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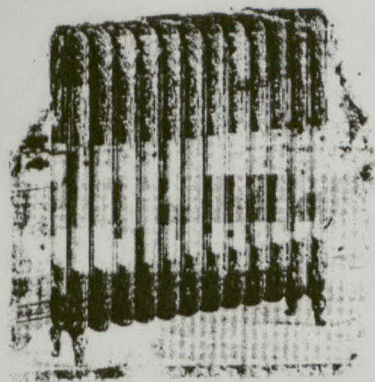
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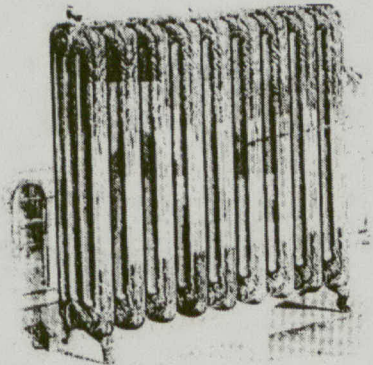
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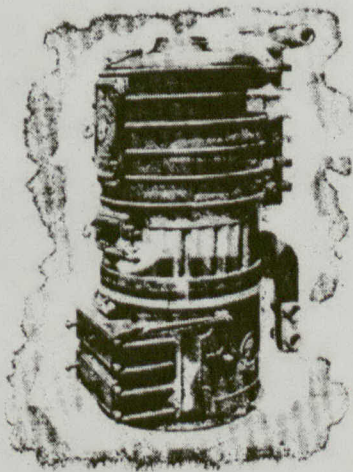
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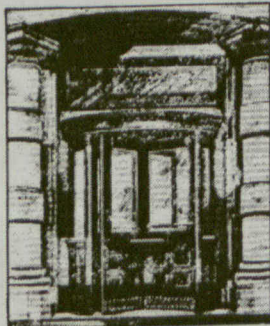
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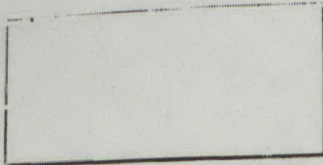
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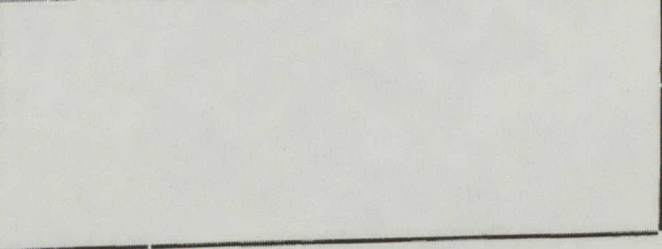
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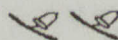
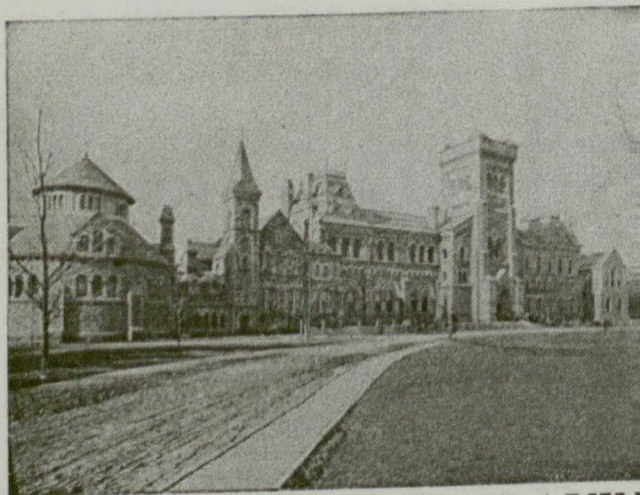
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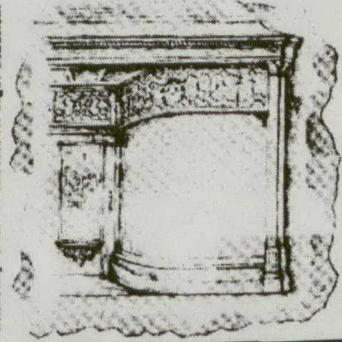
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# The Canadian Architect and Builder

JUNE, 1903.

VOL. XVI.—No. 186.

## ILLUSTRATIONS ON SHEETS.

House in Crescent Road, Toronto.—S. H. Townsend, Architect.  
 Exterior and Interior Views of House in Roxborough Street East.—Chadwick & Beckett, Architects.  
 An Interior—The Ceiling in a Single Tone of Old Plaster Color; the Frieze an Original Mural Painting in Oil;  
 Wood-work, Dark Weathered Oak.—Decorations by W. H. Elliott & Son Co., Toronto.

## ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Four views showing Interior of Board Room and Offices of Canada Permanent and Western Mortgage Corporation,  
 Toronto, Frank Darling and R. J. Edwards, Associate Architects.

## ILLUSTRATIONS IN TEXT.

Views and Plans of a London House and its Surroundings.

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 " FREDERICK G. TODD, Landscape Architect, Montreal  
 " W. H. ELLIOTT, Toronto.  
 " J. C. B. HORWOOD, Architect, Toronto.  
 " A. F. DUNLOP, R.C.A., Architect, Montreal.  
 " FRED. T. HODGSON, Architect, Collingwood, Ont.

### Canadian Building Materials for Japan.

The Hon. Sydney Fisher, who has recently returned from a visit to Japan in connection with the exhibit which Canada is to have at the Osaka Exhibition, states that a market exists there for various lines of Canadian products natural and manufactured. These include lumber, furniture and sheet metal building material. The Japanese Minister of Education was greatly impressed with the adaptability to school building of the metal roofing and ceiling material forming part of the Canadian exhibit, and promised to send one of his architects to inspect it.

### Brick Tests.

The result of a series of tests made to determine the weak points of bricks under different conditions, was recently presented to the American Society of Civil Engineers in the form of a paper containing numerous tables and illustrated by photographs and diagrams. Tests were made for compression, tension, bending shear and torsion, the following being shown to be the order of increase in strength: Tension, shear, torsion bending compression. Further the tests showed that water does not cause deterioration in strength, while reheating greatly improves the quality.

### Effect of Climatic Conditions on Cost of Building.

The opinions of more than twenty-five representative Canadian architects and contractors as to the relative advantages and economy of finishing buildings in winter and summer, are printed in the present number. The subject is considered from every point of view. The letters make interesting and instructive reading, and should help to settle in the minds of building owners, architects and contractors, an important question on which there has hitherto been wide divergence of opinion. The consensus of opinion expressed by our correspondents is strongly in favor of the advantage of summer work. Many good and apparently sufficient reasons are given in support of this view, although the minority who hold to the opposite belief, are not without reasons to support their position. There are many questions of perhaps equal importance on which a comparison of experiences would be profitable.

### Fireproofing That is Not Fireproof.

The destruction of the Roosevelt Building in New York teaches that it is useless to spend money in fireproofing buildings unless every detail of the work is thoroughly done. This building was supposed to be

fireproof. The floors were of steel beams and terra cotta arches, the flanges protected and the space above the arches filled in with concrete. It had a tile roof. But, one of the elevator shafts was unprotected, the columns supporting the different floors were of cast iron, unprotected, and there were numerous partitions glazed in the upper portion with ordinary glass. These caused the destruction of the building. The fire shot up the elevator shaft, the unprotected cast iron columns and glass partitions cracked and gave way, letting down the roof and upper floors, which in falling broke through the lower floors. Fireproofing done in this manner is not only a waste of money but the destruction of the buildings thus carelessly constructed has weakened the confidence of the underwriters and the public in the possibility of making buildings fireproof.

#### Strikes in the Building Trades.

The Engineering Review hits the nail on the head when it says: "The building trades seem to have rooted objection to work. At least, history shows that whenever there seems to be an excellent chance for them and their employers to make some money they, more than any other class of working men, make demands which tend to restrict building operations and throw themselves, or many of themselves, out of work." The truth of this statement was never more forcibly illustrated than this year, when the prospects for an unusually prosperous season have been to a large extent blighted by strikes. It is a pity that the wisdom of the axiom "make hay while the sun shines," is so foolishly disregarded by the workman of to-day. When the summer is ended and the coal bin needs replenishing it will perhaps begin to dawn upon the strikers that they would have been better off had they worked steadily all the year at a few cents an hour below what they demanded and were refused. Labor, unlike many other commodities, cannot be stored away and sold, perhaps at a greater profit, at a later date. The workman who refuses to sell his labor to-day is out of pocket for all time the money he might have obtained for it.

#### Peculiarities of Bricks Composing the Campanile.

Some interesting data, gathered from careful examination of the bricks used in the construction of the fallen Campanile at Venice, is said to have been presented in a recent lecture by Commendatore Boni to the History Congress at Rome. The lecture was illustrated by drawings. The bricks are said to have been manufactured in the first century, not from kneaded and compressed clay, as at the present day, but from slices of the natural clay. On this account each individual brick is believed to have a supporting strength four times as great as the bricks of to-day. The lecturer exhibited specimens of bricks which he had made out of Roman clay in the same manner as the ancient ones, with the object of showing that the new Campanile might be built of the same enduring material as the old. Some of the ancient bricks are curiously marked with figures, numbers, private marks and letters. Signor Boni infers from their shape, texture and general appearance that they were made not by the Venetians, but by the Romans, and prior to being built into the Campanile had been used in fortifications and other forms of construction.

#### The Duty of Committees of Award.

Messrs. G. F. Bodley, R. A., and R. Norman Shaw, R. A., assessors in the Liverpool Cathedral Competition, have presented their report. They give first position to the design by Mr. Gilbert Scott, grandson of Sir Gilbert Scott. The Builder states that Mr. Scott's design entirely ignored an important condition set forth in the instructions to the competitors, viz., that the plan of the cathedral should provide for a wide open space for a large congregation within hearing of the preacher. It is probably for this reason that the Committee have expressed their intention not to accept any of the designs. We were surprised not long since to hear several architects engaged in conversation about competitions, state that it was their practice when preparing plans for a competition to ignore the limit of cost set for the proposed building. It is manifestly unjust to the competitor who honestly strives to strictly conform to all the conditions laid down, and who perhaps is hampered because of his conscientiousness in this regard, that his design should be passed over in favor of the man who sets himself to produce something which will catch the fancy of the assessors, regardless of the conditions.

#### ERRATA.

Through oversight the name of Mr. Frank Darling does not appear on the illustration sheets in this number showing views of the interior of the Canada Permanent and Western Mortgage Company's Offices and Board Room, Toronto. Mr. Edwards writes that Mr. Darling and himself were joint architects in the planning of these improvements.

#### EMPLOYMENT WANTED BY BRITISH BUILDING MECHANICS.

538 Oxford St., London, W., England.

May 31st, 1903.

To the Editor of the CANADIAN ARCHITECT AND BUILDER.

Sir,—Hearing that men are wanted in the building trades in Canada, may I suggest to you the formation of a similar society to the "Canadian Farmers Help Society." There are many men of good experience with references as to their workmanship and reliability who are quite unable to get good permanent work here in London. The work that is offered is so desultory and has no permanence except in a minority of cases. Taking myself as an example, I have had three and a half months work this year, and although I have worked to my employers' satisfaction and have good references, I am quite dependant on taking my chance with two or three hundred other applicants for the very few berths on offer here in England. Should you consider this any further or care to throw your columns open to a few advertisements from men in London wanting work in Canada, I feel sure that there would be many hundreds of men to avail themselves of your kindness. Thanking you in anticipation.

I am Sirs

Yours sincerely,

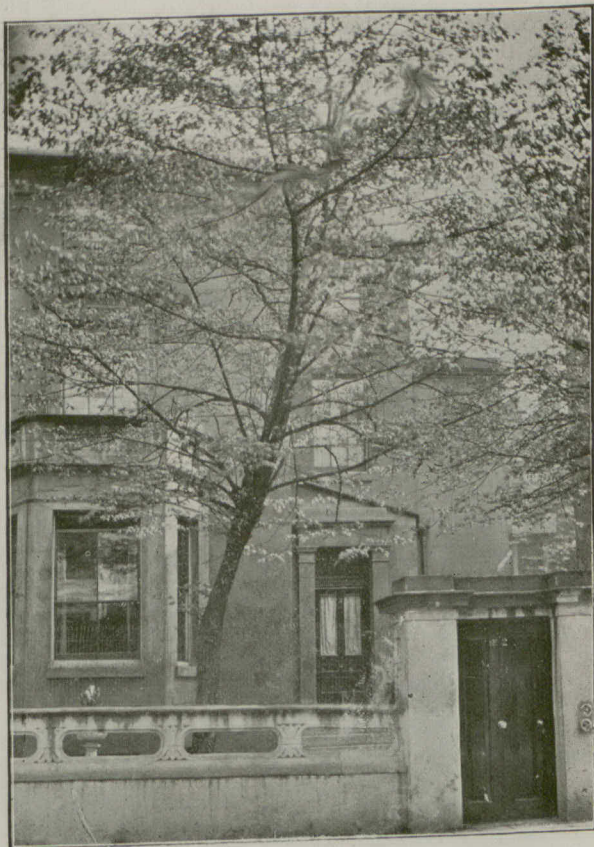
ROBERT H. BAKER.

[There is at present a brisk demand in Canada for building mechanics, as well as mechanics of all kinds, but the trade unions are demanding higher wages and shorter hours, and are strongly objecting to mechanics being brought in from Great Britain. There is no doubt, however, that competent workmen coming here at the present time would be certain to find employment at air wages. We hope that some of the workmen who find it difficult to obtain regular employment in London, may find their way to Canada. If they are competent and sober, they can rely upon getting employment.—EDITOR, C. A. & B.]

NOTES OF TRAVEL.—I.

A LONDON HOUSE AND ITS SURROUNDINGS.

The accompanying plan shows a typical west end house of the smaller size in a good neighborhood.



VIEW OF FRONT OF HOUSE.

The plan itself is interesting, and to my mind shows a true elegance obtained by dispensing with certain

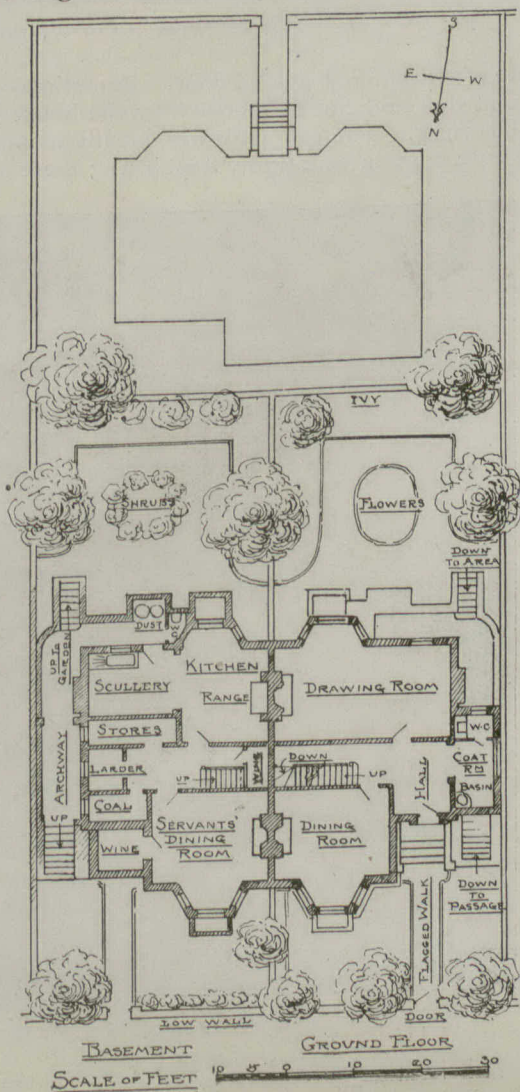
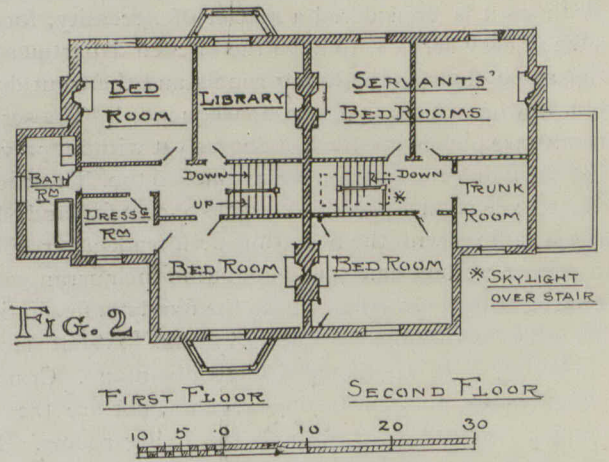


FIG 1

conditions which are usually, in Ontario at any rate, considered to be indispensable in the plan of a first-class house. In the first instance the single flight of stairs will attract attention. It is considered, with us, a matter of the first importance that every house, no matter how small, that pretends, though a cottage, to



be "a cottage of gentility," should have a back stair. The greatest pains can not prevent this stair injuring the simplicity of the ground floor, and thereby adding to the cost to an extent that does not appear in the cubical contents of the staircase itself; and unless sufficient space is taken to disconnect it from the kitchen it is a sure means of conveying the smell of cooking from the kitchen to the rest of the house. The gains on the other side are that servants will not be encountered on the stair from ground to first floor, which is the extent of the back stair in this sort of house, and that the stair carpet on this stair lasts longer. The latter point must be yielded; but, if the stair is well placed—as it is in the example here given—the passage of servants is no real trouble. In the old days, when slops had to come downstairs to be carried out of the house, the back stairs had a reason for existence even in small houses; but now-a-days there is no actual traffic on the main stair during the day. It affords a means of access to the housemaid's up-stairs work; that is all. As far as the approach to the servants' bedrooms goes, it is generally conceded that this should merge in the family lines of communication for some part of its way, and that communication with the kitchen should not be too easy. It seems therefore as if too much can be made of the desirability of a back stair, and that a retired arrangement of the main stair, something after the manner of the stair in this plan, might be substituted with advantage for small houses.

The principal reason however, why the ground floor, in the plan before us, is so simple is that it has no service rooms. It would be undoubtedly better, for easy service, and the care of glass and china, to move the lavatory back and the entrance and dining room to the right and slip in a service pantry entered from a sort of back hall, formed under the stair landing by moving the door at the head of the stairs to the face of the landing at there-turn. But how this spoils the hall, complicates the plumbing and makes tight work of the entrance and area steps, taking from

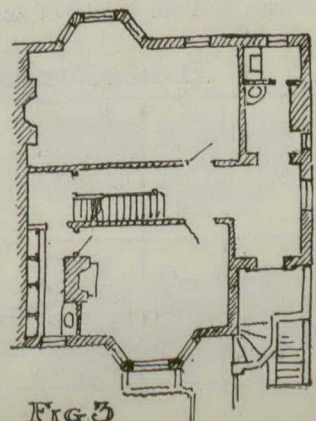


FIG 3

them their present dignity! There is however no doubt that the ground floor service room should be managed somehow. It is quite otherwise with the kitchen; the beauty, not only of this house, but of the whole neighbourhood, lies in the basement kitchen; and here is the point best worth considering about the London house. With us it is considered a matter of necessity, for the sake of easy service, to have the kitchen department on the same floor as the living rooms and the front door; but how much we suffer in consequence! The service rooms are pinched to the last degree yet without preventing the living rooms from being pinched too. The kitchen must, except on a prohibitive scale of cost for land, share the best floor with the best rooms; intrude a perceptible presence among them; and condition their arrangement and lighting. In other words the family suffer in order to give advantage to the servants. What is this advantage? It is not an all around advantage. Cramped quarters are no gain to the servants, nor are they any happier for being so close to the living rooms. It is chiefly for convenient communication with the dining room and the front door that the kitchen department is placed on the ground floor; and the insertion on the ground floor of a serving pantry, with a sink and with cupboards for china and glass, fairly meets this necessity; for the maid, whose duty it is to attend to the front door during most of the day, will have her special quarters in this pantry. If ease of service for the dining room and front door is met in this way, the balance of advantage seems to be in favor of a basement kitchen, merely from the servants' point of view; for there will be ample quarters, isolated and distinct, and comfortable in summer as well as in winter. We are apt to think of a basement as a damp and dreary place; and so they are in houses where the basement is not used, and is not built for use; but these high, airy and dry English basements are quite another thing, and indeed it is more sanitary for the rest of the house that the cellar should be kept warm and dry by being occupied. But the great gain is in point of beauty and cost; larger rooms on the ground floor for the same money, and every room with a free look out.

It is in the matter of look out that the London house is such a useful study of how to make the most of a town lot. It is not an individual work; all the houses in the block must be planned with the same idea: If the custom is not already established it is a case for building restrictions; and in the borough of Kensington, where the house before us is situated, the law comes in also forbidding the drying of clothes in gardens. The result is a block of buildings as in Fig 4.

The kitchens are all invisible and there are no back yards—except in the American sense of ornamental ground. Ashes and rubbish are placed in two large cans which have a place of their own, outside in the kitchen area of every house, where they are concealed from view, but readily accessible to the dustman on his rounds. Rag and bottle men and all kinds of waste

users also thrive in London. The result is a clear area, on both sides of the house, which is devoted to trees, shrubs and flowers in borders, and either paved or tamped hard with London red earth mixed with gravel. The street fence is a low wall, usually of brick plain or stuccoed and painted like the house. The divisions inside the lot are often of inconspicuous iron. Sometimes there is a stone or terra cotta balustrade on top. An interesting feature is the gate which rises up between posts, no matter how low the wall is, and is



FIG. 5.—VIEW FROM DRAWING ROOM WINDOW.

more often than not a solid door. Sometimes this door is kept shut and can be opened from the house when the bell is rung. The bell pulls are usually in any case in the gate post, in beautifully kept brass; there are a pair,

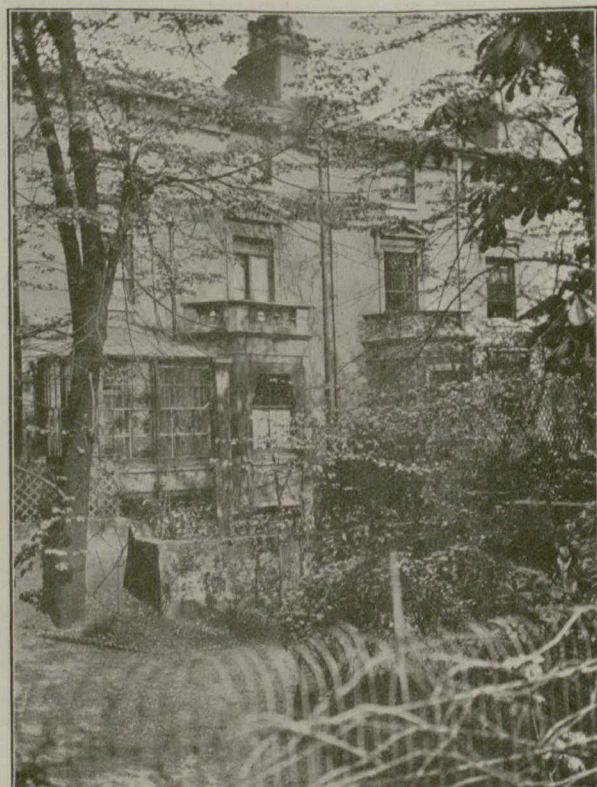
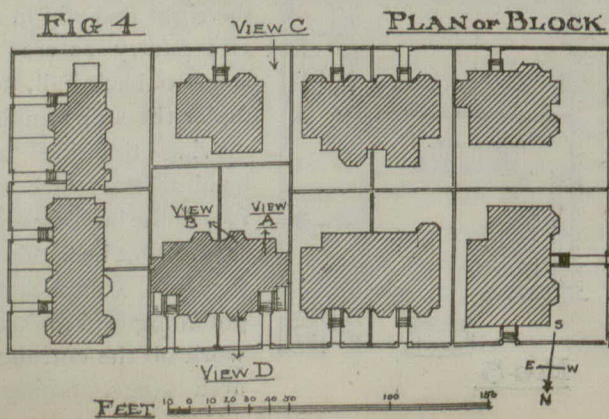


FIG. 6.—FROM DRAWING ROOM BAY WINDOW.

one labelled "visitors" and one "tradesmen" so that the servant within knows whether to go to the door upstairs or downstairs.

W. A. LANGTON.



RELATIVE COST OF DOING WORK IN WINTER AND SUMMER.

A difference of opinion seems to exist among architects and builders as to whether the inside work on a building can be done more cheaply in winter than in summer, and whether a contractor is justified in submitting lower tenders for such work to be done in winter. The arguments pro and con will be found in the following letters recently received from representative architects and contractors throughout Canada:

TORONTO, April 29th, 1903.

I consider the contractor is justified in submitting a lower tender for work on a building to be executed in the winter season. At the same time my experience and observation has been that a client who is obliged to pay for caretaker and for fuel during the construction, also for loss of interest on the work, does not save anything thereby. My advice in future will be for my client to make as early a start as possible in the Spring, and excepting strikes, I think that his work would cost less and he would be farther ahead by the end of the season.

GEO. W. GOINLOCK.

TORONTO, April 30th, 1903.

With respect to plastering in winter or summer months would say that the extra cost for plastering in winter as against summer is about 2 per cent., but occasionally a contractor being slack and wanting to keep his men employed will cut the figure a little for that particular purpose. This does not include furnishing heat which would still add about 4 per cent.

J. M. GANDER.

MONTREAL, April 30th, 1903.

As to the comparative advantage of doing inside iron work in winter or summer, we may say that according to our experience there is very little difference. There may be an apparent difference in lower wages in the winter, but taking the cold into account, which frequently prevents men from doing their best, and the cost of heating, which is a large item, it brings the cost of producing the work up to the highest summer level. In summer wages are somewhat higher, but the conditions are more favorable for doing work, and men will accomplish more than in the winter; therefore we consider that there is no difference from point of cost in either winter or summer.

H. R. IVES & CO.

MONTREAL, April 30th, 1903.

As a result of an experience of sixteen years in the business, I am prepared to say that inside work on buildings of the fireproof class can be done cheaper in winter than in summer, and as far as terra cotta fireproofing is concerned, the winter job is both better and cheaper.

And I have every reason to say that terra cotta fireproof arches, and partitions that are built in winter with a reasonable amount of care are certainly stronger and better in every sense than if the same class of work was done in summer time especially if the terra cotta blocks are kept dry. I claim that there is a better unity between the cement mortar and the blocks than could possibly be obtained in the summer time. I claim this from the reason that the arches in the roof of the Royal Electric Sub-Station in Montreal were placed in position in the month of February 1902 and the plasterers plastered the ceiling in March—the following month—the said roof was about 60 ft. in the clear above the ground floor and the contractor experienced no difficulty whatever. And also the floor arches, the roof, the partitions, etc., of the Guardian building of this city were placed in position between October and February and no doubt the workmen made a better average per nine hours day, and the work is certainly better than could be obtained if it had been done in the summer.

N. T. GAGNON

LONDON, ONT., April 30th, 1903.

With reference to difference in the cost of doing the inside work on a building in winter and summer, would say my opinion, from past experience, is that the work can be done more cheaply in summer for several seasons. In the first place it is necessary to keep fires going to keep the building warm in winter, and we

have found that this occupies a considerable portion of the time of at least one man. The fire would invariably be allowed to go out during the night, and have to be put on fresh in the morning, which would mean that the house would be too cold for working for perhaps an hour or more. In addition to this the days being much shorter in winter, it is often impossible for the workmen to see the work properly after 4.30 in the afternoon, whereas in summer there is no objection of this kind. Of course the wages paid are the same per hour summer or winter, so there is no difference in that respect.

S. STEVELY.

LONDON, ONT., April 30th, 1903.

Replying to yours of the 29th, I would say no, the inside work on a building cannot be done more cheaply in winter than in summer, because labor costs the same in winter as in summer. From my own experience, at times I have taken work lower in winter to keep my men employed.

Regarding finishing a house in winter I think the work is much better done, and more satisfactory to the proprietor, as the building must be heated, which dries out the timbers, and with our present heating system greater care has to be taken to prevent shrinkage. A good house I always recommend to be finished in the winter.

WM. TYTLER.

MONTREAL, May 1st, 1903.

I cannot see the economy there may be, in doing inside work in winter instead of summer. Inside work may be considered to be: Plaster work, joinery, painting and glazing, plumbing, gas, electricity, heating.

Plumbing, gas, electricity, heating could be done any time and the quality may not suffer thereby. As to strict economy I don't believe there is any, as working hours are shorter in winter than summer and the wages are as high in winter as summer. It is very well known, at least here in Montreal, that although plaster work is done all through winter, it does not give so good a job and the expense for heating while the work goes on must be added to the regular price.

And should working hours apply just as well to that trade as to others:

As to joinery work, short hours apply, and to have real good work heating must be used, consequently adding to the expense—I don't believe there is any economy on that head. Painting, although not so much affected as joinery from the cold and moist weather, is not I believe done more economically in winter than in summer. As a whole, winter work is a necessary evil, that's all.

JOS. VENNE, Architect.

MONTREAL, May 2nd, 1903.

In reply to your enquiry I am of the opinion that the season is no factor in prices. Formerly it was so, when wages were lower in the winter.

WM. E. DORAN, Architect.

LONDON, ONT., May 1st, 1903.

My business it is all outside work and from 26 years experience I find that winter work does not pay unless I get more money for the work than I do in the summer.

JOHN WHITTAKER.

TORONTO, May 2nd, 1903.

Inside work I think, cannot be done with less cost to the contractor in winter than in summer, but it is frequently done I am sure with less cost to the owner, for the simple reason that the contractor, to keep things moving in slack time, takes work cheaper. Every architect is familiar with the carpenter's expression, "Well, we're not very busy now, and could do work cheaper than if left till spring." Whether a contractor is justified in submitting lower tenders in the winter than in summer depends on the facilities of the individual contractor. As the conditions under which the work is done in winter vary more than in summer some would be justified while others would not, in taking work cheaper.

HENRY SIMPSON.

TORONTO, May 2nd, 1903.

In answer to your question I would say that in my opinion work can be done more cheaply in summer at the present time. Some years ago during the dull times workmen were willing to

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work for lower wages during the winter season and work could perhaps under those conditions be done more cheaply, but those conditions do not prevail at present.

R. G. KIRBY.

MONTREAL, May 2nd, 1903.

My experience in over twelve years practice as an architect is that the inside work of a building can be done cheaper in winter than in summer. I believe the reason of this is, that the building operations are more active in summer than winter.

ALCIDE CHAUSSE.

QUEBEC, May 3rd, 1903.

Replying to your enquiry of April 29th, I beg to state that all things considered, I do not see how the inside finish of a building can be done cheaper in winter than in summer, the only difference in favor of the former being a slight increase in cost of labor, practically compensated for by the shortness of working hours and the extra cost and inefficiency of artificial light, to which must be added the cost of heating, which comes very high in an incomplete building. That is my own experience, and I hear it has been strictly confirmed by the experience of contractors on our new theatre, the Quebec Auditorium, where the cost of heating, even under normal fuel rates, would still have overruled the saving on winter labor.

G. E. TANGUAY.

MONTREAL, May 5th, 1903.

Re price of summer vs. winter work, I would say that I would not be an authority on the question of inside work. With regard to our roofing, of course there is a heavy difference in cost, although we cannot obtain any better price for doing it. Our Montreal winter season's work costs us fully 20% more than the same work during the summer weather.

C. T. WILLIAMS.

TORONTO, May 5th, 1903.

I have always found that men working on buildings always work better during the summer than in the winter. They enjoy the fine weather and are in better spirits, can keep their tools in better order. Material can be got in better, while on the other hand, no matter how comfortable a building may be enclosed during the winter, there is always a certain amount of running in and out, dampness in the building, the difficulty of getting to work on time in bad weather, all of which affects the men, and I have always found that I could do my work better and cheaper during the summer than winter and do not consider that any contractor is justified in taking contracts cheaper in winter, the wage question being equal.

H. MARTIN.

TORONTO, May 7th, 1903.

My experience has been that winter work is slightly cheaper. Wages in both seasons are the same, but mill work would be cheaper during the winter months, as the factories prefer to keep running on, taking work at low figures rather than stop machinery or lose good men; and the contractors also prefer to keep going for less returns in order to keep their men together. I prefer winter finishing; on account of the scarcity of work there is a chance to get the better class of mechanics, and the temporary heating of a building is preferable to finish in rather than the changeable atmosphere of summer. My experience has been, without exception, that interior work stands better when done during winter months, and under conditions that are most trying to such work, namely, when artificial heating is being used.

W. L. SYMONS.

MONTREAL, May 7th, 1903.

My experience is that with a climate like ours it is cheaper to do work on buildings in summer than in winter.

In winter buildings require to be heated to prevent water and steam pipes from freezing, also all plaster and mortar of all kinds has to be more closely looked after than in summer, and even if there were no water or steam pipes, plaster and mortar to freeze, the building not being heated there would be dampness which would cause lumber to twist and warp. I am of the opinion that all building trades require more attention in winter than in summer, therefore conclude, building operations are more expensive in winter than in summer.

JOHN WIGHTON.

VANCOUVER, May 5th, 1903.

The writer's experience is that winter finishing is more expensive than that done in summer. Heating, special care of the premises and waste of materials all have to be taken into account, also time for completion, interest on money in the event of the work being prolonged. Winter work means that painting or other branches will be delayed for spring, hence extra time is required. A contractor under certain circumstances might be able to figure lower for winter, especially if sub trades are done by contract and special reduction made to have work going on during the dull season. Over here in British Columbia we consider a contract requires a higher figure, but localities differ in this respect. My advice would be to do everything possible during the summer months, put on extra men and rush the work—save time and save money.

E. COOK.

WINNIPEG, May 8th, 1903.

I consider it worth from 10 to 15% more to finish work in winter than in summer, besides getting a better job done in summer.

W. F. LEE.

MONTREAL, May 16th, 1903.

We know that in our line it costs less to do our work in the summer than it does in the winter. The long light days and the more comfortable climatic conditions are all in favor of summer work. It used to be the custom to reduce wages in the fall, which has probably given rise to the cheaper idea. But men now get as much per hour in winter as in summer.

J. W. HUGHES & SON.

VANCOUVER, B. C., May 7th, 1903.

Your enquiry of April 29th at hand. Will answer with few lines covering my observations for over twenty years—providing the wages paid per hour are the same in winter as in summer, I consider the work will cost at least fifteen per cent. more in winter than in summer, and in seven out of ten cases, the finished work does not give the satisfaction to owners or architects that the summer work would have given at the less cost. The imperfect light in most parts of the building for two to four hours each day (although men are only working from 7 to 8 hours daily), the imperfect heating and drying of most buildings, during finishing; the extra amount of time required in cleaning and caring for the finishing materials are the chief contributors towards their extra cost. Under conditions favorable towards contractors, with an oversupply of labor to select help from (only the best of men will be used) and the men anxious to hold their positions by working well and doing good work the fifteen per cent. extra cost referred to might be reduced to about five per cent. or in some cases brought even with cost of summer work.

C. P. SHINDLER.

LONDON, ONT., May 11th, 1903.

Yours of April 23rd received and the contents considered by the Board of Directors at their last meeting. They were unanimously of the opinion that building contractors were not under any condition ever justified in submitting lower estimates for winter work. The lack of proper light and heat are of course the two principal hindrances to work being done as cheaply in winter, and added to that in some trades, particularly bricklayers and plasterers, is the very great waste attendant upon winter work.

GEO. S. GOULD,  
Secretary, Builders' Exchange.

VICTORIA, B. C., May 6th, 1903.

My experience as a contractor teaches me that work cannot be done cheaper during the winter months, than the summer months. The material is in better condition to work in the summer and much more easily cleaned to a smooth surface. In this climate we have considerable rain during the winter months; the atmosphere is damp and penetrating and buildings erected during the winter require fires to prevent dampness penetrating and swelling the inside finish. The dry season has the advantage as to cost. We make no difference as to cost summer or winter.

H. C. MCKILLICAN.

SAN FRANCISCO, CAL., May 12th, 1903.

My opinion is very positive that work can be done inside building much cheaper in summer than winter in any

city in Canada. The climatic conditions in California, U.S.A., are such that it does not make much difference. In summer you have climate in your favour; your building is more accessible; it costs nothing for artificial drying; you have no frost to contend with and your men have no broken time. I know I was caught twice in winter time—once in Vancouver, B. C.—when building Molson's Bank the frost brought down the Bank ceiling, which was very expensive; this was four years ago; two years ago I was caught with Rossland Post Office in winter time, and in that case it cost over 25 per cent. more. Carpenter work likewise suffers as does also painters' as they are nearly always humbugged waiting for plastering, etc.

THOS. BRADBURY.

VICTORIA, B. C., May 11th, 1903.

We can do work cheaper in summer, as everything is dry and in much better condition. The only reason that we know could be advanced for cheaper winter work is that there is not usually

round, so that wages are the same, but the dark days are no profitable, for even though the hours are reduced to from 8 a.m. to 4 p.m., there are still days when it is too dark before quitting time. With all these items against us, contractors here figure no higher for inside work coming in winter, for the reason that it can be pushed along, whereas outside work at the same time may drag with uncertainty, carpenters at the best not averaging more than three quarters of the time outside, and bricklayers less during this period.

BAYNES & HORIE.

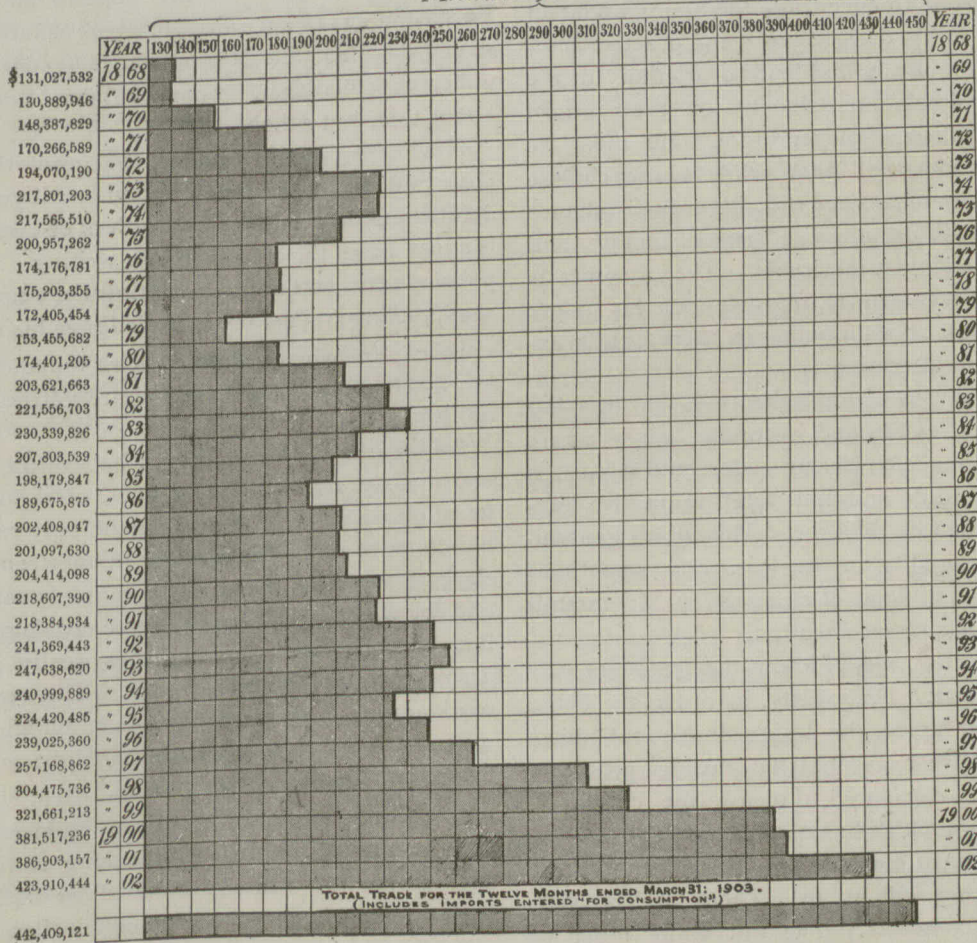
TORONTO, May 9th, 1903.

My opinion is, 1st, you cannot make the same progress; 2nd, you cannot make the same job in winter as in summer. In winter it takes from 12 to 15 days to dry out the first coat of plastering before it is ready for the second coat, and that has to be done with furnaces, which means time and money that you have not to expend in summer. Also you have got to take into consideration waste of material in our line (plastering) which does not take

TOTAL TRADE OF THE DOMINION OF CANADA

FOR THE FISCAL YEARS ENDED JUNE 30TH, 1868 TO 1902.

Millions of Dollars



as much doing in winter, and rather than be idle, sometimes work is taken cheaper.

E. W. WHITTINGTON.

VANCOUVER, May 9th, 1903.

As far as our experience goes in this city, and we have been in the business for fifteen years, inside work costs slightly more and is not so satisfactory when done in winter—that is to say in the months of November, December, January and February.

1st. A striking feature of this climate is the dampness of these months, making it necessary to close in a building and provide heat; where there is a furnace it is simple, but in many cases temporary stoves are needed; either way means more or less extra cost, risk from fire and disfiguring of walls with smoke, etc. 2nd. The plastering in nearly all cases is not properly set and consequently many more cuts and marks will occur in it which can never be made as good as the original. 3rd. Great care has to be exercised in getting the finishing lumber on the job in fine weather, and even then sometimes it is caught on the road in a storm which makes trouble, sometimes having to be renewed. 4th. As to labor, there is a steady demand for good men the year

place in summer. Therefore I fail to see how work can be done cheaper in winter than summer.

JNO. NELSON.

VANCOUVER, B. C., May 6th, 1903.

Re cost of inside work in summer v. winter. My experience is that there is very little difference. Where trade unions regulate the wages, making them the same per hour throughout the year as they generally do, I think the cost of inside work as well as outside work is greater in winter than in summer in our Country (Canada). There is more to contend with in several respects—such as bad light, too much moisture or frost, expense of heating and drying, difficulties in caring for materials. On the other hand a better grade of men can usually be obtained in the winter season; this is an advantage which almost makes up for the disadvantages, but not quite in my opinion.

A. E. CARTER.

TORONTO, May 19th, 1903.

My opinion is that the inside work of an ordinary building, whether residential or commercial, cannot be executed more cheaply in winter than in summer. My reasons for this opinion are: 1st, Artificial heat must be provided; 2nd, Workmen always do more and better work in the bright days of summer than in the dull days of winter.

J. W. SIDDALL.



## THE CANADIAN ARCHITECT AND BUILDER

## PRACTICE.\*

BY R. M. BUTLER.

One of the first duties of an architect is to strive to administer his contract so that it may work out not only a substantial and creditable building, but that the contract may be carried out pleasantly and profitably to both parties to it. He should, so far as is consistent with his duties, aid in making the work reasonably profitable to the builder who has to earn his bread by such work. The architect must avoid being a partisan—above all should he disassociate himself from that class of employer to whom every builder is a rogue; he should if possible teach him better, or, if that be impossible, at least protect the builder. On the other hand, he must be prepared for the unscrupulous and dishonest builder and the builder who has a tendency to rush or curtail and cheapen work.

Then there is the tendency to accumulate extras from the day the first sod is dug. Builders who take work too cheaply are prone to encourage the young architect to make changes in his design, but if the practise is indulged in extras mount up and lead to friction in the end. Young architects must also be on their guard against becoming their employer's tool. He must be made to clearly understand that while every change does not necessarily mean an extra, it generally shapes that way. In a building of much artistic quality and detail changes are almost inevitable. The architect is not worth his salt who cannot improve upon his paper design, but in small or plain buildings there is less excuse for extras and alterations.

The two main causes of unpleasantness in building contracts are, first, extras and, secondly, cases where the builder is not made to clearly understand what it is he has contracted to do and finds later he has let himself in for more than he thought. This arises generally from his own stupidity or neglect, and sometimes from insufficiency and want of clearness in the quantities or in the plans and specification.

As to the first cause, we all know the insidious way in which extras arise. Frequently, in order to get a tender at a desired figure, the design is so cut down that extra items have to be inserted during progress, and this is scarcely calculated to please the employer.

One of the things which has most forcibly struck me is the unwillingness of many employers to frankly state the limit of cost they will go to. There are no bargains in building contracts. The full value must be paid if the work is to be sound. An architect is like a doctor; if the employer is to get the full benefit of the architect's services he must be perfectly frank with him; and it is the architect's business for his own protection, too, to keep him well up to this.

Having got so far, the architect's business is to keep the employer as free as possible of extras, of disputes, of law, and above all of so-called friendly arbitrations. My experience is that two actions at law are not so bad as one formal arbitration. Arbitrators seldom please either party: and if differences arise between the parties which cannot be settled by friendly give-and-take, or by the mediation or authority of the architect, let the issue be knit and tried by the best of all arbitrators—twelve jurymen, as I heard the late Judge Murphy say—or, what is even better, before an experienced, clear-headed and impartial judge. There is

infinitely more chance in this of a satisfactory and equitable issue; but avoid law if you can.

Clear instructions having been obtained, let the plans and specification be plain and lucid, admitting of no misconception, accurate and workmanlike. If you have, for instance, an irregular and hilly site, let it be carefully levelled and the depths of the foundations at every point shown on the drawings; this is ever so much better than settling it when the trenches are opened, as is sometimes the case.

In the specification avoid conventional "padding" as much as possible. Let the work, however, be fully described in every detail, giving dimensions wherever possible. The most common faults in specifications are omissions. See that nothing, however unimportant, is left out.

Builders tendering are entitled to much consideration. They go to great trouble and expend much time in a labor for which only one can hope to be recompensed. Be scrupulous in such little matters as only opening the sealed detailed bills of men whose tenders are actually under consideration. Some builders don't care a jot about this, but others do.

Having secured a builder, the great thing is to be clear and thoroughly understood in all your drawings, details and instructions and orders of every kind. Let the last be as far as possible in writing. Order no important extra without acquainting the employer, for you are handling his money and pledging his credit.

Be careful when ordering extra foundations that you know what you want done and are getting no more and no less.

As regards clerk of works, I believe their utility to be enormously overrated. A good clerk of works is a jewel above price, and correspondingly rare. In great buildings of some intricacy, or in very remote places, a clerk of works is essential for administrative purposes and for working out troublesome problems on the spot; but in such cases he becomes really a conducting architect or architect-in-charge. The average clerk of works on an average medium-sized building is, I think, a useless luxury, and his wages might more profitably be spent upon the building itself.

I believe a downright dishonest builder is very rare—it is not to his interest in the long run; but against such a man the ordinary clerk of works is worse than useless, for his interference only incites foremen and puts them on their mettle to see how far they can fool him. I have seen many instances of this.

If you do have a clerk of works, insist upon his keeping very carefully and fully a diary, in which he enters everything of the least importance on the job, and, above all, insist on weekly reports—otherwise you are better off without a clerk of works. Do not allow him to get into the habit of ordering extras, however small. The employer is not liable for such orders, but it is unpleasant to have to repudiate them.

In my own experience I have met with one, and only one, man who was really useful clerk of works and saved the architect much trouble.

I see by the address of the president of the Royal Institute of Architects of Ireland that the builders are pressing their case for a revision of the existing conditions of contract and that the two principal points are, first, the introduction of an independent architect in every building contract who shall be a sort of permanent

\* Abstracted from a paper read before the Architectural Association of Ireland on December 16th, 1902.

arbitrator between builder and architect, and may be appealed to at any moment during the progress of the building to decide questions of materials, price, quantity and the interpretation of the plans and specification. I fail to see either the need or the equity of this, or how any architect would willingly submit to have his judgment daily and hourly questioned by a quarrelsome cantankerous builder. Even if the private architect yield to this, I think few corporations or public bodies will agree to this procedure. The other point is making the quantities part of the contract; with this also I disagree. That a builder should be compelled to do any work for which he is not to be paid, all because of the surveyor's error, is no doubt hard, but he takes the quantities at his own risk and it ought to be possible to devise some other safeguard, either by making surveyors guarantee their quantities or by some arrangement of independent checking. To say that an employer might at any moment during the progress of a building find his outlay compulsorily doubled would be an element about which there would be no finality, one which might lead to the employer's ruin, and would certainly tend to cripple and discourage building enterprise.

Both these proposals are, I think, clumsy and unworkable, and the builders have not proved the need for any such radical change in the whole principle of existing methods.

As to the architect's administration in general of the building. He should be possessed of sufficient legal knowledge to know how to act under all ordinary emergencies, such as the death, insanity or bankruptcy of the builder, the compulsory taking over of the work, dealing with refractory builders in regard to defective materials, and so on.

#### PERFECT PLANNING.

Mr. Butler Wilson, in the address he delivered as President of the Leeds and Yorkshire Architectural Society, spoke of the hindrances which interfered with realization of perfect planning. Architects often have to deal with a site which bristled with obstacles and restrictions, and in such case it would be a fatal mistake to endeavour to place there a preconceived arrangement only suitable for some totally different situation. Rather should they endeavour to turn obstacles into advantages. Though they might have the desire to make themselves thoroughly acquainted with the needs of the client, those endeavours were often met by ill-concealed indifference—an indifference which often expressed itself in some such words as "get the building finished, and we will adapt it to our requirements." But that was entirely unsatisfactory. Architects must be determined to fulfil requirements in a far more complete way than their clients had ever imagined.

Another difficulty was that of adapting the acknowledged forms of architecture to the ever-increasing advantage of modern constructive inventions. The fight between material and imagination did not decrease with the advance of time, and there was no doubt that many accepted forms were, under certain modern conditions, far from applicable to functions which this age demanded. To grapple with those demands and at the same time preserve the essential qualities of their art was the task which lay before them. This could best be done, not by ignoring or rejecting inventions and appliances which, on the grounds of their practical util-

ity, had come to stay, but by a frank acknowledgement and acceptance of their value, and a determination to make those inventions their servants rather than their masters. They must be ready to progress in that respect, and to seize upon all that was best in modern constructional methods, for there was no law born of past experience which might not be instantly repealed owing to the appearance of new conditions and materials.

If architecture as a fine art was to live it must adapt itself to present needs. Iron and steel had almost ousted carpentry from buildings of any size, and the arrival of the flanged beam and iron joist marked a great era. Steel, combining as it did the virtues of cast and wrought iron, could be utilized for supporting enormous loads. The idea that constructive metal-work needed concealing from view was rapidly dying out. They were now able to build a partition  $2\frac{1}{2}$  in. thick which local authorities recognized as a 9 in. brick wall for fireproof purposes. Architects were, indeed, feeling the steady invasion of the technical constructor. Technical construction was advancing, and they must not allow the constructive specialist to gain an ascendancy.

#### THE QUALIFICATIONS FOR AN ARCHITECT.

These were summed up by Mr. G. S. Aitken in a recent address to the Northern Architectural Association as follows:—It is needful for the architect to be a man of culture, that he may have a mind open to all claims upon him and the best way to meet them. A man of taste, that he may do the right thing, whether in the use of form or the application of colour. A man of some degree of personality, that he may, avoiding the slavish copying of past work, give the world the best of his own. An alert man, ready to use the new inventions, taking care to do this with a well-balanced mind. An enthusiast, in favour of all that is good in the old, and yet looking forward to what may come, as well as backward to what has happened. A man in sympathy with the great students and thinkers who are able to influence his labour more than many seem to consider. One, thankful to all the great art writers who have worked in the right spirit, although he may not agree with all their conclusions. Seeing poetry in his art, that gives it proportion, grace, and lovely colour, as well as the prose that ensures stability of construction and consideration for the material needs of man. In sympathy with Nature if he would have his work full of perennial freshness, and seeking to become master in the knowledge of those principles by which through the Creator the world lives, moves, and has its being, so that they may have an influence on and find a place in the work he brings into existence.

The retirement is announced of Prof. William R. Ware, for twenty-two years professor of Architecture at Columbia University.

"If a doctor makes a mistake it is promptly put underground, but if the architect makes a mistake the building is forever staring him in the face. Let him spare no trouble, therefore, to make whatever is entrusted to him, no matter how small, as perfect as possible for its purpose, and as beautiful, regardless of whether it is going to pay him or not. Art in architecture consists in being simple and truthful. The ability of an architect is not determined by the amount of material he uses; one might almost say that as much ability is required to build a house as to erect a palace. Above all he should be ambitious, aim high, and he will hit the mark sooner or later."—Architecture.

## SKETCHING IN CHARCOAL

Mr. Ralph Hedley, R. I. B. A., recently delivered an address on this subject before the Northern Architectural Association in which he said charcoal had been appreciated by artists for ages, but he did not think it had been quite sufficiently appreciated by architects. The reason why he advocated charcoal so much for drawing details of what ever kind of decoration was required was because it lends itself so readily to what one desires to express. Delicate, sharp or soft lines; broad and delicate tints; broad and decided shadows could be produced with charcoal with much more ease than with pen or pencil. With charcoal they could give all relative planes, of any required depth or strength, quality and feeling. That was of the utmost importance, and would enable details to be understood at once—that was projections and sinkings—if great care was taken to imagine a light coming from either the right or the left. In showing relief in a design, if they got the light full on it was rather deceptive when it was handed over to be executed. It was often very difficult to know whether the designer of some piece of ornament intended parts to be concave or convex without showing a section, and it was quite impossible to show sections in delicate parts of foliage. If a little thought was displayed in drawing, it could be expressed and understood almost as well as working from a model in relief. It was extremely difficult to express with pen or pencil in full-sized drawings. By the pressure required and the trouble involved in drawing a great number of thin lines all freedom was lost, and with freedom—certainly individuality must be lost, and he thought every drawing of decoration should have individuality. The easiest way of getting individuality was by working with something that expressed thoughts, and they could not help themselves if they used charcoal freely. Their own feeling was bound to crop up.

## PROFESSIONAL CHARGES.

The commission paid to architects will always be a subject of controversy until the meaning of a uniform scale is understood, says the Building News. Why every class of building, plain and ornamental, simple in plan and construction or complex, should be charged for at the same rate on the total cost it is difficult to say. The rate may vary in respect of the cost of the building—why not also according to the degree of complexity of design and skill required? As the more complex the design the greater is the cost of construction, it follows that the professional services necessary may be valued in an inverse proportion to the skill and labour actually expended on the work. So it is, at least, in a very large number of cases which require not only a high professional skill and personal attention on the part of the architect, though the building may be comparatively small. Expenditure we know runs up on the plainest building when there is a large quantity of work or unskilled labour, as—say, in the construction of factories, sheds, workhouses, barracks, and other buildings, also in the multiplication of one design; but the two kinds of cost must be kept separate. If it is fair to reduce the rate of percentage from 5 per cent. when the cost exceeds a certain sum for plain buildings, or for repetition of the same set of drawings, it is obviously equally unfair and unjust to expect the architect to design and personally superin-

tend an elaborately-planned residence, hotel, or technical school at the same rate as he would ordinary dwellings or cottages. In other words, if he is expected to throw off 1 or 2 per cent. in any large buildings where there is great repetition or an enormous expenditure in foundations or brickwork, he is entitled to a higher rate per cent. upon those designs which are largely made up of fittings and decorations, the cost of which work does not exceed a certain sum. It seems absurd to fix a certain rate of 5 per centum as an arbitrary standard of remuneration unless we fix also the description and cost of the building which it represents.

## SIZE OF WINDOWS IN RELATION TO FLOOR SPACE.

The following conclusions are the result of a careful enquiry recently made at Cornell University to determine the size of windows required to give an adequate supply of natural light to the lecture rooms between 8 a.m. and 5 p.m. All the rooms in question had unobstructed light:—

1. There is to be at least 150 ft. of window-space for each 1,000 sq. ft. of floor-space in rooms which, in use and location, are similar to those here described, and are lighted only from one side. Therefore an office 15 ft. by 25 ft. should have at least 56 sq. ft. of window space, and a class-room 30 ft. by 40 ft. should have at least 180 sq. ft. of unobstructed lighting surface.

2. The proportion between the height of the window-tops and the depth of the room lighted should be at least 500 to 1,000, or, in other words, the distance from the floor to the window-tops should be one-half the depth of the room to be lighted.

The American Architect observes that these figures support the old principle that "top-light" is the best; the nearer the window-tops come to the ceiling the more efficient will be the lighting to be secured from a given surface. Care should be taken that overhanging lintels be not allowed to obstruct the light.

## NOTES.

Mr. John Woodman, M. Can. Soc. C.E., formerly engineer of the western division of the C.P.R., has opened an office in the Merchants' Bank Building, Winnipeg, as consulting engineer and architect.

To complete the repairs of the Doge's Palace, Venice, it will probably be necessary to place beams across the canal over which the Bridge of Sighs is built, the beams resting on the wall of the prisons, to support the portion of the leaning wall fronting the canal.

Mr. Andrew Carnegie has offered to give unconditionally a million dollars for the erection in New York of a building to be used as the headquarters of the four great engineering societies of the United States and the Engineers' Club of New York.

The Western Architect is of the opinion that while concrete has been used for many purposes foolishly of late, as was inevitable, yet the building public have only fairly begun to understand its legitimate uses. While it is rapidly displacing stone for footing courses, its value as material for foundation walls, particularly in clay soils, has hardly occurred to builders generally. In these, careful excavation may be made, the earth making the outside of the mold for the concrete wall, which not only reduces the cost of planking below grade one-half, but lets the wall fill solidly against the earth, thus doing away with the annoying leaks that inevitably follow the laying of stone foundations in clay soils. Here concrete may displace stone walls, fewer cubic feet of materials producing far better results. Again, the Portland cement tile for floors has only begun its invasion of buildings.

## ARCHITECTURAL COMPETITIONS IN BRITISH COLUMBIA.

An architect at Vancouver has sent us particulars of a competition for plans for a High School building to cost \$70,000. The circular of conditions he characterizes as one of the most impudent productions he has ever seen. After describing the requirements of the proposed building, the circular concludes as follows:—"An estimate will be required as follows; viz. : for heating with steam direct, and indirect; hot water and hot air; the fan system to be adopted when heating by indirect steam and hot air. The entire cost of the building not to exceed the sum of \$70,000; the architect to give a written guarantee to that effect. The following are the conditions upon which the plans are to be submitted; viz. : that all plans shall be the property of the Board, and that they shall have the right to use any portion of any plan or any ideas embodied therein. The Board will give prizes as follows: one of \$75.00, one of \$50.00 and one of \$25.00. The architect whose plan is accepted shall not receive any prize, if he is retained to carry out the construction of the building."

What a rare bit of "nerve" is here exhibited by a body of men who, as our correspondent states, officially represent the education of the community! What a paradox to spend seventy thousand dollars for a building for the higher education of the rising generation, while at the same time asking a body of educated men of the present generation to give their services for nothing!

The young men and women for whom it is proposed to build this high school may be expected to question the wisdom of attending the institution if the knowledge they might gain would have no money value. From a money making standpoint they would do better to become day laborers or mechanics according to the implied standard of values of the representatives of education having charge of this competition.

It may safely be assumed, however, that if architects would hold their profession or calling in higher esteem, and show less anxiety to get work by any means and at any price they would not have made to them such absurd and insulting proposals as the one here referred to.

## LEGAL.

An application having been made to the Irish Institute of Architects for information respecting the responsibility of an architect in connection with foundations, the hon. secretary was directed to reply that in the opinion of the Council it is not part of the recognised duty of an architect to sink trial pits to ascertain the nature of the ground upon which a building is to be erected, although in exceptional cases he may, if he thinks it advisable, recommend this to be done at the expense of the employer. The Council consider that the system universally adopted at present is equitable, as the employer only pays for the work which is actually executed. Summary statements of law, especially when formulated by laymen, are not always to be approved, says the Builders' Reporter, and there is a risk of the advice thus given being misunderstood. There are enough decisions to suggest that an architect is expected by English law to examine the site for a building or to have it examined for him, and he is liable for neglect if any damages should arise through acting on incorrect information. Although the builder is responsible for executing proper foundations, the architect is not in consequence exempted. If the builder should suffer loss he cannot look to the architect for compensation. In France the architect is liable to the client as well as to the contractor. Responsibility is believed to be evaded in England by avoiding to state the nature of the soil, either in a specification or on a drawing. But that is a doubtful

expedient which has not been tested in the courts. The omission would be regarded with suspicion by judges. To ascertain the nature of the soil may sometimes be an expensive operation, in which case the advantage of making borings or trial pits should be explained to the building owner, and his sanction obtained for any necessary outlay. But in ordinary cases no architect who is careful of his reputation will neglect to ascertain the nature of the ground on which one of his buildings is to be erected.

## NOTES.

The National Sculpture Society of New York, recently accepted for one of their exhibitions at Madison Square Gardens a piece of sculpture by Miss Florence E. Ward, of Toronto.

The special art scholarship of £60 given by the City Council of Liverpool through the Technical Instruction Committee has been awarded this year to Miss C. E. Martin, of the School of Architecture and Applied Art, University College, Liverpool. The scholarship is tenable for one year at London or some art centre on the Continent.

A French architect, M. Leon-Jean Roux, is said to have bequeathed to the Academie des Beaux-Arts a sum of 800,000 francs, or over £30,000 of English money. The income is to be applied to the creation of annual prizes in painting, sculpture, architecture, miniatures and illuminations, which will commemorate the names Destouches, Delarge and Roux. The academy already possess several funds for similar purposes, but the capital in each case was inferior to the amount bequeathed by M. Roux.

The director of works has decided to have the buildings of the Louisiana Purchase Exposition colored ivory white instead of old ivory white. Ivory white approximates very nearly the dead white which was used at Chicago on the Columbian Exposition. It has in it just a tinge of yellow. The departure from the dead white is expected to gratify the eye of the visitor, relieving somewhat the oppressive glare which characterized the Columbian Exposition during the sunny days. The departure from the white is not, however, sufficient to impair the majesty and dignity with which a great stretch of white facade impresses the spectator.

The Wesleyan chapel at Exeter will be the first large edifice in England erected by the Cottanein system, which has of late been quite extensively used on the continent. By this system, which originated in France, strength, durability, and also adaptability at moderate cost are secured by means of a skeleton of soft steel wire interwoven in the hollow of a special form of brick, or interlaced basket-fashion in varying thicknesses of cement. The building will have an inner and outer shell of three-inch brick covering a steel frame. The air-space between the two walls can be utilized for ventilation, and whereas the air-cushion will keep the interior cool in summer, it will also simplify the task of heating in winter. There is a further very important advantage in that the edifice will itself be fire-proof.

It has been proposed by certain foreign architects who practice in districts where great trouble is experienced from the destruction of brickwork by alkaline incrustations, to lay down a maximum limit for the presence of such impurities in bricks, and to reject all goods which show an excess over this limit. The amount of sulphur dioxides in a powdered sample brick is estimated, and a direct test for the influence of sulphates is also made, the bricks being treated in a vessel with a saturated solution of sodium sulphate by boiling for half an hour and then exposed to a current of air until an incrustation appears. This is repeated no fewer than forty times, after which the residue is dried at 1,000 deg. C. and weighed. The results, which are expressed in percentages of the original weight of the brick, give what is called the coefficient of susceptibility to attack by sulphates.

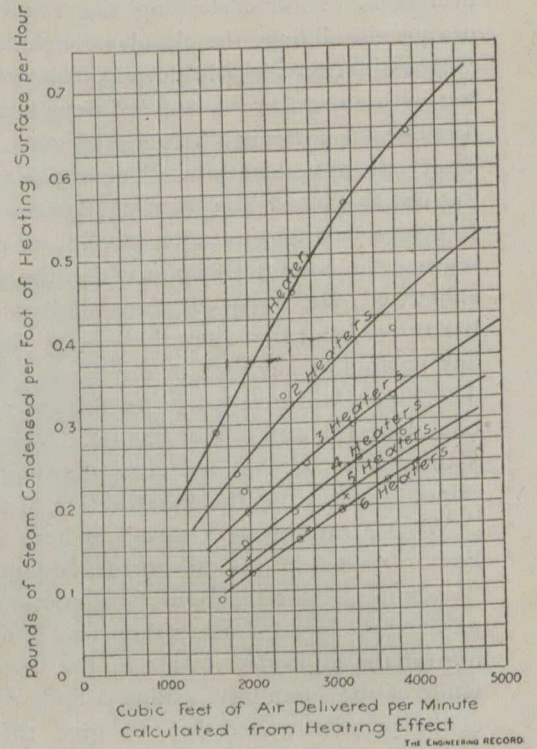
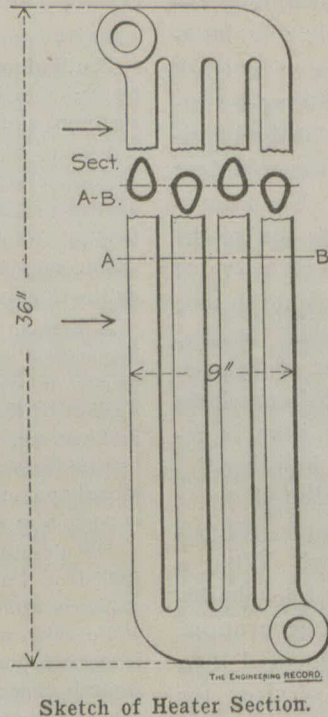
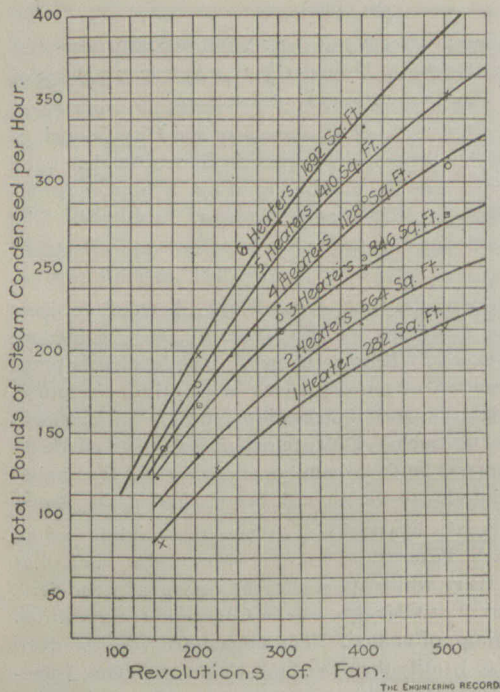
Choir screens originated from the stone balustrade or railings which separated the presbyterium from the other parts of the ancient basilica. They were afterwards retained to separate the space devoted to the clergy from that portion allotted to the congregation. Choir-screens were frequently of the most elaborate design, and were adorned with statues and traceried openings or panels. On the Continent many magnificent examples are to be found. The screen of the minster at Basle, that at Havelberg Cathedral, Munster, Germany; and the Magdalene Church, Troyes, France, are splendid instances of choir-screens. In England we name Long Sutton, Kingsbury, Barnwell, Newark, Stanland we name Long Sutton, Kingsbury, Barnwell, Newark, Stanland Harcourt, and Chester Cathedral, in which churches the screen or rood-loft appears to have been used. The parclose screens at Fyfield (Berks), Ingham (Norfolk), Lavenham, Long Melford, Southwold, and Spalding, are good examples of wooden screens of the Perpendicular period.

TEST OF A CAST-IRON HEATING SURFACE IN CONNECTION WITH A FAN SYSTEM OF HEATING.

At the ninth annual meeting of the American Society of Heating and Ventilating Engineers a paper was read

spaces between the tubes, all as shown in the accompanying sketch. Each section has a surface of 6.7 square feet giving a total for the whole heater of 1,692 square feet.

The fan drew the air over the heater and discharged



by Prof. R. C. Carpenter on a test made at Sibley College, Cornell University, of a cast-iron heating surface used in connection with a blower fan for heating the air. The data and record of the test in slightly condensed form reprinted from the Engineering Record, are given

it into a small chamber, to remove eddies, and thence through a delivery pipe and nozzle, where its velocity was measured, into the room. The fan used was made by the American Blower Company and was of the following dimensions: Height over all, 80 inches; diam-

		RESULT OF TESTS.									
		1	3	5	6	8	10	11			
a.	Number of run	1	1	1	2	2	2	3			
b.	Number of heater units	1	1	1	2	2	2	3			
c.	Heating surface, sq. ft.	282	282	282	564	564	564	846			
d.	Steam press., lbs. abs.	24.69	24.81	24.81	24.69	24.87	24.77	24.81			
e.	R. P. M. of fan	161.	303.	500.8	155.4	304.1	501.5	205.3			
f.	Static head, ins. water	0.207	0.797	2.294	0.203	0.774	2.21	.314			
g.	H.-P. consumed by fan	0.387	1.182	4.178	.0997	1.122	4.17	.3269			
h.	Vel. disch. head, ins. water	0.184	0.780	2.29	0.193	0.763	2.18	.291			
i.	Steam per sq. ft. heat. sur. per hr., lbs.	0.293	0.561	0.721	0.22	0.334	0.408	0.196			
j.	Temp. air received	73.6	73.4	72.3	81.0	81.	83.0	74.1			
k.	Temp. air delivered	125.1	124.6	118.8	143.7	150.4	146.1	158.9			
l.	Rise in temp. of air	51.5	51.2	46.5	62.7	79.4	63.1	84.8			
m.	Temp. water leaving coils	211.7	189.4	186.7	215.6	205.	209.	207.4			
n.	Wt. of air disch. per min., lbs.	109.	214.	318.	132.	163.	253.	134.			
o.	B. T. U. per sq. ft. heat. sur. per hr.	285.3	556.	750.	208.5	325.	397.	190.5			
p.	Air disch., ft. per min., meas.	1992.	3529.	5813.	2015.	2530.	5900.	2473.			
q.	Air enter'g coils, ft. per min., meas.	234.	412.	683.	233.	401.	675.	273.5			
r.	Cu. ft. air per min., calc.	1605.	3150.	4700.	1940.	2400.	3720.	1970.			
s.	Ratio of expansion of air	1.095	1.097	1.090	1.116	1.128	1.120	1.150			

		RESULT OF TESTS.—(Continued.)									
		17	19	20	21	23	24	26	28		
a.	12	14	15	17	19	20	21	23	24	26	28
b.	3	3	4	4	4	5	5	5	6	6	6
c.	846.	846.	1128.	1128.	1128.	1410.	1410.	1410.	1692.	1692.	1692.
d.	24.81	24.81	24.69	24.75	24.47	24.84	24.75	24.79	24.69	24.77	24.77
e.	302.	502.	159.6	301.5	502.4	203.	304.	501.	154.1	302.08	493.
f.	.746	2.167	0.173	0.733	2.08	0.32	0.74	2.07	0.197	0.743	2.08
g.	.864	3.774	.2249	1.003	4.12	.367	.778	3.38	..	0.193	..
h.	.733	2.15	0.167	0.724	2.05	0.28	0.72	2.04	..	0.193	..
i.	0.251	0.33	0.123	0.195	0.284	0.140	0.174	0.25	0.09	0.163	0.232
j.	79.1	86.2	80.0	83.9	80.0	69.9	86.6	91.4	84.4	77.0	74.0
k.	159.1	160.3	159.4	169.4	164.4	172.3	177.6	177.8	174.1	182.3	179.2
l.	80.0	74.1	79.4	85.5	84.4	102.6	91.	86.4	89.7	105.3	105.2
m.	206.3	203.4	219.6	203.9	203.	199.6	204.2	216.4	216.2	215.1	212.3
n.	182.	257.	119.	175.	265.	136.	186.	275.	114.	177.	250.
o.	337.8	322.8	118.8	190.5	276.5	137.3	170.5	240.	862.	156.4	223.
p.	3560.	5890.	1992.	3500.	5960.	2518.	3570.	5980.	2022.	3560.	5960.
q.	398.	666.5	221.	389.	662.5	270.5	393.5	663.5	222.	382.	640.
r.	2680.	3710.	1730.	2520.	3830.	1960.	2690.	3980.	1650.	2560.	3610.
s.	1.150	1.134	1.148	1.157	1.156	1.198	1.164	1.158	1.168	1.196	1.198

herewith: The heating system was arranged specially for the experiment by the American Radiator Company and consisted of twelve radiators placed side by side in two rows of six each, one row above the other and extending parallel to the flow of the air. Each radiator was composed of 21 sections, each of which was a single casting 9 x 36 inches, in the form of four nearly triangular tubes, slightly staggered, with half-inch air

eter of wheel, 48 inches; width at periphery, 17.5 inches; inlet diameter, 30 inches; outlet, 27 x 27 inches. The fan was driven by a 6 x 6 inch vertical engine and was arranged to run at different speeds. The individual radiators were controlled independently so that it was possible to make tests with different amounts of heating surface.

The general results of the test are shown in the

accompanying table, which contains a selection of eighteen runs from the twenty-eight as given with the report. Three runs at different speeds are given for each of the six different amounts of heating surface used, each amount representing a unit consisting of two superimposed radiators. The diagrams herewith show the relation between the speed of the fan and the pounds of steam condensed per hour for different amounts of heating surface; and the relation between the pounds of steam condensed per square foot of heating surface per hour and the cubic feet of air discharged per minute by the fan, for different amounts of heating surface. These curves show at a glance the proportionate decrease in the benefit derived as more heaters are added. In the discussion following the paper Prof. Carpenter stated that beyond 16 pipes, or in this case four heaters, the advantage gained was slight.

Three other diagrams presented with the paper but not given here, show the relation between the steam condensed for different speeds of the fan; the relation between the temperatures of the entering and discharge air; and the relation between the speed of the fan and the steam condensed per square foot of surface per hour, for different amounts of heating surface. The author was assisted in the test by Messrs. Neave and Cazenove, graduate students in the University.

#### DEMAND FOR ROOFING SLATES.

Mr. Harrison Watson, Curator of the Canadian section of the Imperial Institute, London, Eng., has written to the Department of Trade and Commerce at Ottawa, regarding a possible market for Canadian roofing slate. He says:

Quite recently a favorable opportunity for developing trade in an article which Canada possesses to a considerable degree has come to my notice. There is in the United Kingdom a very large consumption of roofing slates, many of which are imported. At a time when roofing slates were practically not used in the United States, the quality of slate deposits in that country was so suitable that several quarries were developed and worked solely for export purposes. In 1896 the slate trade with the United Kingdom amounted to some 46 million slates. Gradually, however, the utilization of roofing slates in building operations in America has been adopted, and between the domestic demands and the consequent increase in prices demanded by American slate producers, this export trade has steadily fallen away until at the present time it has almost ceased. Welsh slates, owing to labor troubles, have been also scarce, and United Kingdom buyers have been obliged to look temporarily to France for supplies. The French slate is inferior to American but is cheaper. A company which has developed and established the trade in American slates in Great Britain applied to me for information as to the possibilities of being able to secure suitable supplies from Canada. Upon inspection of a number of samples of roofing slates from Canadian deposits, the expert informs me that the quality of the Canadian slate is very good and equal to, if not better than, the average American. The company, therefore, state that if they can arrange for regular supplies of the quality equal to that examined by them, they are prepared to contract for large quantities for which they would pay cash.

Provided that further investigation confirms the im-

pression that large deposits of a suitable quality of roofing slate exist in Canada only awaiting development, the establishment of the industry would appear to offer a most profitable investment for capital which will, it is hoped, appeal to Canadian enterprise. The sizes most in demand here are 24" x 12", 22" x 12", 22" x 11", 20" x 12", 20" x 10", 18" x 12", 18" x 10", 18" x 9", 16" x 12", 16" x 10", 16" x 9", 16" x 8". They should measure 18 to 19 inches per 100 slates piled up in the flat. Quarrying is a fairly simple matter, the cost of the necessary equipment being less than in connection with most kinds of mining. As to labor, it is pointed out that a large number of experienced slate workers are at present idle owing to labor troubles in this country, and many would readily go to Canada for reasonable wages.

#### BY THE WAY.

Mr. Chas. Baillarge, the well known engineer and architect, of Quebec has had printed in pamphlet form his interesting paper presented recently before the Royal Society of Canada on "The Construction of an Indestructible Vessel for a Voyage to the North Pole, and How to Reach it." Accompanying the paper is a map of the polar regions showing recent Arctic discoveries and plans for an indestructible vessel.

x x x

Some of the ancient monuments in English cemeteries bear quaint epitaphs, complimentary and otherwise, to the departed. Here is one from a tombstone at Awliscombe, Devonshire:

"Here lie the remains of James Pady, Brickmaker,  
late of this parish, in hopes that his clay may be  
remoulded in a workmanlike manner  
far superior to  
his former perishable materials,—  
Keep death and judgment always in your eye,  
Or else the devil off with you will fly,  
And in his kiln with brimstone ever fry,  
If you neglect the narrow road to seek,  
Christ will reject you, like a half-burnt brick."

#### NOTES.

So far as experimental results now available indicate it would appear that in order to attain impermeability in concrete, whether of gravel or of broken stone, that the mortar mixture must be at least as rich as 1 cement to 2 sand, or 1 cement to 2.5 sand, the proportion of mortar being sufficient to fill entirely the voids, or possibly a little more than that in order to provide for inequalities of mixing in different portions of the mass. Although apparently mortar of 1 cement to 3 sand has occasionally been found impermeable under as high pressure as 40 pounds per square inch, there is little evidence that such a mixture can in general be relied upon. In addition to the importance of these matters of composition to be employed for a permeable concrete, it is undoubtedly also of essential importance that the concrete should be kept thoroughly moistened during the entire period of setting; otherwise not only the ultimate resistance may be impaired, but also the impermeability by the slight contraction of setting in air which has been observed repeatedly. This has a marked influence upon the use of concrete in the walls of buildings, which in their subsequent experience may be exposed to driving rain storms, against which ordinary walls of masonry have frequently been found ineffective.

When an advertiser complains that his advertisement does not interest the readers of a paper, he might do better to change his ad writer than to change his paper. The public is anxious always to be interested, and if the advertisement fails to do it the fault probably lies with the advertisement and not with the public or the newspaper.—Printers' Ink.

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A was for architect, old in his prime,  
 B was a builder who took his own time.  
 C was a client who had his own views,  
 D was the details that no one would use.  
 E the erection he tried to excuse,  
 G was the ground plan exceeding the site,  
 H was the half-timber he had to reveal,  
 I was the ironwork he had to conceal.  
 J was the joinery, mostly of deal.  
 K was the king-post that ought to have stood,  
 L the stone lintel that proved to be wood.  
 M was the mullion that blocked out the light.  
 N was the newel too thin for its height.  
 O the oak sill that was not water-tight.  
 P was the price on the contract agreed,  
 Q was the quantities down to a bead.  
 R was the rage that the client displayed ; and  
 S the sarcastic remarks that he made—when  
 T was the total that had to be paid.  
 U was the umpire called on to decide.  
 V was the value the client denied.  
 W stands for the words that he said,  
 X was the xtras for which he was bled,  
 Y Z the young zealot who wished he was dead.

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"Book of 100 Stained Houses" is the title of a new publication by Mr. Samuel Cabot, of Boston. It contains illustrations of houses on which Cabot's creosote stains have been used and unsolicited testimonials as to their value.

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## A FIFTEEN-STOREY CONCRETE BUILDING.

A building fifteen storeys high, about 210 feet, in which concrete and steel will form the walls, is about to be erected in Cincinnati. The building inspector, who has to authorize the work, appears to have felt his responsibility in approving of the experiment, and an enquiry was held by him on the subject. It was explained that the concrete construction proposed was stronger and more rigid than steel, and will stand the vibrations and strains due to wind pressure better and in a more perfect way. The strength of the structure does not depend on rivetted joints, but on the monolithic character of the concrete, being all one solid mass of stone held together by twisted steel rods and imparting to it an elasticity equivalent to that of a steel building. The architects of the building are Messrs. A. O. Elzner & George M. Anderson, and the structure will be erected by the Cincinnati Fireproof Company. The building

inspector of Philadelphia states that he has had a similar structure under his consideration, and that he had resolved to interpose no obstacle for its erection.

Composition capitals are now being used very largely in Canada. The Detroit Decorative Supply Company are large manufacturers of relief ornaments, staff work, architectural carving and modelling. Their exterior and interior composition ornaments are highly spoken of by architects and builders all over the Continent. The large works of this company turn out this class of goods in a particularly neat manner. They will be pleased to send their new illustrated catalogue to all mentioning this journal and addressing 812 14th avenue, Detroit, Mich.

A new building by-law adopted by the suburban municipality of St. Louis, near Montreal, provides that all new buildings on St. Lawrence street must be of pressed brick or stone and three storeys high at least; they are also to be built on the line of the street. It is expected that a regularity in design and construction will thus be brought about in the great number of business and residential buildings which are to be erected when the land for widening the street has been expropriated. In the new residential streets to be opened up the houses are to be built ten feet back from the line of the street.

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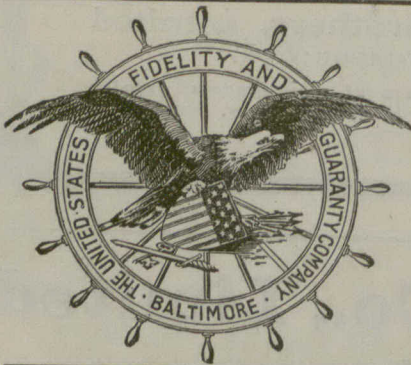
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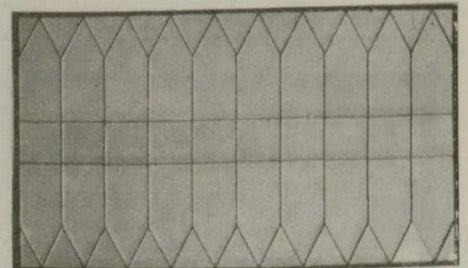
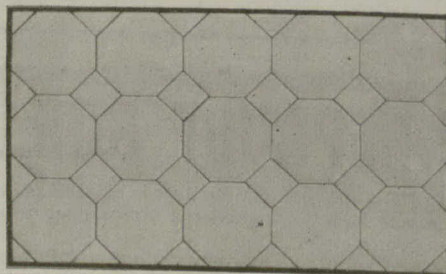
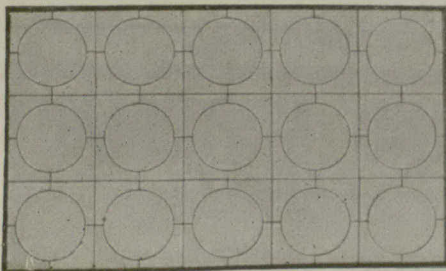
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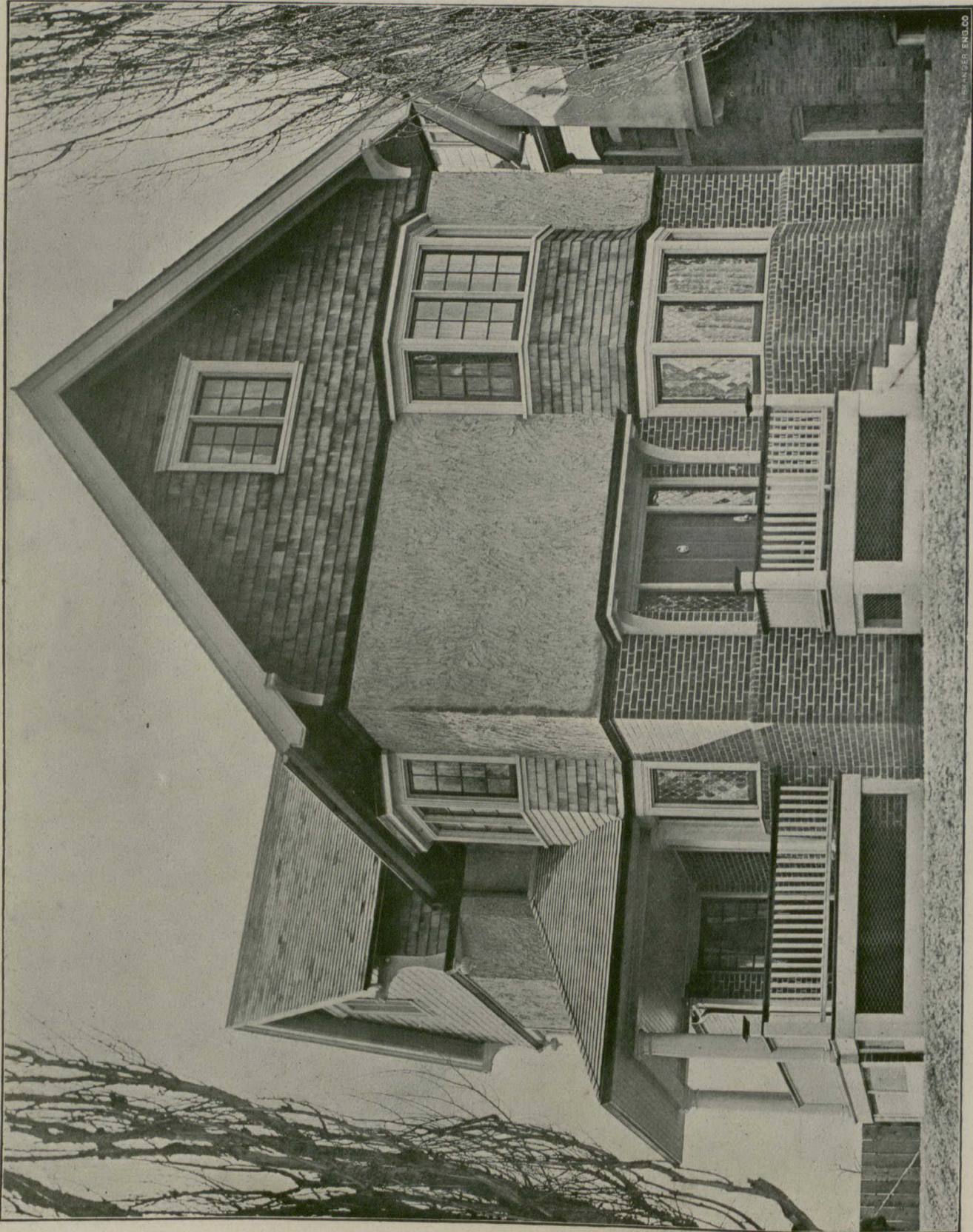
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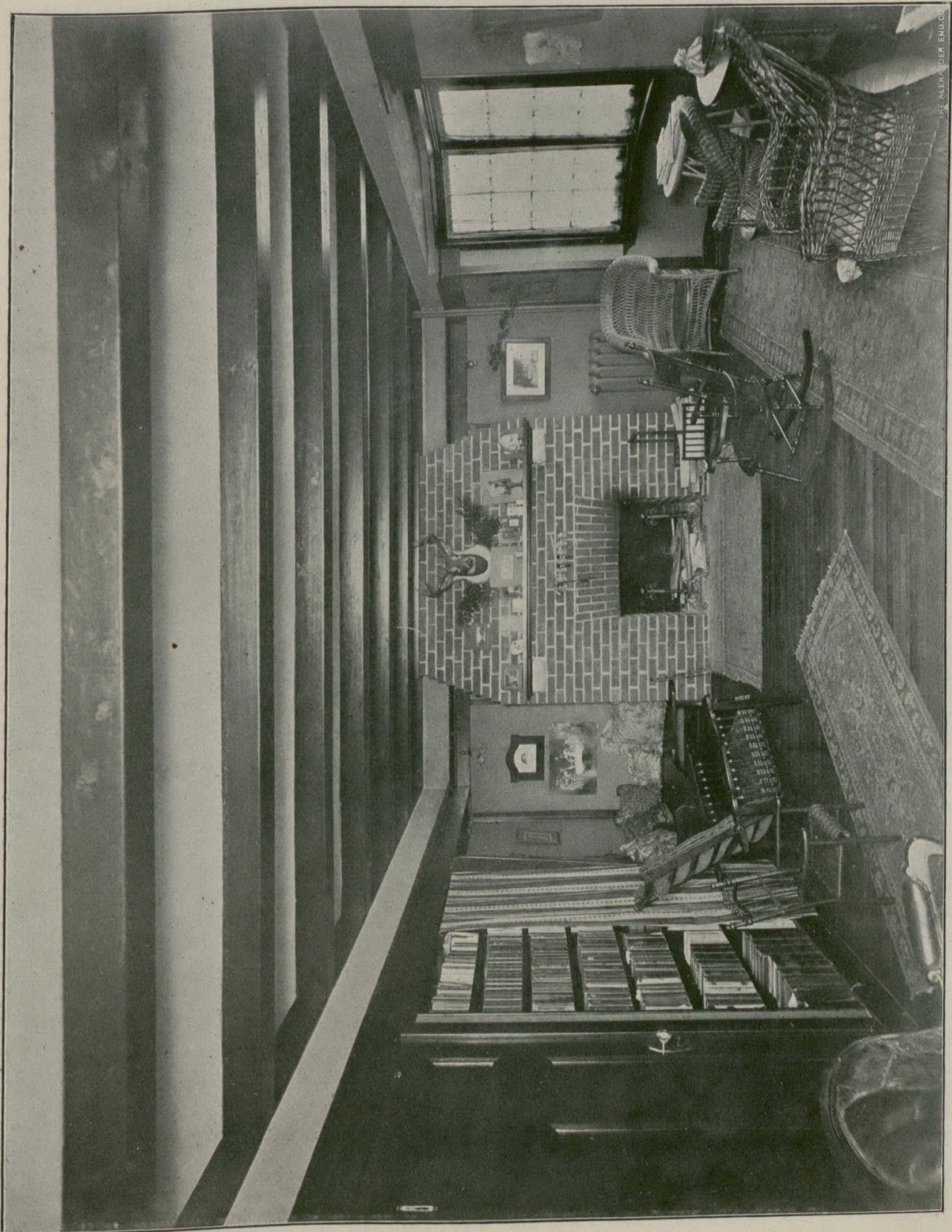
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Mr. E. G. Acheson has recently been conducting some interesting work with clay earth, and has obtained a product called "Egyptianized Clay." This is obtained by a very simple treatment with tannins or similar extracts of vegetable matter whereby the clay is rendered very much higher in tensile strength, more dense, and the shrinkage is materially reduced. To obtain this same effect was probably the real object of the use of straw by the Egyptians. This having occurred to Mr. Acheson, he ex-

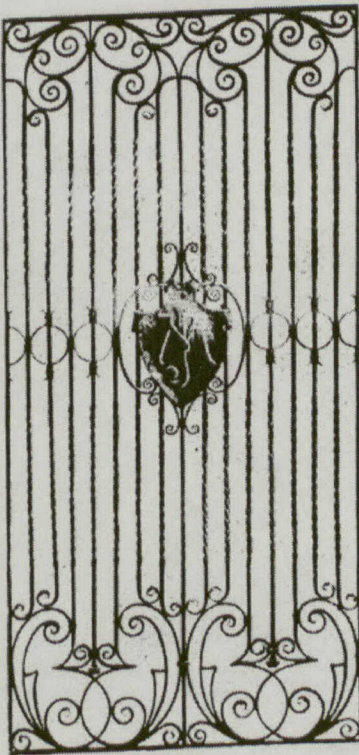
tracted the soluble matters from the straw, throwing away the fibre, and by treating the clay with these soluble constituents obtained the above mentioned results. The tensile strength was increased as much as 350 per cent. in the sun-dried article.

PERSONAL.

Mr. Kivas Tully, the veteran civil engineer and architect of the Ontario Public Works Department, has had conferred on him by the British Government the Imperial Service Order.

The death is announced of Mr. Bruce Price of New York, the well known architect, who was the designer of the Windsor Street Passenger Depot of the C. P. R. in Montreal and the Chateau Frontenac Hotel, Quebec.

Mr. Henry F. Duck, civil engineer and architect, of Toronto, has been appointed general manager for Great Britain for Milliken Bros., civil engineers and contractors, of New York. Mr. Duck is now en route to Great Britain to assume his duties. He carries with him the best wishes for success of numerous professional and other friends in Canada.



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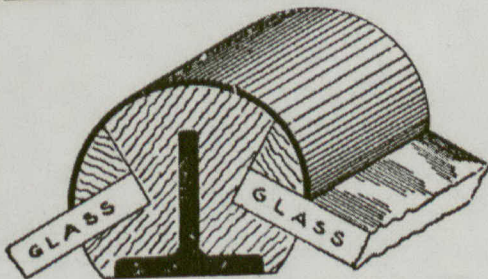
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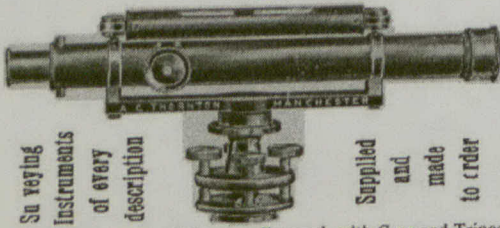
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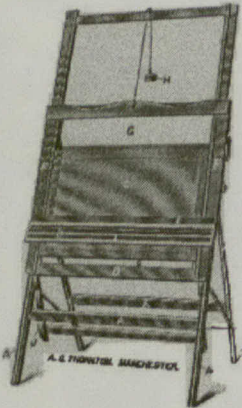
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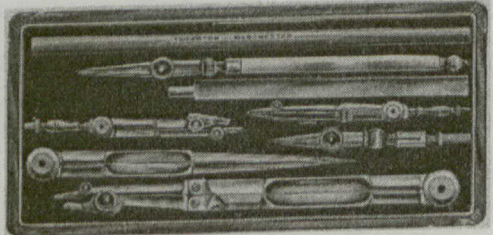
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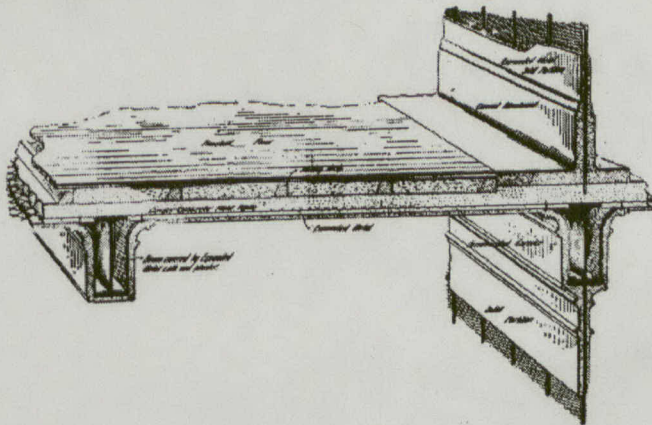


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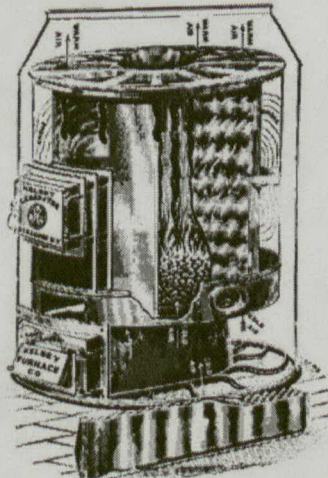
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