The Canadian Builder

A Practical Paper Devoted to all Branches of the Building Trades

Published by the Commercial Press, Limited, who publish or control The Canadian Manufacturer, The Canadian Clayworker, The Railway Journal of Canada, Canadian Hardware, Stove & Paint Journal, The Merchants' Magazine, Etc.

Vol. 2 TORONTO, MAY, 1912 No. 5

We Want to Make This Journal

of the utmost practical value to every subscriber, but in order to do so, we need the active co-operation of our readers themselves.

A Word About Plans

¶ The majority of our readers probably appreciate the plans most. They are reduced from plans of buildings actually erected. If you have constructed some moderate sized building (not necessarily a house) of which you feel proud, send us the drawings and details, also a photograph of the completed exterior if possible. We will return them promptly, whether we make use of them or not. The movement for "Better Building" must be widespread and thorough. If you believe in it give it your personal support by affording us the opportunity to publish the results of your best work.

Practical Pointers

¶ No doubt you have seen practical pointers in our pages that have helped you in your business. Those were the result of the other fellow's experience. You may be able to offer suggestions that will help him in the same way. Send them in for publication. "One good turn deserves another."

Needs of Each District

¶ Conditions in different parts of our great Dominion vary considerably, and the needs of the builder in Alberta are dissimilar from those of the builder in Quebec or Ontario. "The Canadian Builder" circulates from the Atlantic to the Pacific, and in order to make it truly national, we must keep in close touch with East and West alike. Our own correspondents keep us well posted, but we shall be glad to hear from our readers direct, particularly from those in the smaller centres. If you have anything of special interest to communicate regarding conditions or methods in your district, let us hear from you.

The Commercial Press, Limited, 408 McKinnon Bldg., Toronto

Good Live Business Getters

¶ Because this is the first time we have had a chance to talk to the readers of this magazine we are going to make our talk a general one. We are going to tell you of better business and how we help you get more business.

¶ The readers of this paper are business men—men who are out to sell at a profit what the other man wants, be it their services as architects, carpenters, contractors, masons or plasterers, or be it some material for the erection of buildings.

¶ Many of the readers of this magazine now represents some company who manufactures building materials. Some of you represent us. This message is for you both.

¶ We are starting a great educational campaign in this paper and in many other papers throughout Canada. We are going to educate the man who wants buildings erected to use metal wherever he can. We are going to educate him to the use of metal shingles for the roof of his barn and corrugated iron for the sides. We are going to get him to use sanitary steel stalls and stanchions and water bowls. We are going to teach him how best to erect his buildings, so that everything will be sanitary, convenient, lasting, proof against fire and proof against lightning.

¶ For his house we are going to teach him to use metal lath, plasterer's corner bead, metal ceilings and sidewalls and metal shingles. The day is not far distant when all these things will be specified in contracts and estimates.

Wanted in Every Community

¶ This great educational campaign will be followed by an advertising campaign which will bring in a flood of enquiries. They will come in from districts where we now have agents and they will come from districts where we are not represented. So we want agents in all districts to handle our goods.

¶ There is no company in Canada to-day that can give representatives any better service than we can. We are working to get all the business we can through our agents.

¶ Besides the help of our travellers we send out helpful sales letters and business getting letters to prospective customers and we give them the right kind of help.

¶ Our plan of selling and helping the agents sell has been of great advantage to our entire force this year and we feel sure that we can do even greater things during the next year.

¶ Builders—and that takes in every man who helps erect a structure—have a great many places to use our materials during the year and add a little to their earnings, and at the same time give to the customer great value. Plasterers can use Herringbone Metal Lath and Acorn Corner Bead, Roofers can use Metal Shingles—or if wood shingles is specified they can use our Acorn Galvanized Ridge and Valley, Preston Steel Ceilings and Sidewalls can be used houses and easily erected with the help of our simple instructions.

¶ Pressed Steel Sidings can be used on many houses and also on many of the outbuildings. Acorn Quality Corrugated Iron can be used on any outbuildings.

¶ We want live men to represent us in every territory in Canada. Men who will get out and push the sale of our materials, men who can get business for us as well as for themselves. We have many such men to-day and we want more. We want a chain of Preston business getters who can get every order they go after.

¶ How about you? We are sure that we can co-operate with you to your advantage. Perhaps you will need some of our materials tomorrow on the building you are going to erect. Why not give us a chance to figure on it for you. We will treat you right and help you all that we can with your work. Get in touch with us at once.

¶ Remember that we can put you in touch with many people in your district who will build and this will mean more business for you. Write us immediately.

¶ Ask for our catalogue and price list. Tell us your occupation.

¶ Our future anouncements will appear through this paper each month. Watch these two pages.

The Metal Shingle & Siding Co.

Preston, Ont. and Montreal, Que.

Cosy and Picturesque Dwelling

Approximate Cost $3,300

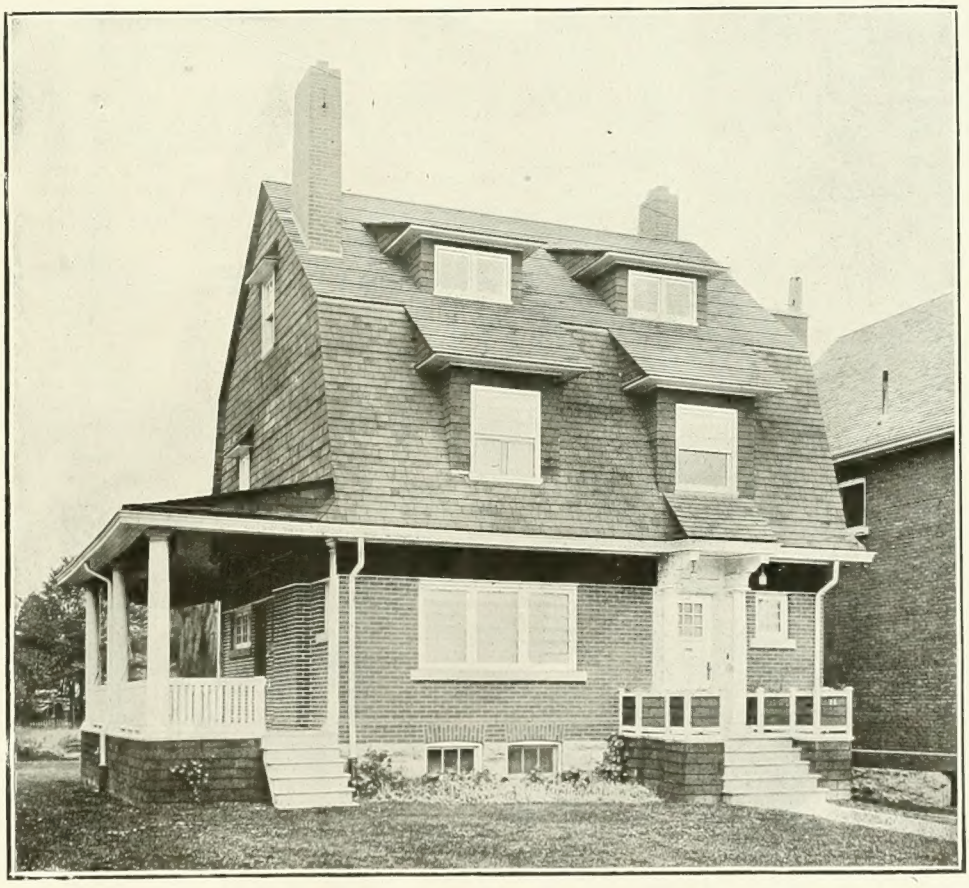
Residence of Orville Quigley, Esq., Fairley Avenue, Hamilton, Ont.
Designed by Herbert H. New, Spectator Building, Hamilton.

The photo and plans given herewith reveal a pleasing adaptation of Dutch Colonial ideas to a Canadian residence. The double row of dormer windows, seldom seen in this country but common in the older parts of many cities in Germany and Holland, gives a quaint appearance to the outside of the structure.

The verandah extending the full length of the building, and the spacious platform at front door, flanked by seats, give ample accommodation for outside comfort in hot weather. The detail of the front entrance is simple and effective; this was altered from the original design, as the photo shows.

Special features of the first floor plan are the roominess of the hall and kitchen, which are well provided with shelving and closets, and the side door opening from cellar stairway.

On the second floor the large linen closet, with clothes chute adjoining, are very convenient. The bedrooms are all well proportioned.

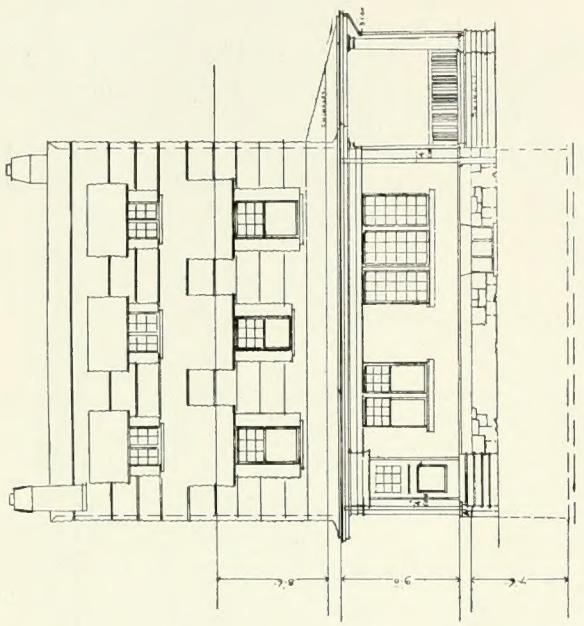


RESIDENCE OF ORVILLE QUIGLEY, ESQ., HAMILTON
Designed by Herbert H. New

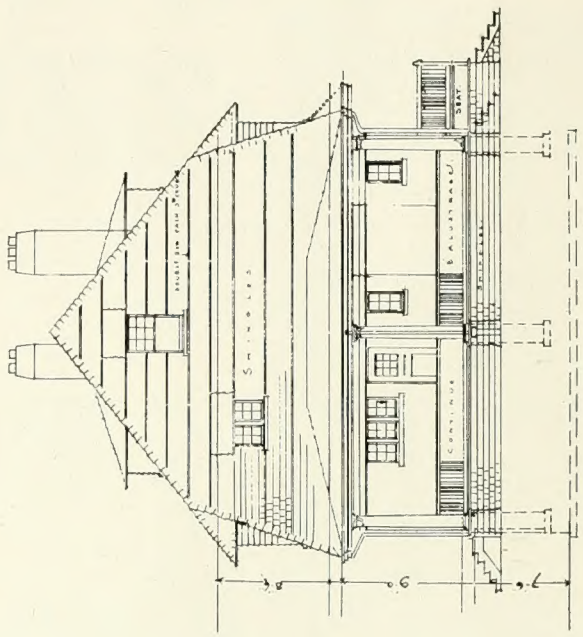
The cellar plan shows that the basement of a house can be utilized to the full for domestic purposes.

Hardwood floors are provided throughout, and the doors are of white wood, stained mahogany. The house is heated by hot water.

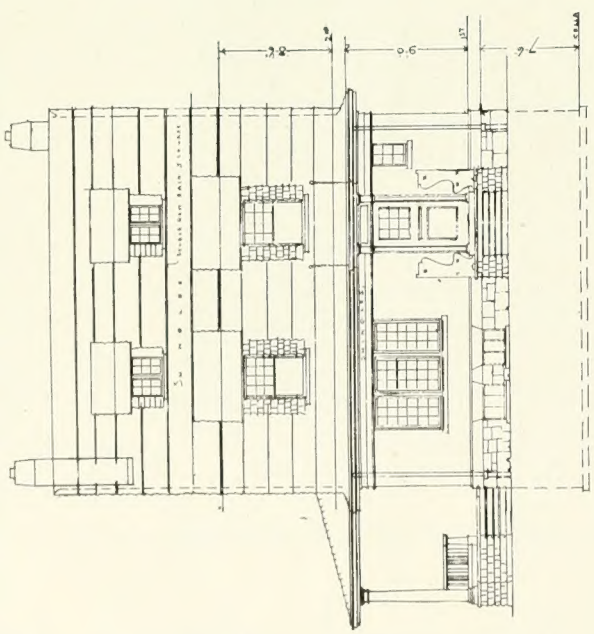
The section shows construction details of the various floors.



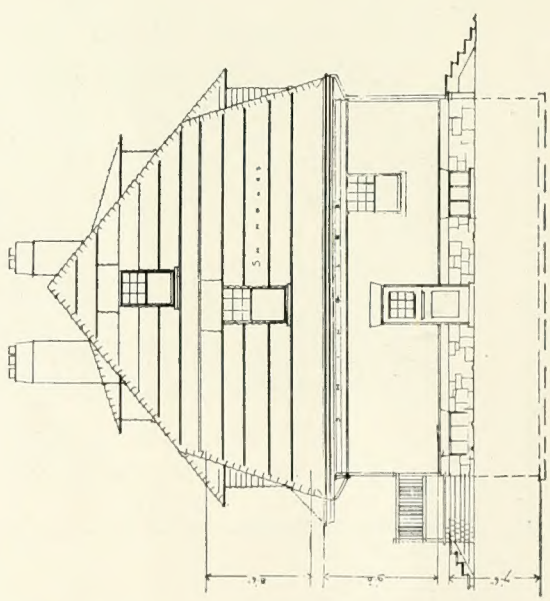
Rear Elevation



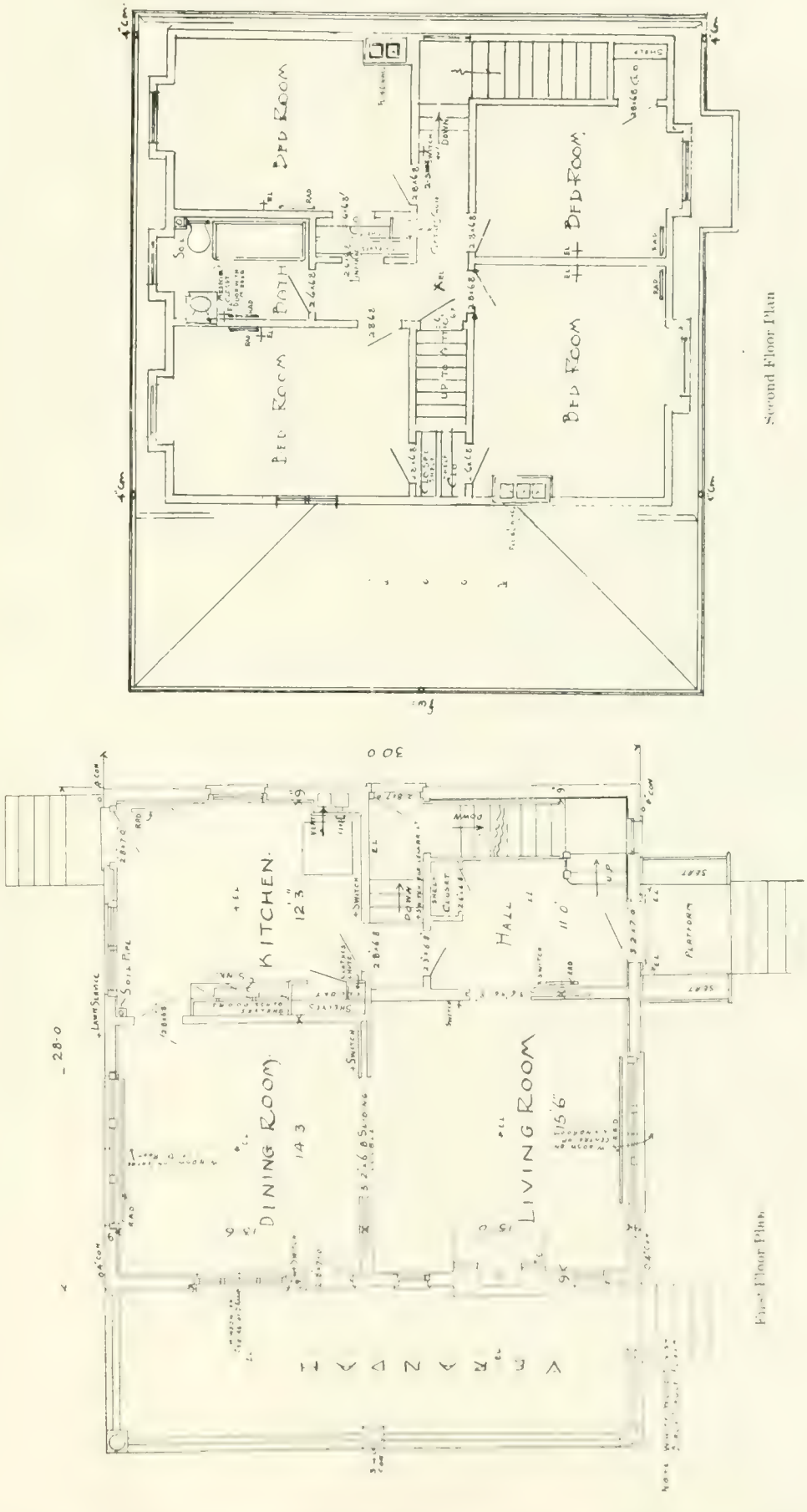
Left Side Elevation



Front Elevation



Right Side Elevation

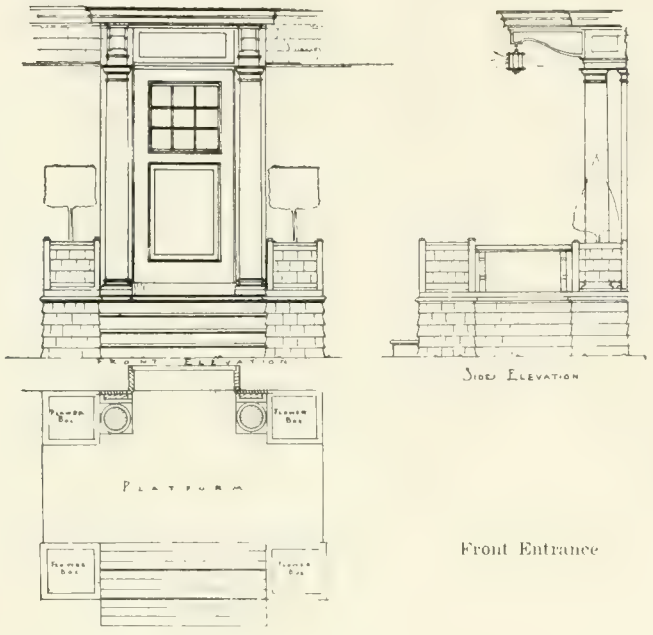


Second Floor Plan

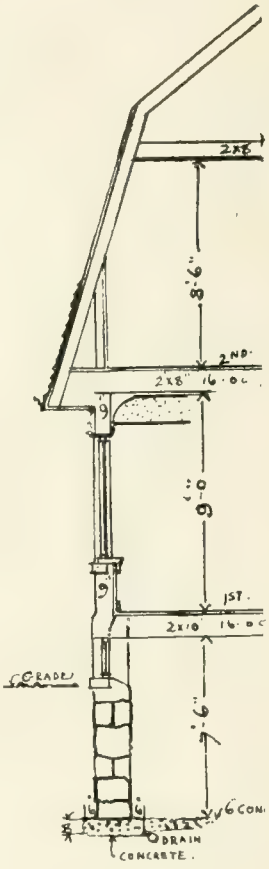
First Floor Plan

RESIDENCE OF ORVILLE QUIGLEY, ESQ., HAMILTON

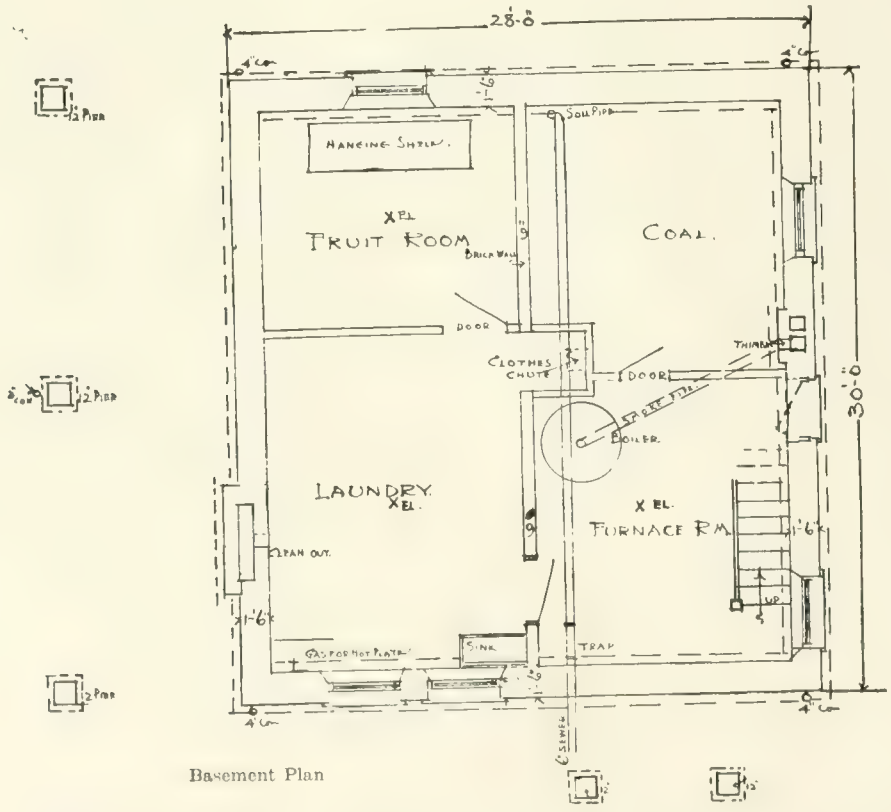
HERBERT H. NEW, ARCHITECT



Front Entrance



Section



Basement Plan

RESIDENCE OF ORVILLE QUIGLEY, ESQ.,
HAMILTON

Workmen's Compensation for Injuries

Notes of an Address by Mr. F. W. Wegenast, of the Canadian Manufacturers' Association, at the C.N.A.B.E. Convention, Toronto, Thursday, February 22, 1912.

At the outset Mr. Wegenast credited his hearers with the same desire as the Canadian manufacturers to do everything humanly possible to prevent accidents, the same desire to deal fairly with their employees and dependants in the matter of compensating them for the effects of accidents. He also believed they shared in the general dissatisfaction with the existing system of compensation. The subject was many sided, and a variety of phases had to be considered before it was possible to reach any conclusion of practical value.

Proceeding, the speaker said: There are five principal aspects of the subject that must be considered, the historical, the economic, the legal, the political and the actuarial or insurance side. The historical aspect, dealing with the systems of other countries and their results and failures and successes has not been properly reckoned with in many jurisdictions where workmen's compensation systems have been introduced. This is particularly true of seven of the nine provinces of Canada where systems have been introduced which are discredited by the experience of other countries.

The economic phase is also a very serious one. It is a subject of discussion with political economists and of study in our universities. I need not say that an economic feature of very direct importance to you as employers is the question where the money is to come from to provide the compensation; and although I do not wish to minimize the importance of this feature, involving as it does a possible increase in expense to employers in this province of from two to eight million dollars annually, I want to emphasize the vital economic importance of another feature, namely, the prevention of accidents. We hear much in Canada to-day of conservation of our natural resources. The conservation of the life, health and industrial efficiency of our workmen is of greater importance than the conservation of any of our resources of forest or mine. Of the legal aspect I could not say more in a brief talk like this than your experience has already taught you. The political aspect I suppose I must not discuss on an occasion of this kind. (Laughter). The actuarial or insurance side of the subject is one of its most important features, not only in its direct pecuniary bearing but also in view of effects to be referred to presently.

Features of a Satisfactory System.

The special committee of the Canadian Manufacturers Association, after careful study, drew up a statement of the features which should characterize a satisfactory compensation system:

First. For reasons both humanitarian and economic the prevention of accidents should be a prime consideration in any scheme of workmen's compensation, and no system will be satisfactory which will not tend to produce the maximum of effort and result in conserving life, health and industrial efficiency of the workman.

Second. Relief should be provided in every case of injury arising out of industrial accident. Such relief should not be contingent upon proof of fault on the part of the employer, but gross carelessness, drunkenness or intentional wrong on the part of the workman should be penalized in some way.

Third.—The system of relief should be adapted to cover wage-workers in every industry or calling involving any occupational risk, and should not be confined to such industries as railroading, manufacturing, building, etc.

Fourth.—The relief should be as far as practicable by way of substitution for the wages of which the injured workman and his dependants are deprived by the injury. It should as a rule be periodical and not in a lump sum.

Fifth.—The relief should be certain. It should not depend upon the continued solvency of the employer in whose service the injury was sustained.

Sixth.—The amount of compensation should be definite and ascertainable both to the workman and the employer. The system should entirely displace the present method of compensation by an action for damages, and the employer should not be subjected to any further or other liability except in cases of gross carelessness or intentional wrong on the part of the employer.

MR. F. W. WEGENAST
Legal Department, Canadian Manufacturers' Association

Seventh. The funds for relief should be provided by joint contributions from employers, workmen and the state. Employers and workmen should pay in such proportions as represent the number of accidents occurring by reason of the hazard of the industry and the fault of the employer on the one hand and the fault

of the workman on the other. The state should contribute a portion sufficient to cover the expenses of administrating the system.

Eighth.—The system of relief should be such as to secure in its administration a maximum of efficiency and economy, and as large a proportion as possible of the money contributed should be actually paid out in compensation.

Ninth.—The procedure for the adjustment of claims should be as far as possible dissociated from the regular courts of law. It should be simple and calculated to involve in its operation a minimum of friction between employer and employee.

Tenth.—The system of compensation should be directly associated with a system of inspection, with a view to the prevention of accidents and a system of prompt and expert medical attendance to mitigate the effect of injuries.

Eleventh.—The system should be such as to secure as liberal measure of relief as possible without undue strain upon industry.

Twelfth.—The system should be such as to afford some promise of permancy.

In regard to the prevention of accidents an ounce of prevention, after all, is worth a pound of compensation, and the experience of other jurisdiction shows that accidents are preventable to a degree that is perhaps not realized by any one who has not made a special study of the subject. I think I am safe in saying that of the accidents that occur in the city of Toronto during the year 50 per cent. are preventable by the adoption of proper, reasonable means.

Coming to the inspection idea, I would like to throw out this suggestion. It appears to me that ultimately the whole system of factory inspection, so far as it relates to the prevention of accidents, will be merged in a system of workmen's compensation, so that the inspection instead of coming from without shall come from within and be actuated by a desire to prevent accidents and prevent expense, rather than coming by paternalistic supervision from without.

After discussing at some length several of the other principles in the foregoing outline, the speaker proceeded to deal with the systems now in vogue:—

Systems in Vogue.

Individual Liability Systems.
Collective Liability Systems.
State Liability Systems.

The first of these, represented by such systems as that of England and the seven provinces of Canada, has almost entirely failed. Under this system the obligation to compensate is thrown entirely upon the individual employer. His workman looks to him individually and directly for compensation, and the employee's ability to collect compensation, and the employer's ability to pay it, depend upon the latter's solvency. If he be insured with a liability insurance company compensation may further depend upon the solvency of the company.

In the Collective Liability systems the liability to compensate the workman is thrown not on the individual employers, but on the employers collectively in groups. In Germany they put the builders in certain lines into a certain class, and they throw the liability on that class, or on a fund raised and maintained by that class. When a man gets hurt he applies for his compensation not to his employer, but to the Society which manages the fund. The Collective Liability systems, notably that of Germany, have been found to fulfil to a very large degree the requirements laid down in the principles above outlined.

The State Liability systems, which are really collective, have also shown good results, but in their case there is the difficulty that the machinery may be and sometimes is more elaborate than necessary.

Mr. Wegenast then proceeded to outline the scheme for Ontario now being laid before Sir William Meredith, viz., a system of mutual insurance under the administration of a government commission. Industries should be divided into classes and each class assessed with an appropriate premium on the pay-roll to provide the funds for compensation. Claims for compensation should be adjusted by the commission without recourse to an action at law.

The paper was followed by a long and interesting discussion, making one of the most practical and helpful sessions of the convention.

PROGRESS OF BUILDERS' EXCHANGE MOVEMENT.

Exchange Formed at Hamilton Successful Inaugural Banquet.

The building and allied trades at Hamilton, Ont., formerly banded together under the name of the Building Contractors' Association, have fallen into line with the Builders' Exchange movement. The association named above has been replaced by "The Builders' Exchange of the City of Hamilton," the officers of which are:

Robert Somerville, President.

Roderick Nicholson, 1st Vice-President.

John Poag, 2nd Vice-President.

Richard Press, Treasurer.

Arthur Heatley, Secretary.

The inaugural banquet was held at the Waldorf Hotel, Hamilton, on Friday, April 26. Over 100 members and visitors attended, and the gathering was a conspicuous success. President Somerville occupied the chair, and Secretary A. Heatley acted as toastmaster. Mayor Lees and Alderman Clark spoke, giving the new Exchange a send off on behalf of the city.

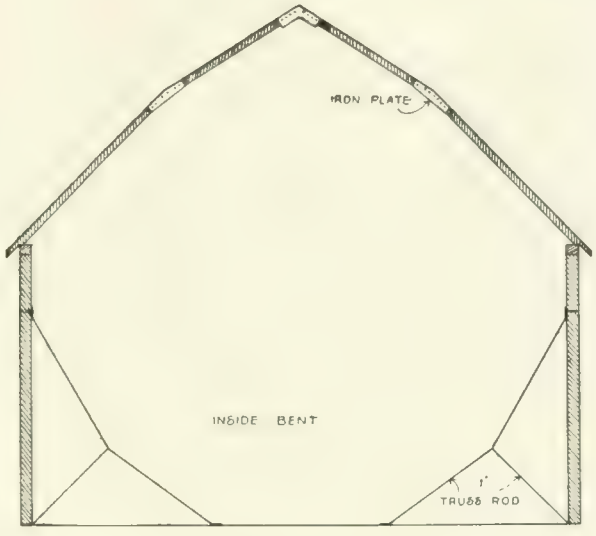
The principal interest centered in the addresses of George Gander, President of the recently formed Builders' and Supply Association of Ontario; John Aldridge, Treasurer of Toronto Exchange, and H. S. Wallace, Hamilton. Messrs. Gander and Aldridge dealt with the nature of the work accomplished by the Toronto Exchange, while Mr. Wallace spoke of previous organizations of the trade in Hamilton, closing his speech with an admirable outline of the aims and scope of the new Exchange.

E. Heatley, vocalist, and H. Bennett, the well-known "Harry Lauder" impersonator, aided by S. Walling, accompanist, rendered several acceptable and amusing items.

We sincerely hope this initial banquet is only the first of a long series of successes in the career of the Hamilton Exchange. The charter of the Exchange has been secured.

The phenomenal progress in the building trade at Victoria, B.C., still continues. Building permits issued during the first quarter of 1912 aggregated $2,852,725, compared with $614,340 in January, February, and March, 1911.

IDEAL BARN PLANS



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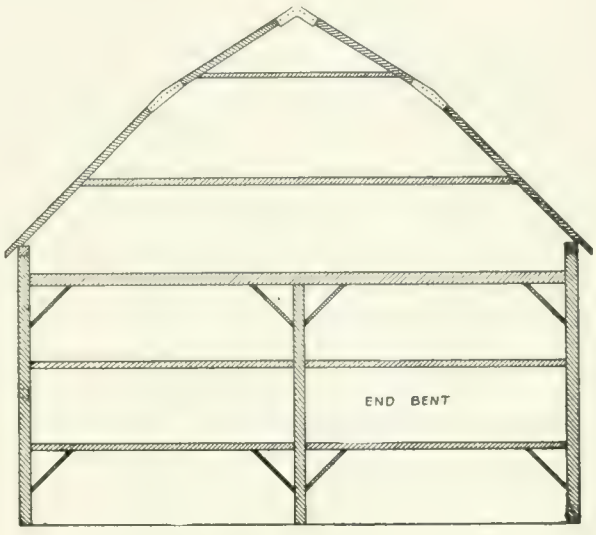

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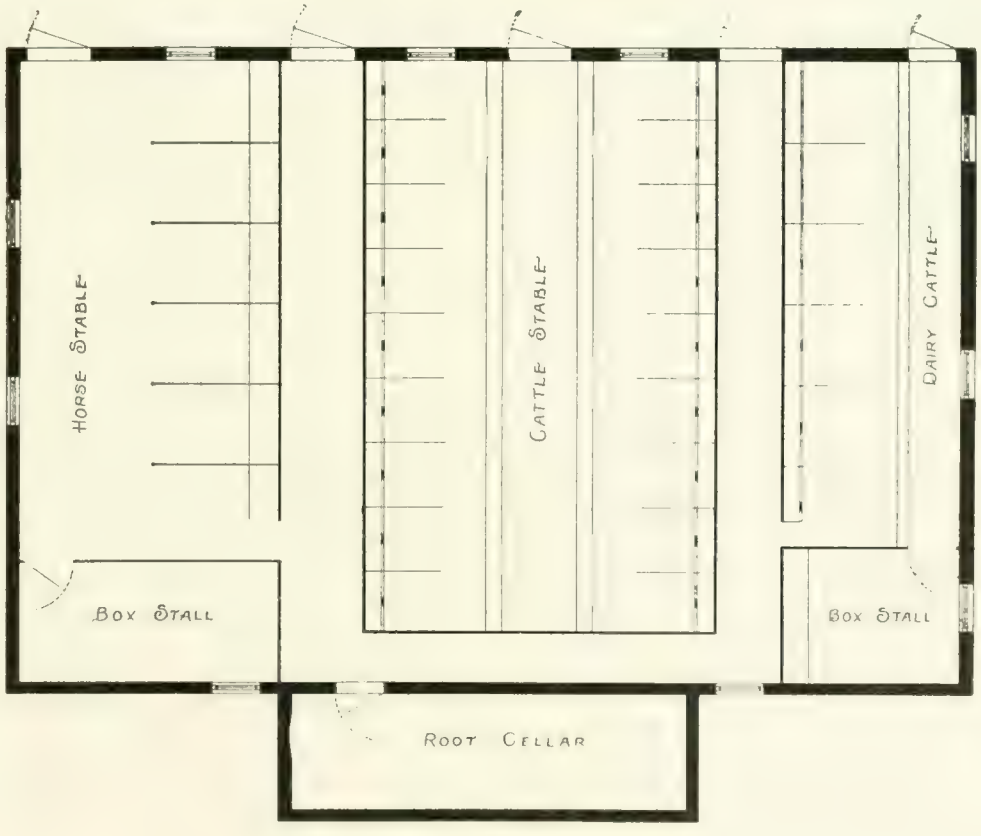


60 ft. long. 40 ft. wide.

PLAN NO. 1. BY H. VOGAN, WOODSTOCK, ONT.

We shall insert from time to time plans of various types of barns, suitable for erection in different localities, taken from "Ideal Barn Plans," published by the Metal Shingle and Siding Co., Ltd., Preston, Ont. and Montreal, Que.

ACCIDENTS DURING MARCH.

During the month of March there were 5 fatal and 16 non-fatal accidents recorded in connection with the building trades, compared with 5 fatal and 15 non-fatal accidents during March, 1911. Of the fatal accidents 4 were due to falls and 1 to a falling tile. The majority of the non-fatal accidents were due to falls.

A SMALL CONVENIENT BRICK DWELLING.

Editorial Correspondence.

The brick house illustrated herewith, is designed along similar lines to one of the houses described in the April issue of The Canadian Builder. It is slightly smaller being 22½ x 30 feet and is without an attic.

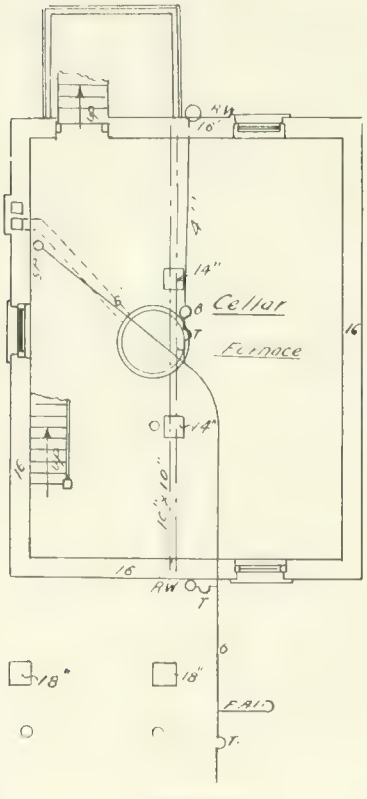
A reference to the plans reveals some interesting features. At the front entrance, the vestibule takes in a space the width of the stairs. This forms a convenient cloak room.

In the dining room is an oriel window facing the south. There is also an oriel window in the front bedroom facing west, making a large bright room.

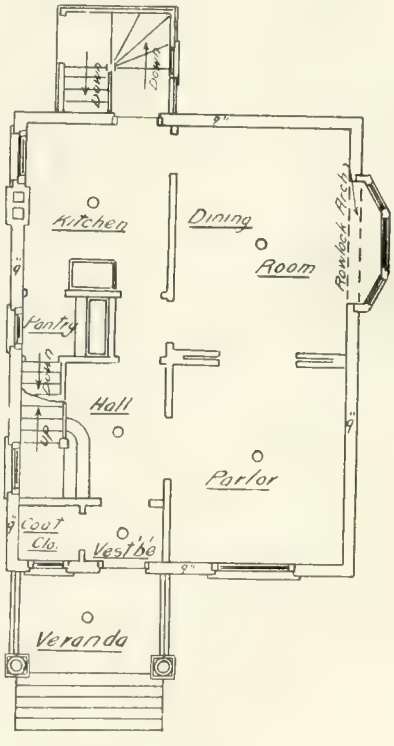
The basement has a well cemented floor and is well drained. There is an outside entrance to the basement. This entrance forms a back balcony which is entered through the little upstairs back room.

On the stairway are two casement windows, one at each landing. Both windows may be opened. The lower one is in the wall but the one at the second landing is built like a ≻, on the principle of a window seat, but smaller.

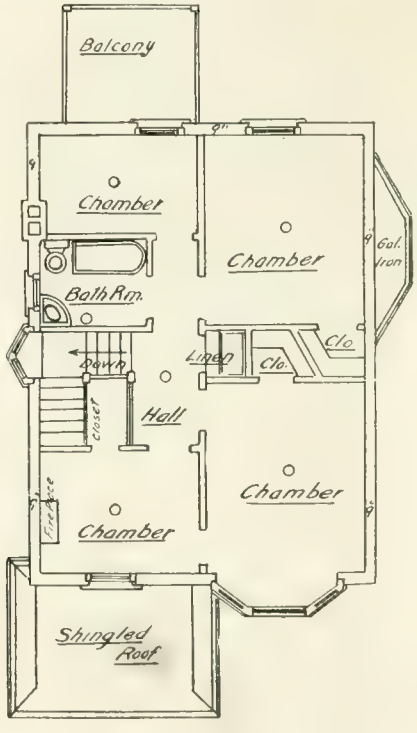
The house is heated by hot water heating, the water gauge and tank being placed in the bath room. Water for the bath is heated by a gas heater, both water boiler and heater being located in the kitchen. The kitchen is small, but convenient, where a gas stove is used. Should it be desired to use a coal or wood stove in the kitchen it would be found a little small and an extended kitchen would probably be found more convenient. This would also give a larger room upstairs. The pantry is underneath the front stairs.



Basement

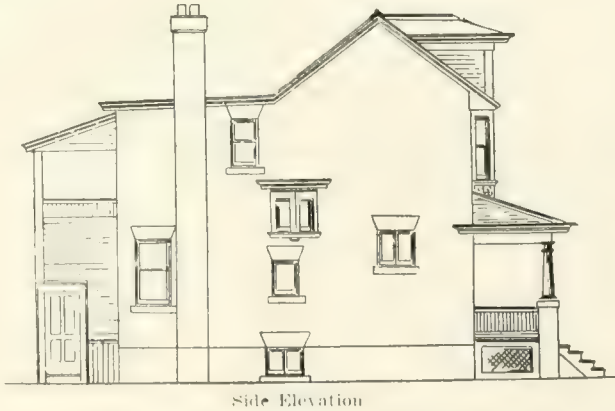


First Floor

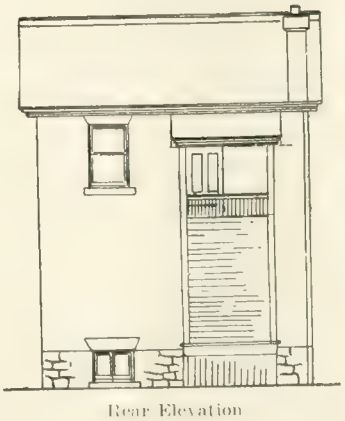


Second Floor

Front Elevation



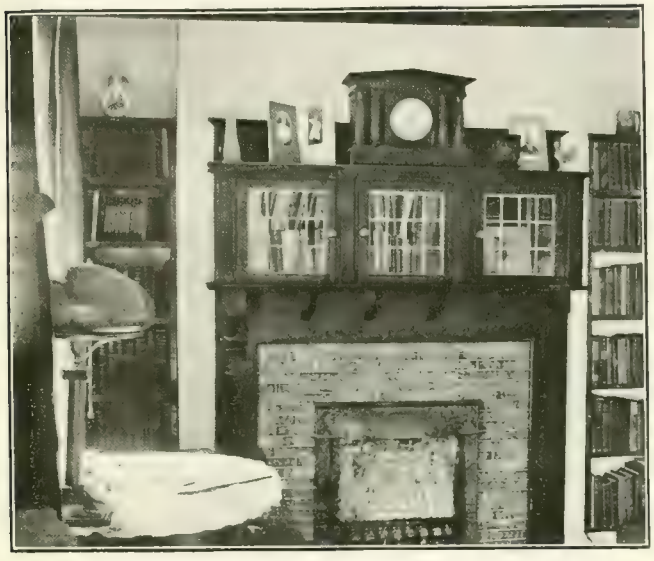
Side Elevation



Rear Elevation

A SMALL CONVENIENT BRICK DWELLING

A view shows the arrangement in the den. In the alcoves on either side of the fireplace, book cases are arranged. There is also a closet for surplus books. This is not shown in the plan but is very convenient. Another good feature is the small arch with curtains between the bedroom and the den with its fireplace.



Arrangement of book shelves, fireplace, clock, etc., in the den of the brick house described and illustrated herewith

Front View of Dwelling, described herewith

Typical Specifications for Stucco on Metal Lath

We have received from Mr. D. M. Turner, Secretary of the Associated Metal Lath Manufacturers, Youngstown, Ohio, a "Typical Specification for Stucco on Metal Lath," which should be of practical interest to our readers. We give below complete copy of the document:—

The merits of the stucco house are now so well recognized that arguments in its favor seem to be trite. It is assumed that the prospective builder and his architect want a stucco exterior and realizing that when built, the house will look as substantial as stone, brick or solid concrete they want a structure that will age slowly and gracefully through decades—not fail perceptibly from year to year.

This specification is offered with this realization promised, but it must be borne in mind that poor work is dear at any price. A faithful observance of every detail will give results gratifying to the architect and satisfactory to the owner.

Metal lath is recommended because wood lath absorbs moisture required by the mortar. Wood lath drys out and shrinks away from the plaster following which the alternate shrinkage and swelling resulting from moisture causes unsightly cracks and finally failure. Wood lath, also, increases the fire risk and it will harbor vermin.

Metal lath in combination with cement plaster is "reinforced concrete" and will insure an unbroken surface, to be assured of which is at least an uncertainty when the plaster is applied direct to a wall set up in block form. The air space afforded by metal lath construction is the most efficient insulation.

A careful following of this specification will absolutely give a construction economical and enduring.

Framing and General Construction.

Flimsy construction in framing is false economy. The best will prove cheapest. The studs spaced at 12 inch between centers wherever possible, should be run entirely from foundation to the rafters without any interfering horizontal grain in the wood. These studs shall be tied together just below the second storey joists by a 6-inch board which shall be let into the joists on their inner side, so as to be flush and securely nailed to them. This board will also act as a sill for the second storey joists, which in addition will be securely spiked to the sides of the studs. At two points between the foundation and the eaves, brace between the studding with 2-inch x 3-inch bridging placed horizontally but with the faces of the bridging inclined in alternate directions in adjacent spaces.

All roof gutters should be fixed and down-spouts put up before the plastering is done; the down-spouts should be temporarily placed about a foot from the wall so there will be no break in the plastering where they are to be finally fixed.

Wood copings or rails for tops of parapets, balustrades, etc., are not so good as cement for they may curl up, warp, check, crack, and in various ways fail to do what they should—keep water from getting behind the plaster. This also applies to brick chimneys which when plastered should have wide and tight caps of concrete or stone to prevent water running behind the plaster.

If only wood sills are used, they should project well

from the face of the plaster and should have a good drip; either by being placed with a downward slant or by a groove rebated in the under side of the sill near enough to its edge that it will not be covered by plaster. The drip is an essential of good stucco construction that can not be slighted. It must be used to prevent water getting behind the plaster.

Lath and plaster should not be carried all the way down to the ground; this same restriction applies to brick or stone.

Care should be taken that all trim be placed the proper distance from the studding or furring to show its right projection after the plaster is on. It is a common mistake to allow too little for the lath and plaster, with the result that mouldings which should project from the face of the wall are back from it or partly buried under the plaster, thus missing the effect desired. About 1½ inches should be allowed for the lath and plaster, making sure that the projection of the moulding to show when finished is not measured in as part of this thickness.

Furring.

Use painted or galvanized steel rods or painted or galvanized crimped furring. One-quarter inch is best and it should not be over one-half inch at the most. This furring is to be applied along the face of the studding with galvanized staples.

Insulation.

After the lath on the outside has been back-plastered the air space may be divided by applying heavy building paper, quilting, felt or some suitable insulating material between the studs, fastening it by nailing wood strips over folded ends of the material. This insulation should be so fastened as to clear the 2-inch bridging, leaving the preponderance of the air-space on the outside. Care must be taken to keep the insulating material clear of the outside plaster and to make tight joints against the wood framing at the top and bottom of the spaces and against the bridging where the 3-inch face intercepts.

Corner Bead.

If corner bead is not used, there should be 6-inch strips of metal lath bent around the corners and stapled over the lathing unless the sheets of metal lath as applied are folded around the corners.

Even though corner bead is used, it is a good precaution to bind the corners in this way and apply the corner bead over the strips of lath.

Lathing.

The lath shall be painted to protect it until it can be applied and covered with Portland cement plaster Care should be taken not to expose the lath to the weather while it is lying about the building.

Use metal lath weighing not less than 3 lbs. per sq. yard spaced at 12 inch centers and fastened horizontally over the furring strips with galvanized staples 1¼ x No. 14 gauge. The sheets between furring are to be tied with No. 18 gauge galvanized wire.

Plastering.

Portland cement will protect metal from corrosion absolutely by reason of its moisture-resisting qualities. Calcined gypsum should not be used in combination with Portland cement; the gypsum will destroy the protective quality in the cement and neither should it be used as a substitute for Portland cement. A gypsum plaster may repel moisture for a time, but Portland cement actually thrives on it.

It is not theory only that Portland cement will preserve iron or steel indefinitely; it has been well demonstrated that Portland cement stucco will endure in any habitable climate. The first and second coats should be of good thickness and the finishing coat should have with it a mixture of waterproofing. A total thickness of plaster of about 1½ inches is good practice.

It is aimed for the first and second coats to get a Portland cement mortar with as little lime in it as will make it work properly. Clean long winter cattle hair should be used.

For first and second coats and back-plastering, mix in the following proportions:—

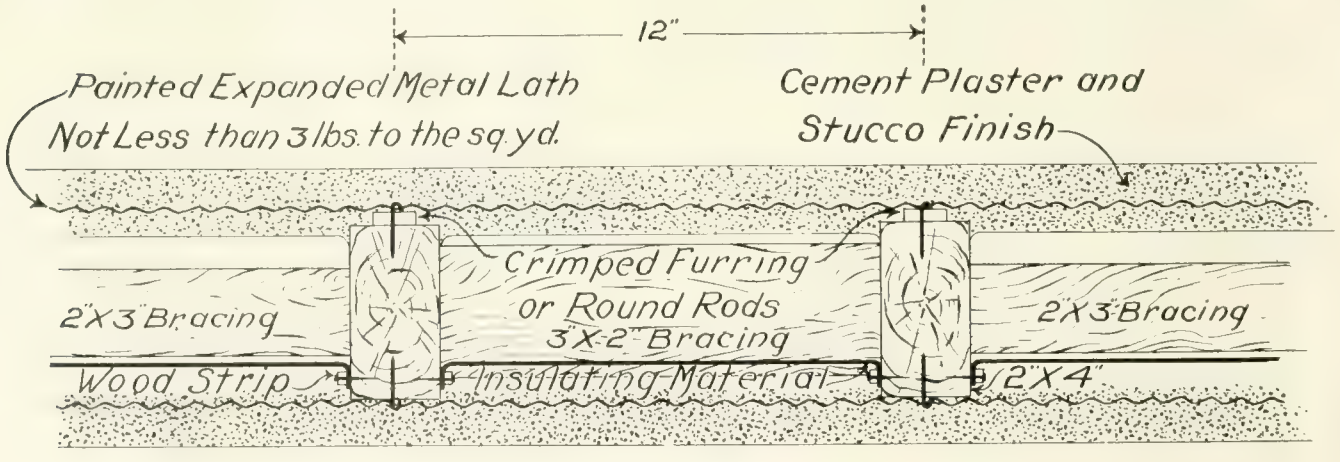
Lime mortar—2 barrels of hydrated lime, 1 yard of clean sharp sand free from loam, 4 bushels cattle hair

Make up at least 3 days before using.

Cement mortar—2 parts of clean sharp sand free from loam, 1 part Portland cement.

Mix fresh in small batches as used.

The lime mortar and cement mortar should be mixed and tempered separately, measured carefully, equal parts of each and mixed well together.



Detail Showing Section of Exterior Wall

In plastering over the face of the stud, the plaster should be forced well through the lath in order to fill entirely the space between the lath and the stud.

The back-plastering should be a heavy coat well troweled so that the lath is entirely enveloped. The finish coat may be done in a way to get any one of the many surfaces which give stucco its charm; this coat should contain no lime as it makes the wall more porous, and if a lighter color is wanted than can be gotten with ordinary cement, a white Portland cement should be used.

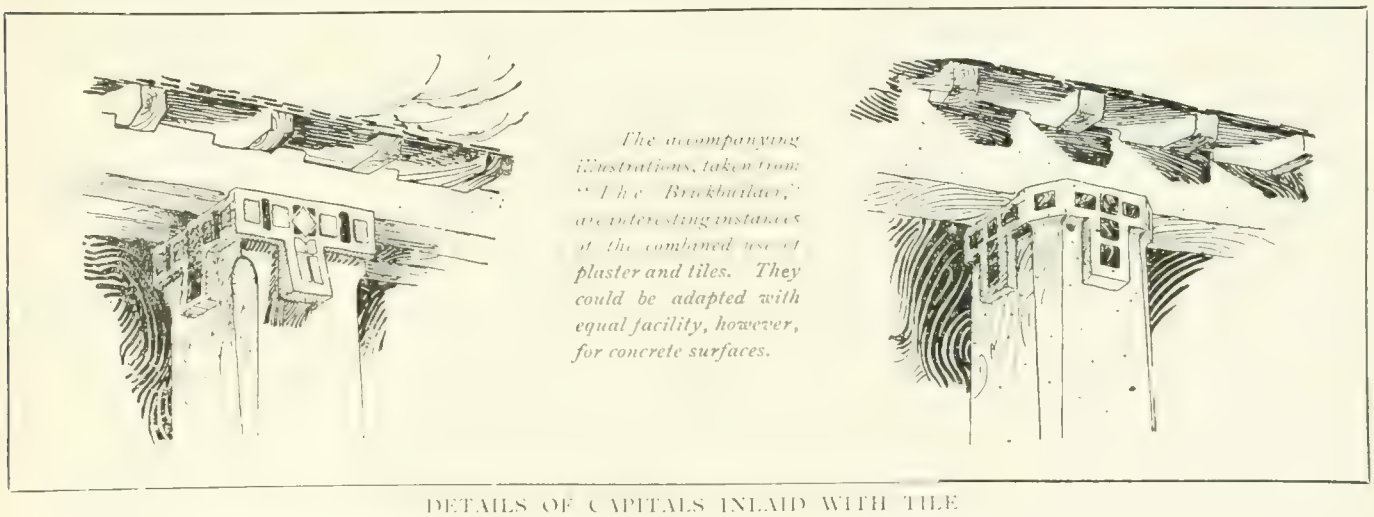
The waterproofing acceptable to the architect should be mixed with the last coat of the exterior according to directions given by the waterproofing manufacturer. The lathing and plastering on the inner side of the wall need not differ from ordinary practice.

The exterior plaster must not be allowed to set rapidly, if necessary, hang a curtain in front of the wall of burlap or other material that can be kept moist for a couple of days. Stucco should never be applied when the temperature is below freezing.

Stucco on Brick.

In applying stucco over brick chimneys a ½-inch painted or galvanized steel furring strip not lighter than 22 gauge should be fastened to the brick at 12-inch centers with galvanized staples 2-inch x No. 9 gauge driven into the mortar joints. The lath is fastened to the furring with No. 18 gauge galvanized wire, run through under the furring and the same material used for lacing the ends of the sheets together between furring strips.

The same mixture for plaster is recommended for this work as on the metal lath on studding. Before plastering, the brick should be well wetted to prevent its absorbing the moisture from the plaster and the first coat should be forced through thoroughly so that the entire space back of the lath is filled with the Portland cement plaster and the lath enveloped.



The accompanying illustrations, taken from "The Brickbuilder," are interesting instances of the combined use of plaster and tiles. They could be adapted with equal facility, however, for concrete surfaces.

DETAILS OF CAPITALS INLAID WITH TILE

WESTERN JOTTINGS.

Again Winnipeg reports an enormous increase in building permits, the figures for March beating all previous records. The comparative figures are: March 1911, 270 permits, 337 buildings, to cost $1,070,550; March 1912, 374 permits, 498 buildings, to cost $1,779,750. For the first three months of the year the figures closely approach the three million dollar mark, being $2,932,810.

Among new companies registered in Winnipeg are the "Canadian Fire-Proofing Impregnation Company, Limited," who have acquired from Emil Muschik the rights and interest in his fire-proofing impregnation formula and process for treating wood, canvas, and all building and construction material generally; "The Canadian Construction Company, Limited," who will do a general construction business; and "The Builders' Supply Company, Limited.

Vancouver Island is developing rapidly. Not only in Victoria, as noted above, but in other centres also, expansion and improvement are proceeding on a large scale. At Nanaimo the Western Fuel Co. are constructing a sea wall and water front road to cost $1,000,000. At Wellington the Pacific Coast Collieries Co. is installing a new plant which will increase its daily output from 800 to 3,000 tons. The Canadian Collieries are about to spend $2,000,000 in improvements in the Comox district. Duncans is to have a $15,000 railway depot and a Government building (for post office, customs, etc.) to cost $50,000.

Supporters of the town planning movement will be interested to learn that Colonel Montgomery, the American town builder, and the original locator of Fort Worth, Texas, has bought a large tract of land at Quatsino, Vancouver Island, with the idea of laying out a townsite.

What is probably the record in Moose Jaw for one day was the building permits issued by the Building Inspector yesterday, April 24, which totalled over $400,000.00. This shows the total permits for the month reaching figures over the million mark, as during the first twelve days permits were issued which totalled $500,000.00

On Saturday, April 20th, a successful demonstration of the Elliott Woodworking Machine was given at the establishment of the Kent-Garvin Co., Hamilton, who have the agency for that city. Ten machines were sold.

Campbellton, N.B., will see great building activity this year. A new hospital is contemplated, in addition to several brick and concrete structures, residential and commercial, while it is rumored that a company is planning to erect a fireproof opera house on the principal street, the building alone to cost $40,000 to $50,000. Another evidence that Canadian progress and prosperity are general, and not confined to a certain specially favored localities.

The Canadian Builder

A Practical Paper Devoted to all Branches of the Building Trades

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THE LARGER OUTLOOK.

With the disappearance of the snow and the advent of warmer weather the normal operations of the building trades are resumed. Indications point to a season of activity unsurpassed in the history of Canada, and the outlook is full of promise in the East as well as the West. Activity in building affects many other trades, in fact it would be difficult to name an industry whose prosperity has a more far-reaching effect. Lumber (including the manufacture of sashes, doors and flooring), brick, concrete and stone, are most influenced, of course, but plumbing, heating, sheet metal, roofing, hardware, painting and decorating, all receive a strong impetus when building booms.

To the architect, the builder, and the workman, this prospect means much. To the architect, as a professional man, it means increasing practice; to the builder, as an employer and a business man, it means heavier responsibility and wider scope; to the workman, as an industrial man, it means ample employment. To all three it should mean prosperity.

Each of this trio of workers has his own living to make and his own ends to serve, but it appeals to us that much lasting good would result from a recognition of the fact that each is contributing a share and performing a part of one great whole, the final success or failure of which depends, to some extent, upon their mutual understanding and co-operation. When good feeling exists between architect and builder at one end, and between builder and workman at the other, friction, loss of time, waste of money, and other evils may be eliminated and the common good of all three promoted.

This may seem idealistic. It is, and we make no apology for it. Ideals move the world in general; they also move Canada in particular. At the present time the commercial ideal, the almighty dollar, is followed enthusiastically from coast to coast, and we are far too fond of talking as if it were the only one worth following. Every sane and thoughtful man knows it is not, and we plead for "The Larger Outlook" in connection with building among its three typical workers—architect, builder and workman—as an ideal worth while. For the sake of the final result let each consider the other and find points of agreement and sympathy, rather than of dissension and alienation. The dominance of the ideal, the larger outlook, is the explanation of all great and lasting effort. It has wrought wonders in every sphere of human thought and endeavor. This spirit, this practical recognition of a grand aim and ideal by all concerned, was the chief secret of success in the erection of the old cathedrals, which still remain the architectural glory of Europe.

The fostering and practice of such a spirit in Canada would enhance the work and ennoble the workers to-day. "The larger outlook" need not remain an idle dream. Its transformation into a living reality is possible and desirable. Is it probable? We hope so.

THE PREVENTION OF ACCIDENTS.

In his address on "Workmen's Compensation" before the Toronto Convention, outlined on another page of this issue, Mr. F. W. Wegenast remarked: "I think I am safe in saying that of the accidents that occur in the city of Toronto during the year 50 per cent. are preventable by the adoption of proper, reasonable means."

We see from the statistics issued by the Department of Labor at Ottawa that industrial accidents in Canada are decreasing, but with the question of Workmen's Compensation in the air and the loss of the "Titanic" fresh in our minds it is an opportune time for giving practical heed to the improvement of means for the prevention of accidents.

"We have taken a great deal of interest during the last few years in the question of the conservation of our natural resources. The conservation of the health, life and industrial efficiency of our workmen is of more value than the conservation of any other resources we have in this country," continued Mr. Wegenast, in another passage of the address quoted above. We heartily endorse his words, which are worth weighing by all employers of labor throughout the Dominion, including builders and contractors.

The criticism of the Toronto Building Inspection Department attributed to Mr. W. A. Tice, on another page of this issue was taken from the daily papers. Mr. Tice informs us that he did not make these statements

CANADIAN NATIONAL ASSOCIATION OF BUILDERS' EXCHANGES.

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Lethbridge, Alta.	E. Power, Sec., Acadia Block
Vancouver, B.C.	Builders' Exchange, 342 Pender Street.
Victoria, B.C.	Chancery Chambers.

Brick Work, Concrete Work and Masonry

HOW TO BUILD A CHIMNEY.

By Donald Folsom.

Fireplaces and chimneys have been in use for over three hundred years, says Donald Folsom, in The Country Gentleman, and yet we usually build them in a hit-or-miss way that relies chiefly on luck for success. The result, nine times out of ten, is either a big fire and no heat, or a smoldering pile of logs and a room full of smoke. A little care and thought given to the design and the construction would banish these objectionable features. The properly designed fireplace should throw the maximum amount of heat into the room and the minimum amount up the chimney, and should carry all the smoke up the chimney. It should also be an ornament to a room and should be made safe against fires.

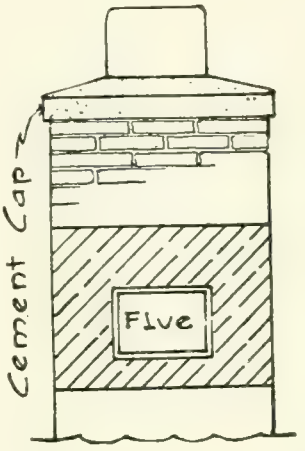
One of the illustrations shows a fireplace the design of which is along the most modern lines, and those generally accepted as mathematically correct. It has a simple brick front with a wooden mantel shelf, supported on corbeled brick brackets. The only attempt at ornament is the line of half-bricks or "bats" round the opening of the firebox, and the bricks on end at the base of the jambs. This front, of course, may be elaborated or the character changed to suit the architecture of the room in which it is to be placed or the

individual tastes of the owner, or it may be built of stone or other material; but the principles involved in its construction would be the same.

For practical purposes the opening of the firebox should not be over three feet wide and from two feet six inches to three feet high. The depth should be one-half of the opening; and the width across the back, two-thirds. The flue should have an area equal to one-tenth of the area of the opening of the firebox if wood or bituminous coal is to be burned, but it may be reduced to one-fifteenth if anthracite coal is used.

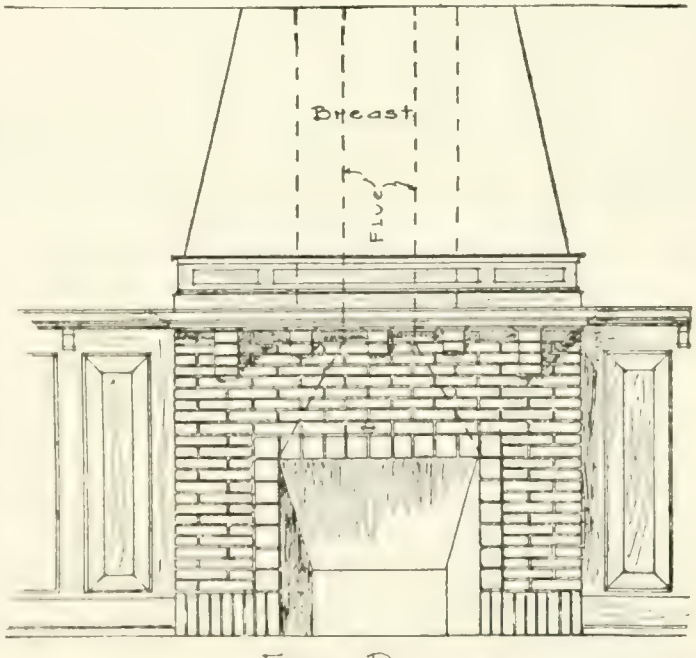
The ash-pit is a very convenient though not an essential part of this design. In a fireplace that is frequently used it will be found to be a great saving in time and labor, since the pit will have to be emptied but once or twice a year and then from the cellar. The piers on each side of the firebox, known as the jambs, must, of course, begin at the cellar bottom. These jambs and the back wall form the sides of the ash-pit. The front is a four-inch brick wall and at the bottom of this is placed the ash door for removing the ashes. At the top the sides of the pit are corbeled out toward the center to support the hearth. An opening six inches square should be left in the center for the ash dump. From a point below the floor line the trimmer arch is turned against a specially prepared framing of joists, and the space above the arch is filled with concrete and leveled up to receive the hearth. By this arrangement it is almost impossible for the fire to come into contact with any woodwork. A hearth set directly upon a wood joist is very dangerous.

When the ash-pit is finished and the trimmer arch is in place the really important part of the construction



·CHIMNEY·

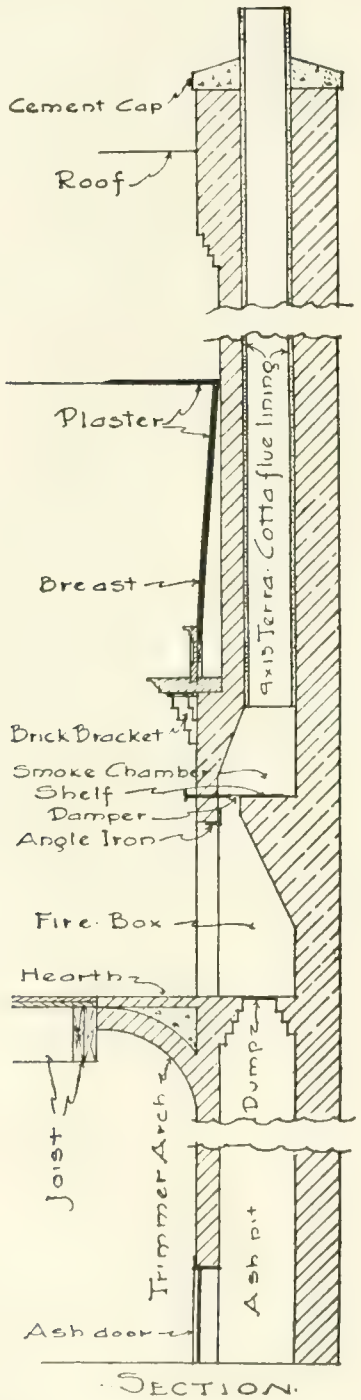
begins. The illustration shows the opening to the firebox three feet wide so that the depth should be one foot six inches and the width across the back two feet. Beginning at the three-foot opening, we extend the side walls straight back for four inches, or the width of one brick. This saves grinding the brick. They are then carried back at an angle to the two-foot width at the back. These angles by reflection increase the amount of heat thrown into the room. The back wall rises vertically for twelve inches, and then slopes forward to a point two inches above and four



·FIRE·PLACE

inches back from the inside of the top of the opening. This forms a throat or smoke outlet four inches wide.

The sloping out of the back is sometimes accomplished by corbeling or "stepping" out the brick. This will give, however, a series of sharp edges that are likely to become chipped and unsightly. A better way is to tip the brick to the angle of the slope, and thus form a smooth surface. Even when a flat arch



is used the brick across the top of the opening should be carried on a small angle iron. For a segmental arch or a stone lintel this iron will not be necessary. The shelf extends back to a point directly under the back of the flue. The space just above the shelf is the smoke chamber, the front and sides of which converge toward the top at an angle of not less than sixty degrees until they meet the flue. To determine the size of our flue we shall have to find the area of the opening of the firebox. The opening is three feet wide and two feet eight inches high, and so would have an area of 1,152 square inches. The area of the flue must be one-tenth of this, or 115 1-5 square inches. A nine by thirteen flue will give us an area of 117 square inches and will be the size used. The shelf and the smoke chamber are of vital importance in fireplace construction. The shelf serves to deflect the descending currents of cold air outward to meet the ascending currents of hot air at the throat, thereby preventing the smoke from being forced into the room by "down draft," while the chamber allows the smoke to accumulate and roll easily round until it finds its way out of the smaller flue opening.

The flue should always be started directly over the center of the firebox to insure an even draft, but if necessary may be deflected to one side after going straight up for two or three feet.

GOOD ADVICE TO CONCRETE SPECIALISTS.

Having in mind the honest and thorough workmanship that usually attends construction in England, Concrete and Constructional Engineering gives the following good advice to those about to make a specialty of concrete work, an admonition that could be followed with profit in other countries:

"The great thing for specialist contractors to strive against is the insidious manner in which by the growth of their businesses they may devolve from good to inferior and bad work. It is hard to set oneself against taking on work when it is offered, and to continue to have a small output and make a regular profit year after year when it appears so easy to increase; but that will be the most effectual procedure in the end. They should make up their minds to carry out only a certain amount of work which they have the staff capable of doing, and see that they get proper prices. If they do that they will not need to complain of excessive cutting of prices, and they will be able to go on in a profitable business, whereas the opposite road leads to continual striving to increase the output and cheapen the production so as to enable undercutting. This tends in a short while surely to reduce the profits for everyone, and to bring the rates down to such a point that few can do good work and make a profit. It has been proved in general contracting work that such a policy is a foolish one, because a few firms are quite unable in the building and engineering industries to freeze out their rivals and secure a monopoly; a combine is quite impossible in these trades. Therefore, everyone in the end loses by such undercutting. If the specialist contractors are wise they will be careful not to undercut, but to maintain a fair price for good work, or refuse to do work too cheaply with its natural degeneration into shoddy work. In the end the public will appreciate that good work must be paid for, and, fortunately, the engineering and architectural professions are pretty well aware of it; at any rate, the leading members know what is good work, and they are prepared to back the firms that do it."

GOVERNMENT-BUILT CONCRETE DWELLINGS FOR NEW ZEALAND WORKINGMEN.

In accordance with an act passed in December, 1910, the government of New Zealand is now putting into operation a plan for the sale to workmen, in cash installments, of dwellings especially suitable to their use.

Workers' dwellings under the new act, the same as under the old, may be built of wood, concrete, or brick, but the total cost must not exceed £600 ($2,920). The department of labor has recommended to the workers that they choose houses of ferro-concrete, for although they cost somewhat more than wood (approximately $30 per dwelling), this extra cost is more than compensated for by the extra durability, the saving in cost of maintenance and insurance, and the fact that the dwellings are warmer, more weatherproof, and less sensitive generally to external influences.

The concrete dwellings present the best appearance and give the best satisfaction, especially as regards saving in fire insurance. In Wellington, which is located in a district subject to frequent earthquakes, wood and concrete construction are both considered safer than brick, but as the earthquake risk also carries with it an extra fire rate, the concrete dwellings appear more desirable than those of wood, and the fire insurance companies doing business there charge only 3s. 4d. (81 cents) premium on every £100 ($86.65) on concrete houses as against 8s. 9d. ($2.12) on wooden houses.

INFLUENCE OF TRANSPORTATION ON CONCRETE.

While French practice in concrete construction is to convey the raw material to the building under construction and there set up a contractor's plant and make the concrete as needed, some German practice has been to finish the concrete at the plant and then convey it to the building, often over long distances. The French do not favor this latter practice as they fear the action of the vibrations and shaking to which the concrete is exposed in transportation, and also do not care to meet the expenses of transport and delays due to unfavorable weather, which is especially common in the winter.

Herr Magens, a German engineer, has investigated this question and has made comparative tests between concrete cubes made at the plant and then conveyed longer distances to the buildings, and between concrete cubes made directly at the building and then used there. He recommends the use of slow setting cements, as also a long setting time in warm weather if possible. If the cement has set a sufficiently long time, the vibrations of the transportation will have no bad effect on the concrete. In comparing test cubes, he allowed them to set 28-60 days and then tested them, finding that the concrete conveyed long distances showed in nearly all cases a considerable increase in compressive strength, varying between 4 to 48 kg. sq. cm. (56-198 lb. sq. in.).

A number of laboratories that were interested in this question made similar experiments and found the same results, the variations being from 7 to 33 per cent. in favor of the transported concrete. In general it may be said that transportation of concrete has no bad effect on the same, and in many cases has even a good effect. The results also point to the conclusion that inert material with sharp and ragged edges such as broken stone gives better results than smooth round material like pebbles and gravel. It is claimed that the shaking and the vibrations to which the concrete is subjected in conveying even adds to its density and closer structure. The building department at Ratzeburg tested transported concrete for foundations and found it to be 15 per cent. superior to the concrete made at the construction plant. This concrete had been transported a distance of 5,000 feet from the place of manufacture to the building where it was to be used, the conveyance being by industrial railway and conveyors.—Le Ciment.

ORNAMENTAL CONCRETE POSTS IN CALIFORNIA.

City Engineer Lewis, of Venice, California, has initiated a new venture in municipal lighting with a concrete ornamental post, designed by himself.

The city will manufacture them to sell to property owners at cost and furnish light free of direct charge. Molds made to order have been procured by the city and all preparations for producing the standards in municipal yards are complete. The post itself will cost $9. The total expense of setting up the concrete post, equipping it with electric light and connecting with conduit is placed at $15 each.—"Cement Age."

[illegible] of Concrete Block House. Block made by a Miller Machine.

Carpentry and Woodworking

A MODERN STORE FRONT.

Complete Details Showing Construction and Arrangement.

The advertising value of an attractive store front, says the "American Carpenter and Builder," is in reality of much more importance than many merchants realize. A neat, handsome store front undoubtedly makes a strong and lasting impression on passers by and prospective customers.

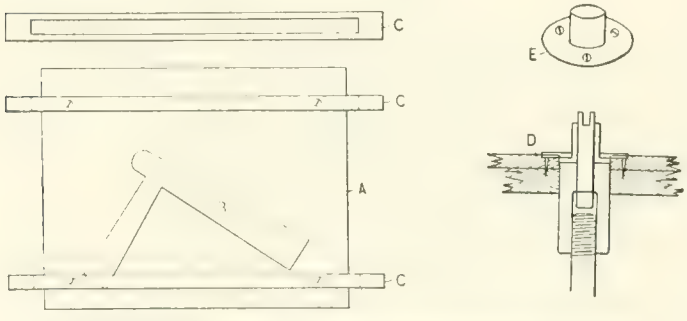
The construction of the windows, the awnings, the signs above them, and the general appearance of the building, is almost of as great importance as the window display itself and is the first point by which a customer judges a store. We show herewith an interesting type of present-day store-front construction for a building twenty-five feet wide. It is a thoroughly practical type, the windows are brought down close to the sidewalk, and are large and well arranged. Above them is an arrangement of prism glass which throws a flood of light back into the store.

The plan and front elevation are given to the scale one-eighth inch equals one foot; and two sections and three plans at various heights at the scale of three-eighths equals one foot. There are also one-quarter full sized details to make the construction clear. It will be noted that all glass is secured in place by small iron straps, which make a very neat and attractive appearance.

FORMS FOR ROUTING STAIR STRINGS ON THE SHAPER.

In answer to a correspondent of "Wood Craft," C. L. Lund gives the following method of making a form for routing stair strings on the shaper:

Use a board, say 20 inches wide, and cut out at B the size you want the strings cut. Now add on each side the projection of your shaper collar outside the



Special Form and Shaper Bearings for Routing Stair Strings

cutter; that is, if your cutter is ¾ inch and your chuck 1¼ inches, you must have an opening in your form A ½ inch larger than you want to cut.

Now take two strips of hardwood, C, 1⅛ by 2 inches and 8 inches longer than your form B. Cut a slot in your strips 1 inch longer than your form. Slip one on each edge of your form and screw them on, one on each side of your string. That gives you a chance to adjust your strips to any pitch. The strips will slide on your shaper top.

It is not necessary to use both right and left head. All you have to do is to start cutting at the bottom end of one string and at top end of the other so you can cut with the grain when you finish corners where the lower edge of the riser is to join the step.

Have a chuck made to screw on the end of regular spindle to hold the router bit. Make a false top, D, for your machine to come up high enough to suit what you want to do.

Screw a 2-inch maple block on the under side of your top and bore a hole through it to fit your chuck. That will answer as a boxing and your spindle will run steadier as it is now too far from top bearing.

Use plenty of oil so that your wood boxing won't catch fire from friction of chuck. Also use a flush setscrew for the cutter because it cannot project. Your chuck must be long enough to come through your table if you want it to serve for a guide.

A better way than to use the chuck for a guide would be to have a steel guide, E, made to screw to the false top and have the cutter come through it. The smaller your guide, E, the better. The hole through guide would not need to be more than ⅛ inch larger than the cutter.

The advantage of using a false top on the machine is that all you have to do is to put on your chuck and false top and then your machine is ready for your routing.

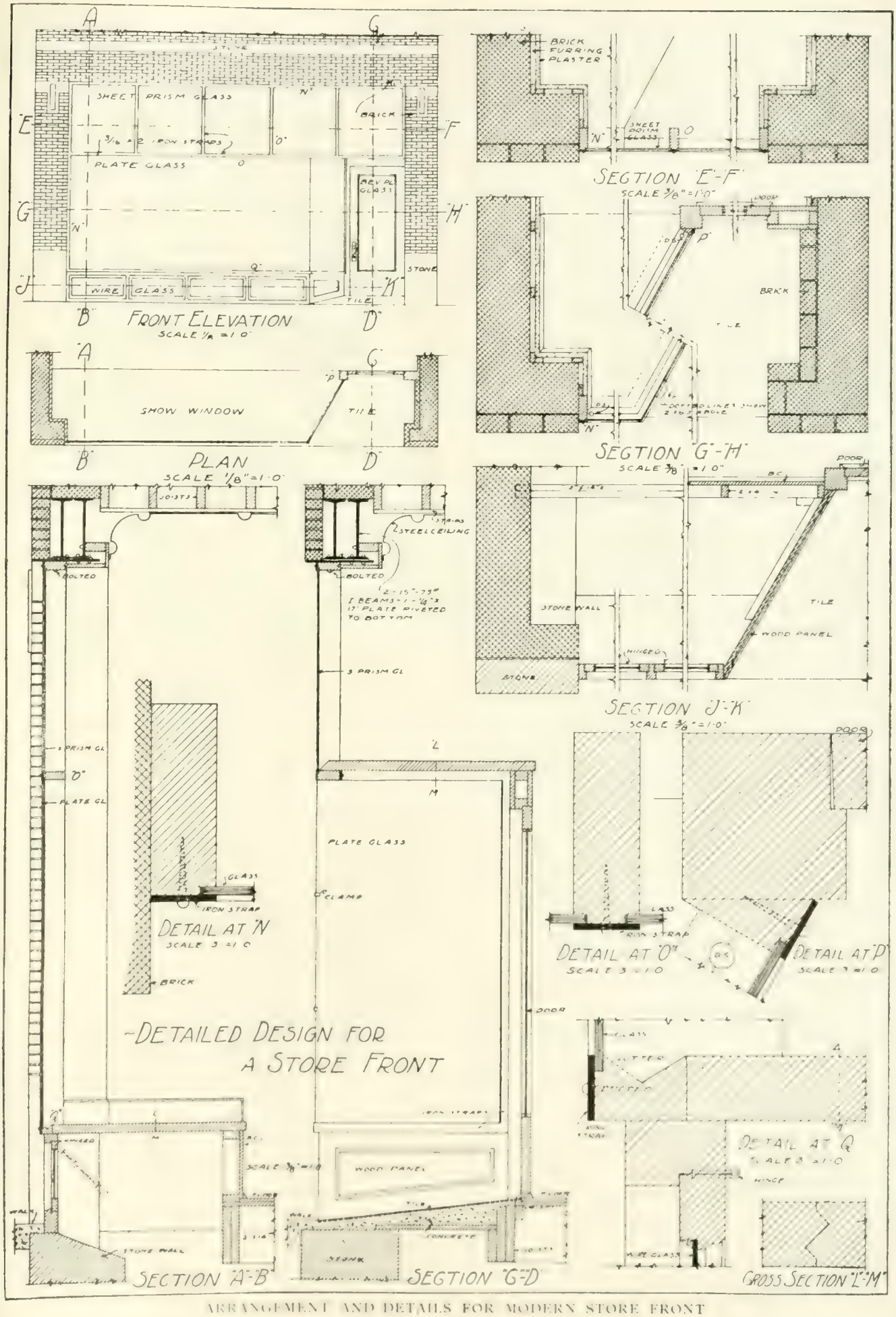
I may also point out that it is well to put the strings together and mark them across the edges to tell how far to move the pattern for each of the steps.

TROUBLES WITH WOODWORKING MACHINERY ELIMINATED BY SUBSTANTIAL FOUNDATIONS.

About half the trouble with wood-working machinery comes from settling or pulling out of line; in other words, traceable directly to lack of thoroughly stable foundations, says "The Wood-Worker." That is one explanation of why machinery in up-to-date institutions is not so much trouble as it was years ago. In the earlier days, when factories were put up on mud-sills and poor foundations of one kind and another, there was almost incessant trouble: the building would settle, throwing the shafting out of line, and the strain on belts would pull the shafting and machines out of line for the same reason—because they were not well enough secured to a substantial foundation.

Trouble of this kind is much more prolific among the mills in the country than the city, but it was quite common in the city factories before the general use of concrete. Sometimes very good footings were put under posts, but when this was the case generally the building overhead was made heavy and loaded down with stock of one kind and another, until settling resulted just the same. From this settling more machinery ran heavily and more shafting cut in its bearings from being pulled out of line, than from any other one cause. There is enough of it, even now, that it would well be made the subject of investigation by nearly every factory.

There is little excuse for poor foundations under machinery these days, with cement plentiful and com-



ARRANGEMENT AND DETAILS FOR MODERN STORE FRONT

paratively cheap. Where machines are heavy and not on the ground floor, the better plan is to get separate foundations under each machine; but where this cannot be done and the machinery must be mounted on posts, bridgetrees and second floors, there is one thing every man can do, and that is, put a heavy enough concrete footing under the posts that there is no possible chance for settling. Then, and then only, will it be found that it is comparatively easy to keep shafting in line, belts running true and machinery standing up to its work and requiring only nominal attention and repairs.

Then the going over of machinery once or twice a year, to test and put it in order for alignment, will be a comparatively simple and satisfactory task, and will not involve all the resetting and overhauling of the building and supports that has characterized work of this kind too often in the past. So, no matter what your factory equipment is, a few single machines or a multitude of them, look first to the foundations. It pays. An extra hundred dollars or two spent in foundations will be saved in the course of a few years in the way of the machinery alone; and, besides, it gives you a building that is more substantial and satisfactory in every manner.

Another good idea is to avoid loading the floors which carry machines heavily with stock. Have your stock warehouses on independent foundations. Carry only such as is being worked on the floor among the machines. This, however, is simply an important side detail, and does not alter the main fact that the most important thing in connection with the care of machinery is to look, first, after the foundation under it.

HOW TO COPE MOLDINGS.

By Owen B. Maginnis in "The Carpenter."

One of the means employed by cabinet makers, carpenters and wood workers in making joints in interior and re-entrant angles is the art of "coping."

This word is used in contradistinction to "mitering," a method entirely used for joining pieces of woodwork of continuous grain on exterior angles. Webster gives the word "cope" as, to cover; to match against;

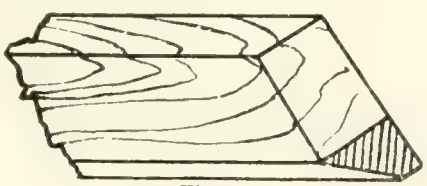


Fig. 1.

a covering. So it is admirably adapted and very appropriate, as when a carpenter copes he really covers and matches against.

Coping is generally used for moldings, square and flat surfaces being fitted together, one piece abutting against the other but curved or molded profiles and surfaces can only be coped to a successful joint.

Mitering interior angles is often faulty and is rarely done by mechanics of ability, on account of one or the other joints slipping past its fellow, spoiling the intersection and exposing end-wood added to the difference of the profiles of machine-run moldings. Against plaster the inside miter is useless, as one piece is almost certain to draw away and open the joint as it is being nailed into the studding. The best way then to make this joint is to cope.

Fig. 1 represents a simple cope, being a common shelf cleat with a chamfered edge coped or fitted square to another. As will be seen, it is the end cut to fix over the other and against it so as to appear as if mitered.

In order to gain this point the piece is first placed in a miter box and cut on the side to which the joint fits—in this case the right-hand side. When this is done the piece is sawn through from the face kerf line and slightly under so that the joint may close on

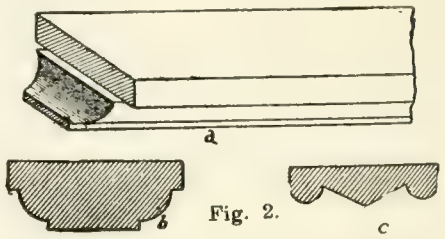


Fig. 2.

every point. When fitted on an obtuse angle it must be beveled back to suit the angle.

Placed in position if cut slightly, a hair long, the joint will be close and fit well, but the strip coped to must always be nailed well back and solid before marking the piece to be coped, as it is certain to yield to the concussive blows of the hammer. The above is a plumb or vertical cope.

A horizontal cope is shown at Fig. 2, representing a ceiling strip or piece of astragal coped to a quarter

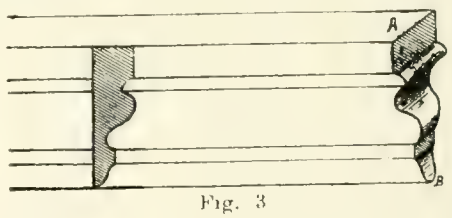


Fig. 3

round or oval. d is the coped end, done by placing the molding on its back in the miter box and each on the side square across the piece, after cutting and chiseling the end out to the profiles made by the saw in the mitering until it appears as in the sketch d, so it will fit closely against the section as b. This cope ought to be slightly hollow so as to press against the surface of the molding.

Fig. 2-C cannot be coped, as some of its members sink below the others, which will be seen at a glance,

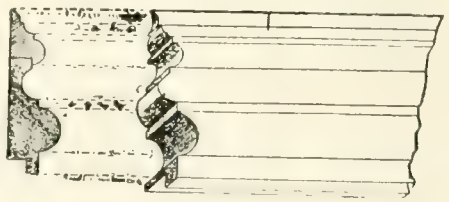


Fig. 4.

and the molding mitered, and it is in sections of this form where the art cannot be profitably applied, but interior mitres (if they must be used) should be nailed and glued together, if possible, before setting in position.

When it is found necessary to cope an architrave molding like Fig. 3, whose profile is a series of compound curves and flats, the miter box is again brought into requisition and the end wrought to the mitered

face line, always beveling slightly under to bring the copied joint close on the line of A-B.

A sharp penknife is essential and a great aid in coping moldings to cut away the wood on the curves exactly to the mitered line, which can scarcely be done correctly with the compass saw, gouge or chisel, as in soft wood the arises are very liable to break under the pressure of the hand even though the edge be keen, whereas the small blade of a good pocket knife, if reasonably sharp, can be very handily drawn around the quick curves and will also cut obliquely against the grain without injuring the edge of the end wood, which is often cross and brittle.

Another cope represented at Fig. 4 being a section of rebated wainscot capping with its wall molding, and another piece coped to it on the left hand and at right angles. To do this the coping is mitered in the left-hand cut in the box, Fig. 1, and then sawed out to miter line with a fine compass or keyhole saw and trimmed smooth with a pocket knife. The wall molding is similarly wrought but for all moldings when coping, pieces of same thickness and material should be selected.

Acute angle pieces are easily coped and obtuse angles may also be taking care that the end is beveled well back to clear the piece passing behind it, otherwise the joint will rest and the back be open.

Coping obtuse angles gives a good chance to bring the joint close by aniling through the cope into the piece behind, which can never be done with an inside miter.

Crown moldings, Fig. 5, can also be intersected by this method when returned on inside corners as on wardrobes, dressers, angles on house cornices, etc., first mitering as hereinbefore described by placing the molding in the box upside down with the surface e-e that

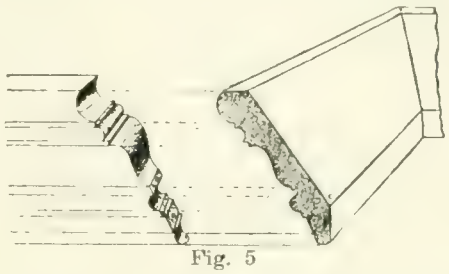


Fig. 5

is to be nailed plumb against the side of the box, the level part d-e resting flat on the bottom. When cut to an inside miter the end is cut out over the profile d-b, being level or parallel to d-e in the way represented. Coping on the angle as a gable with an eave molding can also be done, but the pieces must be wrought so that they will intersect and continue true —member with member.

Roofing and Metal Working

THE TITANIC DISASTER OF JOHN AND MOLLY.

By Edward Dreier.

Fifteen years ago John Jones came to Canada. His assets were a fine body, health and a desire to succeed. He was twenty-five years old. For a few months he wandered around trying to get a job that would make him wealthy in just a short time. John was young. He didn't find what he wanted, but spent all his cash paying his expenses. Then John sat down and figured out how many kinds of damphool he was. As I said, John was young and strong and he knew that he was up against it. So John went out into the country and secured a job on a farm.

We all know what farm wages were then, and John got no more than the rest. Like most thrifty people John saved his money. He used to sit nights in his room dreaming of the account that was steadily growing in the bank. Several times John got increases in his wages, for he was willing to work and helped his employer at every turn of the wheel.

Then John had chances to make a few investments which brought in some extra money. This happened several times, and finally there was a thousand dollars to his credit in the bank. Suddenly one night John became very lonesome. He didn't understand just what made him that way, but anyway he was lonesome.

John's employer had a daughter—several in fact as all farmers do, but this one daughter was different from the rest, so John thought. She wasnt beautiful, but people said that she was very good looking. Like John she had a beautiful strong body, health and a desire to succeed. In the house she worked as hard as John worked in the field. Soon John found out why he was lonesome and the old, old story happened.

After they were married John bought a farm, and from the first his work was one round of successes. He had fine horses, fine cattle, fine pigs and his wife had fine poultry. People used to say that his was the finest farm down the Old Road, and I reckon it was.

When the farm was purchased it had a few old farm buildings and a small house. As the young couple grew in prosperity they tore down the old buildings and built new ones. Because people said that they had the finest farm they tried to keep up in the best way. While they always had a small balance in the bank for a rainy day, most of the money was put into improvements.

Children came to bless their home, and as they grew they showed the same spirit as the father and mother. They were workers. They helped the father and mother with the chores and delighted in bragging to the neighbors' children (as children will always do), about the good things they had on their farm.

Then came the new house. This was to be their triumph. Most all the money was used by the time the new house was up and equipped with all the modern conveniences. Then John had to get busy and earn more money. For two years he worked and got money together so that he and the wife could go on a little trip for a few weeks and still have some left to keep things running.

The day came and they all set out, leaving the farm in the hands of the hired men. They were gone for

two weeks and no word was heard from them—they were enjoying everything. Then they came home.

When they got off the train in town they met some of their friends; sympathy showed in every face. They felt that something was wrong, and they hurried for home. It was seven miles home and the horses were sent flying. When they arrived and made the last turn which should have brought their home into view there was nothing to be seen. John threw his weight on the lines and pulled the horses to a stand. He looked at Molly and she at him. Then he rushed the horse for the last half mile on the gallop and pulled up at his gate.

Where the beautiful new house stood there were blackened timbers, where the barns and out buildings stood there was nothing to be seen but a big black basement. An odor of burnt flesh was in the air.

In a few minutes John became an old man. The spry, happy Molly climbed stiffly from the buggy and walked over to John and offered words of cheer, as all good women do when men are down. Then the neighbors came in and told them the story.

Old Bill Speers, who lived across the road, knocked his lantern from the peg in the hay mow one night and the hay caught fire. In a few minutes the barn was a furnace. Burning shingles were carried for hundreds of yards by the wind. Some lit on John's wood shingled house and fire started. Before help could come the house was burning. More shingles were carried and an out building caught fire, and from there to the straw stack and the barns, everything went, even the horses and some of the cattle. It was a clean sweep.

Fifteen years of hard labor, sacrifices and pride were wiped out in a single night, because John didn't have the right kind of protection. His buildings were fire traps. They could not be saved, for the farmers had no well organized fire department with engines and hose to put out a fire. Bucket brigades could not be organized in a minute, so there was no chance.

Just think what it must have meant to him. Things that he had worked for for years, things he had given the best part of his life for, had been wiped out in a minute and left him an old man at forty. It meant a start all over again—the erection of more buildings and securing of new stock. What will John be at sixty? We will leave that to your imagination.

How about you? How long have you worked and slaved for what you have to-day? How many sacrifices have you made and how many sacrifices has your wife made to make your place a real home? What would you do if your home should be wiped out some night by fire? And what would you be at sixty?

Why not make your home a place of safety? The fire starts from the roof when burning embers are falling. Why not get a roof that won't burn? Why not use metal shingles on all your buildings Why not cover all your out buildings with corrugated iron sides? There you get beauty, neatness, protection from fire and lightning, long life, peace of mind during fires and storms and happiness. Don't delay a minute. Get in touch with manufacturers of metal shingles and corrugated iron. Protect yourself from these dangers, so that you will not be broken men at sixty. Investigate metal shingles thoroughly. Don't be satisfied with one kind, see them all and then choose the kind which, in your mind, will give the best service.

Don't say that this will never happen to your buildings. People said that the great ship Titanic couldn't sink. Yet the Titanic sank on her first trip and took with her the loves, hopes and happiness of over a thousand homes. It meant to the nations what a fire would mean to you, if your buildings were to be destroyed. Until you protect your buildings with metal you are in constant danger. Take heed.

(Editor's Note.—The above is a true story of a real man and woman whose names are not John and Molly Jones. It is a true story that has many of like nature to go with it. The day will come when every building on the farm as well as in the city will have to be built to conform with fire laws. The day is surely coming when roofs will be covered with material which will not burn. Protect yourself now, before it is too late.

Heating, Lighting and Plumbing

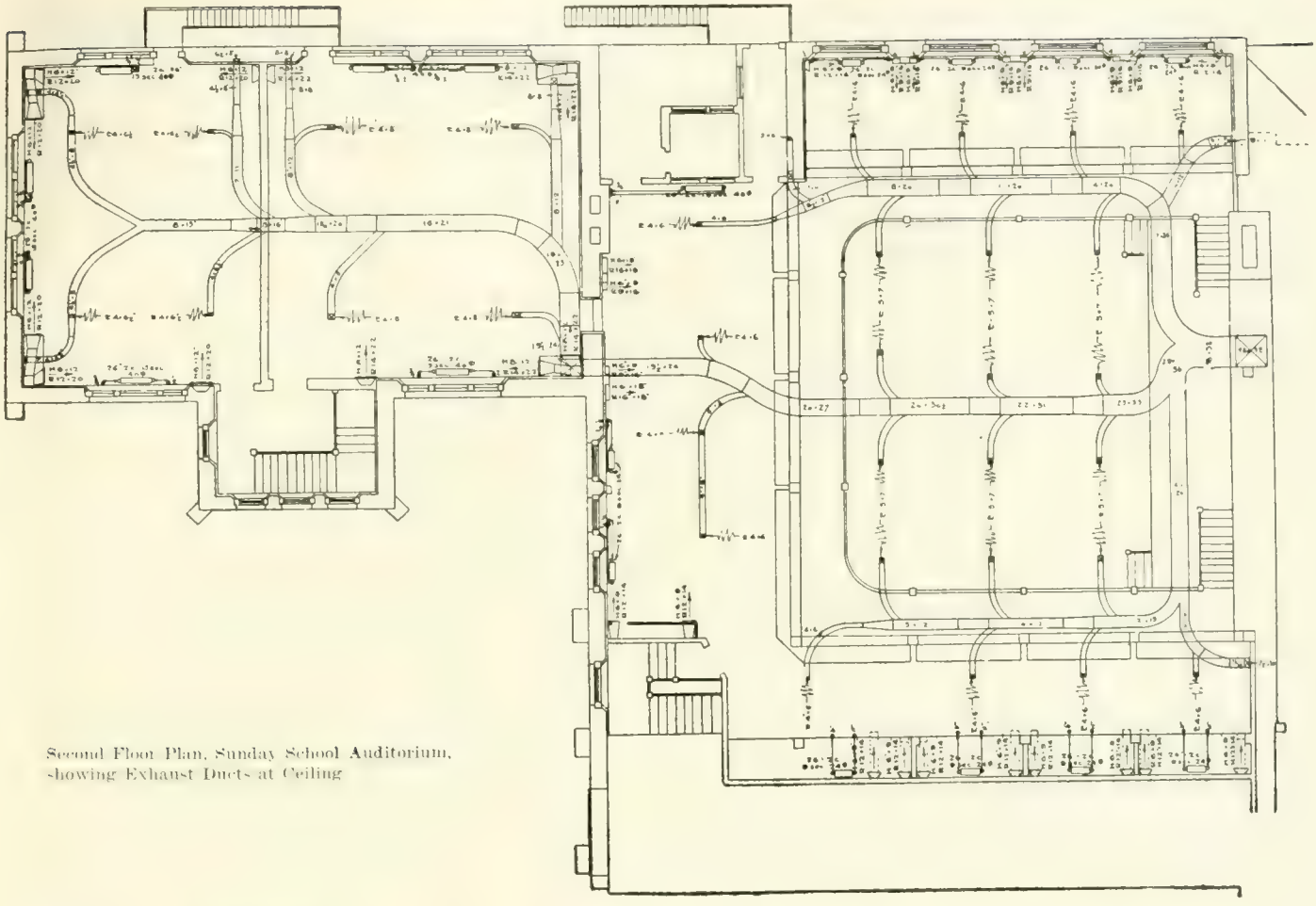
VENTILATION FOR A SUNDAY-SCHOOL AUDITORIUM

Unique Methods Adopted at the Christian Union Congregational Church, Upper Montclair, N.J.

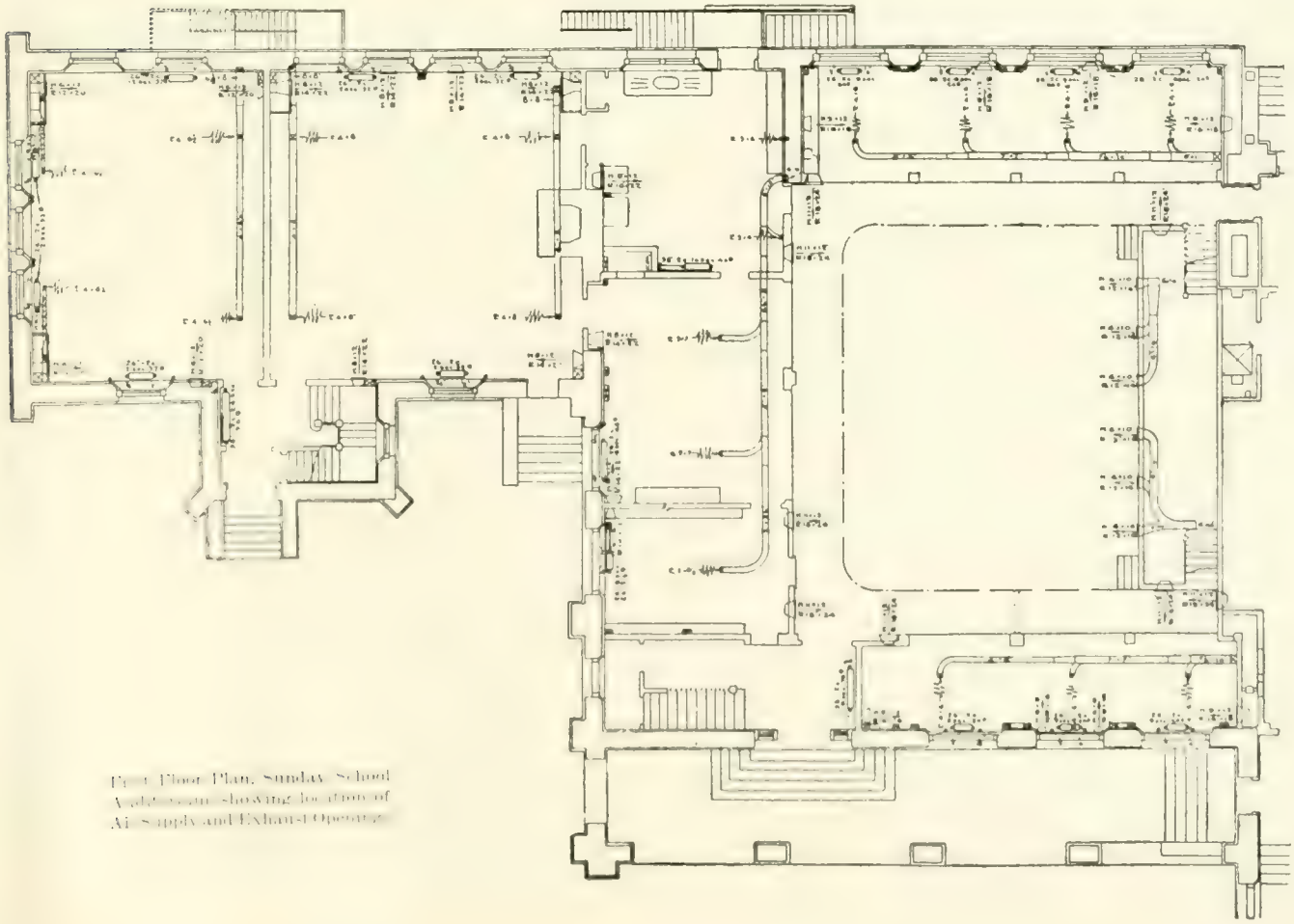
Aside from the fact that the accompanying plans present a number of unusual features in the design of ventilating equipment, says "The Heating and Ventilating Magazine," the successful operation of the system as installed, giving such marked satisfaction as to call for general comment, lends a timely interest to the scheme adopted. The system as illustrated herewith is used to ventilate the Sunday School auditorium and the rooms connected therewith at the Christian Union Congregational Church in Upper Montclair, N.J. It is intended to provide a sufficient volume of air, and to maintain its purity, for 600 persons, of which number about 350 are provided for in the auditorium proper. The cost of operating the heating and ventilating plant in a building of this character was one of the features that required careful consideration.

Some part of the building is in use almost daily during the cold weather and heat has to be maintained in the various rooms almost continuously. Ventilation is required for a short period of time during occupancy. The heating, therefore, is accomplished by direct radiation and the ventilation by an entirely separate plant which can be operated or not, as desired.

The air for ventilating is taken from the outside and passed successively through screens for removing the dust, thence through tempering coils and a humidifier. It is then driven by a fan through the fresh air ducts into the various rooms. The air is tempered in this manner to about 80 degrees F. It is admitted to the rooms near the floor lines, the registers being placed just above the baseboards. These inlets are so arranged with deflectors that the air is carried down



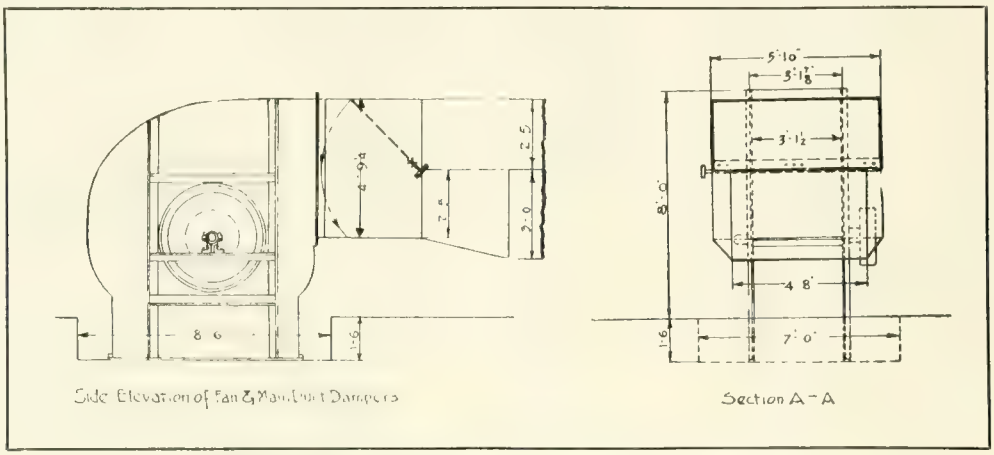
Second Floor Plan, Sunday School Auditorium, showing Exhaust Ducts at Ceiling



First Floor Plan, Sunday School Auditorium, showing location of Air Supply and Exhaust Openings

toward the floor. The velocities are arranged not to exceed 200 feet per minute.

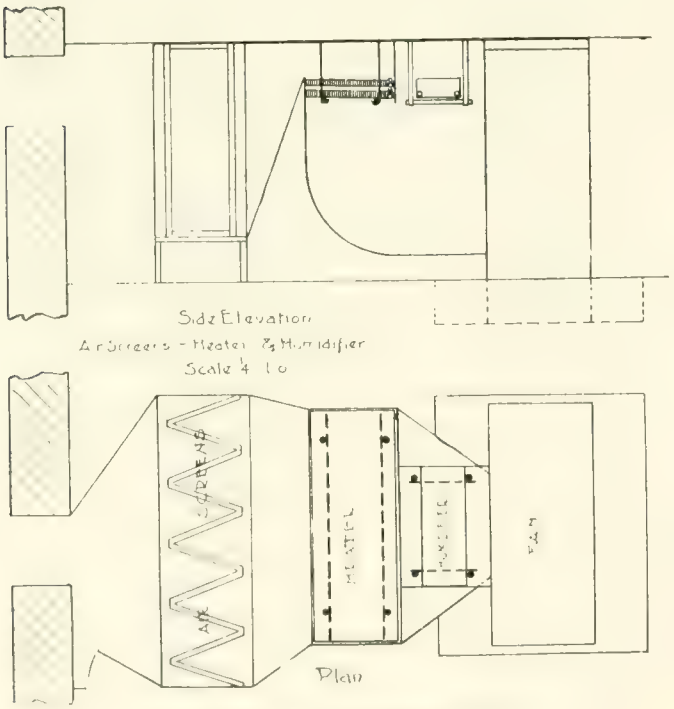
The vitiated air is exhausted at the ceiling by means of a full-housed steel plate fan connected by ducts to the various outlets. The velocity of air through the vent outlets is about 1,800 feet per minute. The outlets are arranged so as to draw air evenly from all parts of the room. The volume exhausted is about



Fan Elevations showing Damper Arrangement for Double Duct

80 per cent of the volume of the air supply, 20 per cent. being allowed for ordinary leakage.

Automatic control of the temperature, both for the heating and ventilating, is accomplished by means of thermostats. The thermostats are located in the main auditorium and are so arranged that at a temperature of 67 degrees F., the heat from the direct radiation



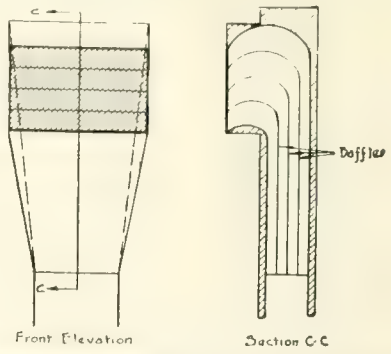
Details of Heating and Humidifying Scheme

is cut off. At 69 degrees the heat from one tempering coil is cut off and at 71 degrees the heat from the second coil is cut off. These temperatures are taken in the auditorium and not in the ducts or elsewhere.

In order to maintain the outdoor condition of the air supply, the humidifying apparatus is designed to maintain a relative humidity of 60 per cent. This apparatus consists of coils of steam pipe placed in a tank of water which is automatically supplied by means of a float valve. The steam in the coil is controlled by a humidistat which is located in the auditorium, so that the humidity supply is governed by the conditions in the room occupied, rather than in the air chamber between the heaters and fan or elsewhere. The idea both with the temperature and humidifying control apparatus, was to have the control exercised in the atmosphere of the room occupied.

Special Arrangements When Parts of the Main Room are Shut Off.

During the session of the Sunday School, the spaces under the balcony are occupied by classes and, by means of sliding doors, each class room is made practically into a separate room. The plans for heating and ventilating necessarily included methods for



Arrangement of Baffles in Air Supply Duct at Registers

warming and ventilating these rooms individually, as well as forming a part of the general scheme for ventilating the entire room when thrown into an auditorium.

System May Serve Sunday School or Church, as Desired

It was desired, when the installation was made, to have it designed so that it could serve for the Sunday School portion of the building or for the main church auditorium, immediately adjoining. It was necessary, therefore, to connect both the supply and exhaust fans to both sections of the building and so equip them that by operating a damper in the main duct connected to each fan, the plant could be put into service in

either portion of the building. The plans for the supply fan show how this was accomplished. The larger damper shown is balanced by weights and connected with a switch operated by the thermostatic system, so that by throwing off two switches, the supply and exhaust fans can be put into service in either part of the building. Duplicate sets of thermostats and humidostats are placed in the church auditorium so that the control of temperature and humidity is always exercised from the part of the building which is using the system.

The plans also show the scheme of the distributing ducts. The basement plans contain the supply ducts while the exhaust ducts are shown on the second floor plan, the outlets for both the supply and exhaust being indicated on the drawings.

The exhaust fan, it will be noticed, is placed in the basement. The reason for locating it there was that no suitable place could be found for it in the attic and because connection could more readily be made from the church auditorium without the use of an additional unit.

UNIQUE PLAN TO SOLVE WATER SUPPLY PROBLEM.

Santa Monica, Cal., is considering a unique plan for solving a serious water problem. The supply is already inadequate and an application for a part of the Owens River from Los Angeles has not been granted. Now it is proposed to distill ocean water for domestic purposes, and the municipality may purchase the "Burning mountain," several miles up the coast in the Santa Monica range for use as a heating plant. It is believed the sea water could be carried through a "U" pipe deep to the hot interior of the smoking hill and distilled at practically no cost. Power might be produced, some engineers think, that would enable the municipality to maintain an electric lighting plant.

Painting and Decorating Plastering

PAINTING OVER CONCRETE.

There never was a more unlikely surface to paint over than that formed of cement, or concrete, says "Cement and Engineering News." We painters can make a go of paint on almost anything, but this stuff has somewhat stumped us, sure. In the first place, cement is alkaline, and lye and oil are a bad combination as a paint coating. There you are. And paint for cement must be different in that it must penetrate the stuff more than wood, filling the pores and making a solid surface. If the cement is exterior and has stood against sun, rain and all the other elements, for months, the alkali will have greatly lost away, and then ordinary oil paint has a chance of staying on. In fact, a new concrete or cement surface never should be coated, but should be left to exposure for a year at least. Then there is the matter of dampness. Cement or concrete, the same thing, holds moisture a long time, and also takes up moisture readily, hence we have this to combat. Paint is impotent against moisture from beneath.

The neutralizing of the lime or alkali in the cement with an acid works badly, as it causes chloride of lime to form, which crumbles and destroys the cement. Muriatic acid of 7 or 8 per cent. dilution has been used. Sulphate of zinc is a better thing to use, adding an equal weight of water to it. The zinc sulphate uniting with the lime forms sulphate of lime or gypsum. There does not seem to be any injurious action set up by this preparation, and painters have been using it successfully for some time now. A coat of the solution is well brushed into the surface of the concrete, with a stiff brush, and in the course of two or three days it is dry, hard and firm, ready for the paint.

Another method is to employ carbonate of ammonia, ten pounds to the 15 gallons of water. Apply a coat with a brush and leave it to dry. This produces insoluble calcium carbonate on the surface, the major portion of the ammonia being set free in the process of drying. The surface is ready for the paint when dry, and no injurious action follows its use. Where lime mortar is used, as in plastering or stuccoing the exterior of a building, it is best to apply two weak coats of this solution, rather than one strong coating.

There are now on the market waterproof stains for coating cement surfaces, coloring the work and rendering it proof against rain or dampness of any kind. These colored stains are said to wear well, holding their color as well as any ordinary paint, and the colors are soft and pleasing. Renewing the coating once every three or four years keeps the work looking fresh and attractive.

From a French source we hear of a coating that is said to hold back the alkali and serve as a priming coat, over which any regular paint may be applied. Here is the formula:—

White pigment	70
Kerosene oil, 150 deg.	10
Raw linseed oil	10
Water and lime solution	4
Fat linseed oil	3
Liquid japan drier	3

The white pigment may be white lead or lithopone, or zinc and white lead for exterior work, and all zinc or all lithopone for interior work. The white pigment should be ground in pure raw linseed oil and kerosene, mixed; the other ingredients to be added after grinding.

The water and lime solution is made as follows: Weigh out 10 pounds of fresh lump lime and pour over it 3 gallons of hot water, in a suitable vessel, which cover over to keep in the heat. After 12 hours decant the liquid and filter it through several thicknesses of cheesecloth.

"Why is concrete painted?" For the same reason that wooden buildings are painted, namely, to beautify and to waterproof. There is no building surface that looks so unsightly as cement. Then, as long as the

cement surface is unpainted it absorbs moisture, and paint is to prevent this. Will linseed oil paint answer? Yes, if the cement surface is in proper condition to receive the paint, and this is just as true of wooden surfaces. I have spoken of this already. I find some advocating soda water, such as the druggist gets in cylinders under great pressure, carbonic acid water. This is brushed on, or sprayed on, as you choose. The carbonic acid kills the alkali. In fact, it is about the same process that nature employs, only in a quicker way.

A writer in "Concrete" tells how to mix a white lead paint for coating over cement. He says to mix 100 lbs. white lead with 9 gallons of boiled oil, or the same of raw oil with the addition of three half-pints of japan drier and one pint of turpentine. That is for the priming coat. Some painters prefer a primer of red lead, using at the rate of 85 lbs. red lead, dry, one gallon boiled oil and one quart of turpentine. I would add that as it is difficult to get real boiled oil it is best to use the raw oil with japan added. For the second coat he indicates 100 lbs. white lead, 4 gallons pure raw linseed oil and one pint of turpentine. Or one-third boiled oil and one-third raw oil, mixed, may be used. For the finishing coat, 100 lbs. white lead 3½ gallons linseed oil (one-third boiled and two-thirds raw), or 3½ gallons raw oil and one pint driers and one pint turpentine. There is no reason why ordinary paint should not do as well on properly prepared cement as on wood, brick, stucco or stone. The protective stains mentioned are all right, and if paint is preferred it too may be all right. But the surface for paint must be strictly all right or the result will be disappointing.

PAINT FOR SALT WATER EXPOSURE.

Seashore painting is, perhaps, attended with more unsatisfactory results than painting under any other exterior conditions, remarks A. Ashmun Kelly in "The National Builder." The salt laden air, more especially during misty or foggy conditions, is very destructive to ordinary outside paint, and the matter has been well discussed by leading master painters, both those who do painting at the seashore and painters from interior parts of the country. Of course, it is the man who deals with the subject in a practical way, right on the spot, that can tell most about it, or whose ideas will be worth something, all else being merely theory. By the way, there is no lack of theory regarding paint and painting, and while very good in its way, yet valueless unless backed up by practical experience.

Painters tell of success and want of success, in the matter of seashore painting, and, of course, both conditions may easily exist, it depending upon the man and his method of dealing with the problem. But it seems to have been pretty well established that a paint composed of white lead and zinc white, mixed with raw linseed oil, will give the most satisfactory results as to wearing and holding color. The amount of zinc proposed varies with painters, some placing a few pounds, say ten, as the limit, whilst others will go from that on up to one third or more. My impression is that the painter who did the great pier at Atlantic City used a lead zinc compound paint. And if my memory is not at fault I may say that he is an earnest advocate of lead and zinc mixed paint for the seaside. Nevertheless, there are many painters who decry the use of any zinc with white lead, whether at the seashore or in interior parts. The effect of the zinc is to make a harder paint than lead alone will make, and so the harder surface is thought to afford more protection against the wind blown sand, and misty and always salt laden air of the ocean. Just what effect salt has on paint I do not know, but think it is the dampness it causes that injures the paint.

It would seem, to resort to theory now, that the harder the surface of a paint the better it would wear against salt and sand. If, therefore, assuming this to be correct, we should add some good hard copal gum varnish to the paint, as we do in some cases, as when seeking to make a damp resist paint, it would seem that greater durability could be secured. Linseed oil itself is not proof against moisture, a well known fact, hence even though protected by the pigments of the paint it will fail to stand well excepting under average good conditions. Zinc white will, as previously stated, make a harder paint, but then it also tends to produce a surface so inelastic that cracking or scaling may follow. To avoid this we would simply reduce the amount of zinc to one that would not unduly harden the paint. Lead, even in the form of the carbonate, is a soft substance, and white lead paint is inclined to chalk or flour off, when it loses the oil binding it together. In one respect this is desirable, as it leaves a good surface for repainting on. But the addition of, say ten per cent. of zinc, would, I believe, greatly improve the quality of a paint for seaside exposures. And no doubt a composite paint, as it is called, or one containing certain proportions of white lead, zinc white, barytes or finely pulverized and floated silica, with whatever pigment might be desired for coloring, and the necessary amount of raw linseed oil, or equal parts of raw and boiled oil, as some advocate, would prove a good paint.

Wall of Five-storey Factory in Toronto Collapses Before Building is Completed

Two Persons Killed. Experts Differ as to Cause. Thorough Investigation Necessary.

At 10.30 a.m. on Saturday, May 4, the south wall collapsed of the 5-storey factory of Messrs. William Neilson, Limited, Ice Cream and Confectionery Manufacturers, 277-307 Gladstone Avenue, Toronto. There were about 170 employees, mostly girls, at work in the building at the time, in addition to the contractor's workmen. 2 persons were killed and 13 injured.

The disaster was one of the most serious of the kind that has occurred in Canada during recent years.

Particulars of the Structure.

The building was of the standard mill construction type, 120 feet x 101 feet x 68 feet high. Only the basement and the two first stories were occupied for business purposes, the three upper stories being unfinished. The wall that fell was 120 feet long x 68 feet high, 22 inches thick at the bottom and 14 inches at the top. The older portion of the factory had been constructed some time, and the new addition, work on which was started in March last, was being rushed to completion. According to contract it was to have been ready by May 1.

Theories as to Cause.

The accident has produced a large crop of criticism and comment from experts and outsiders alike. The wide difference of opinion among the experts will be seen from the following outline of the views expressed by men prominent in connection with building matters in Toronto.

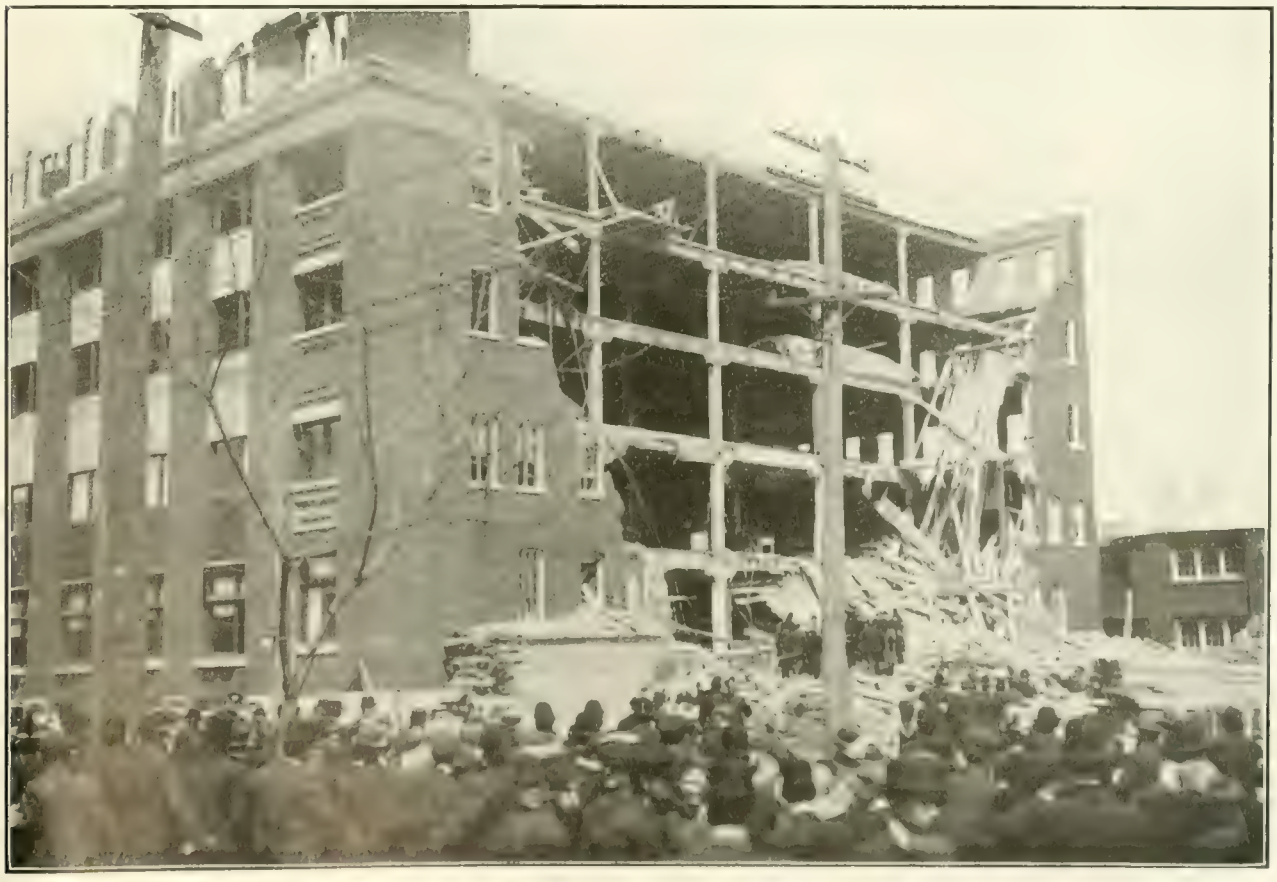
Alderman McBride stated emphatically that cheap construction must stop, and that American methods were too closely followed in this country. He criticized the inadequate size of the iron brackets bolted on to the side of the cross-beams to carry the joists.

Alderman J. T. V. May, a builder of long experience, also spoke of the faulty hangers or brackets, in spite of the fact that they were commonly used.

Mr. F. Armstrong, a well known builder, declared that hurried construction was at the root of the trouble. Four months were needed for proper erection. The clean condition of the bricks showed that the mortar was not set.

Mr. W. F. Sparling, of the firm of Curry and Sparling, architects, suggests that the wall may have collapsed through being forced out by the expansion of the flooring. "Kiln-dried flooring, now generally adopted for mill construction buildings, will pick up water like a sponge when exposed to air," said Mr. Sparling, "especially in the spring after rains, or if actually rained on before it is laid on the joists." Mr. Sparling found in a Toronto building that flooring 2 inches x 5 inches on edge expanded under exposure to the air 8 to 12 inches in a 200-foot space.

One contractor, whose name is not given, stated that green walls were a continual source of trouble.



South wall of Neilson Factory, Gladstone Avenue, Toronto, which collapsed at 10.30 a.m. on Saturday, May 4th, 1912

The unequal drying out of the wall was considered by many as sufficient to cause the accident.

Several builders who have been making an investigation say there is no mystery as to the cause of the collapse. Two varieties of brick were used in the wall—the regular stock kind on the outside and another inside. A difference in thickness of 3-16 inch appears to have caused the trouble. With every five layers, which is a "course," headers were used, and in order to even up the two kinds of brick an extra amount of mortar was put in on the inside bricks. The weight of the bricks, after reaching the 5 stories, made the mortar settle, with the result that some of the bricks on the outside used to face the building were forced out of position and the wall weakened so considerably that it buckled and fell. Common hard brick were used on the outside and sand and lime brick on the inside. In contrast to this it is stated by the City Architect's department that the bricks used were identical in size, though of different kind.

Mr. Maurice Grimbly, manager of The Robert Simpson Company's construction department, emphasized the fact that in his judgment the attempt to force the pace in construction will lead to disastrous results if not checked. Time is required to produce satisfactory work. That is inevitable according to the laws of nature, and infringements of those laws lead to trouble.

On the City Architect's staff there is considerable divergence of opinion. For instance, Mr. W. A. Tice, building inspector for the district in which the Neilson building is situated, thinks the excessive piling of hardwood lumber on the upper floors near to the green wall may have occasioned the breakdown. The lumber in question will be noticed in the photograph, a large quantity of it having fallen to the ground. Mr. Tice says that the staff of inspectors is too small for the work to be done. He was able to visit the building only once a week, owing to pressure of work. Mr. G. S. W. Price, Assistant City Architect, on the other hand, entirely disagrees with Mr. Tice. No feasible theory has yet been advanced, as far as he can see. He remarked that the finding of a defective beam among the debris, or the evidence of some of the bricklayers on the wall, may lead to an explanation of the mystery. He considered inspection once a week often enough.

Mr. Jas. P. Snook, another building inspector, holds that mill construction is not safe, the arrangement for allowing floors to drop through in case of fire, leaving the wall standing, being dangerous.

Mr. C. W. Wood, of Chas. W. Wood and Sons, the contractors for the new addition to the building, is unable to account for the disaster. Although the work was being performed rapidly, the workmanship could not be bettered.

Messrs. Chadwick and Beckitt, the architects, offer no explanation. They are puzzled like the rest.

Mr. Neilson, the owner, says that he required a good building and had no desire to stint expense. The cost of the new portion was to be about $40,000. The damage is estimated at from $25,000 to $30,000.

City Coroner's Remarks.

In addressing the jury at the inquest on the bodies of the 2 dead employees, Dr. J. C. Elliott, City Coroner, advised the jurors to visit the scene of the accident personally, paying careful attention to 5 points:—

1. The condition of the wall.
2. The nature of the mortar.
3. The condition of the supports and joists.
4. The weight placed on the building by fresh hardwood lumber lately unloaded.
5. Whether there was any proper binding of the walls.

The inquest was adjourned for a week, in order to give the jury time to study the situation, and to enable the City Architect's department to make a thorough investigation.

It cannot be urged too strongly that adequate time be taken, and the most competent men engaged, for the work of investigation, particularly in view of the two enquiries into the "Titanic" disaster, the hurried one on this side of the Atlantic and the deliberate one now proceeding on the other. Hustling is not always the best policy.

Questions at Issue.

As this matter is necessarily of vital interest to all our readers we shall be glad to receive expressions of their ideas as to the cause or causes (for it may have been the result of many complicated factors) of the accident. It is desirable in the interests of all concerned that this matter be thrashed out from every standpoint, and that no opinion of practical value be withheld. It may be of assistance to enumerate some of the principal questions at issue:—

Design of building.
Size of brackets or hangers and desirability of ties.
Quality of mortar used.
Difference in size of brick used for outer and inner half of walls.
Unequal drying out of walls.
Expansion of lumber caused by exposure to moisture.
Speed of construction.
Frequency and thoroughness of inspection.
Soundness of civic building regulations.

The safety of human life, the essentials of satisfactory design and efficient construction, the necessity for vigilant and competent inspection, are all points of supreme importance. Last, but not least, is the honor of the building trade. Surely that is also worthy of consideration.

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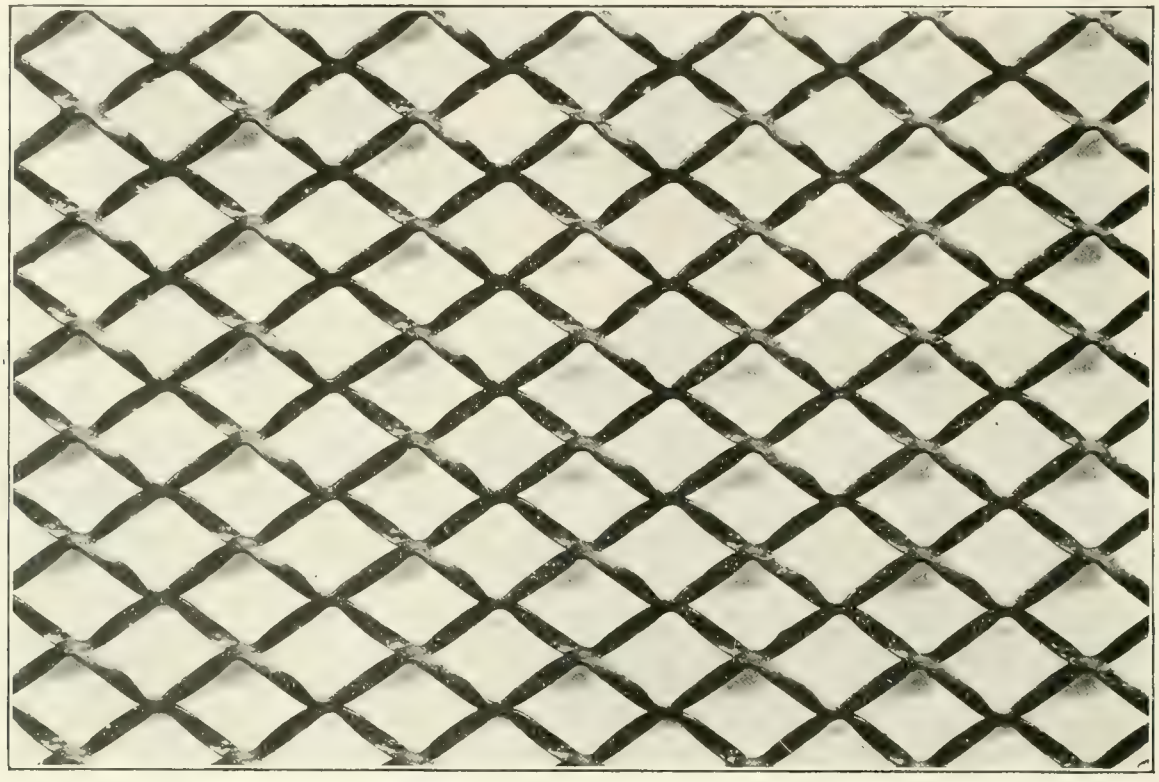

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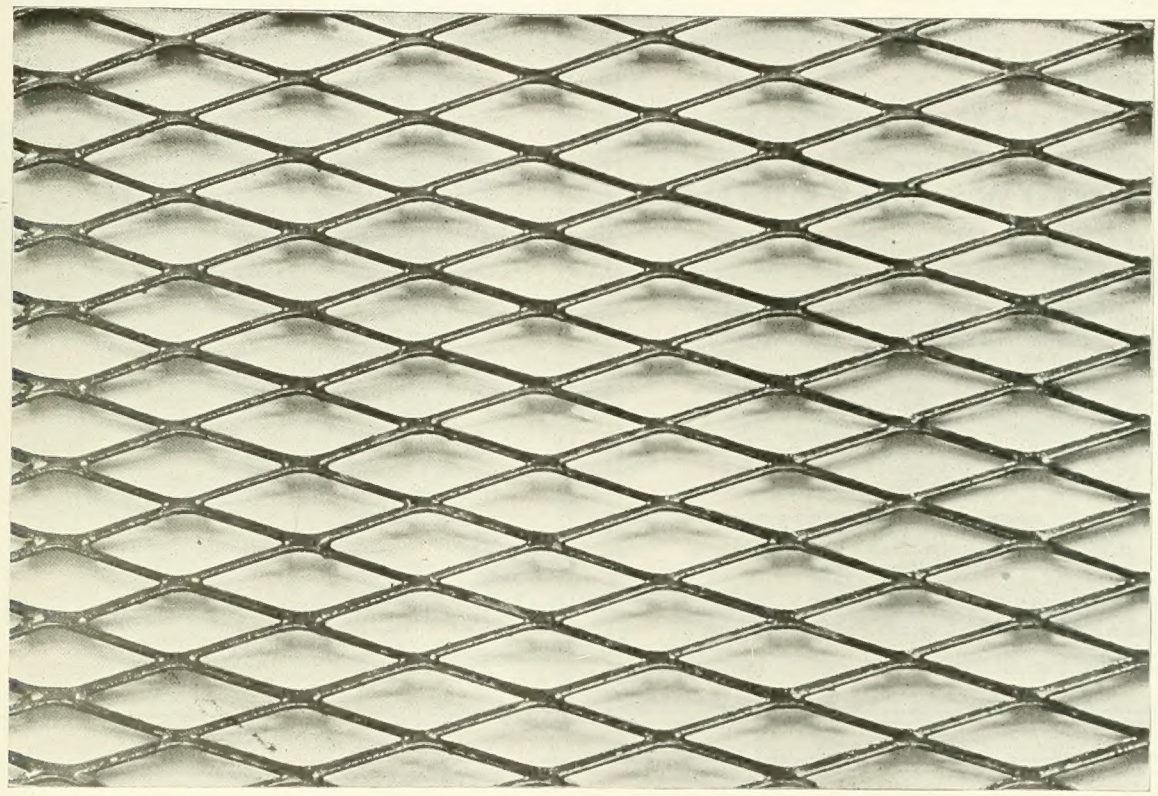

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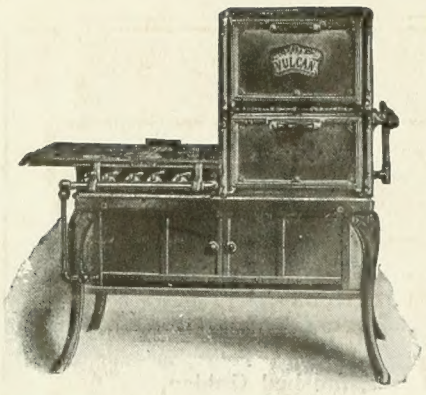

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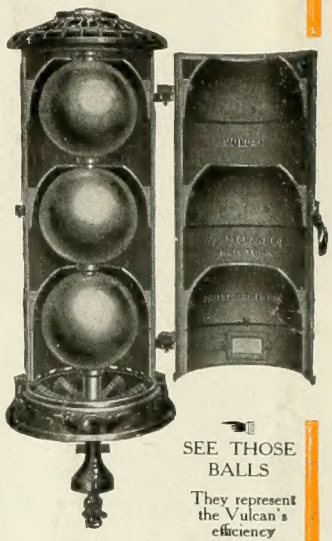

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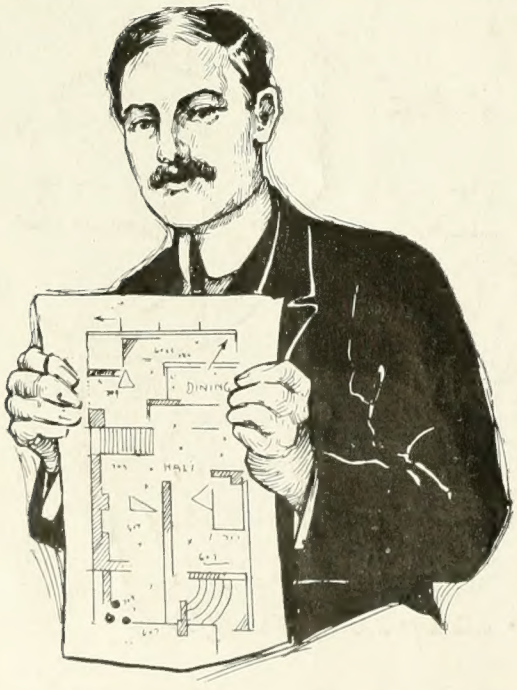

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