton. Before being built into piers, the bricks were individually tested for absorption by being immersed in water for thirty minutes.

The piers were built by a skilled bricklayer, who also provided the lime mortar, which consisted of $4\frac{1}{2}$ yards of Bloor street coarse sand to ten barrels of lime, this being about the proportion of two parts sand to one part lime. The cement mortar was mixed in the proportion of three parts sand to one part of good Portland cement.

The piers were built and laid aside to harden in the mechanical laboratory of the School of Practical

Science, in a temperature which averaged about 60° Fahrenheit, and were prepared for the test as follows: A thin mortar of neat cement was spread on a smooth cast-iron plate, and the pier placed upon the mortar and left until the cement hardened. The bottom bed was then trimmed off flush with the sides, the pier placed on the testing machine, and a layer of neat Portland cement mortar was placed on top, the pier was slid under the head of machine, and the head was brought to its bearing while the mortar was yet soft. This method ensured two parallel beds and gave a uniformly distributed stress on the pier. The load was applied slowly and continuously, until complete failure of the pier occurred.

The results of the tests are as follows:—

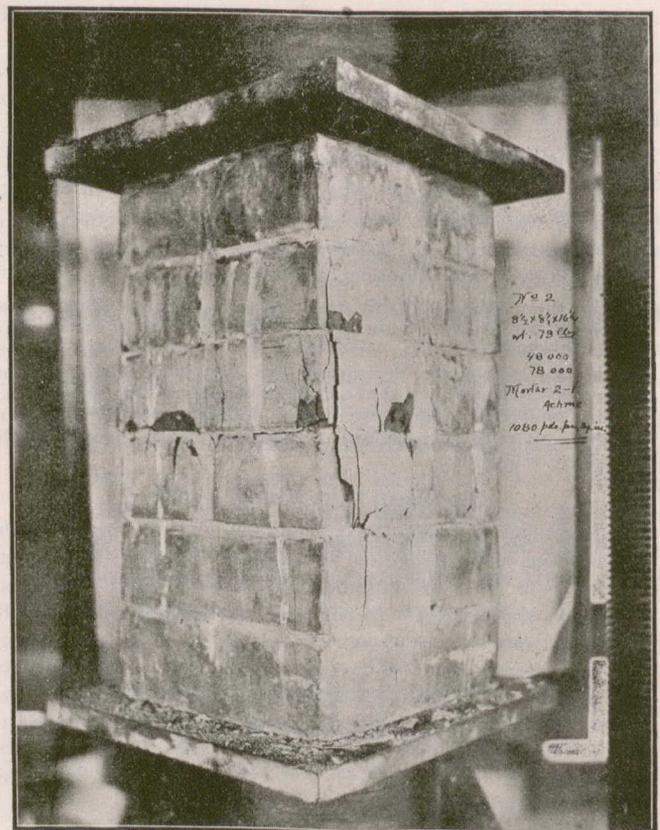
Pier No. 1.—Common brick, 4 courses; dimensions, $8\frac{1}{2} \times 8\frac{1}{2} \times 11\frac{1}{4}$ " high; ult. strength, 88,000 pounds; cement mortar, 2 to 1.

No. 2.—Common brick, 6 courses; dimensions, $8\frac{1}{2} \times 8\frac{1}{2} \times 16\frac{1}{4}$ " high; ult. strength, 78,000 pounds; cement mortar, 2 to 1.

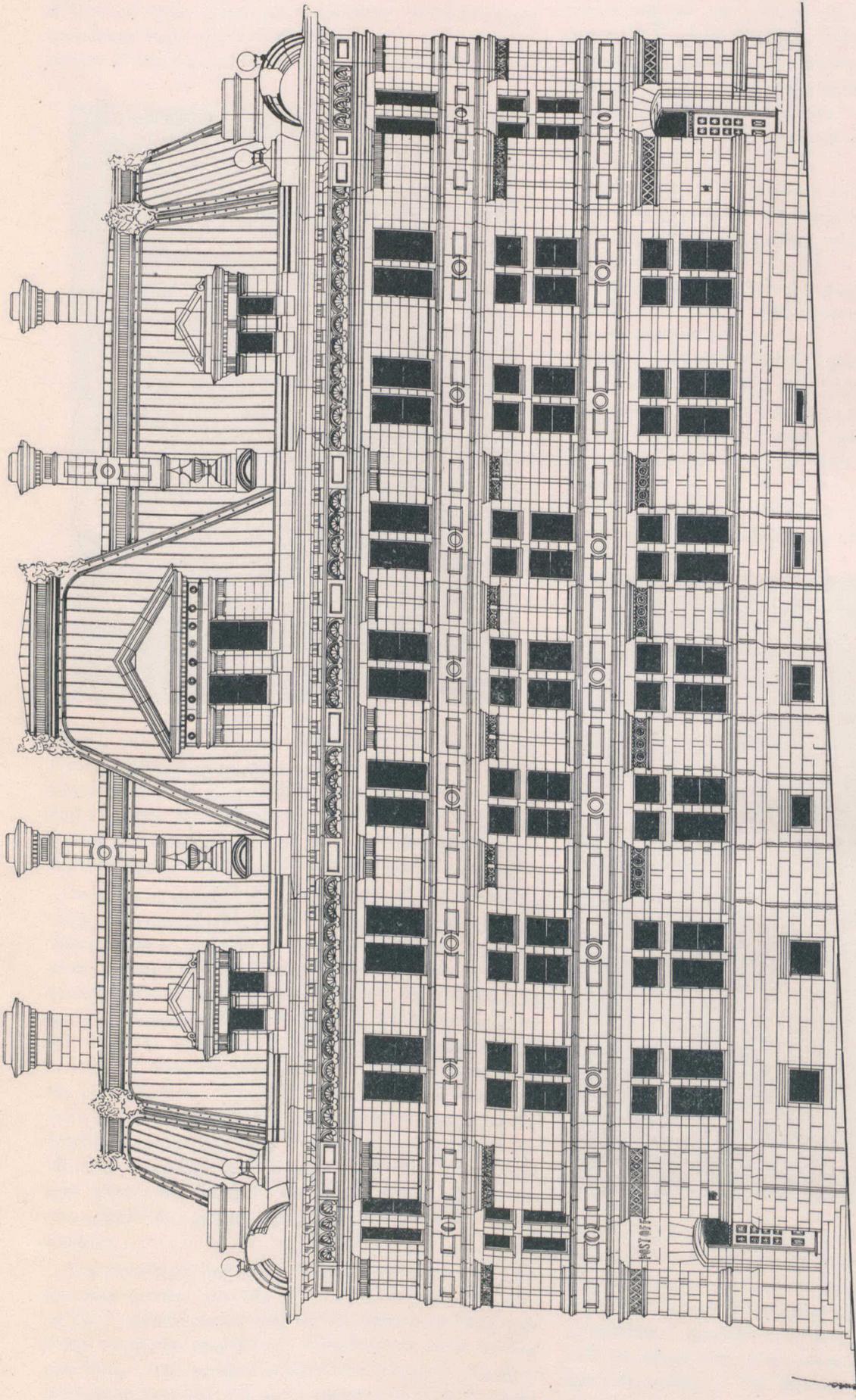
No. 3.—Common brick, second quality, 5 courses; dimensions, $8\frac{1}{2} \times 8\frac{1}{2} \times 14\frac{1}{4}$ " high; ult. strength, 70,000 pounds; cement mortar, 2 to 1.

No. 4.—Common brick, first quality, 8 courses; dimensions, $8\frac{1}{2} \times 8\frac{1}{2} \times 22$ " high; ult. strength, 128,000 pounds.

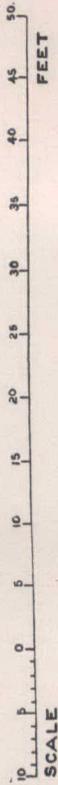
Our knowledge of this important subject is further augmented by an elaborate and carefully conducted



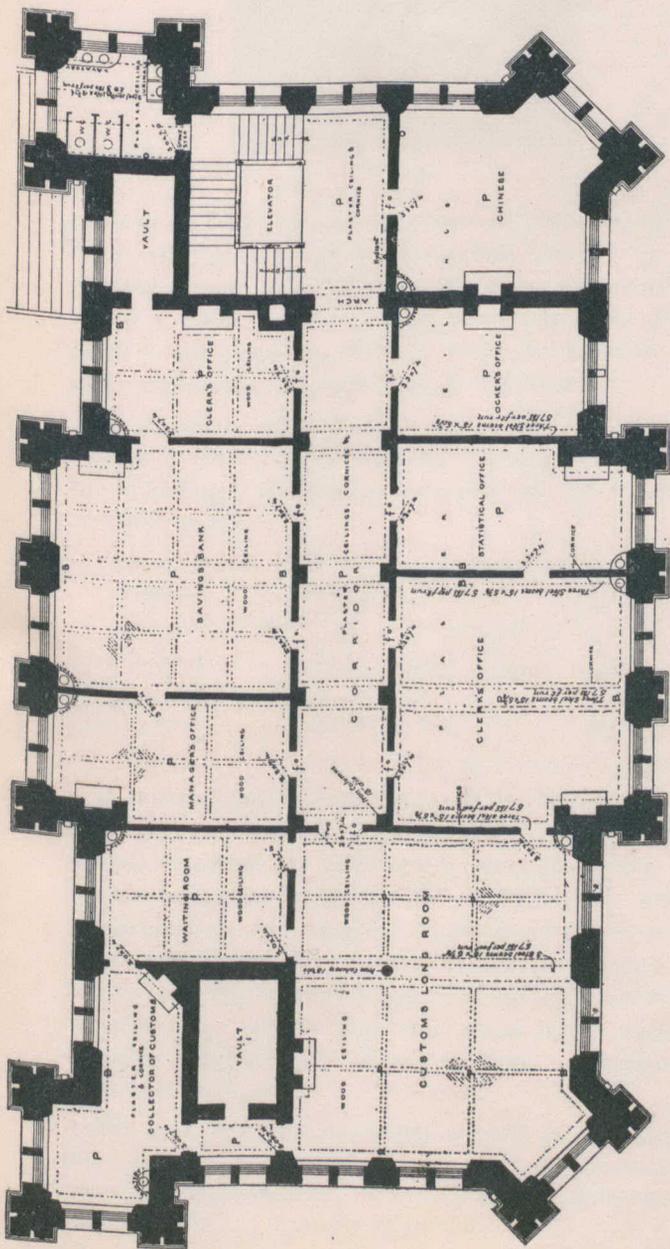
series of tests of English brickwork carried out under the direction of the Science Standing Committee of the Royal Institute of British Architects, the results of which have recently appeared in the British architectural journals. Strange as it may appear these tests are said to afford the only accurate information available upon the subject. The method adopted was similar to the Canadian one, viz., to first test the individual bricks and afterwards test piers 18 inches square and 6 feet in height, composed of similar bricks, some built in mortar and some in cement. A specially designed testing



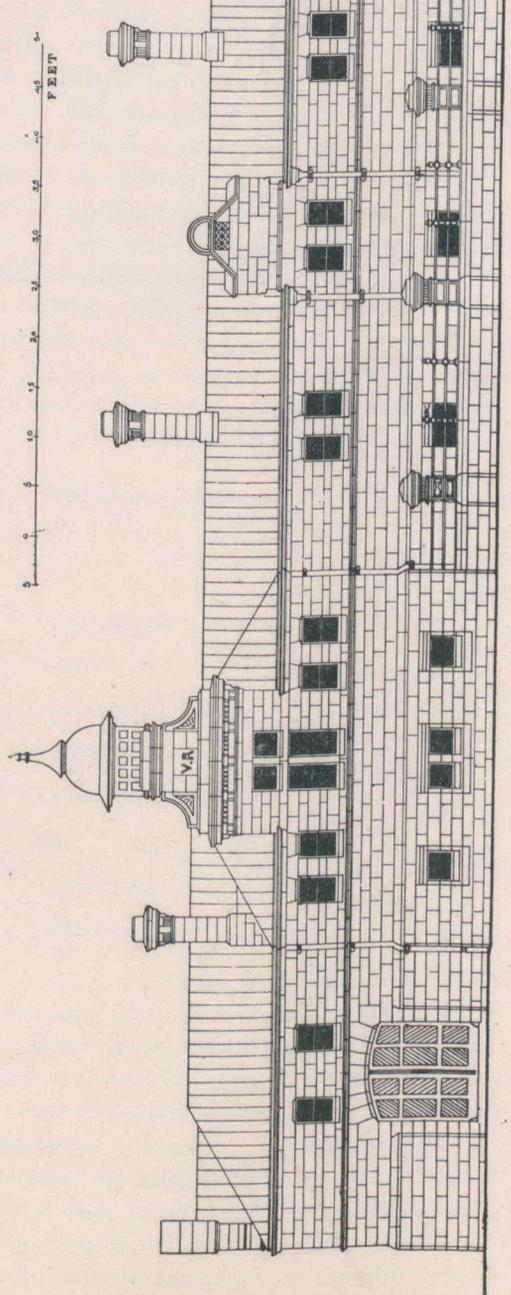
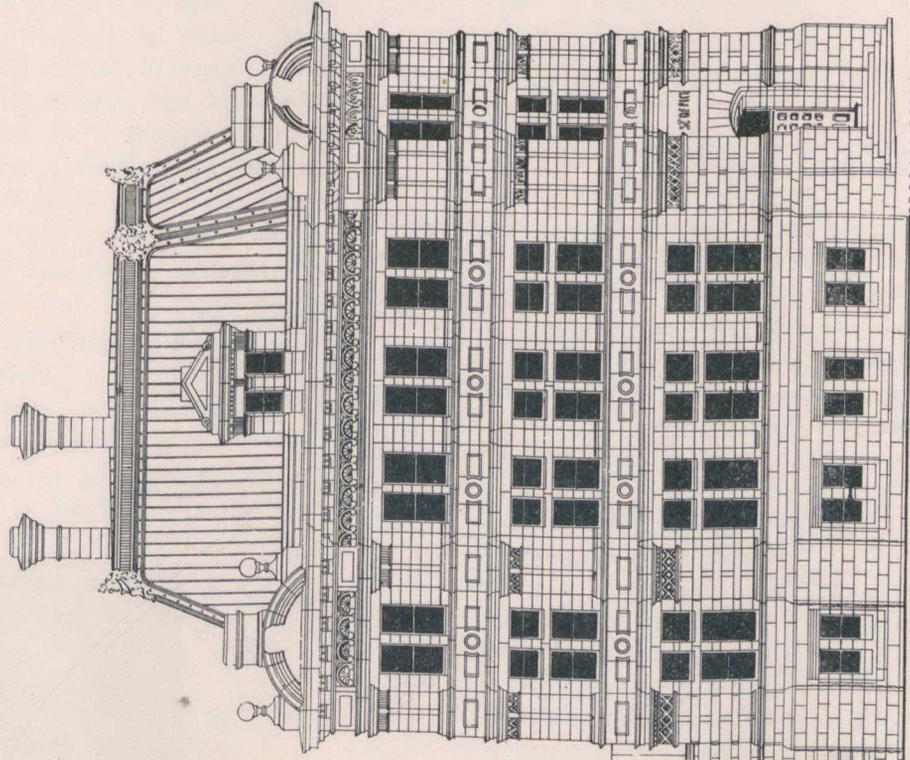
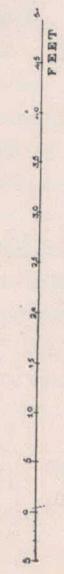
— ELEVATION ON GOVERNMENT STREET. —



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PLAN OF FIRST FLOOR



ELEVATION ON HUMBOLT STREET.

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machine capable of exerting a pressure of 500 tons was employed.

The brick piers to be tested were built upon wrought-iron plates, 2 ft. 6 in. x 2 ft. x 1/2 in. thick, placed upon temporary lines of rails 140 feet in length, laid to 16 in. gauge. The piers, standing on the iron plates, were drawn along the rails by a suitable crab and winch, so that all unnecessary handling of the piers was carefully avoided and risk of fracture thereby entirely obviated.

The following varieties of bricks were used in building the piers:—

1. London stocks from Sittingbourne, Kent.
2. Gault from Burham, Kent.
3. Leicester red from Elliston, near Leicester.
4. Staffordshire blue from Rowley Regis.

Each pier was constructed in duplicate, in lime mortar and cement mortar, so that the total number of



FIG. 3.

piers to be experimented upon was 32, that is to say, 16 for testing at the age of 3 months, and 16 for nine months' tests. The piers were, with one exception, 18 in. x 18 in. and 6 feet high, or as near those dimensions as the particular kind of brick would allow; the exact dimensions are tabulated in the report.

Four bricks of each class were carefully tested by Professor Unwin at the Central Technical College, and the following results were recorded for the respective crushing loads.

Description.	Crushing stress, tons per square foot.	Mean strength, tons per square foot.
London Stocks ..	60.76 — 94.6	84.27
Gault	166.9 — 197.6	182.2
Leicester red ..	311.4 — 591.4	382.1
Blue Stafford ..	564.8 — 788.0	701.1

It is also recorded that some of the bricks were too strong to be crushed as whole bricks in the 100 ton testing machine at Kensington, and, therefore, half bricks were used. With the exception of London stocks, which are roughly made, and, therefore, not capable of being very neatly divided, it appears that bricks tested as half-bricks show about 25 per cent. less resistance per square foot than when tested as whole bricks. A tabulated statement is given in the report to illustrate this point.

The lime and cement mortars used in building the piers were also carefully tested, and the compressive strengths ascertained. The results are summarised as follows:—

Lime briquettes, composed of 2 of sand to 1 of lime by measure:—

Strength at	4 weeks	6.08 tons per square foot.
" " 12	" 8.73	" " "
" " 24	" 15.72	" " "

Cement briquettes, composed of 4 of sand to 1 of cement by measure:—

Mean strength at	4 weeks	31.45 tons per square foot.
" " " 13.7	" 48.52	" " " "
" " " 24	" 56.15	" " " "

The above-named briquettes were formed with the standard sand normally employed in testing cements and other similar materials. It is a pure siliceous sand, obtained from Leighton Buzzard. The actual sand used in building the piers was not so pure in quality, having a rather large proportion of earthy matter, ranging from 0.14 to 0.96 per cent. in the several samples analysed. The mean strength was, therefore, lower, being, for the cement briquettes, 29.00 tons per square foot at the age of 24 weeks.

Analyses of the lime and cement mortars were also made by Mr. W. J. Dibdin, chemist to the London County Council, from material taken from the debris of the piers after they had been experimented upon.

The crushing of the piers was carried on in December last, the first pier being crushed on the 9th of that month as an experimental trial of the testing apparatus. Owing to the large-sized valve on the hydraulic ram, the water pressure was admitted too freely, and the pier was crushed too quickly for accurate results to be obtained. It has consequently been rebuilt for further trial. Before the next piers were experimented upon, careful alterations were made to the ram valve, a fresh pressure gauge was introduced, and a modification was made to the testing frame to obviate a slight concavity in the head girders. The apparatus was then found to be in proper order for testing the remaining piers. Detailed descriptive tables are given of the results obtained by crushing each pier, and they indicate the manner in which the experiments were carried out.

A summary is given of the results obtained on the 16 piers tested, which may be briefly tabulated as under:—

No. of Pier.	Description of Brick.	Age.	Commence-	Final
			ment of failure.	collapse.
		Weeks.	Tons per square foot.	Tons per sq. foot.
1	London Stocks in Mortar	17.7	—	—
2	" " "	18.3	4.18	10.41
3	Gault	18.3	5.00	21.82
4	" " "	18.8	6.16	22.03
5	Leicester Red ..	19.1	15.20	29.93
6	" " "	18.6	16.11	31.55
7	Staffordshire Blue ..	18.6	22.43	69.22
8	" " "	19.4	21.42	79.39
9	London Stocks in Cement	21.1	7.22	16.03
10	" " "	21.0	5.72	13.83
*11	Gault	21.0	6.98	17.98
*12	" " "	20.5	7.08	17.51
13	Leicester Red ..	22.1	17.87	67.36
*14	" " "	21.7	21.82	49.54
*15	Staffordshire Blue ..	21.7	29.45	84.47
*16	" " "	22.7	16.91	61.14

The piers marked *, when crushed, were found to have been partly constructed with portions of stock bricks for filling in, instead of the proper material for the respective piers. It has, therefore, been considered desirable to re-construct these piers so that the final results may be absolutely accurate. From a practical point of view, says the British Clayworker, it is, perhaps, not greatly to be regretted that such an "accident" should have happened, for the Institute will be in a better

position to gauge the effect of the introduction of extraneous material in the harder brick piers. It is, unfortunately, not an uncommon experience in dealing with hard bricks, to find that some workmen make no endeavor to cut closers, but substitute bricks which can be more readily manipulated. This defective work would be almost entirely obviated if brickmakers would produce king and queen closers of all the harder varieties of bricks.

An interesting series of photographs was taken of all the piers under different stages of compression, from which some of the most instructive and typical forms of failure may be studied. At early stages of pressure, the mortar and cement joints begin to fail—they squeeze out, and portions drop off. This is followed by the cracking of some of the bricks, and spalling off at the angles. Longitudinal seams, in most instances, were opened out in a line with the

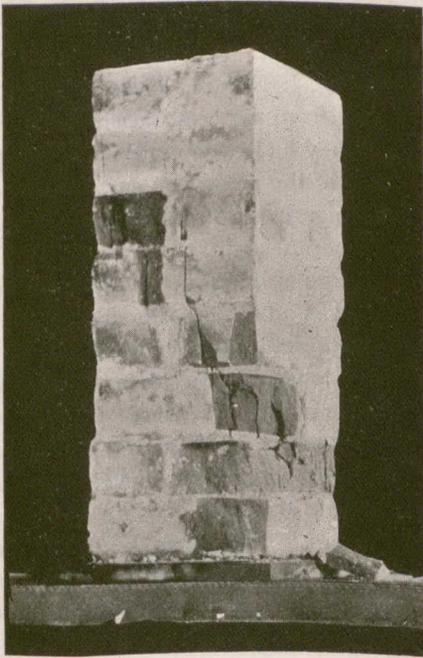


FIG 4.

vertical joints or closers, and finally, in many instances, the piers bulged out on all sides and collapsed.

The differences in the behaviour of the piers while under compression were accurately noted in each case.

It is stated that, "all through the series it was evident that the vertical line of joints formed by the closers was a plane of weakness, and it was generally at this line that the serious cracks first showed themselves." In the discussion which followed the reading of the report, Professor Unwin said: "If the structure is one that has special vertical planes of weakness, like the joints in a pier which has not been built very long, then the crushing load develops vertical fissures, due to the tension acting horizontally." We may point out that in the brick piers experimented upon by the American Institution of Civil Engineers at Watertown Arsenal, the normal type of failure was this vertical splitting of the pier, as in nearly every instance longitudinal cracks and seams were opened up. In the American examples, so far as we can judge from the sketches and diagrams appended to the Official Report, no closers were used, the bricks in all cases being whole bricks, so disposed as to break joint. Various types of bonding were also employed; in some instances as many as five or six courses had the vertical joints in one plane, the alternating five or six courses breaking joint in another plane. Yet, even in these cases, the same vertical fissures appeared, emanating from the vertical planes of weakness.

It seems, therefore, fair to infer that there is little evidence to show that the closer method of bonding is more defective than the whole-brick bond. Moreover, as the American piers were much older than any of the piers tested by the Royal Institute of British Architects, the age ranging from 15 to 24 months, the newness of the pier does not, in this respect, appear to be of the importance suggested by Professor Unwin.

TALKS ON HOUSE PAINTING.

It is doubtful whether the average carpenter and builder or general contractor gives the subject of painting the attention it deserves, says Mr. Seymour Jennings, and this is especially the case with those who carry on business in a comparatively small way. If the amount of painting to be done forms a very considerable part of the work, as in the case of repairs, they will, as a rule, either decide not to tender at all, or else will obtain a tender from a painter as sub-contractor. This is all very well for the painter, but the builder, of course, has to make his price somewhat higher, to cover his own trouble, and so he stands but little chance of getting the work.

In new work, as in old, the painting is an important item, and it behoves the contractor to see that it is executed in the most economical manner possible. Now there is no part of work in the building trade that is so easy to "scamp" as the painting. If the brickwork is wrong, or if the woodwork is inferior, it shows itself at once, and besides, as far as the actual structure itself is concerned, the district surveyor or his equivalent will look after that, to say nothing of the architect. But when it comes to the paint the case is very different. The local authority, whoever he may be, doesn't care twopence about it, and in ninety-nine cases out of a hundred the architect himself knows little concerning it—in fact, excepting so far as the actual appearance of the work when finished is concerned, he as a rule has no idea whether it is good or bad.

These facts must be borne in mind by the carpenter who gives his work out to a sub-contracting painter to do. Unless he has made a study of paints and painting, he is in the painter's hands almost entirely. Not that I have a word to say against painters as a class; considering the temptations they have to contend with, they are, I, think, in integrity not a little above some other trades I could mention. The point that I do want to insist upon is, it never pays to scamp the painting. The defects will soon become obvious. Suppose, for instance, that you have some work to do at a low price, and, in order to make it pay, it is impossible to use the best materials. You must economize somewhere. Very well, but don't do it to any extent in the painting. If you use, for instance, a common resin varnish at a few shillings a gallon, and after a few months it cracks in all directions, what sort of a reputation do you think you will get for yourself? I do not mean to say you should use 20s. varnish, but do use fair quality, honest goods.

If I have convinced you that it always pays to let the painting be done as well as possible, within the price to be paid for the work as a whole, it will, of course, follow that if you do give it out, you should, under no circumstances, let it to any one who is not known to you to be an honest, straightforward man of his word. Again, if you decide to do the work yourself, you should for your own protection, only deal with a first-

class house, who will sell you only good materials. By "first-class" I do not mean necessarily a large concern, but one upon which you and others may absolutely rely. The importance of this will become apparent to you if you consider for a minute. If you go to your timber merchant to buy some timber you are very unlikely to be deceived; you know what you are buying. If you are a family man and go to the butcher's to purchase a joint of meat, it is quite unlikely that he'll "have you" isn't it? Unless, indeed, in selling foreign-killed meat as English. But when it comes to paint material, how do you know whether the white lead is not half chalk, the linseed oil largely composed of resin with, perhaps, a little mineral oil added? You don't know, or at least, very few carpenters and builders do. Why, even the turpentine may be largely adulterated with benzine, and as for the colours—I have many times come across so-called vermilion that consisted wholly of red lead toned up to the proper colour with the dye recene; and I have known a green sold containing over ninety per cent. of barytes, an adulterant that is absolutely valueless for staining or colouring purposes, for the very simple reason that it has no colour.

I want to consider some of the methods by which you may economize. One, and perhaps the most important, item is the prevention of waste. Many workmen are allowed to get into slovenly habits and waste a good deal of material; and this is especially the case with dry colours, most of which are quite expensive. The most economical colours to use, by the bye, are those ground in oil. There is very little waste with them and they save time. But the great secret of economy in the paint department is to engage a good, smart foreman, one who will get the men into good habits and keep them so, and who will keep a watchful eye to see that they not only take care of the material, but that they keep their brushes and tools in good order. Pay such a foreman a few shillings more a week, if necessary; it will be money well spent, I assure you.

You have, doubtless, heard of the old story of the New York builder and his hod-carriers. In any case, it will bear repetition. The custom "on the other side," as here, is for the hod carriers to go up and down the ladder in regular order, every man in his proper place. For one man to get before or behind another would be an awful thing. Well, the builder of whom I speak noticed that the carriers were going up and down the ladders very slowly, much to his disgust. He tried all means to make them go faster, including, I am afraid, some not very choice language; but it was no use. Presently an idea occurred to him. He picked out a smart young fellow and took him into his confidence, promised him twenty-five per cent. more wages, and put him at the head of the gang. Of course this leader exerted very nerve to get up and down quickly, and as the whole gang was compelled to follow him, the "boss" got somewhere about twenty-five per cent. more work out of all the men for his expenditure of twenty-five per cent. extra on one of them. So take my advice. Have a smart foreman who will look after your interests, not one, though, on any account, who cannot get along well with the men. There is all the difference in the world between getting a fair amount of work out of a man and being a nigger-driver. The clever foreman knows where the line should be drawn.

Another thing—do insist upon the men being properly clad. I know a painter who insists upon every work-

man bringing clean overalls every Monday morning. He told me that the rule was much objected to at first, but he insisted, and now the men go out to a job a credit to their employer and to themselves. And if you do repairing work, do, as you value your future prospects, have everything cleared up after you. Leave the place neat and tidy. It will cost you a shilling or so more, but take my word that it will not be money thrown away. Have you ever considered the bearing that women have on the repairing part of your business? True, it is the gentleman who pays the bill and who assents to the work being done, but it is the lady who has to put up with all the trouble and fuss, and it is she also who you should aim to please in ninety-nine cases out of a hundred. Now, perhaps—most likely, in fact—you recognized all this years ago, and always make a practice of having the colours of paper and paintwork suit her taste. Well, you do right. Never mind about the man who pays the bill. She'll know how to deal with him if she's an average wife, because if she is that she will possess a full share of that valuable quality, tact. But don't spoil all your efforts to cultivate her goodwill by leaving a lot of rubbish around.

Now as to materials. Do not use ready mixed paints; they are not made for painters. They are intended for the "everybody-his-own-painter" sort of a man—the man who finds time hang so heavily on his hands that he will cheerfully spend about three times as much on labour (certainly its his own) and bad paint in painting a job than would pay for the work to be properly done by a qualified mechanic. You know the kind of man; he is closely related to the gentleman who builds himself a summer house of a nightmare design, and who uses up about three times the amount of timber required, spoils a complete set of cheap tools (which is not to be regretted), and smashes his thumb half a dozen times or so during the process, and all in order that he may have the pleasure of doing what the carpenter would have done for him at half the cost and then made a handsome profit.

I have said before, use good materials. Of course you know that there are various grades of white lead. There is "Genuine," "No. 1," "No. 2," and so on. The genuine is genuine—that is to say, it is strictly pure hydro-carbonate of lead—i.e., white lead proper. The other grades are cheaper and contain more or less whiting, barytes and other materials. For certain work they will do well enough, especially for that which is not exposed to the weather. A friend of mine had some years ago the job of redecorating a large school room. The walls and ceilings were to be painted in lead and oil, and the work was to be finished by a certain date under heavy penalties in case of failure. Work seemed to pour in that week, and, as a consequence, the school work was to be delayed. On the day before the work was to be completed the ceiling had not been touched. In the morning one coat was given it, and my friend calculated that by two o'clock the following morning it would be quite dry enough to take the second coat, so he arranged that some of the men should work all night. About one o'clock he went to the job to take a final look at it before going home, and to his horror found that it had been discovered that there was only enough white lead to do about one-third of the work. There was plenty of oil and plenty of turps. The only thing in the paint material way on the premises was a lot of putty. So he gave orders at once to have this beaten up with the lead, added a liberal amount of oil and turps, and finished the job. He assured me that the work stood as well as any he had ever done. Of course, what he had done, in fact, was to make his paint very similar to, say, No. 2 or No. 3 white lead. Putty, of course, is simply whiting ground in linseed oil, and by adding the whiting to the lead, and giving the mixture a good binder in the shape of pure linseed oil, he had obtained a good paint—that is good for the particular purpose—at a very low cost.

MANUFACTURES AND MATERIALS

"COPPER."

THE following is an abstract of a paper read by Mr. Nelson Dawson before the Architectural Association of London, Eng. :—

In talking about metal, its uses and design, the metal-worker, unconsciously perhaps, divides the subject in his own mind into three parts—cast, forged, and sheet. Here are the three different treatments to which nearly every metal can be subjected, and the three processes that the designer can take advantage of in thinking out his design. These practically are also the three different trades into which metal workmen are divided.

It is not until we come to look closely into the thing that we see how widely apart these three branches lie. One may not realise at the first glance that under the heading "cast" nearly all statuesque and sculptors' metal-work must be done; and if we do not admit that it "must" be cast, at least we know that it always has been so up to the present, except in very early days.

For wrought work we may take, as an example, the Eleanor grille in Westminster Abbey, that monument of twelfth-century skill in ironwork.

For treatment of metal in sheet we might instance the elaborate figure-compositions of Cellini's time, that have since then been used to cover shields with, or to beat up a dish for an altar, or to put some repousse' ornament on a cup or other plane surface. Here, indeed, are three very different crafts so widely apart that really we should not wonder that they have become so much split up and separated, or that all metals are not capable of receiving all three treatments satisfactorily. Thus, with copper, we find it is practically useless for casting; while in forged work we can with difficulty recall anything in this metal, so we are left with sheet, and here really lies the strong point of copper.

The kindliness of copper under the hammer in practice is a constant surprise; with care one is able to do almost anything with it—to bump it up into relief, and then, if it is wrong, to hammer it all flat and begin again; to take a flat piece, and hammer it first into a cup-shape, afterwards drawing in the top and lengthening it upwards until the original piece of sheet-copper is a vase with oval body and long narrow neck. A metal-spinner of much experience said that in their trade the most difficult thing to do was the ordinary stethoscope that doctors use. But a good coppersmith would not make any difficulty about such a shape if he had a good bit of copper to do it with. Formerly the common jelly mould was the triumph of the craft, and it is easy to understand that to make a shape with many pinnacles and castellations from flat sheet, keeping a fairly even thickness and never tearing open the metal, took some skill (one uses the past tense because, probably, being such a very fine sort of craft, it is by this time obsolete, and put aside in favour of a mechanical process, such as stamping).

Repousse' has come to be the general term for all ornamental work raised on sheet-copper by the hammer. The prefix "re" probably means "back," so that it implies that some part of the metal is beaten back. It really hardly matters if, to gain the relief, one beats up

the design from the back, or beats back the background in front—pretty much the same end is reached.

In beating up small ornamental work in copper, especially when it is as small as silversmiths require, it is put down on a cement made of pitch and other ingredients. This is melted every time the copper is put down, and, besides holding the metal tightly, offers a slightly yielding material against which to hammer. If, when the copper is on the pitch, we take a punch and make a straight line—indented of course—that line will come out on the face of the metal as a clean, sharp line. If, however, we do not put the copper on to any cement at all, but make the indented line on it, as it lies on the wooden bench, it produces a very different effect on the face side. Now the line shows indefinitely, and, instead of the metal being raised just where it was struck, the surrounding part is dragged up too. If an effect were desired between these two extremes, one should place the copper on a half-way material, such as stiff clay or modelling wax. The result of the beating would also be half-way—neither too precise a line nor too blurred.

It will be seen that these three courses are likely to give a considerable range, especially where the metal-worker has some artistic capabilities; but the usual way, which is generally the worse way, is to first trace on the face side of the copper the whole design, with what is practically an incised line, and then slightly bump it up here and there from the back. This is the cheapest and readiest way of getting an effect. But to get the best quality out of copper or any other metal with the repousse' treatment, let the face-side have the least possible amount of work—none at all, if it can be helped.

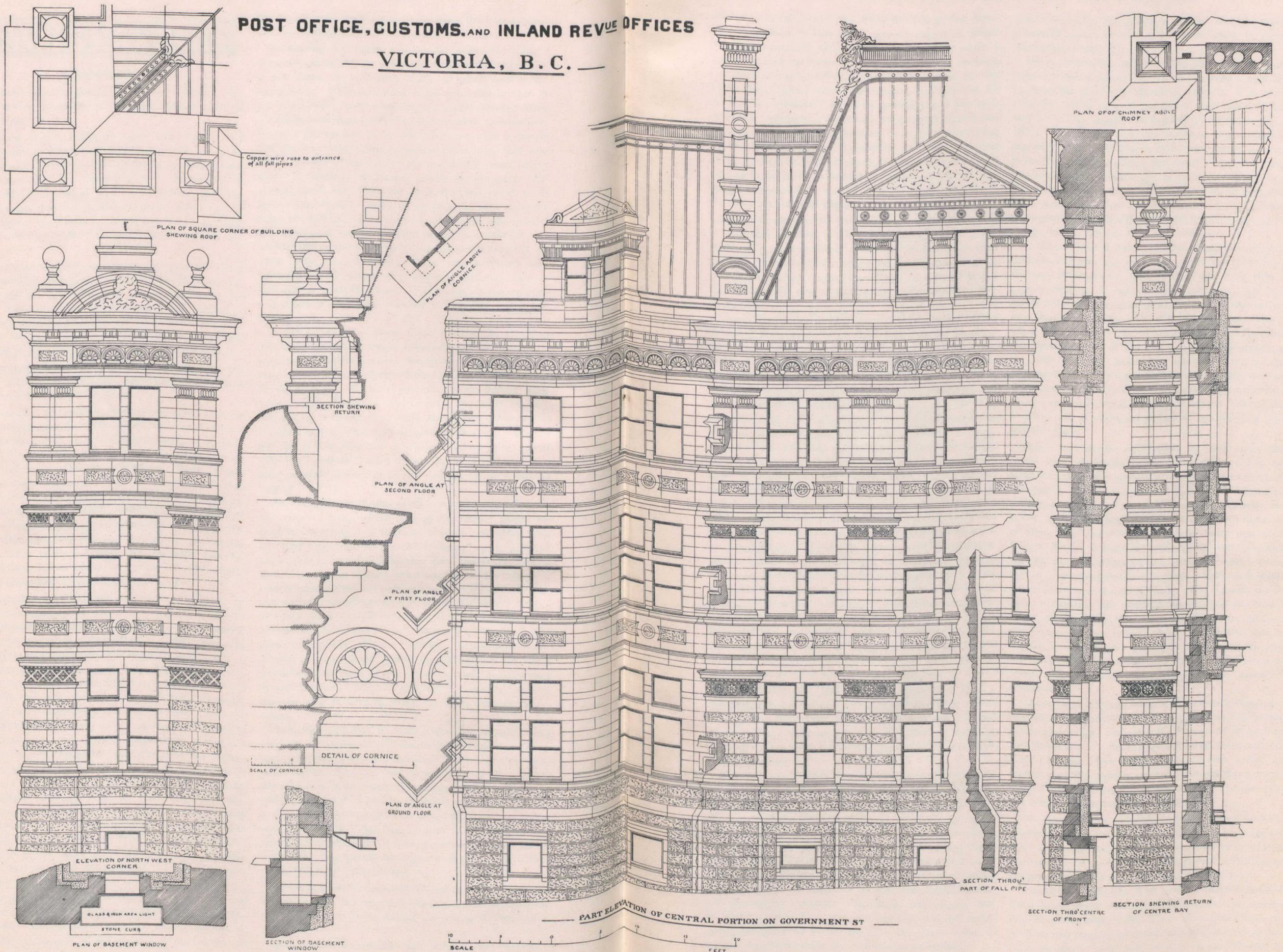
This point is an all-important one architecturally, for this reason: That where ornamental copper would be used in a building as a decorative panel—a tablet with lettering otherwise—it should "carry," as a sculptor says—that is, the design should look clearer at a little distance off than it does close to. A design which is clearly and sharply cut and looks very well close to will not show to advantage at a distance, will not "carry," in other words, while a design that looks somewhat blurred and indistinct close to becomes quite sharp and clear ten yards off—it "carries" exceedingly well. This is one very good reason for putting all the work possible on the back of the metal, leaving it somewhat blurred in front, and not "finishing" it, as they say, by chasing and putting a clean hard line around everything.

One objection that is made regarding copper when used for decoration in a house is that it requires cleaning, or it loses its chief beauty. Well, there is some truth in this, but it is not altogether correct. In the first place, if it be required to keep its own colour, it can be lacquered; and this, if judiciously done, will last a very long time, and is both easy and cheap to renew when necessary. But copper that is not lacquered—simply left and dusted in the ordinary way by the housemaid when the rest of the house is dusted—will take a most delightful color in time.

There is a whole range of colours that once produced on the copper are not only themselves permanent, but act as a varnish in preventing an action of the atmosphere.

The importance of this fact showed out recently in the case of a memorial-tablet in a church which was

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THOS. FULLER, ARCHITECT, PUBLIC WORKS DEPARTMENT, OTTAWA.

desired to be of copper, the objection being that when the immediate friends had passed away, it would become uncared for and soon reach the dingy state, a condition that the more familiar marble never reaches. It seems difficult to find a metal that would do any better than copper, which was wanted, but with the aid of such an artificially-produced patina, the difficulty is removed, and there is no reason why copper should not be used. For any case where an inscription or lettering in any form is wanted, it may be said that no other metal opens out such chances as copper, especially if treated in an artistic manner, provided, of course, the design and execution is not left to the tender mercies of the usual commercial person.

One can only refer to the lamentable state that mural brasses have reached in our time, and suggest that the artistically treated copper offers an escape from such terrors, especially if the tablet be within reach of an occasional duster, giving the slight amount of polish that makes the use of lacquer or other preservatives unnecessary.

One other treatment of copper must be noticed before finishing, and as artists we shall feel it to be treading on unholy ground — electrotyping. Sometimes one thinks that this must be a fine process and a nineteenth-century blessing, while the next electro one comes across the whole thing is condemned bag and baggage. A clever mechanic will turn out in electro a copy of a repousse dish that an expert could not tell from the original, unless he looked at the back. This is a thing to be thankful for, this tell-tale back of the electrotype, otherwise there would be no telling at all, so faithfully does it reproduce every mark, even touch of the hammer or chisel. It is interesting to know what is going on around us, and it may not be out of place to relate a little incident that occurred recently. In the workshop of a clever electrotyper a specimen of work was brought in to show. It was a small electric-light table-standard about 9 in. high, of interesting design, and apparently highly chased, in copper, with a good chocolate-brown patina, and mounted on a small oak plinth. "Now this," said he, "is electroed from a fine old Sheffield plate candle-stick in the South Kensington Museum, and we have an order for a quantity. We have acquired the right to reproduce the things in the museum, and, with our skill in this line, there is nothing that we shall not be able to copy."

Now, frankly, if I had seen this piece in a shop I should not have been able to tell how it had been made, because it had been electroed in two halves and soldered up, so that the back could not be seen, and on the face only gave the evidence of highly chased work and most careful finishing.

One may say, if this has exactly the appearance of the correct thing, it must be as good. Most plausible, but most weak! There is often a sorry mind behind a fair face, and the fact that you can mechanically reproduce a good thing a hundred times, makes it a hundred times worse. A good piece of copper or any other metal work, on which an artist has spent time and care, will always be valuable; and equally the most exact reproduction of it, especially by any mechanical means, will always be valueless. Seriously and calmly, this form of copper work is the only one that may be called unlawful, and if we do not leave it altogether alone, it should only be used for the commonest purposes.

We have now considered some of the good points

and some of the bad points of copper, and the question naturally arises, To what use can this metal be put with advantage to-day?

Well, externally, and except in the case of roofing, copper is not much used. There has been a mild desire to cover the door of a church or mansion with it occasionally; in the case of the former with repousse work, which we may imagine as capable of having a very rich effect. Sometimes one sees the name of a tradesman in high-relief letters in copper or a name plate by a door, in both of which positions they seem to get well rubbed, and invariably catch the eye as we pass. In one or two cases sheet copper has been largely used, in conjunction with wood-work, in the decoration of big West-end public-houses; and although here it looks applique and cheap, that is not the fault of the copper.

It may be well to take this opportunity of saying how difficult, but how important it is, so to use sheet copper, or any other metal, that it does not look thin and papery, and as if cut out with scissors. Of course sheet-metal, unless of some thickness is frequently cut into shape with shears, but if this is apparent when the work is finished the effect is disastrous. All the durable and hard qualities of the metal seem to disappear, and the thin, fragile undurable character asserts itself unpleasantly. For a glaring instance of this misuse in sheet-metal, though in iron, we have only to turn to the much-vaunted iron railing from Hampton Court Palace, in the South Kensington Museum, reputedly by Huntingdon Shaw.

One would not be understood to mean that sheet-metal must be made to look like cast, or any other form of metal, only equally it must not be made to look like paper. If any metal-work looks thin and poor, not solid and strong and metallic, then the designer is no artist, and the workman no craftsman—both have wasted their time and chance. Beyond these one or two things, then, one does not see copper used externally; though, at least, wherever sheet-brass is used, there also certainly sheet-copper may be used. Indoors it is different, especially in domestic work. For a good, comfortable, homelike, and cheerful appearance in drawing-room, dining-room, or kitchen, one may safely say copper cannot be beaten. Near a fireplace, and kept bright, it has a cherry glow that rivals the fire itself; the mere fact alone of its being kept so bright is a constant and recurring announcement of housewifely attainments.

There is hardly any interior metal-work that, if one desired, might not be done in copper, saving, perhaps, poker and tongs; and even the former of these I once saw made out of a huge copper bolt of some old Navy ship. Hinges, too, one would not use it for, as it would wear too quickly; but we can use the gun-metal alloy where the actual wear and tear comes, and rely on our old friend for the ornamental part.

For finger-plates, a handsome set of door furniture in bright copper will do more to redeem a drawing-room from depression than the most gorgeous wall-paper, and the sparkle of electric lights in copper reflectors and copper stands will be only second to gold itself.

To-day, no lady who had any self-respect could live for a single day if she had not a more or less ancestral copper coal-scuttle, while two or three years ago, to be without any equally ancestral warming-pan hung on the drawing-room wall was almost a punishable matter.

STUDENTS' DEPARTMENT.

C. A. & B. COMPETITION.

WE had expected to be able to announce in the present number the decision of the judges in the above competition. Owing, however, to the absence on their holidays of some of the members of the Ontario committee, it has been found impossible to do so.

The report of the committee appointed by the Province of Quebec Association of Architects has been received, but will be held over for publication in our August number simultaneously with the report of the Ontario judges.

MAXIMS FOR DRAFTSMEN.

THE power of shading rightly depends mainly on lightness of hand and keenness of sight; but there are other qualities required in drawing dependent not only on lightness, but steadiness of hand; and the eye to be perfect in its power, must be made accurate as well as keen, and not only see shrewdly, but measure justly.

Nearly all expression of form, in drawing, depends on your power of graduating delicately; and the graduation is always most skillful which passes from one tint to another very little paler.

In darkness of ground there is the light of the little pebbles or dust; in darkness of foliage, the glitter of the leaves; in the darkness of flesh, transparency, in that of stone, granulation; in every case there is some mingling of light.

An entire master of the pencil or brush ought, indeed, to be able to draw any form at once as Giotto his circle; but such skill as this is only to be expected of the consummate master, having pencil in hand all his life, all day long, hence, the force of Giotto's proof of his skill.—Ruskin.

COMPETITION CONDITIONS.

THE British Architect suggests the following as being lines upon which architectural competitions might be successfully and satisfactorily conducted:—

1. There should be two trials. This we still think the better plan in view of the past history of competitions. But we do not see the slightest necessity for the cruel waste of competitors' time and efforts such as usually results.
2. The first competition should be open to everyone over the age of 25.
3. There should be no charge whatever for the conditions of the competition.
4. There should be nothing required beyond plans, one or two sections, one main elevation and two monochrome perspectives, each taken from a given point and of fixed size, and arranged with some reference to the laws of perspective.
5. There should be three fixed premiums, to be paid down outright to the three best of these designs.
6. Out of all the first competitors, six should be selected to compete finally.
7. Each of these should receive a reasonable (not a large) honorarium for preparing elaborated designs, which should follow the lines of their previous ones.
8. The best of these six should be appointed architect.
9. The authorities should agree to leave the decision in the hands of three experts; one to be the city surveyor and the other two artistic practising architects.

EARLY ENGLISH WINDOWS.

EARLY English glass paintings are remarkable for the intensity, vividness and richness of their colouring, for the strength and boldness of their outlines, for the height, spirited action, and classical air of the figures, and for the form of the foliage used in the patterns. The earliest foliage partakes of the shape of the Greek honeysuckle, like the ornaments of Norman architecture; the latter resembles the trefoil-leaved scrollage so common in Early English sculpture. The richest windows of this style (and which are therefore more rich than any other windows) are the medallation and the Jesse. The medallation window generally has a deep border running entirely round the light. The enclosed space is principally occupied with pictures of simple design, each represented on a panel, having a well-defined border and a stiff coloured ground. The interstices between the panels and the border of the window are filled with ornamental patterns. Very little white glass is used in the windows, and the figures, though strongly shaded, are so little relieved that when seen from a distance the whole window presents the rich, variegated, and somewhat confused appearance of a turkey carpet, to which they have often been likened. The Jesse window, although as rich, is seldom so confused as the medallation window, owing to its design being simpler and better defined. The figure and canopy window, of which there are some splendid remains scattered about Canterbury Cathedral, is less mosaic in its colouring, the figures being much larger than those in the medallation and Jesse windows, which occasions greater breadths of color to be used in the draperies. Yet these windows are as intensely coloured as the others. Their canopy work exactly resembles that in the illuminations and sculpture of the time. The white pattern windows are of a rich sea-green hue. In general their design consists of, as it were, a series of panels laid one over the other, each panel having a separate pattern painted on it. The ground of the pattern is most commonly cross hatched with thin black lines, but this cross hatching is not unfrequently omitted in windows occupying a great height from the floor. Some pattern windows are composed of ornamental quarries. Most of the white pattern windows have deep borders richly coloured like those of medallation windows, and some, as at Stanton Harcourt, are further enriched by the insertion of coloured pictures represented on panels. It is clear that Early English windows owe their magnificent effect to the material of which they are composed. The pot-metal glass is generally deep in hue, but being very irregular in its tint. The white glass, which is usually of a rich sea green colour, is also very irregularly blown, and the ruby glass, except some pieces which seem to have been cut near the extremity of the sheet, is as streaky in its appearance as if the colour had actually been laid on with a brush. It is to these accidental irregularities in hue of the glass that the vivacity of an Early English window is chiefly owing.

In painting buildings that are used to contain articles of an inflammable nature, the painter would do well to suggest the use of a fireproof paint, and while one would think that paint must always burn easily, paints may be obtained that are absolutely unflammable, one of the best known of these is Asbestos paint, which effectually checks fire in its incipient stage.

THE LATE MR. WILLIAM HASKINS, C. E.

A long and useful life was terminated on the 5th inst., on which date occurred the death of Mr. William Haskins, C. E., the well-known City Engineer and manager of the Waterworks Department of the city of Hamilton. Early in the morning he was afflicted with a stroke of apoplexy, from the effects of which he never regained consciousness, expiring at 5:30 o'clock in the afternoon.

Deceased had been attending to his duties as usual up to the previous Saturday, although for the past two years he had not enjoyed the best of health, and last spring visited a health resort in search of restitution. This he regained in a slight degree only. Of late the affairs of the department over which he had charge have been unusually onerous, necessitating his closest attention.

By his death the city of Hamilton loses an efficient and valuable officer, and one who during his many years



THE LATE MR. WM. HASKINS, C. E.

of service exercised his executive ability in an eminently successful manner.

Mr. Haskins was born at Coolkem Hall, County of Wicklow, Ireland, on May 29, 1828, being therefore in his 69th year. He was a son of Abraham Haskins, who came from England and settled in the county of Wicklow. His mother was Margaret Fitzmaurice, daughter of Colonel Fitzmaurice, her father and three brothers being either military or naval officers. He was educated in Dublin, Ireland, where he studied his profession of civil engineer at Trinity College, under Sir John McNeill.

In 1852 deceased came to Canada and obtained a position as assistant engineer on the survey and construction of the Great Western Railway, and afterwards, in 1856, was appointed City Engineer of Hamilton, which position he filled until his death.

In 1861, when the city took over the waterworks from the Board of Commissioners, the duties of manager were entrusted to him. He was not only manager of the engineering, construction and operation of the waterworks system, but financial manager as well, having full charge of the collection and remitting of rates, etc. About 10 years ago these duties were transferred to the tax collector, but Mr. Haskins continued to be city engineer and manager of the waterworks. He was a man of large experience and knowledge, and a thor-

oughly efficient engineer and public officer. Perhaps his greatest work for the city was the management of the Waterworks Department, which he brought to a high state of efficiency, and with every detail of which he was conversant. Quite recently he prepared a number of plans, minutely describing the whole system, in order that at his death the system might be preserved. His ability was recognized outside of Hamilton by the frequency with which he was called on to advise other corporations contemplating important improvements.

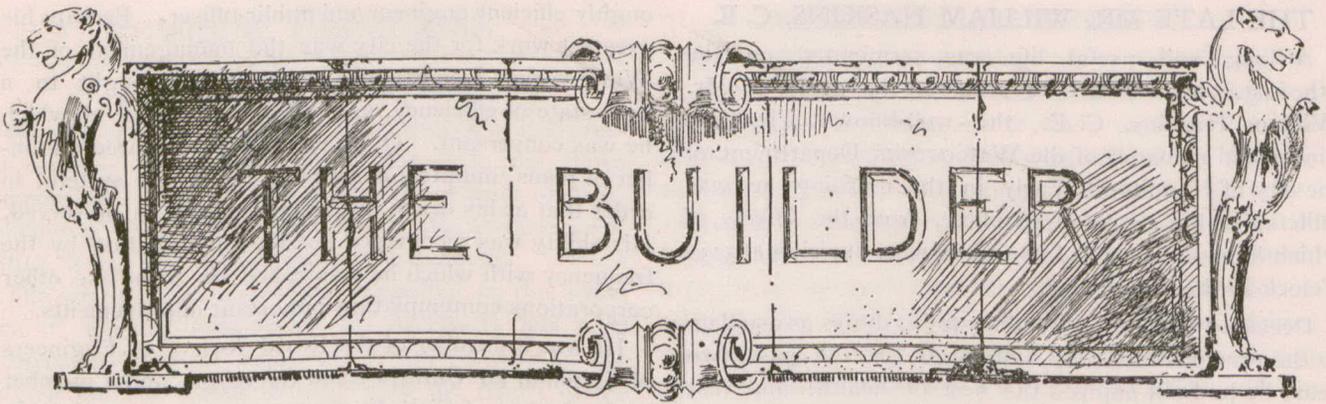
He was a member of the Royal Society of Engineers of England, an Ontario Land Surveyor, and a member of the Society of Civil Engineers of Canada. He was also a member of the Masonic fraternity. In religion he was a member of the Church of England, and in politics a Conservative.

In 1852 Mr. Haskins married Catherine Murray, daughter of Mr. Hugh Murray, of the county of Carlow, Ireland, a gentleman of Scottish ancestry. He leaves a widow and five sons, Messrs. William Fitzmaurice, of Dunnville; Frederick H., of Toronto; Raymond and Gerald, of Hamilton, and Thomas Fitzmaurice, of Dunnville.

His funeral was attended by the mayor and aldermen of the city and the civic employees in a body, and by a very large number of private citizens.

HEATING AND VENTILATING BUILDINGS.

IN a work on heating and ventilating buildings, Prof. Carpenter says the most effective location for the air inlet is probably in or near the ceiling of a room, although authorities differ much in this respect. The advantages of introducing warm air at or near the top of the room are: first, the warmer air tends to rise and hence spreads uniformly under the ceiling; second, it gradually displaces other air, and the room becomes filled with pure air without sensible currents or draughts; third, the cooler air sinks to the bottom and can be taken off by a ventilating shaft. So far as the system introduces air at the top of the room it is a forced distribution and produces better results than other methods. When the inlet is placed in the floor or near the bottom part of the walls it is a receptacle for dust from the room and a lodging and breeding place for microbe organisms. In the ventilation of large buildings the inlets can usually be located in the ceiling, especially if the lighting be done by electricity or in some manner not affected by air currents. The outlet for air should be as near the bottom of a room as possible, and it should be connected with a flue of ample size, maintained at a temperature higher than that of the surrounding air, unless forced circulation is in use, in which case the excess of pressure in a room will produce the required circulation. These conditions should lead us to locate vent-flues on the inside walls of a house or a building, and where they will be kept as warm as possible by the surrounding bodies. If for any reason the temperature in the flue becomes lower than that of the surrounding air, the current will move in a reverse direction and the ventilation system will be obstructed. The conditions as to the size of the outlet register are the same as those for the inlet; the register should be of ample size, the opening should be gradually contracted into the flue, and every precaution should be taken to prevent friction losses.



Taking Quantities.

IN taking measurements where the work is done by the yard, as in painters' work, hardwood finishing, kalsomining and plastering, it is always the best to use a tape-line, then all the breaks, quirks and mouldings can be measured and properly credited. In measuring painting this is very important for running a line around all the corners and quirks of moulded panels adds a large percentage to the total amount, and where the work is piece work, by the yard, the workman is entitled to the full measurement. If the exterior of a house is painted at so much per yard, and the building is a frame one and sided in the ordinary manner, the painter is entitled to payment for the edges of the siding or clapboarding, which, in a building, 24 feet high, would make quite a difference in the result. Twenty-five feet would require forty-eight tiers of siding, and each tier would add one-half inch of surface measurement, or twenty-four inches to the whole height. Let us suppose the building to be fifty feet long, then we should get 100 more surface feet than the face of the building would measure, which would make a little over eleven yards, an item worth looking after. At a meeting of the Master Painters and Decorators of the United States, in Baltimore, some time ago, a schedule of methods of measurements and prices was decided upon, and this, with a number of rules and regulations governing the association, were published in book form for the guidance of painters and decorators throughout the whole United States. The work also gives many hints regarding various styles of work that are valuable and useful. The book, we believe, sells for two dollars to non-members of the association, and something less to members. The art of taking correct measurements is worth acquiring to the workman who does job work, for it is the little kinks in his work that make profit or loss, and he should be able to watch these kinks and turn them to his advantage.

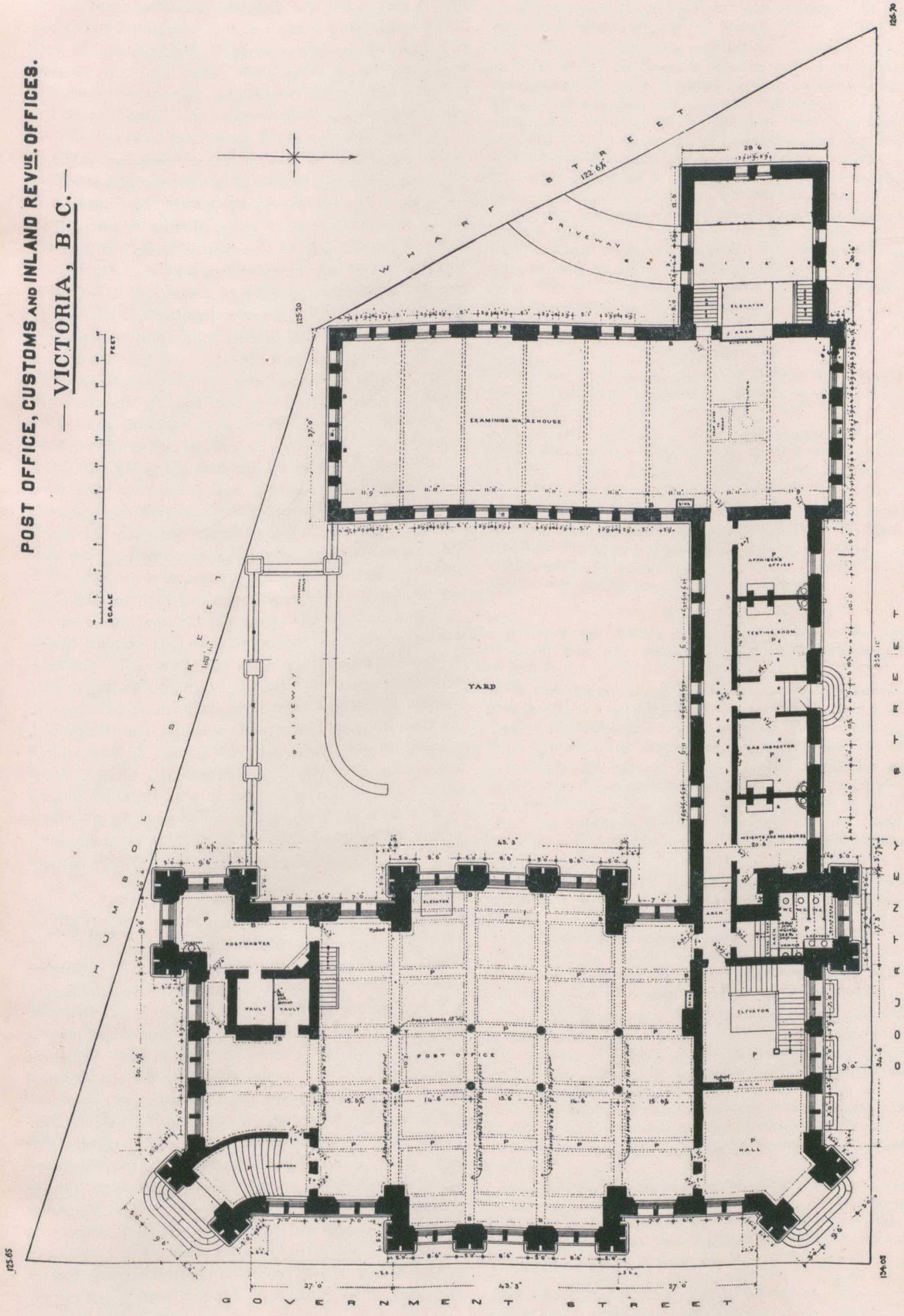
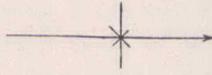
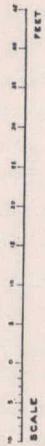
The Plasterer's Measurements.

THERE has always existed more or less misunderstanding anent the "quantities" claimed by the plasterer, and where these quantities have been a subject of dispute it has always been found impossible for two measurements to agree; indeed, the plasterer himself cannot measure a building of any pretensions twice and get the same result each time. This may seem strange, but it is true, and, of course, there is a cause for it. In some localities the plasterer claims and gets full measure for all openings, in other places he gets half the openings, and in others, again, the openings are counted against him. Then again, the practice in some places is to give the plasterer the full height of a room, base and cornice included, while in others he is allowed the base but not the cornice, while yet in others he is allowed neither

base or cornice. Again, it has never been decided what constitutes an opening. Some say an opening is just the space between the jambs of a door or window, while others claim that the opening is over all the wood trimmings, so if the casings were six inches wide, and the door three feet, then the opening would be four feet wide, the same with the windows. The following, however, which is taken from Vogdes, who is an authority on such matters, is generally considered fair and equitable all round. Plastering should be measured by the yard, nine square feet making one yard, and according to custom, no deductions is made for doors, windows and other openings which do not exceed sixty-three square feet. This is the custom that should obtain in Canada, in justice to the plasterer. In measuring closets another author says "it is customary to add half of the contents, and if the shelves and strips are in before plastering, double the contents. Small gables and other tri-angular pieces are counted square. These extra allowances are made to make up for extra labor of lathing and plastering such pieces of work." We can offer no objections to the measurements, as it is well known to workmen that it takes more time to lath and plaster these irregular places than if the walls offered straightforward work. With regard to the cornices and enriched work, Vogdes says "cornices that are plain running members are charged by the running foot, but enriched or carved mouldings are charged by the lineal foot. Paneled work, whether on walls or ceilings, run with a mould, should be rated by the foot superficial." In this case it seems the intention of Mr. Vogdes to charge as for plain work first, where the cornice is placed, and then for the cornice afterwards. This is probably just, as the plasterer has first to lath and then render the wall, before it is in condition to receive the cornice. For circular and elliptical work, two prices should be charged, and for domes or groined ceilings, three prices. He also states that for every twelve feet in height above the first floor, five per cent. should be obtained. These charges may look somewhat formidable on the face, but they are no more than long experience has proved to be just and fair between owner and contractor, and if they were universally adopted and adhered to, there would be less disputes between owners of buildings and their contractors.

A BUILDING that is not "well roofed" is in a serious stage of consumption, and should be placed under treatment at once. If the roof is one covered with shingles, and not old enough to have its timber in a state of decay, there will be but little trouble in making the roof as "tight as a drum," and free from leaks. There is no roof in existence that is so easily kept tight as a shingle

POST OFFICE, CUSTOMS AND INLAND REVENUE OFFICES.
— VICTORIA, B.C. —



PLAN OF GROUND FLOOR

135.65

134.05

136.70

one. By "tight" we mean a roof that does not admit of water or of driven snow finding their way under them. It has become the custom of late years to lay a prepared paper or felt of some sort on the roof boards or sheeting, before the shingles are laid. This is done for a double purpose—and is really a good thing to do. One of the purposes is because the paper assists in keeping the roof tight, making it warmer in winter and cooler in summer, another is because the paper or felt is said to be made incombustible and therefore, acts as a fire arrester, and when it can possibly be done, it is always in order to put a layer of some sort of unburnable fabric between the shingles and the sheeting. A shingle roof should always be painted with some oxide paint of suitable color, at least two coats. This painting is a good investment, as two coat work, when the shingles are laid will lengthen the life of the roof seventy-five per cent., and if this painting is followed up and the roof painted every five or six years, the life of it may be extended to almost any limit. Of course, something depends on the original quality of the shingles themselves. If they are made of good white pine, straight grained, the roof may be made to last a long time, and so, also, if the shingles are made of sound white cedar, but if cut from shakey or "dosey" stock, the life of the roof will be short, as they will rot from the underside. The cypress makes the king of shingles, so far as lasting qualities are concerned. There are many old buildings still standing in Southern New Jersey, Pennsylvania, Maryland and Delaware, that were covered with cypress shingles 150 and 175 years ago, that are still protected from the weather by the shingles that were first laid on, and they have not received a single coat of paint either, or any other composition. The life of an ordinary Canadian shingle is well within the limits of twenty-five years, if it is not protected by paint or other saving composition, owing, perhaps, to our rigorous climate and heavy rainstorms. An old roof, if not too far gone, may be greatly benefited, if given a heavy coat of oxide paint and boiled linseed oil, but, after a roof has seen a half dozen winters or so, unpainted, it is a question whether it is an economy to paint it, as it will eat up an enormous amount of paint and oil to give it justice.

Mortar under Shingles.

MANY architects insert a clause in their specifications calling for half an inch of rough mortar to be laid under the shingles. The object of this, of course, is to act as a non-conductor of heat and cold, and as a fire arrester. We have never been quite sure that the mortar has ever accomplished either of the purposes for which it was intended. The lime in the mortar certainly does no good to the shingles, but harm if rain ever gets to where the lime strikes them, and the shrinkage of the roof boards is sure to crack and break the mortar up, if it should escape being shattered by the hammering and pounding while the shingling is being done. The mortar used for the purpose is generally the most miserable stuff the plasterer can concoct, and the laying of it on the roof boards is not by any means done in the best style. On a flat roof it may be effective, but on a steep roof we have our doubts about it, and in the end we are constrained to think it is about as expensive as good roofing paper.

The stock of the Chanteloup Mfg. Co., Montreal, was damaged by fire a couple of weeks ago to the extent of \$15,000.

LEGAL DECISIONS.

WHEN RIGHT TO LIEN IS WAIVED.—A mechanic's lien is waived or discharged where the parties enter into a special agreement inconsistent with the existence of the lien: as, for example, by the laborer or material man extending credit to the owner beyond the statutory period for bringing an action to enforce the lien.—*Flenniken v. Liscoe* (Supreme Ct. Minn.), 66 N. Y. W. Rep., 979.

A motion for an injunction was made at Victoria, B.C., before the Chief Justice in *Canessa v. Nicol* to restrain the defendant from quarrying stone on plaintiff's property on Gabriola island. Plaintiff and defendant last year made an agreement whereby defendant for the sum of \$25 was given the right to prospect on plaintiff's land, and for the sum of \$300 a year could quarry sandstone there, with a further proviso that defendant had the option of purchasing the land at \$10 an acre. Defendant decided to purchase, but plaintiff now alleges that when he signed the agreement he was not aware of the purchase clause in the agreement, and now wishes to eject defendant from the property. An affidavit on behalf of defendant stated that he is engaged in supplying stone from the quarry under contract for the new post office here. The court ordered that defendant be allowed to continue quarrying on payment into court of \$300.

PERSONAL.

Mr. James T. Davis, of the firm of Davis & Sons, canal contractors, had one of his shoulders dislocated in a runaway accident recently.

Mr. Andrew Onderdonk, the millionaire contractor, who has lately resided in New York, will take up his residence at Hamilton, Ont. He has leased "Highfield," the Turner homestead, which Lord Aberdeen occupied while a resident of that city.

Mr. William McNichol, of St. Catharines, a contractor on the Hamilton Radial Electric Railway, was accidentally killed at Hamilton on the 23rd of June while crossing the Grand Trunk railway tracks, by being struck by a train. Deceased was fifty years of age, and leaves a wife and two children.

Quarter-sawed boards and bastard-sawed boards neither shrink nor wear alike, hence they should not be used side by side for best floors.

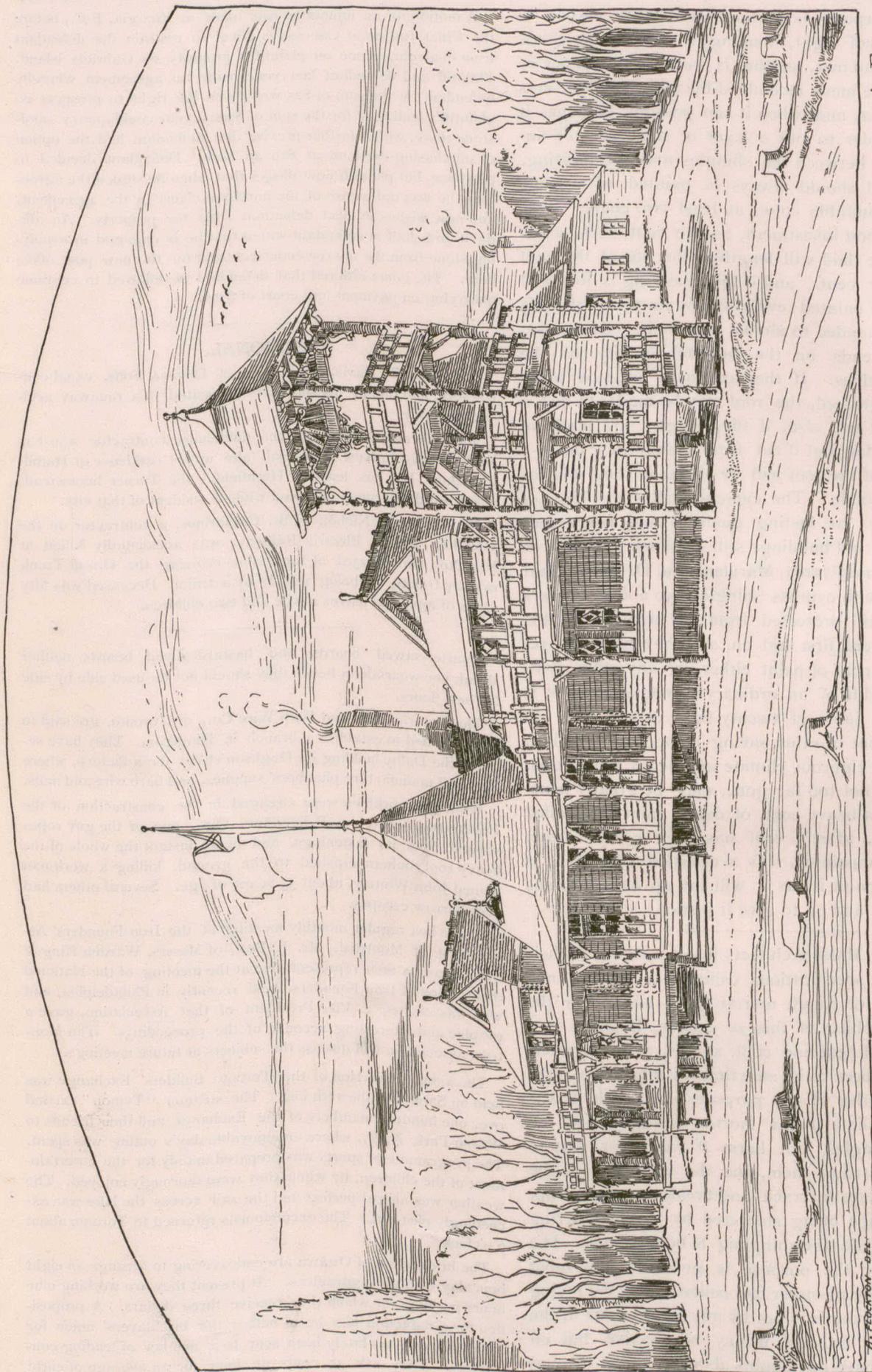
The Ontario Lead and Barb Wire Co., of Toronto, are said to have decided to establish a branch in Hamilton. They have secured the Dalby building on Hughson street for a factory, where they will manufacture plumbers' supplies, and barb wire and nails.

While the workmen were engaged in the construction of the Presbyterian church at Palmerston, Ont., one of the guy ropes slipped from its fastenings, and in an instant the whole of the heavy roof timbers crashed to the ground, killing a workman named John Whitely, about 35 years of age. Several others had very narrow escapes.

At the last regular monthly meeting of the Iron Founders' Association of Montreal, Mr. J. Best, of Messrs. Warden King & Son, who was their representative at the meeting of the National Association of Iron Founders, held recently in Philadelphia, and who was elected a Vice-President of that Association, gave a graphic and interesting account of the proceedings. The Montreal association will discuss the subjects at future meetings.

The annual excursion of the Toronto Builders' Exchange was held on Saturday, the 11th inst. The steamer "Tyron" carried over one hundred members of the Exchange and their friends to Wilson Park, N. Y., where an enjoyable day's outing was spent. The programme of sports was prepared mainly for the entertainment of the children, by whom they were thoroughly enjoyed. The weather was almost perfect and the sail across the lake was exceedingly pleasant. The excursionists returned to Toronto about 9 o'clock.

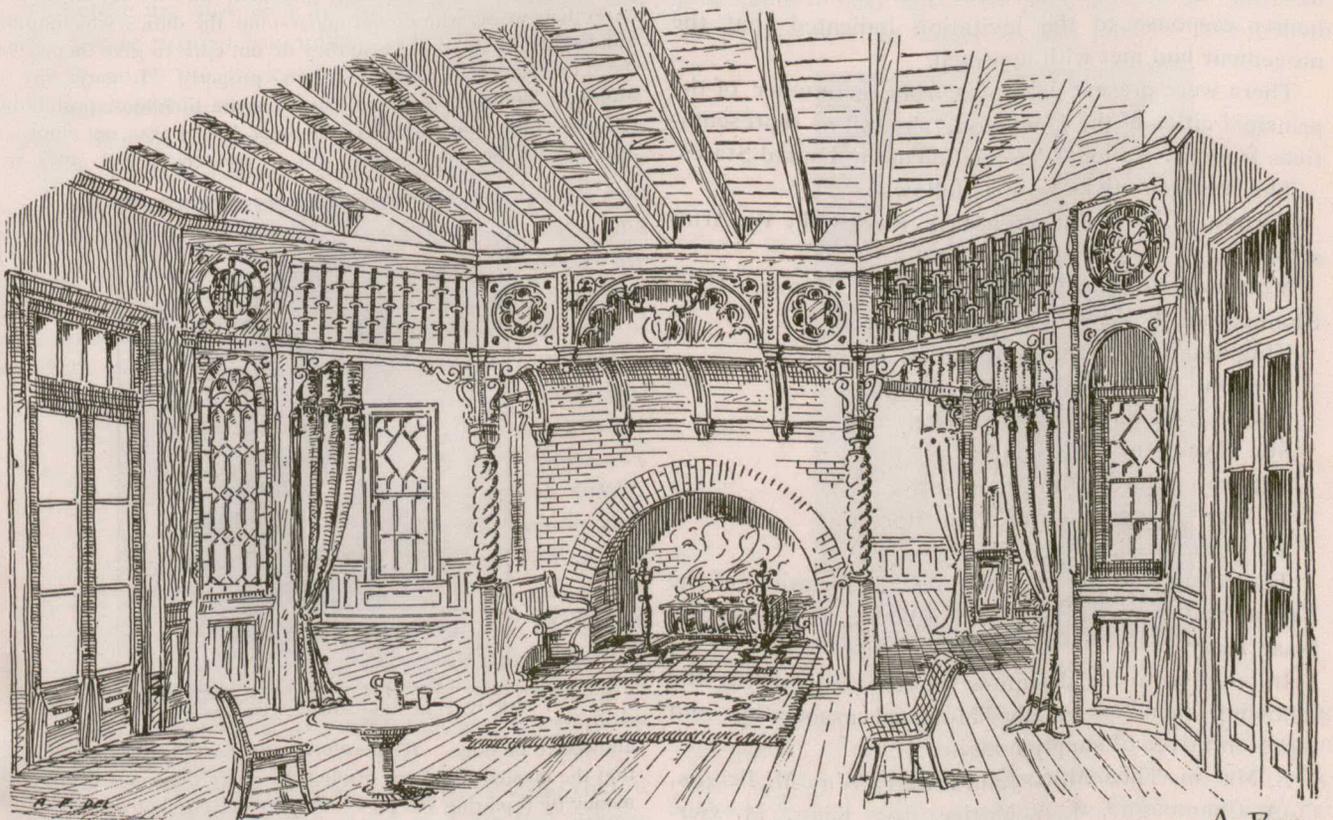
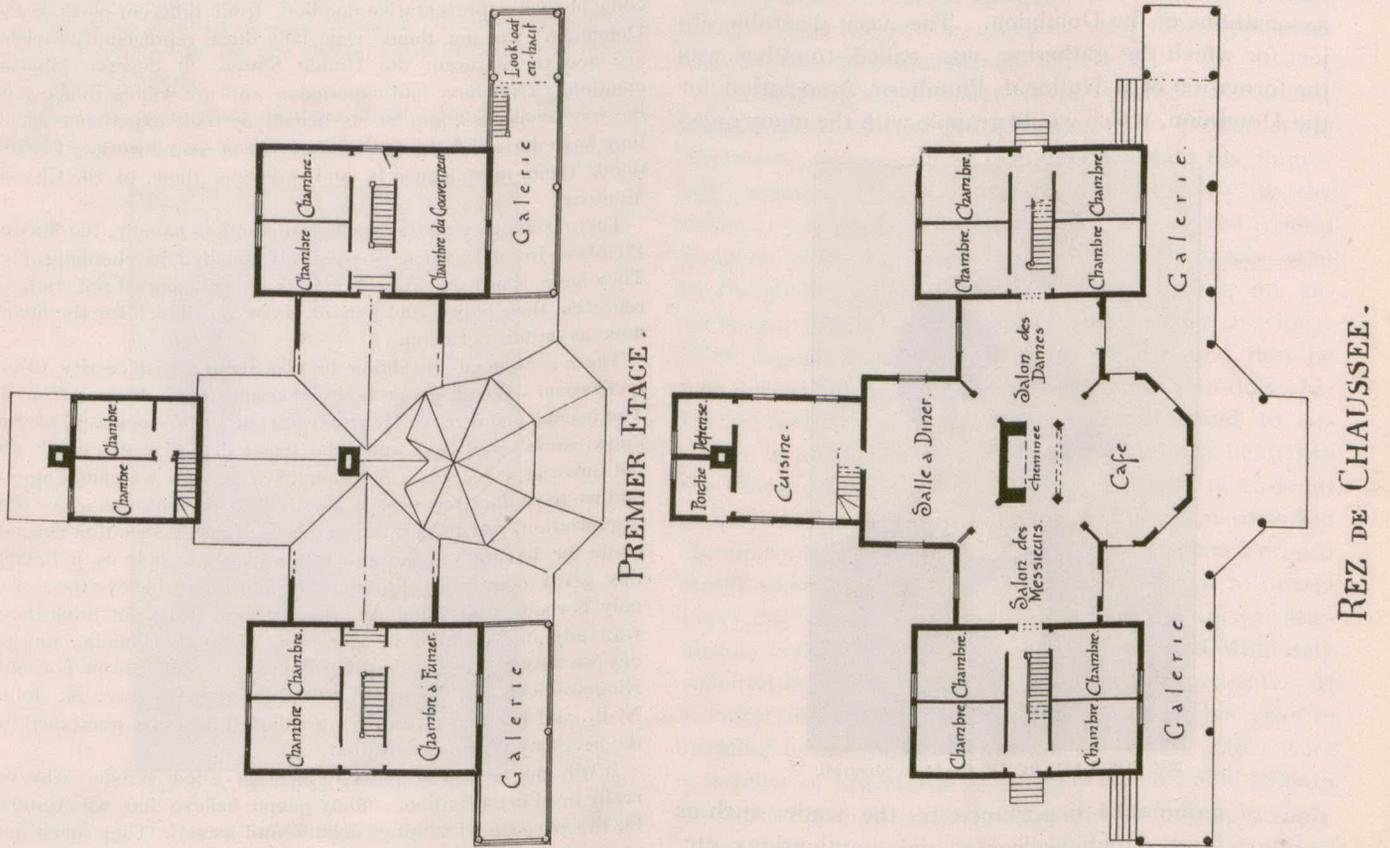
The bricklayers of Ottawa are endeavoring to arrange an eight hour day with the contractors. At present they are working nine hours per day, for which they receive three dollars. A proposition for a reduction has been before the bricklayers' union for some time and has lately been sent to a number of leading contractors. They ask 35 cents an hour for an average of eight hours a day during the week, arranged in such a way as to give a half holiday on Saturday. The contractors are believed to be adverse to the reduction on the above grounds, but are willing to pay wages at the rate of \$3 for nine hours, or 33 $\frac{1}{3}$ cents per hour.



A. Raza,
Architect.

Rendez-vous de Chasse et de Pêche
au Lac Chapleau.

H. FERRON, DEL.



A. Raza.
Architect.

Vue Intérieure du Cafe.

MASTER PLUMBERS.

ORGANIZATION OF A DOMINION ASSOCIATION.

AT the solicitation of the Master Plumbers' Association of Montreal, there convened in that city on the 2nd of July delegates from the different master plumbers' associations of the Dominion. The very desirable object for which the gathering was called together was the formation of a National Plumbers' Association for the Dominion, which would grapple with the many ques-



MR. JOS. LAMARCHE, President, Montreal.

tions of paramount importance to the trade, such as sanitary laws, plumbing licenses and examinations, etc. Letters were sent to each association requesting that a delegate be sent to represent their district, and the hearty response to the invitation indicated that the movement had met with approval.

There were present delegates from a number of the principal cities of the Dominion, as well as representatives from the National Association of the United States.

The representatives were as follows :

Toronto—W. J. Burroughes, A. Fiddes, F. W. Armstrong.

Montreal—Joseph Lamarche, E. C. Mount, Alph. Champagne, J. W. Hughes, P. J. Carroll.

Kingston—J. J. Jamieson, Robert Elliott.

London—R. J. Haslett, Wm. Smith.

Quebec—R. Sampson, O. Matte.

Ste. Hyacinthe—A. Blondin.

Ottawa—John McKinley.

Halifax—George Perrior, John Borton.

St. John, N. B.—J. H. Doody.

The delegates from the National Association of the United States were Messrs. J. F. Davlin, T. J. Tute and Isaac Riley.

In addition to the delegates there were present the following members of the Montreal association and representatives of supply houses :

S. Martin, Thos. Mott, John Foster, Wm. M. Briggs, C. A. Champagne, J. A. Marier, Jos. King, M. Germain, John Burns, Alf. Demers, John Watson, Lt. S. Stephenson, Fred. Horton, Geo. Henders, E. Lesperance, J. C. Jacotel, H. Baillie, Jas. Ballantyne, P. C. Ogilvie, Griffin Rosser, F. H. Barr, G. A. Berrier and Alf. Blais.

The chair was then taken by Mr. Joseph Lamarche, president of the local association, who addressed the delegates as follows :

GENTLEMEN :—In the name of the Master Plumbers' Association of Montreal, as Chairman, let me thank you most cordially for having accepted our invitation. I may state that we do not want to take all the honor upon ourselves of having convened this convention.

It is a long time since we desired to see the master plumbers united in one body, and we are very glad, therefore, that you come in such representative numbers from different parts of the Dominion. Let me thank especially those representatives who are here to represent the United States. It deserves special mention. They have had experience and are willing to show us the way to success, and let us benefit by their experience which they have derived from fourteen or fifteen years work. I really thank them most sincerely and welcome them to the City of Montreal.

There is another matter worthy of mention, namely, the Master Plumbers Journal, which is especially devoted to plumbing, etc. They have sent from New York Mr. Spiers, one of the staff, to represent their paper, and I thank them very much for the honor done us on this occasion.

There is no need of talking to you about the necessity of organization. We all know the good results to be obtained from it. The master plumbers of Montreal started an Association, as you know, some years ago, and did a great deal of work, but it did not turn out a success. A couple of years ago we united again, and we have done our best in Montreal to promote the success of organization, and I think the members of our Association deserve credit for having encouraged other places to help us in having this great convention to-day. At that time I believe there was only Toronto which had an organization. I do not think there was any organization in any other place in Canada, and to day we have representatives from ocean to ocean, from Toronto, Kingston, Ottawa, Montreal, St. Hyacinthe, Quebec, St. John, N. B., and Halifax, N. S. So gentlemen it says a good deal for the necessity of an organization.

It will not be out of place to mention a few reasons why we really need organization. Many people believe that we organize for the purpose of making dollars and cents. They must put away such an idea and we must make them understand we organize not for the reason they suppose, but in the interest of public health. There are many plumbers who do not know how to do their work, who do not understand the duties which appertain to their situation, or else they do not care to give themselves the trouble of executing them properly. I may say of Montreal, that a by-law was passed some time ago, prohibiting the use of tile pipe inside of buildings, but it was not enforced, and though the by-law was still in existence, bad work was



MR. W. J. BURROUGHES, Vice-President, Toronto.

allowed to be done. It therefore cannot be for dollars and cents that the master plumbers organized, since they can make more money by repairing tile pipes than by putting in iron ones. We organized, as I said before, in the interest of the public health.

Another reason is that a great many men go into this kind of work and know practically nothing about it, because they have served but a short apprenticeship; it is therefore the duty of this organization not only to look to the sanitary condition, but to see that proper workmen are turned out and fitted to do the work in the future. A third reason is that manufacturers and suppliers of all kinds are organizing to protect their own interests, and why should not we? We should not only organize in one particular city, but all through the country, all over the

Dominion, so that if necessary we can act in a body and maintain our rights.

As far as trade relations are concerned we have no other wish, but to live and let live. It is the only wish we have here, and I am certain there is no one who will refuse us the advantage of living as well as themselves.

Gentlemen let me thank you once more for having come here in such numbers, and let me express to you my heartiest feelings on the part of the Montreal Master Plumbers to have the honor of receiving you here for the first convention of the Dominion Master Plumbers of Canada.

Mr. Lamarche then made a short speech in French to those who did not understand English.



MR. J. W. HUGHES, Secretary, Montreal.

Mr. T. J. Tute, of Boston, was called upon to address the meeting. He said: I second Mr. Lamarche in saying that we have labored for fifteen years and have still work before us, not as a matter of making dollars and cents, but to protect the public. In building a school it is not so much the brick, the woodwork, and the painting that should be closely attended to, as the sanitary work. Where your children, my children, and children of the world are to meet it is most necessary that they have pure air to breathe, live and work in. When you go on board a steamer the first thing almost that one notices is a card hanging upon the wall indicating the qualifications of the engineer. It is just as important for our trade to have this same qualification. The world may call us the thieving, robbing plumbers; but, gentlemen, thieves and robbers grow rich, but you can find very few rich plumbers. We want to protect our own interests and to keep out impurity, and let innocence be uppermost, where God-like people may dwell in safety. And how are we to do it? It is by clasping hands with one another, with honorable, upright men throughout the world, to try and protect humanity from the cradle to the grave. We most heartily extend that protection to you to its utmost limit, and will always be pleased to do what we can to help you. We are all brothers of one family. You have my best and hearty sympathy and support.

Mr. F. J. Davlin, of Boston, followed, stating that it gave him much pleasure to extend to Canadian master plumbers the fraternal greetings of the master plumbers of the United States, and assure them of their hearty support at all times. Do not be backward, he said, in calling for aid, assistance or information that our association has in its power to give you.

Mr. I. Riley, another delegate from the United States association, was then called upon, and expressed his

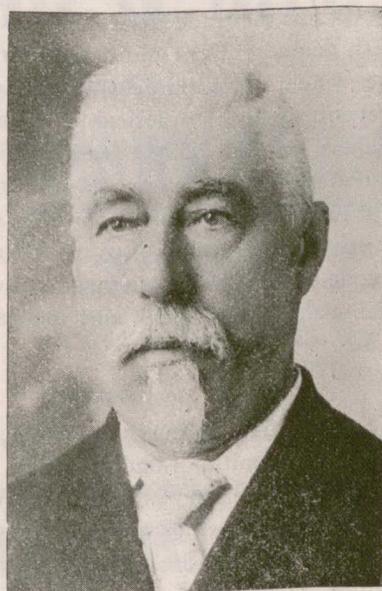
pleasure at being present, and at seeing such a large number present.

The President stated that he had only taken the chair pro tem, but he was requested to continue in office, and Mr. J. W. Hughes, of Montreal, was appointed temporary secretary.

Messrs. R. F. Elliott, Kingston; F. W. Armstrong, Toronto, and O. Matte, Quebec, were then appointed a committee on credentials.

Mr. Burroughes, President of the Toronto Association, was asked to address the delegates. He related some interesting circumstances in connection with the plumbing business in Toronto, referring particularly to the strike of journeymen plumbers over the apprenticeship question in the year 1888, and which was finally won by the master plumbers, as the result of having an association, which had only been formed a year previous. With regard to association matters, he stated that he had always taken a great interest in them and done his best to further the interests of associations and to organize in adjacent cities. About a year ago he wrote the Montreal association about forming a national society, and it was decided that the Montreal association should look after the eastern provinces, and that Toronto would look after the west. Letters were sent to nearly every city in the Dominion, and in every instance a satisfactory reply was received. These steps had ultimately resulted in the meeting at which they were present. At London and Hamilton they had succeeded this year in forming associations. Adjoining these two cities were a number of towns, the plumbers of which would affiliate with the associations of London and Hamilton.

Mr. Borton, president of the Halifax association, said that as regards their association, it had only been organized about a year ago. At that time they saw that something must be done, as the jobbers down there



MR. A. FIDDES, Treasurer, Toronto.

were making a slaughter house of Halifax. A meeting was called, and after a little hard work the association was formed. There were three plumbers, he said, who did not belong to the association in Halifax, and who at the present time cannot get their goods in Canada, but they were getting them from the United States. This was causing the association some trouble.

Mr. Moody, of St. John, N. B., said that St. John was the first to move in the direction of forming an association in the maritime provinces, and Halifax followed. The latter branch, he admitted, had made

greater progress and had a larger membership than St. John.

The following were appointed as members of the committee on constitution and by-laws: Messrs. J. W. Hughes, Montreal; J. J. Jamieson, Kingston; W. J. Burroughes, Toronto; R. J. Haslett, London; R. Sampson, Quebec; A. Blondin, St. Hyacinthe; J. McKinley, Ottawa; J. Borton, Halifax; J. H. Doody, St. John, N. B., and R. F. Elliott, Kingston.

After a few words from Mr. R. F. Elliott, mayor of Kingston, the convention adjourned for lunch.

On reassembling, Mr. E. C. Mount was appointed sergeant-at-arms, and Mr. Hughes read the constitution and by-laws which the Legislative Committee had adopted, being those governing the National Association of Master Plumbers of the United States, with such amendments as were necessary to make the same conform to Canada. The by-laws were read clause by clause and adopted. They provided that the organization should be known as the National Association of Master Plumbers of the Dominion of Canada. It was organized for sanitary, commercial and social purposes, and had for its special objects the advancement appertaining to sanitary laws; to promote and combine the interests of the trade in the latest discoveries in sanitary science; the protection of the trade against imposition, injustice or encroachment upon their common rights or interests; encouraging inventions or improvements in sanitary appliances, fostering an interchange of thought, and eliciting and communicating for the benefit of each member the best talent and result of the experience and ability of all; to promote amicable relations with employees, on the basis of mutual interest and equitable justice to both journeymen and master plumbers; to encourage Dominion and Provincial legislation for the furtherance of the interest of sanitary laws; to secure for the members of the trade equitable treatment in their dealings with manufacturers and dealers in supplies; to regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils growing out of deficient training in the responsible duties of selecting, arranging, and fitting up materials relating to the hydraulic and sanitary condition of dwellings, public and private institutions; to create and maintain a sanitary code at as high a standard as the progress of science (chemical, philosophical and mechanical knowledge) teaches.

ELECTION OF OFFICERS.

Messrs. R. F. Elliott, Kingston, Alph. Champagne, Montreal, and W. Smith, London, were appointed a Nomination Committee, and reported in favor of the appointment of the following officers: President, Mr. Joseph Lamarche, Montreal; vice-president, Mr. W. J. Burroughes, Toronto; vice-presidents from each province represented, Messrs. William Smith, Ontario, O. Matte, Quebec, J. H. Doody, New Brunswick, and John Borton, Nova Scotia; financial and recording secretary, Mr. J. W. Hughes, Montreal; treasurer, Mr. Fiddes, Toronto; executive committee, to act in conjunction with the officers of the association, Ontario, R. F. Elliott, Quebec, E. C. Mount, New Brunswick, Thos. Campbell, Nova Scotia, Geo. A. Perior.

The report was unanimously adopted, after which the newly-elected officers returned thanks for the honor conferred upon them. Adjournment was then announced until 8 p. m., when the members met in secret session, at

which the question of a protective policy was considered and the matter left in the hands of the executive committee.

SECOND DAY.

At 10 o'clock of the following day the convention resumed.

In the absence of Mr. E. C. Mount, who was on the previous day appointed sergeant-at-arms, Mr. O. Matte, of Quebec, was appointed to act in his stead during the morning session.

At the request of the President, the delegates from the several associations reported the number of active members on the rolls as follows:—Halifax, 27; Montreal, 75; St. John, N. B., 12; Toronto, 35; London, Ont., 15; Ottawa, 9; Quebec, 37; Kingston, 7; Hamilton, 12; St. Catharines, 2; Toronto Junction, 1; Peterboro, 1; Galt, 2. St. Hyacinthe has no association, but a representative was present. The United States Association was stated to have a membership of 6,000.

The President reported that it had been decided to compose the Legislative Committee as under:—Messrs. J. McKinley, Ottawa, chairman; F. G. Johnson, Ottawa; A. Blondin, St. Hyacinthe; R. Sampson, Quebec; James Farquhar, Halifax.

The President announced that at 2 o'clock an official reception would be given by the mayor at the city hall, after which they would enjoy a drive through the city.

NEXT PLACE OF MEETING.

The selection of the place of meeting for the next convention was then taken up. Motions were offered in favor of Toronto, Kingston and Quebec. A vote was taken, with the result that Toronto was chosen as the meeting place for the second convention, the date to be fixed by the Executive Committee.

Mr. Hughes moved a vote of thanks to the National Association of Master Plumbers of the United States, which was acknowledged by Messrs. Davlin, Tute and Riley.

Mr. Elliott moved that the thanks be hereby tendered to the press for favors received, especially to Hardware and Metal, THE CANADIAN ARCHITECT AND BUILDER, and last, but not the least, to the Plumbers Trade Journal, and the able representatives sent here to assist us.

The President then called upon Lieut.-Col. Massey, of the Gurney-Massey Co., Montreal, to address the meeting.

Mr. Massey: I need scarcely assure you all that I did not expect you to call on me to say address you this morning. I should, however, fall very far short of my duty if I did not at once accede to your request. As a Montrealer in business here I can only assure those gentlemen from a distance who have come to assist you in forming a plumbers' association in the Dominion of Canada, that we are exceedingly glad to have you come to our city. I think the object of your association is very commendable. The duties of the Montreal association have been very carefully carried out heretofore. I have always loved to learn, and find that in going from place to place we can always derive a great benefit. I trust you may all have a very pleasant stay in Montreal.

Mr. Elliott moved, seconded by Mr. Burroughes, that the master plumbers of the Dominion desire to tender their sincere thanks to the Montreal Master Plumbers' Association for the hearty manner in which they have been received.

The motion was carried amid applause.

Votes of thanks were accorded to the president and secretary, which were suitably acknowledged.

The President then announced the adjournment of the convention.

SOCIAL FEATURES.

At 2 p. m. on the second day the delegates were received by His Worship, Mayor Wilson-Smith, at the city hall. A brief address of welcome was delivered by the Mayor, in which he stated that it was a matter for congratulation that so many business men of practical experience had gathered together to exchange ideas and aid the progress of a science which afforded protection, indirectly, to the commercial prosperity of the country. A visit was also made to the Council chamber, after which the delegates enjoyed a drive round the city by the courtesy of the Montreal members. At 5 p. m. the train was taken for Lachine, where a steamer was taken which carried them down the Lachine rapids.

In the evening the members celebrated the organization of a Dominion Association by a banquet at the Richelieu Hotel. About one hundred persons were present, and the chair was filled by the newly-elected president. The toast of the "Queen" was duly honored, and the health of "The Supply Houses" was responded to by Lieut.-Col. Massey, of the Gurney-Massey Co.; Mr. Sullivan, of Warden King & Son; Mr. McConochy, of Thomas Robertson & Co.; Mr. Glassford, of James Morrison, Toronto, and Mr. Anthes, of the Toronto Foundry Co. Other toasts were "The Visiting Delegates," "The Chairman," and "The Press," to which brief responses were made.

A strong effort is being made by the architects of the state of Washington to have congress make an appropriation to provide for the investigation and testing of American timber, with particular reference to Washington fir. The bill as now proposed, provides for an appropriation of \$40,000 for the purpose, of which at least thirty per cent. shall be devoted to the testing of timber of the Pacific coast.

A class in bricklaying has been established in San Francisco, Cal., by a resident bricklayer who has been engaged in business for many years. The class is composed of boys from ten years of age upward, who take a lesson every day after school hours, and also on Saturday. An hour is spent in drawing to scale that which they build during the week. The pupils are the sons of the leading contractors of the city, and instruction is given in laying Roman, common and press brick, as well as how to do all kinds of work pertaining to the trade.

THE Gurney Foundry Company, Limited, of Toronto and Montreal, have recently opened large showrooms at 75 Finsbury Pavement, E.C., where they display a quantity of their hot water boilers and radiators (low pressure). After careful inspection their manufactures seem to be of the highest quality, both in materials and workmanship. This system of heating has given great satisfaction where it has been installed, and we may mention the following buildings in which this system may be seen in use:—The Tivoli Music Hall and Restaurant; the Union Bank, Princes Street, E.C.; the Garrick Theatre; Sir Charles Tupper's residence; Peek, Winch & Co., New Buildings, Eastcheap; London and Midland Bank, Peckham; and the New Fish Market, Farringdon Road, E.C.—British Architect.

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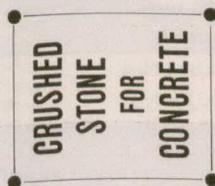
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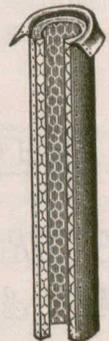
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ILLUSTRATIONS.

POST OFFICE, CUSTOMS, AND INLAND REVENUE OFFICES,
VICTORIA, B. C.—THOS. FULLER, OTTAWA, ARCHITECT.

This building is being constructed on a plot of land bounded by Government, Courtney, Wharf and Humboldt streets. The outside walls are to be built of grey cretaceous sandstone from Gabriola Island, on a basement of granite, the partitions of the basement and ground floor to be brick, and the remaining partition, as well as the floors and roof, of wood, the roof covering to be of copper. There is to be a main portion, 136 ft. by 75 ft., having three full storeys, a basement and a mansard, and also an L-shaped annex of one storey and basement, having frontages of 107 feet and 103 feet on Courtney and Wharf streets respectively.

The main building is to be apportioned as follows:—The basement to the heating apparatus, fuel, stores, water closets, etc.; the ground floor to the local post office; the first floor to the customs and finance; the second floor to the Inland Revenue and post office inspector's office, and the finished portion of the attic to the caretaker for a residence.

The annex will consist of a portion 75 feet by 26 feet, devoted to stores, a portion 109 ft. by 38 ft. for a bonded warehouse, and, in rear of the warehouse, a one-storey drive-way 30 ft. by 29 ft. The drive-way is 13 ft. wide, paved with granite, and leads from Humboldt street to the yard. Seven fire proof vaults are to be provided for the use of the several departments occupying the building. The building will be heated throughout by hot water direct heating.

Plans, specifications, and details for all the works, including fittings, heating, etc., were prepared by the

Chief Architect of the Department of Public Works, Mr. Thos. Fuller, and the work is being carried out under the supervision of F. C. Gamble, departmental resident engineer at Victoria, B. C. The contractors for the construction of the building are Messrs. Elford Smith, Victoria, B. C., the fittings and heating not yet being contracted for.

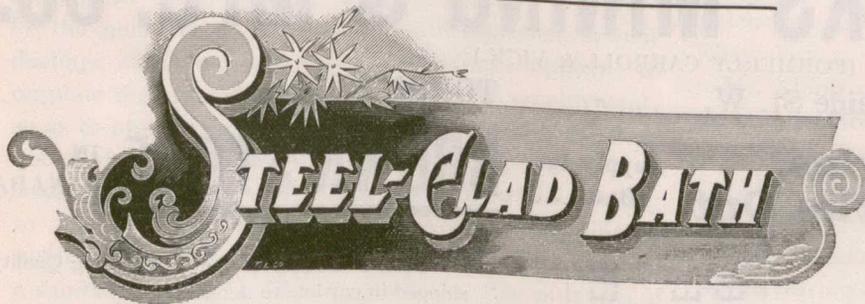
CEMENT SIDEWALKS.

REPLYING to a correspondent who has had difficulty in making a cement sidewalk retain a smooth surface, a writer in Paving and Municipal Engineering says:—

"While the top mixture should be thoroughly rammed or beaten and well troweled, yet this treatment should not be continued so long as to bring to the surface a considerable quantity of neat cement, thus leaving the layer of mortar next below without sufficient cement to bind it together. If this is done, the thin layer of neat cement may flake off when set, revealing a layer of almost clear sand below. A similar result obtains if one attempts to retrowel a surface once finished and partially set but afterward defaced. Sprinkling the walk before the cement has thoroughly set may cause blisters which mar the appearance of the work; on the other hand, the walk should be protected from the direct rays of the hot sun, or surface cracks may result."

The following rules for the use of cement in freezing weather will be found useful:—As little water should be used as will permit a thorough incorporation of the materials. The water, sand, and stone may well be heated to about 100 degs. F., and in any case should be above 32 degs. F. Salt may be used in small quantities to delay freezing until the work is in place, or in larger quantities to prevent freezing until the cement has set and hardened sufficiently to resist the destructive tendency of the freezing weather.—Municipal Engineering.

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