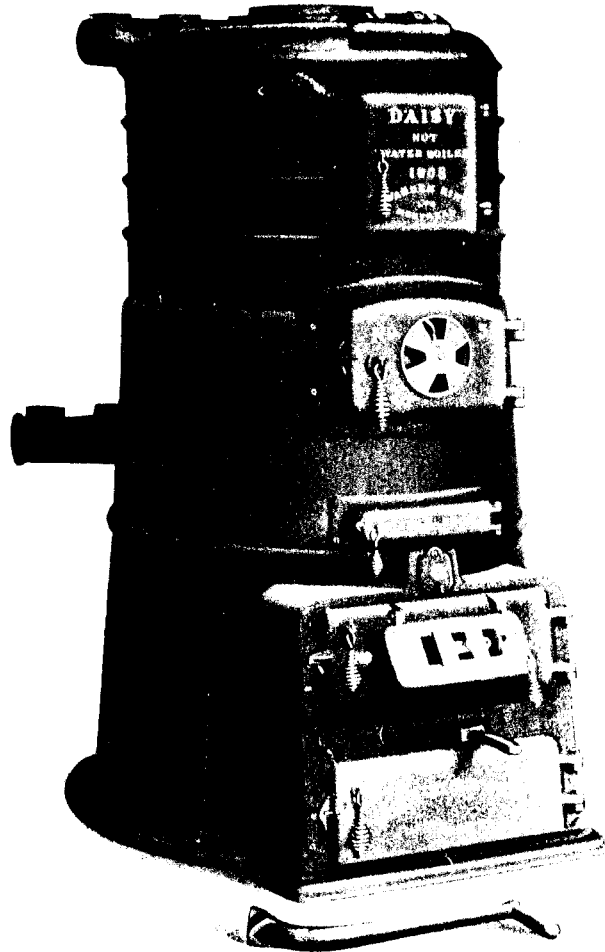


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THE INCOMPARABLE
DAISY

BETTER THAN EVER CANADA'S BEST PRODUCTION



1908 SERIES

30,000 IN ACTIVE SERVICE
IT
STANDS IN A CLASS BY ITSELF
IMITATED
BUT NEVER RIVALLED

CLUFF BROTHERS

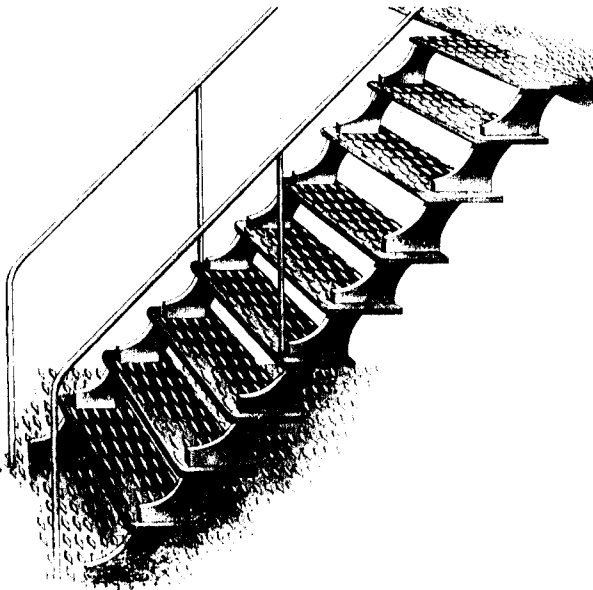
LOMBARD STREET, TORONTO

Selling Agents: **WARDEN KING, Limited**

AMERICAN PRESSED STEEL FLOOR PLATES

WILL NOT CRACK OR BREAK

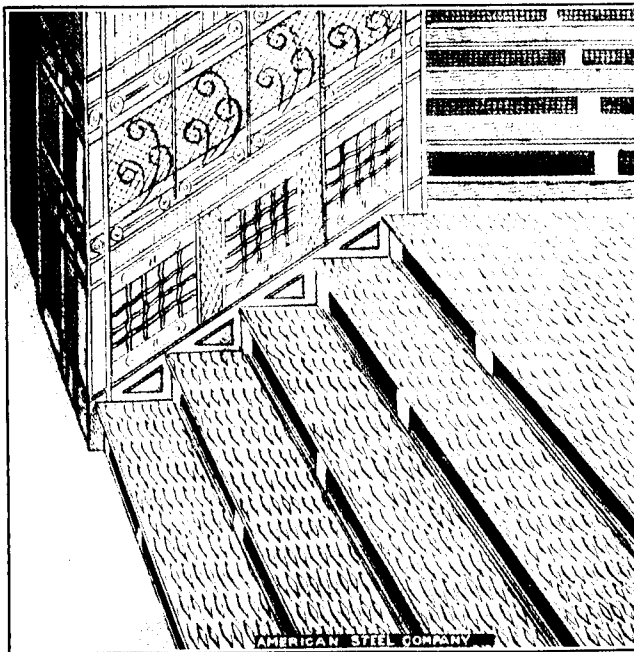
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Stronger
Than
Cast Iron



30 per cent.
Cheaper
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Conduit and
Gas Flue
Covers,
etc., etc.



Stair-ways
Cellar Doors
etc., etc.

WRITE FOR BOOKLET

DRUMMOND McCALL & CO.

MONTREAL AND TORONTO

The
Work
of the
IDEAL
Concrete
Block
Machine



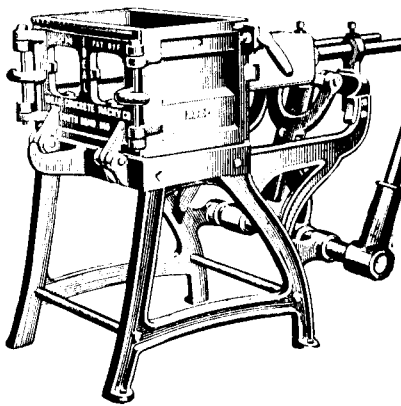
The
Beauty
of
Stone
at
Little
Cost

Ever notice how quickly *one* specially attractive type of building will influence the architecture of a whole community?

The rugged artistic beauty of Ideal Concrete Block construction is always admired. Its little cost puts it within the reach of the man who could not afford to build of brick or stone, and every Ideal Concrete building erected is *one more* everlasting free advertisement for the maker of the blocks. That's why

it pays to own an

Two Sizes: Model "A" 16 inch length.
Model "B" 21 inch length.
Interchangeable to 4, 6, 8, 10 and 12 inch
widths; 4, 6 and 8 inch heights.



IDEAL

Face-Down Interchangeable CONCRETE BLOCK MACHINE

HOW It Pays; Read What An "IDEAL" User Says:

ple, allowing a rich facing mixture, with coarser material for back of block.

Send for free catalogue showing complete line of concrete machinery, including Mixers, Brick Machines, Sill and Lintel Machines, Spindle, Ball, Sidewalk, Step, Sill Molds, etc. A practical encyclopaedia of the concrete industry.

IDEAL CONCRETE MACHINERY CO., LTD.

Factory—221 King St., London, Ont., Can.

CANADIAN SALES AGENTS, MUSSENS LIMITED, Montreal, Toronto, Winnipeg, Vancouver.

The interchangeable features found in the "IDEAL," alone, more than double its range of use and profit. It is the only machine legally built on the perfected "face-down" prin-

Perth Amboy, N. J., Feb. 22, 1908.

It is three months since I began the operation of the IDEAL machine, and I have established what I consider the best method of manufacturing blocks. My capacity is 160 blocks a day.

The following are the figures for each business day in my plant:

4 Bbls. Cement at \$1.61	\$6.44
2 1/2c. per block for labor	4.00
Carting blocks	1.60
My own time per day	5.00

Total	\$17.04
Average selling price 15c.	28.80

My profit per day \$11.76

Sand is plenty here, and its cost is too small to consider. Owing to the unsettled condition of the country, I did not expect to make a sale this winter. I have done no advertising, but blocks sell fast enough to keep me busy, and after three months' work, I have not enough blocks on hand to get a good start for spring.

Very truly yours,
Rob't. H. McHose.

Terrano Flooring

Terrano Flooring must not be confounded with other unsuccessful floorings of this character exploited in Canada. Sixty successful floors laid to date is our chief recommendation.

Terrano is laid about 1-2 inch thick on expanded metal, which makes it absolutely impossible for the floors to crack or break up.

Terrano is the ideal flooring for private houses, public buildings, restaurants, cafes, street and railway cars, etc.

All Terrano laid by us is absolutely guaranteed against cracking, breaking up or other defects.

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General Sales Agents

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22 St. John St.	-	-	MONTREAL

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Terra Cotta is the ideal building material for the Canadian climate. It is not affected by severe cold or heat, is non-absorbent, will not stain, check or crack, and is no more expensive than the ordinary imitation stone.

We also handle enameled brick, fire brick, sanitary goods and other products of the Leeds Fireclay Co., Ltd., Wortley, Leeds, England.

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& CORK
COMPANY**

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**No other Insulation
meets these requirements**

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Write for Blue Print showing details of construction, also Catalogue and samples of our Cork Board.

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Hamilton Powder Co.....Montreal
Standard Explosives, Ltd.....Montreal
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City Dairy, LtdToronto
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Dominion Meat Co., LtdCalgary
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DON VALLEY PRODUCTS

Highly praised by MESSRS. EDEN SMITH & SON . . . One of Canada's Leading Architectural Firms

Eden Smith
Eden Smith

Bank of Commerce Building
199 Yonge Street

Eden Smith & Son
Architects

Toronto, June 15, 1908.

Don Valley Brick Works,
36 Toronto St.,
Toronto.

Dear Sirs,-

We always have pleasure in recommending Don Valley products. We have used them for many years and found the material and workmanship of the best quality and your business methods thoroughly modern.

We have specified your products for the University Residences, and for a Residence for J. E. O'Brian, Esq.

Yours truly,

Eden Smith & Son

WE MANUFACTURE:—Pressed Brick and Common Brick, Porous Terra Cotta Fire-proofing in Arches, Blocks and Furring, Brick Mantels, Vitrified Brick, Porous Terra Cotta Bricks and Wire Cuts, Enamelled Brick and Tile.

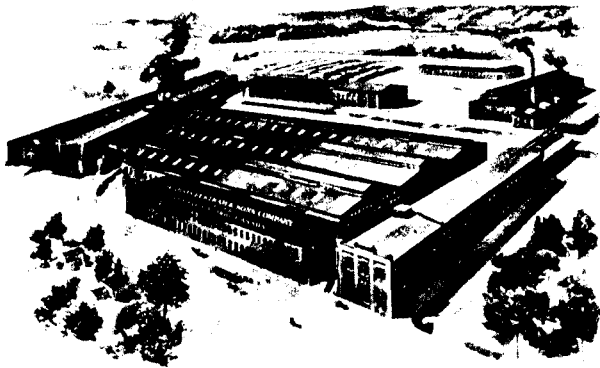
We will gladly furnish you with any further information you may desire.

The Don Valley Brick Works

Head Office—36 Toronto St., Toronto. Montreal Agent, David McGill, 206 Merchants Bank Chambers.

PAROID ROOFING

MADE IN CANADA



PLANT OF THE
JOHN BERTRAM & SONS CO., LTD., DUNDAS, ONT.
Roofed with Paroid

Evidence of the superior qualities of PAROID is the endorsement it has received from the leading Railroad Systems, Corporations, Architects, and Builders throughout Canada and the United States for over ten years.

PAROID'S quality is the strongest roofing guarantee.

The PAROID fixtures are also different from all others—the cap is patented and being square has more binding surface than the ordinary round caps—that's an important feature—and each cap and nail is coated with a waterproof preparation which retards rust.

These patented fixtures only come with PAROID and that's another reason why PAROID makes a permanently satisfactory roof.

Let us send you samples of PAROID and these special PAROID fixtures.

If you have not had our complete sample book we shall be pleased to send one for your files.

F. W. BIRD & SON, Makers,

Canadian Factory and Office: HAMILTON, ONTARIO

Branches: WINNIPEG, MAN. ST. JOHN, N.B. Factories: EAST WALPOLE, MASS., Established 1817
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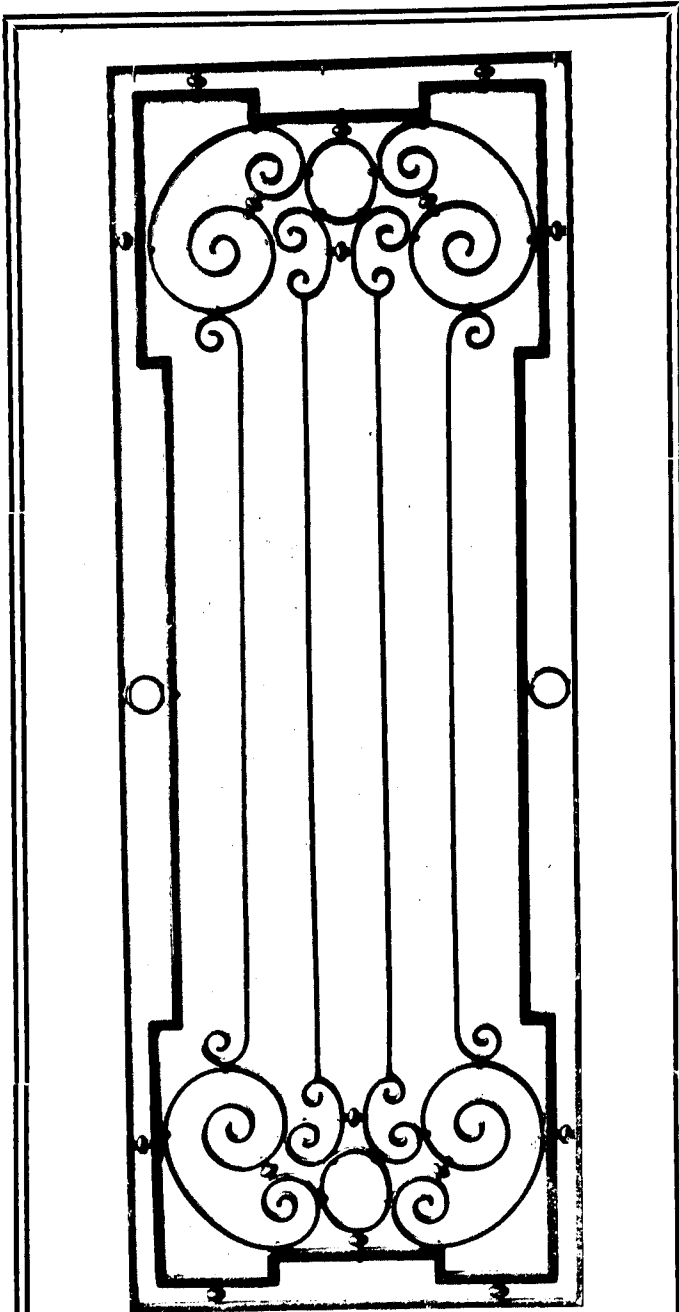


The **NATURO** Closet is new. Different altogether from the old style closet.

It isn't all in the Slant. The Seat has an Important bearing on results.

Write for special catalogue of **NATURO** Closets.

THE JAMES ROBERTSON CO., LIMITED, TORONTO AND MONTREAL



ORNAMENTAL IRON

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| Grills | Iron Stairs |
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Decorative Bronze and Brass Work

OF THE HIGHEST STANDARD

Dennis Wire & Iron Works Co.
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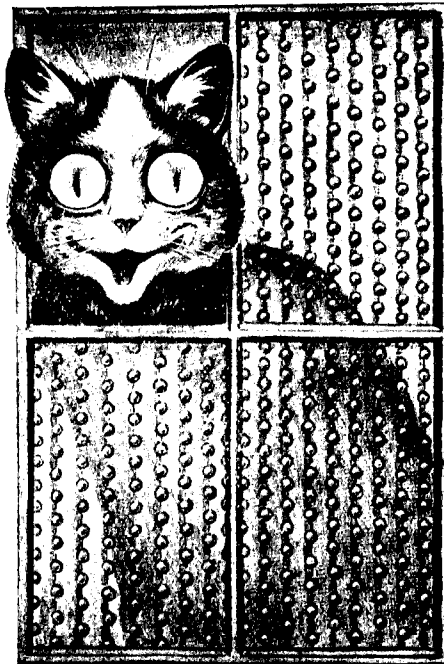
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**Consider
The Effect**

Both DAY and NIGHT

IN PLANNING a home, office or shop, do not overlook the decorative effect of the glass which is to be used in the windows, doors, partitions, screens, etc., exercise your own judgment in its selection.



TRY

"CAT'S EYE GLASS"

(Registered Mark)

"An entirely new type of Obscure Glass. A decided departure from the common sameness of the ordinary figured rolled patterns."

Very Substantial. Not Expensive.
No Crevices in Which Dust Can Collect.

Supplied in Squares or Sheets by

HOBBS MANUFACTURING CO.,

LIMITED

Manufacturers and Importers of GLASS of Every Description for Building Purposes.

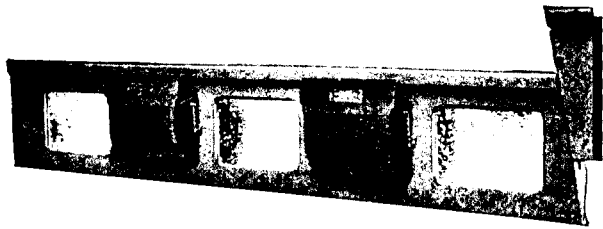
LONDON, WINNIPEG,
TORONTO, - - - CANADA

Send for a sample of this scientifically arranged glass, and examine its novel and brilliant appearance. Increases the light slightly.

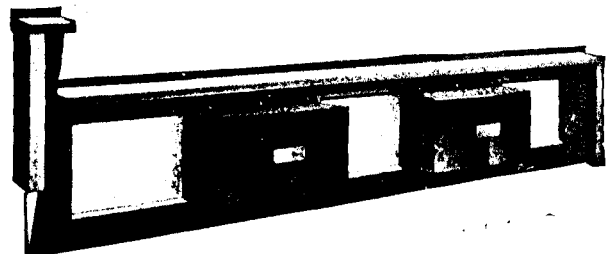
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THE PULLMAN AUTOMATIC VENTILATOR

REGULAR PANEL INSTALLATION

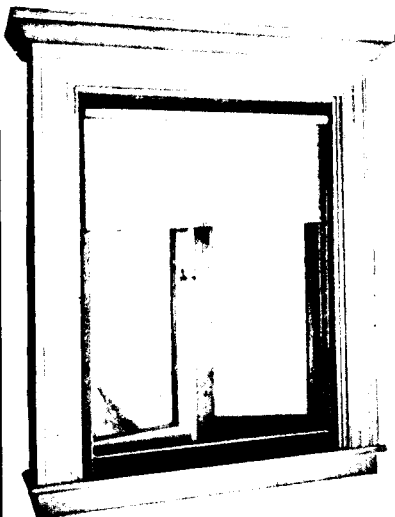


Inside View of Glazed Panel Installation, Showing Air-Diffusion Boxes.



Outside View of Glazed Panel Installation, showing Hoods.

THE INVISIBLE ROLL SCREEN

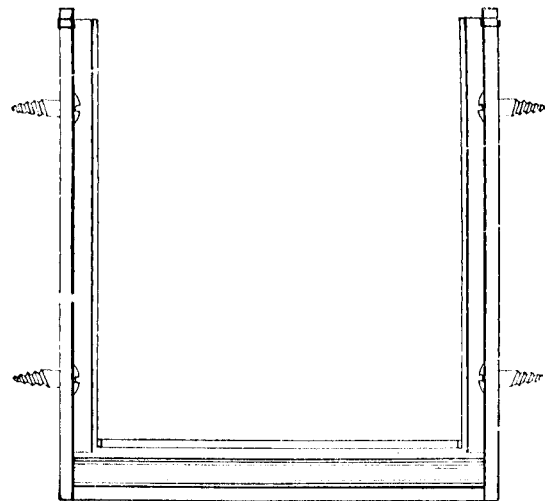


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Screen in Service, Showing Window Shade Attached.



Lower Screen Partly Up
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Window Equipped for both Upper and Lower Sashes.



The Invisible Roll Screen Rolled Up.

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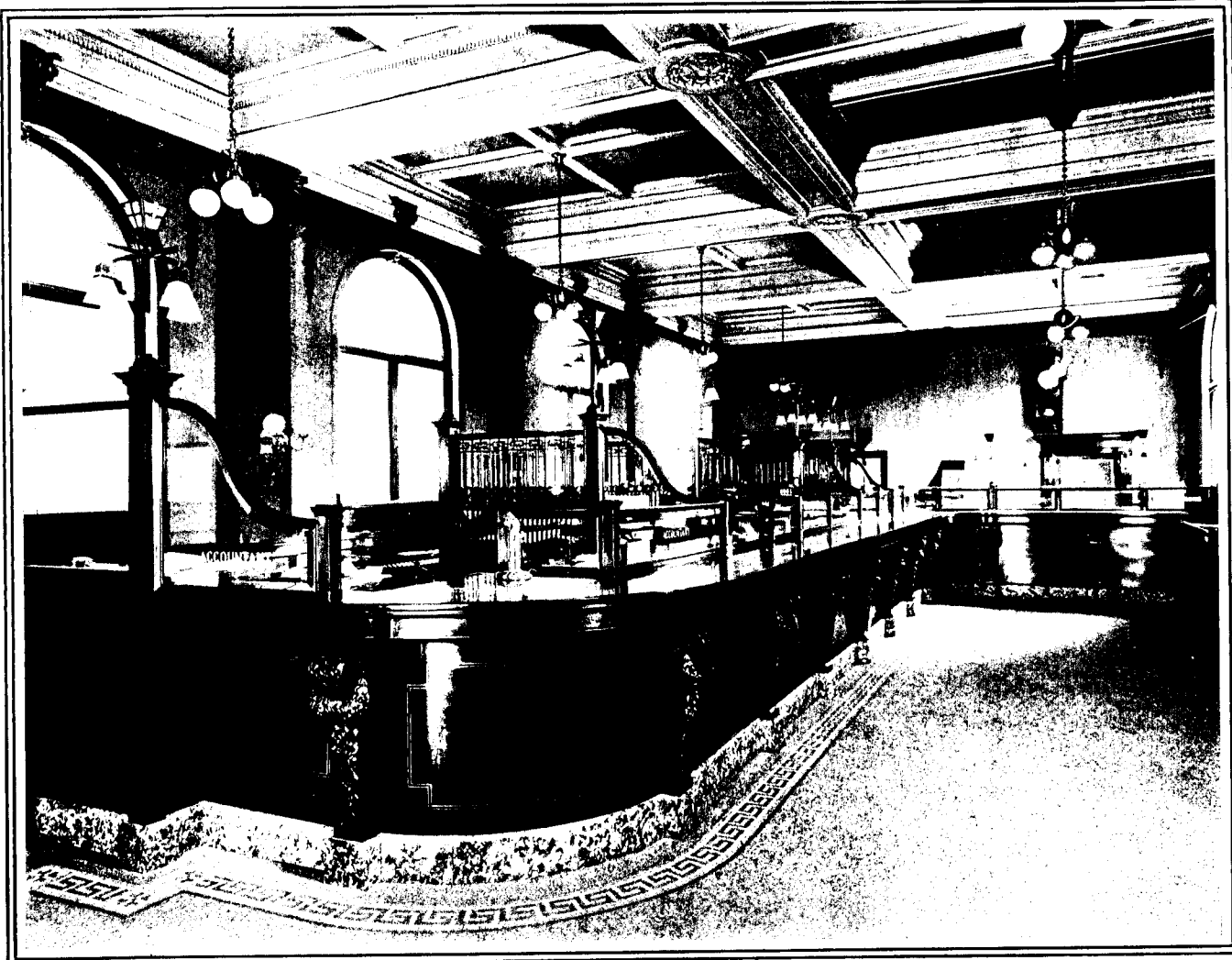
WILLIAM STEWART & COMPANY

Canadian Selling Agents

224 BOARD OF TRADE - MONTREAL

Branch Office: 20 SATURDAY NIGHT BUILDING, TORONTO. Phone Main 6264

The Bank Fixtures and Wood Work in This Bank Were Furnished and Installed by Us



BANKING ROOM, BANK OF BRITISH NORTH AMERICA, WEST TORONTO. ELLIS & CONNERY, ARCHITECTS.

OUR plant is the best equipped in Canada, for the manufacture of high grade interior woodwork. We manufacture and install *hardwood fixtures for banks, offices, libraries, churches, hotels, store buildings*, and make a specialty of *store fronts, staircases, mantels and house fittings*.

WE ARE PREPARED TO EXECUTE WORK IN ANY PART OF THE DOMINION OF CANADA ON REASONABLY SHORT NOTICE

Among the contracts which we are now completing is the interior woodwork and bank fixtures for the *Bank of Commerce at Vancouver*; interior woodwork and office fixtures for the *Canadian Express building at Montreal*; interior woodwork for the *Armories at Hamilton*; *Bank of Commerce, King and Jarvis Streets, Toronto*; *Post Office, St. Mary's, Ontario*; *Office of the Canadian Northern, Toronto*; and the *City Ticket Offices of the Grand Trunk Railway, Toronto*.

IF YOU HAVE A HIGH-CLASS PIECE OF WORK ON HAND, THAT YOU WOULD LIKE TO HAVE DONE AT A REASONABLY LOW COST, GIVE US AN OPPORTUNITY TO FIGURE ON IT.

TORONTO-WATERLOO OFFICE FIXTURE CO.

WATERLOO, ONTARIO, and 75 YONGE ST., TORONTO

MILTON PRESSED BRICK

"THE STANDARD OF EXCELLENCE IN BRICK MASONRY"



Bank of British North America, Toronto Junction — Ellis & Connery, Architects,
in which Milton Pressed Brick was used.

Milton Pressed Brick is used in buildings both large and small, from Vancouver to Halifax, whenever excellence in effect and stability of construction are the two most desired ends to be attained.

IN COLOR Milton Pressed Brick is rich beyond comparison. In strength it bears a reputation equalled by none and superior to all. In finish and form it stands pre-eminent.

The Milton Pressed Brick Co.

The Largest Manufacturers of High Grade Pressed Brick in Canada.

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PORTLAND-CEMENT

Mills at Montreal, Que. and Lakefield, Ont.

Annual Capacity 1,000,000 Barrels.

Unexcelled for Fineness, Soundness, Strength and Color

Highest Quality--Fulfilling requirements of all standard specifications.

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“Samson Brand”



Manufactured from the finest raw material obtainable, by skilled workmen and the most modern machinery.

**UNEXCELLED FOR STRENGTH
AND UNIFORMITY**

By reason of our excellent connection by rail and water we are in a position to meet any competition and make quickest delivery.

THE OWEN SOUND PORTLAND CEMENT CO.,
LIMITED

OWEN SOUND - ONTARIO

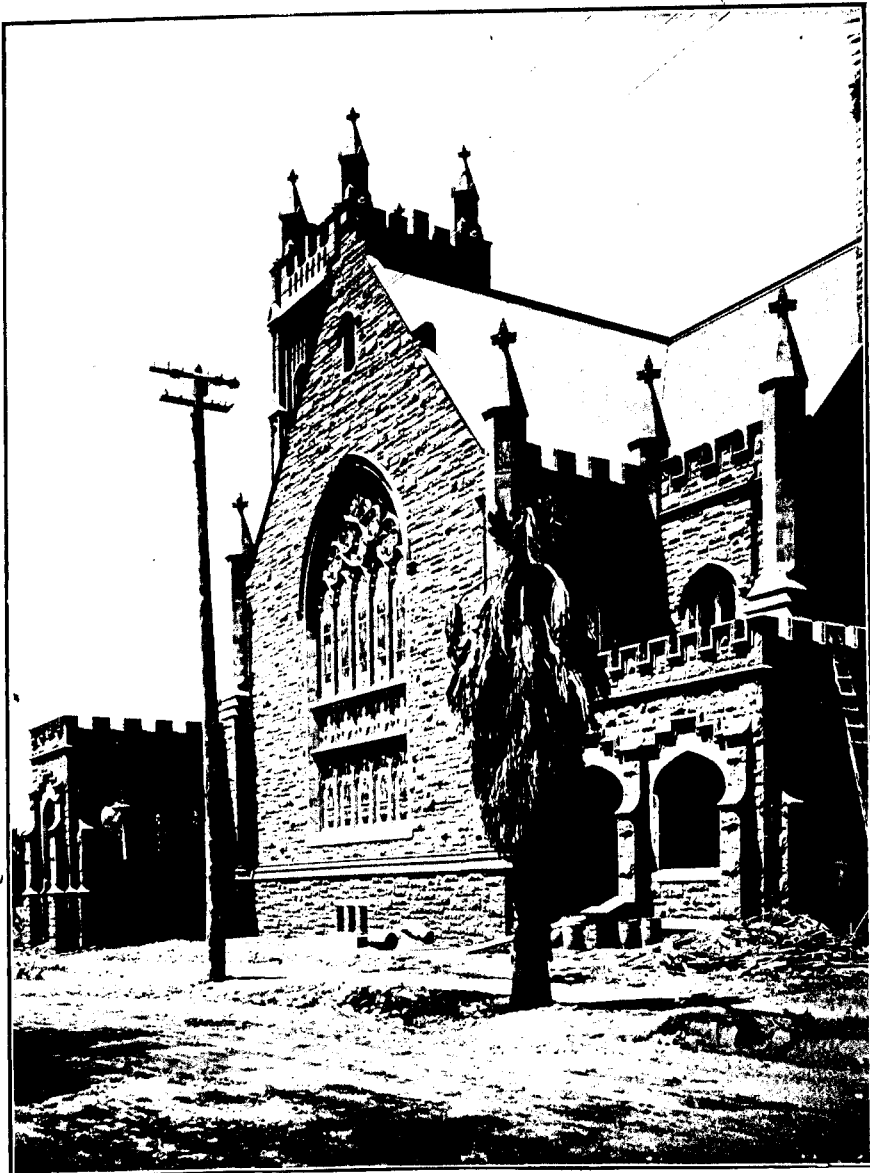
THE CALIFORNIA SYSTEM OF MANUFACTURING HIGH-CLASS CEMENT STONE

is the *cheapest*, the most *effective*, the most *satisfying* to yourself and your customers,
We can make good. Don't take our word for it *Investigate* and see for yourself.

REAL RANDOM
ASHLAR

STONE ANY FRAC-
TIONAL SIZE CALLED
FOR, TO MEET
ARCHITECTS' DE-
SIGNS WITHOUT
CHANGE

ANY SPECIFIED DE-
SIGN, REGARDLESS
OF DRAFT OR DEPTH
OF UNDERCUTS



PRESBYTERIAN CHURCH, PASADENA, CALIFORNIA. (Partial view.)

ORNAMENTAL
WORK
OF ALL KINDS

FRIESE, OR BELT
COURSES

BALUSTERS

COLUMNS

CAPITALS

BRACKETS

CROCKETS

GARGOYLES

FINIALS

ENRICHMENTS

LANDSCAPE DECOR-
ATION FOR PARKS
AND ESTATES

This building is where we have *made good*. We can do as much for you, and you can do the same for your customers. *Broken Ashlar* laid up in block and snack, no blind or false joints, but the *goods* at practically no greater cost to you than the ordinary *mud pie* and *gingerbread* blocks.

We install the California System anywhere under the positive guarantee that it will give all the results that we claim for it.

We erect large buildings any place where our system has not been installed.

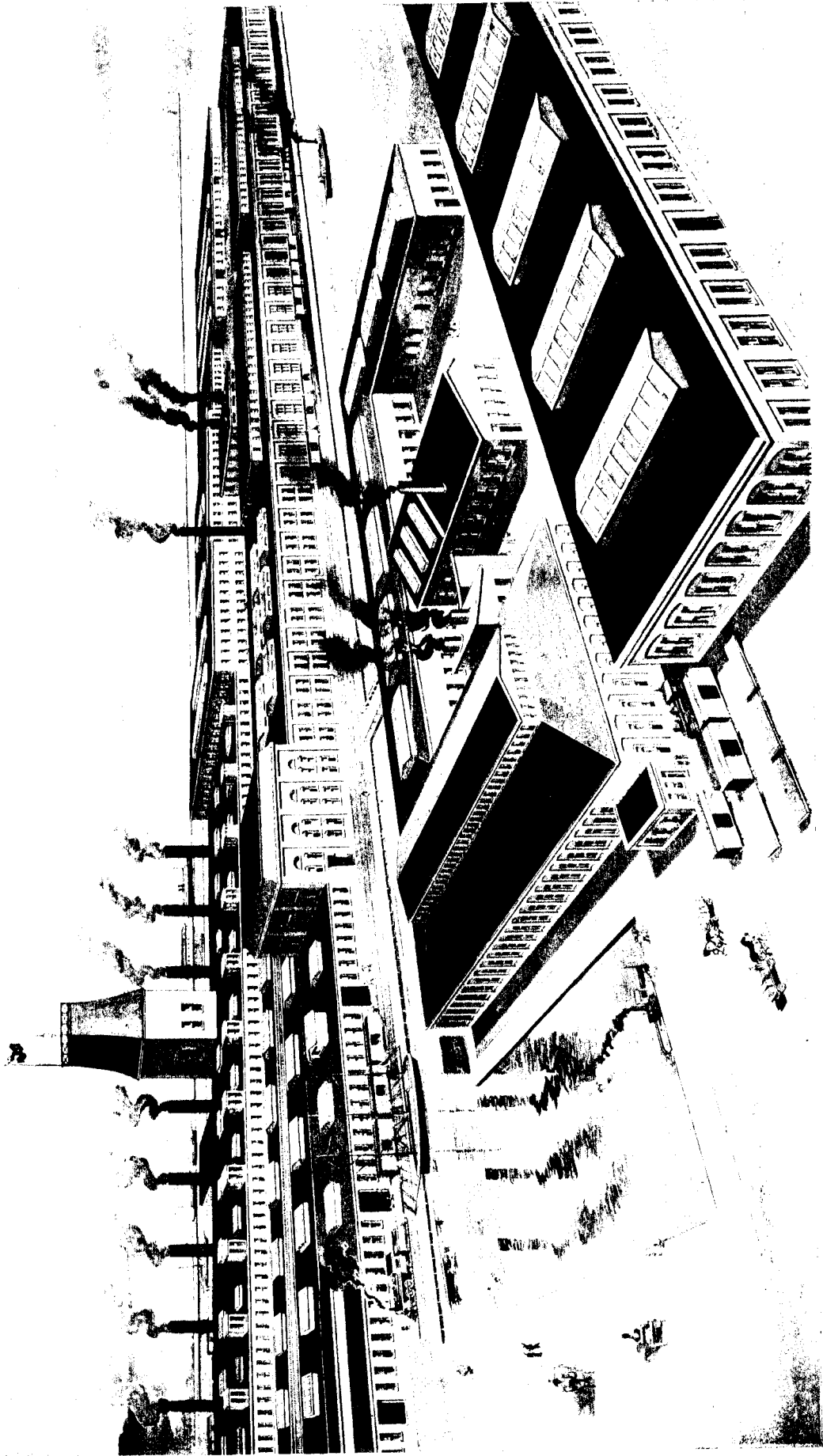
We supply moulds according to designs submitted for any work that you have in hand.

OUR MOTTO—Each and every piece of work **different**, made practical by the low cost of operating by the California System.

WRITE US FOR PARTICULARS

CANADIAN CONCRETE MACHINERY COMPANY, Limited

Office: 510 Board of Trade Building, TORONTO, ONT.




THE LARGEST EXCLUSIVE CAST IRON PORCELAIN ENAMELING WORKS UNDER THE BRITISH FLAG.

The Standard Ideal Company, Limited

PORT HURON, ONTARIO.

The Standard Ideal Company, Limited

UR attention has been directed to a Circular issued by Messrs. Thos. C. Collins & Son, of Montreal, Sales Agents for the Standard Sanitary Manufacturing Company, of Pittsburgh, U.S., headed:—

“IMPORTANT NOTICE TO CANADIAN ARCHITECTS AND TRADE.”

Up to the present time, we have ignored the attacks, direct and indirect, cast at us by the above-mentioned firm, believing them to be but the mis-directed efforts of Trade jealousy, but after perusing their recent Circular letter, we feel it obligatory upon ourselves, and as a protection to the Architects and Plumbing Trade in general, to make public a few of the actual facts.

THE STANDARD **I**deal SANITARY COMPANY, a Company with Canadian Capital invested, was incorporated under a Provincial Charter in November, 1902, and their business was acquired by the Standard **I**deal Company, who received a Charter from the Ontario Government on October 4th, 1905.

Since the inception of the above Companies, the business has been conducted under the Charter name, operating as a Canadian Corporation manufacturing goods in Canada, for the Canadian Trade, and this fact is known to every Architect, Plumber and Jobber throughout the Dominion of Canada.

The assets of our Company amount to over a half a million of dollars.

Our Trade Mark is original and registered with the Government in 1903.

Four years after our Company had been in existence The word "Standard" was registered by the Pittsburg Company, i. e., in July, 1906

Our Company has, during that period, acquired about 90 per cent. of the Trade in Porcelain Enamelled Cast Iron Ware of this country, this being due entirely to superiority of Ware over that of any of our Alien Competitors.

We are advised that in using our own name, we are not infringing upon any person's or Company's rights. We have always conducted our business under our legal name, and from our registered place of business, Port Hope, as a Canadian Corporation, making and marketing our Wares in the Dominion, and having no connection whatever with any foreign Corporation.

The Standard Ideal Company, Limited
Port Hope, Ontario

Decreasing Fireproofing Cost

Are you familiar with
the new methods of using

Terra Cotta Hollow Tile

in connection with re-enforced concrete structural members?

Are you familiar with the economy, efficiency and strength of long span Hollow Tile Floors (re-enforced) used in spans up to 25 feet?

Are you aware of the greatly decreased cost of fireproof construction under these methods?

How can you be sure of the best fire-proof construction, or the lowest cost, or either, unless you figure with the largest fireproofing organization in the world?

Send us your plans to figure.
Estimates cheerfully made.

National Fire Proofing Company

Manufacturers of

Terra Cotta Hollow Tile

Contractors for Construction of Fireproof Buildings

The largest firm in the world devoted exclusively to the business of fireproof construction.
Capital Twelve and one-half Million Dollars.

PITTSBURG, Fulton Building
PHILADELPHIA, Land Title Building
WASHINGTON, D. C., Colorado Building
BOSTON, Old South Building
ST. LOUIS, MO.
CHICAGO, Commercial National Bank Bldg.
NEW YORK, Flatiron Building
MINNEAPOLIS, MINN., Lumber Ex.
LOS ANGELES, CALIF., Union Trust Building
LONDON, ENG., 26 Chancery Lane
SAN FRANCISCO, CALIF., Monaduook Bldg.

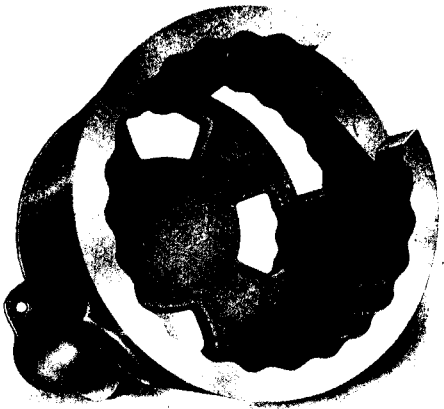
Twenty-six factories throughout the United States

TORONTO
TRADERS BANK BLDG.

A Question of Coal Capacity

Just three years ago we started to preach the gospel of deep firepot Hot Water Boilers. We didn't refer to any ancient

THE SAFFORD FIREPOT



Note the splendid corrugated direct fire surface

and historic lineage, because it was our firm conviction that the old shallow firepot man was all wrong.

We have sold a good many hundred Boilers since then, and our conviction is firmer than ever. The doctrine has even carried conviction to the heart of the antiquated old type Boiler maker.

THE SAFFORD BOILER

stands to-day as the only Hot Water Heating Boiler that has coal-carrying capacity sufficient to maintain, under proper combustion, the maximum temperature for eight hours on one firing.



Note the large self-cleaning flue surfaces

There are many other features. Write us to-day ; we will be glad to show you.

DOMINION RADIATOR CO., Limited

TORONTO

MONTREAL

WINNIPEG

ST. JOHN, N.B.

SAFFORD RADIATORS

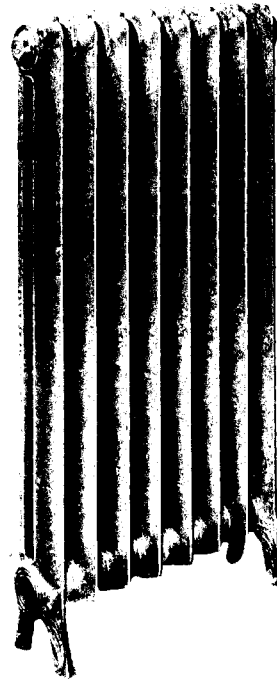


**Safford "Zenda" Ornamental
The New Single Column Radiator**

"Economizing Space"

For narrow halls, or rooms in which it is desirable that the radiator should project the least possible distance from the wall, the new Safford "Zenda" Radiator allows the utmost economy of space.

We manufacture a larger assortment of styles than any manufacturer in the world, and can positively satisfy any peculiar architectural arrangement of the building. Catalogue cheerfully furnished on application.



Safford "Zenda" Plain

DOMINION RADIATOR CO., Limited

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ST. JOHN, N. B.

EXPANDED METAL

the Universally Acknowledged Superior System of

FIREPROOF CONSTRUCTION

IN REINFORCED CONCRETE



EXPANDED METAL REINFORCEMENT FOR CEMENT FLOORS IN RECENTLY COMPLETED ADDITION
TO T. EATON CO.'S STORE, TORONTO

EXPANDED METAL

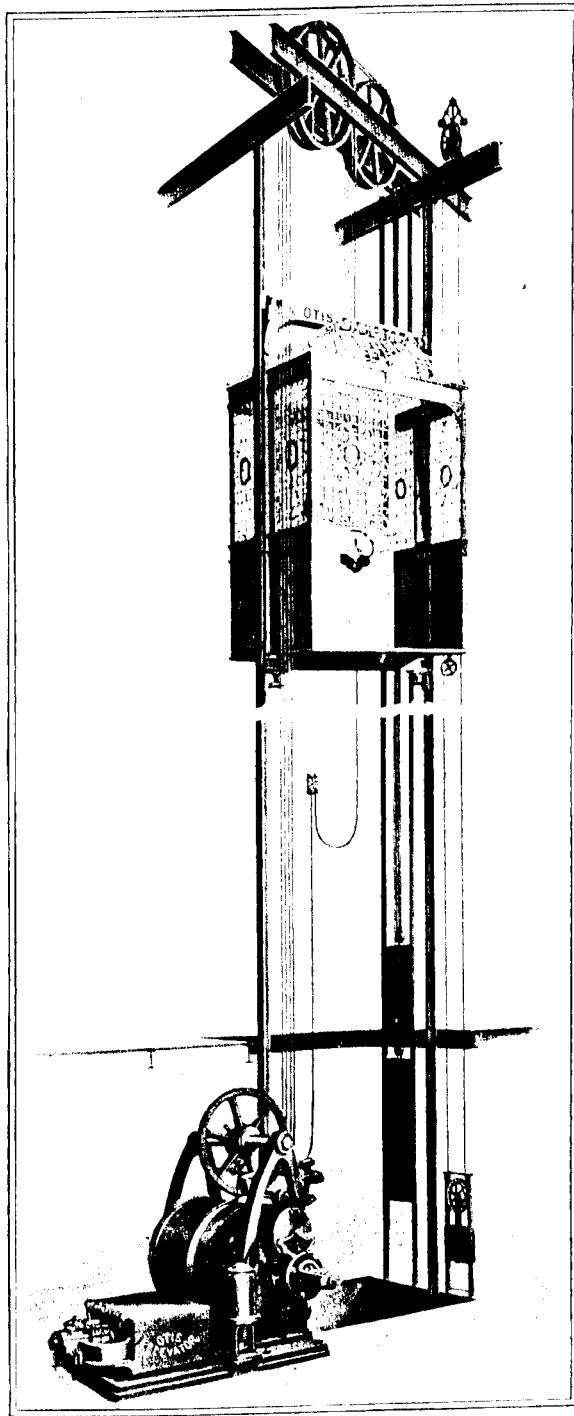
furnishes a bond of any desired strength, rigidity against vibration and elasticity to withstand wind or other stresses. The mesh is scientifically and exactly employed to get the greatest cross-section value and best distribution of stress, and it positively cannot slip through nor shear the concrete. Its specification is a positive proof of weight, gauge, size and strength.

SEND FOR NEW CATALOGUE—CONTAINS VALUABLE INFORMATION
ON CONCRETE CONSTRUCTION, ENGINEERING DATA AND TABLES.

Expanded Metal and Fireproofing Company

100 KING STREET WEST, TORONTO

OTIS ELEVATORS



Electric Passenger Elevator Installed in Yonge Street Branch, Bank of Toronto Building, Toronto, which is built for Public Buildings, Office Buildings, Hotels, Apartment Houses, Warehouses, Etc.

THIS illustration shows our electric passenger elevator operated and controlled by the magnet control and lever switch in the car.

We build this machine for both passenger and freight service, changing the style and type of the engine as requirements demand.

All of our engines are fitted with our positive automatic stop, bringing the car to a standstill at the upper and lower terminals, independently of the operator in the car; all of our elevators have the Otis speed governor safety device, tested by actual use for over thirty years. Its action and control of the safety apparatus is entirely independent of the breaking of the lifting cables.

The Otis electric elevator engines have passed beyond the stage of experiment, having now been on the market some twelve years, during which time we have installed over **ten thousand electric passenger and freight elevators.**

Lists of many users of the different types of these machines can be obtained upon application at any of our branch offices throughout Canada, the United States, England, France, Germany and other foreign countries.

Manufactured and Installed in Canada by

OTIS-FENSOM ELEVATOR COMPANY, Limited

HEAD OFFICE
Traders Bank Bldg., Toronto

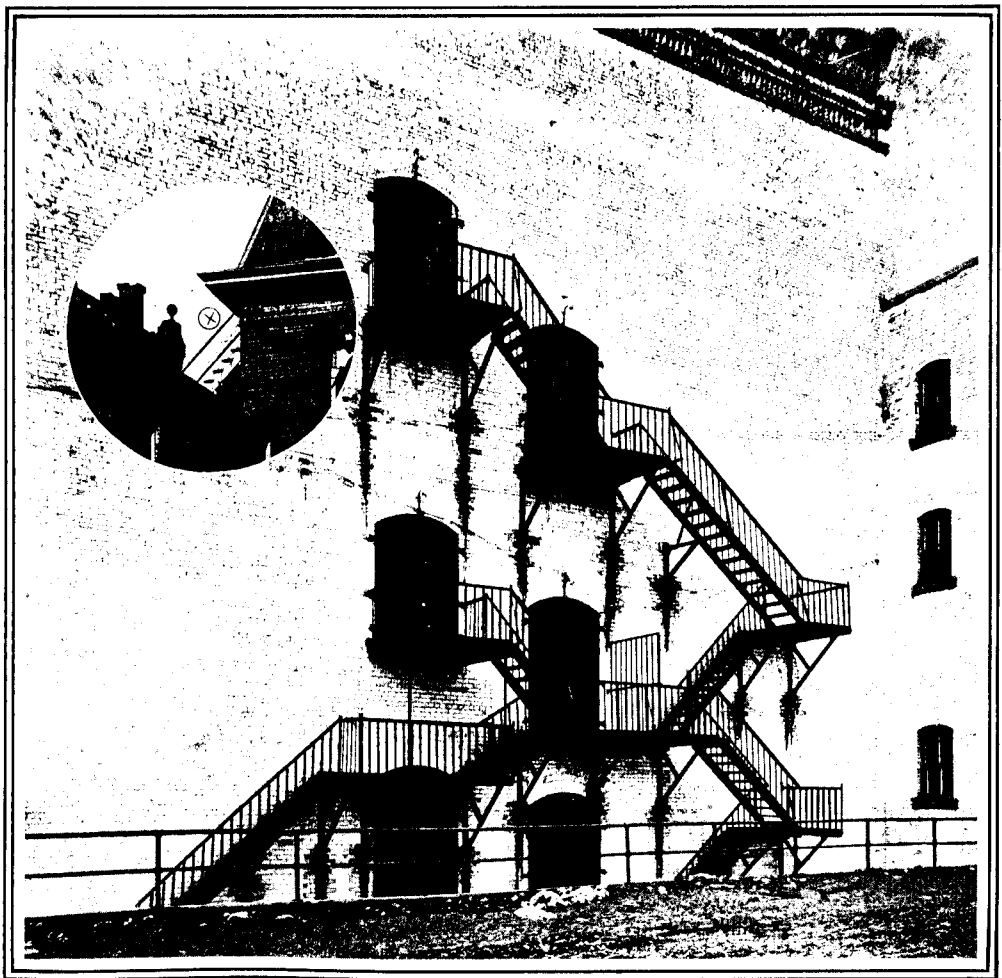
WORKS
Hamilton, Ont.

OFFICES IN
Principal Cities



The upper illustrations show a representative Toronto Public School—three-storey structures without fire escapes. Note the wood staircases and the wood posts supporting them. This school has two stairways but both face one exit. To use the rear exit it is necessary to make a complete turn to get out into the vestibule and another turn to get out of the building. In case of a fire or panic in this building the consequences would be awful.

The lower illustrations show the fire escapes required on theatres in Toronto for the protection of amusement seekers, as compared with the only fire escape on a school building in Toronto—a wooden affair leading down upon the top of another structure, lately built on the York street school. A protection furnished amusement seekers that is denied school children.



EDITORIAL



PUBLIC WITHOUT PROTECTION AGAINST THE USE OF FIRE-TRAPS — ILL-FATED STRUCTURE AT TILLSONBURG ONLY ONE OF A THOUSAND IN THE DOMINION. - -

LEGAL PROTECTION is afforded the hotel keeper against being defrauded by the man who neglects or refuses to pay his hotel bill. If a guest absconds and surreptitiously evades payment for "service rendered," he is arrested and thrown in jail. But what protection does the law give to the man that is obliged to pay for a service not rendered and loses his life because of the inadequacy of this service?

We ask what protection has the public against the niggardly, criminal policy of the hotel-keeper who does not conduct his business (licensed by the Government) in a structure that gives some measure of safety to those whose business requires them to patronize his hotel, which he has failed to equip with the necessary means of protection in case of fire.

The law protects the hotel-keeper against being defrauded of a few dollars by a dishonest guest, but fails to protect the life of the guest against the criminally negligent, closefisted hotel-keeper who does not provide a suitable structure in which a man may take a night's rest without taking his life in his own hands.

The Queen's hotel at Tillsonburg, recently destroyed by fire, is only one of thousands of structures of like nature throughout the Dominion, in which men are licensed to serve the public without the least apparent consideration being given to safeguards against the loss of life, property, or permanent bodily injury in event of fire.

There was nothing surprising in this recent fire that took its toll of two lives and serious bodily injury to six, unless it was that such fires are not more frequent and that the list of fatalities was not greater. The two lives that were lost are simply sacrifices to the criminal greed of the proprietor upon the altar of government shortsightedness and official negligence.

A man who would use a building of the same type of construction and equipment as the Queen's hotel for a warehouse for the storage of any commercial commodity other than ice, would be considered little short of insane. Fire insurance companies would refuse to give him insurance on such a risk. But a man is licensed by the Government to use such a structure for the "storage" of human lives and the proprietor has no desire to use a better class of structure than required, because he is not *legally* responsible for the lives of his guests.

Human life represents no commercial value to him.

QUEEN'S HOTEL, TILLSONBURG—A GOOD BUILDING FOR A BONFIRE—AN ANTI-QUATED "TINDER BOX" WITH NO MEANS FOR ESCAPE. - - - - -

THE QUEEN'S HOTEL was a three story frame structure constructed on the simplest lines of frame construction of thirty years ago. In plan and arrangement no consideration had been given to means of escape in case of fire. It was simply a square frame building, with wood staircases, the top two floors of which were apportioned off into narrow halls and small bedrooms. Every material used in its construction was of the most inflammable nature. Its exterior appearance gave unmistakable evidence of its age, and suggested the impression that if not shortly torn down, it would have to effect its own destruction either by burning or collapsing.

If some patriotic town desired to celebrate Guy Fawkes' day with a mammoth bonfire, they could not have selected better materials to make a quick, glorious blaze than those of which this hotel was constructed, nor could they have built or selected a stack of debris, or a deserted worthless structure that would have given the desired effect in a great blaze better than would the Queen's Hotel at Tillsonburg.

We are told that in this, the very exemplification of fire-trap building construction, even the few safeguards provided by law, in a rather indifferent manner, in the shape of fire ropes, and fire escapes, were neglected and when the fire broke out the inmates found themselves closed up in a blazing "tinder box" without any means of escape. Would that the agonizing torture of the last moments of the unfortunate victims could be forever painted upon the minds of those responsible for their deaths!

It is said that many hotel-keepers object to fire escapes because they suggest a means of jumping bills by

the dishonest. A glorious principle it is that prompts a man to refuse to give the inmates of his hostelry a means whereby they may escape with their lives because, forsooth, it might offer an easy exit for the dishonest with their baggage. Suppose we were to consider this contention, almost without parallel for its inhuman inconsistency, it still remains a fact that the law protects the proprietor against the dishonest, who evade the payment of their bills, but the guest is not protected against the loss of his life in a closed tinder box. A man is obliged to give up his life because the proprietor closed up all adequate means of escape to keep people from jumping their bills.

There is an act, however, that provides that every hotel building over two stories shall be provided with at least one iron fire escape and that each guest room shall be provided with a fire rope. But the weakness of this law is in the fact that it does not distinctly specify what shall constitute adequate fire escapes for a certain number of rooms, nor where such iron stairs shall be located and that it does not require all hallways leading to fire escapes to be lighted with red lights.

There is some discussion as to whether there were fire ropes in the bedrooms or not, but the fact remains that if there had been an ample number of properly constructed fire escapes within easy access of all the rooms, and had the location of these fire escapes been indicated by red lights, the guests would have all made their safe exit from even this, the worst type of death-trap imaginable.

Investigation will show as to whether the license inspector of this district is legally responsible for an infraction of this law. It looks as though he were. He is at least morally responsible for the lack of common sense in the execution of his duties, if not legally so. If license inspectors were one-half as diligent in insisting upon common sense precautions being taken for the protection of the travelling public in event of fire, as they are in demanding that the law respecting closing hours for bar-rooms be observed, there would be no such fatalities as occurred in the Tillsonburg fire.

It was considered unnecessary to conduct a coroners' investigation into the cause of the deaths, resultant from the fire. If a catastrophe of this character does not require investigation, we ask what manner of case does? It seems that Tillsonburg is without a citizen with sufficient backbone to take the initiative in demanding such an investigation. It is gratifying to learn, however, that an inquiry is to be held by the Provincial Government, and it is to be hoped that it will be sufficiently thorough to place the direct responsibility for the fatalities, and that its report will be the means of bringing before the notice of the provincial legislators the necessity for a law governing the construction and equipment of all public and semi-public buildings, as well as private and commercial buildings of any magnitude within the province. It is not only licensed hotels, the construction and equipment of which should be regulated and inspected by the Provincial Government, but the hotels located in local option districts, public buildings, schools, colleges, factories, business buildings, churches, apartment buildings, and large boarding houses should be constructed according to sane government regulations and be regularly inspected by competent provincial inspectors.

*FOUR DIRECT CAUSES FOR FATAL FIRE—
PROVINCIAL BUILDING LAWS ONLY
MEANS OF PREVENTING A RECURRENCE
—LEGISLATURE SHOULD ACT AT ONCE.*

THE TILLSONBURG FIRE is directly attributable, first, to the lack of efficient provincial measures providing for the reasonably safe construction of hotels and buildings of a semi-public nature;

secondly, to the criminal greed of the proprietor in failing to provide a structure suitable for the purpose for which it was used, in not providing this building with greater safeguards than an inefficient law demanded, and in conducting a lucrative business in a structure that common reason showed to be nothing short of a death-trap; thirdly, to the gross lack of common sense on the part of the local license inspector, if not sheer negligence; fourthly, to the apparently public indifference to the importance of sound building construction.

There is only one method of preventing a recurrence of this horrible tragedy in possibly a greater and more awful catastrophe in the future. That is in provincial legislation that will require all hotels, whether licensed or temperance, all apartment buildings and boarding houses, to be of fireproof or fire resisting construction, with fireproof staircases, enclosed elevator shafts, broad, light halls, and fireproof furnace rooms. Large outside iron stairways should be provided for, on at least two sides of the building. Large outside iron balconies should be required on each floor, within easy access of every room, and red lights should be kept constantly burning in the hallways to indicate the location of the fire escapes.

This legislation should not only cover hotels but should affect theatres, halls, schools, churches, factories, and in fact all classes of buildings. It should take the form of a complete provincial building code. Larger cities, it is true, can handle the inspection of its buildings, but smaller cities and towns have not a sufficient amount of building to justify the employment of a building inspector and the establishment of a building department. This is evidenced by the fact that many buildings such as halls, theatres, hotels, schools, etc., are erected that show, in their construction, the lack of adequate building laws. The matter of hotels will undoubtedly be investigated. We have been recently looking into our school buildings, but why stop here, why wait for some horrible catastrophe in a factory building, in a church or a hall? We need provincial building laws. Evidence of this fact can be found on every side. Must we wait for more tragedies before we act? Must we sacrifice more human life before we are convinced of the importance of public interest in good building construction?

*QUEBEC'S NEW BUILDING LAW FAULTY—
SHOULD BE MORE EXPLICIT—DANGER OF
DEPENDING TOO MUCH UPON INTEGRITY
OF INSPECTORS.*

QUEBEC PROVINCE recently passed an Act respecting "safety in public buildings" which, while a move in the proper direction, does not go far enough. It is decidedly weak in that it is not sufficiently specific and leaves too much to the discretion of the building inspector.

It is not a building code. It is simply a law regulating the provisions that shall be made in buildings used by the public, for the prevention of fatalities in case of fire or panic. It does not classify buildings into first, second, third class, etc., and specify what is required in the matter of fire equipment in each case. It does not deal with the basic materials to be provided in buildings to be used for certain purposes, nor does it touch upon the methods of construction to be employed in the erection of the various classes of buildings which it affects.

It states that all theatres hereafter constructed shall be of fireproof construction, and that fireproof buildings need not comply with the provisions with respect to fire escapes, but does not define fireproof construction. This lack of specific regulations is most unfortunate, in that it offers many opportunities to the owner to evade the use

of materials, methods and equipment in the construction of his building necessary to the safety of the public and contemplated in the Act.

Another unfortunate feature of the Act is, as we have stated, that of leaving too much to the judgment of the building inspector. Public buildings now open to the public are required to conform with the regulations only to the extent deemed advisable and necessary by the inspector. The law suggests certain safety devices such as fire escapes and adds "or other means of safety, in case of fire, approved or prescribed by the inspector." It states further that this law respecting fire escapes shall not apply to any public building that is fireproof to the "satisfaction of the inspector." Again, such safety contrivances shall be installed at the places "directed by the inspector," and built in a manner "specified in his order." It requires that all buildings hereafter built or altered to serve as theatres shall be fireproof, "to the satisfaction of the building inspector."

Why the necessity of going to the trouble of making laws designed to specify what shall constitute proper equipment for the safety of human life in public buildings, if it is to be left with the discretion of the building inspector as to whether they are to be complied with or not? Why not simply empower the building inspector to order such precautions as he in his own judgment thinks necessary and simplify matters?

It is a grave mistake to permit a building inspector to make exceptions in the enforcement of building laws at his own discretion. His position carries with it too many dangers of graft and other illegitimate influences in any case without increasing this danger by placing in his hands laws of an inexplicit nature that may be used as a club or a favor. The zeal of an inspector is not a dependable quantity at the best. He should therefore be given rigid, explicit laws; he should be backed up in his strict enforcement of the regulations and be held responsible by law for his negligence in either permitting or failing to punish any infraction of the law.

FEATURES OF QUEBEC'S NEW LAW—SCHOOLS AND HOTELS MUST HAVE FIRE ESCAPES—BUILDINGS MUST BE PLACARDED "DANGEROUS."

SOME INTERESTING and praiseworthy features are to be found in the Quebec law respecting safety in public buildings, apart from its being too inexplicit in some particulars and leaving too much to the discretion of the building inspector.

Within the meaning of this act the term public buildings includes churches and chapels, or buildings used as such, seminaries, colleges, convents, monasteries, school-houses, public or private hospitals, orphan asylums, infant asylums, charity work-rooms, hotels, boarding houses capable of receiving at least fifteen boarders, theatres, halls for public meetings, lectures or amusements, buildings for the holding of exhibitions, stands on race-courses or other sporting grounds, buildings in parks, skating rinks, rooms for showing moving pictures, buildings of three stories or more over the ground floor occupied as offices, stores employing at least ten clerks and court-houses.

It requires that every building of at least three stories, and every school building shall be provided with safety appliances on the outside; such as iron stairs, safety tubes of canvas or metal, or other means of safety in case of fire, approved or prescribed by the inspector.

It provides that safety staircases shall be built of iron with sufficient side railings, and shall be connected with the inside of the building by means of doors or windows; and shall also have sufficient railings at each story

above the first, including the attic when it is used as a workshop, and shall be kept in good condition and unobstructed.

Canvas tubes shall consist of tubes made of strong canvas, treated chemically and so as to offer sufficient resistance to fire. Such tubes shall be solidly fixed to an iron frame and shall be supplied with brakes to check the descent.

Metal tubes shall consist of tubes of metal or sheet iron, of spiral form, and connected to each story by galleries.

All balconies, galleries and staircases must be put at the places and in the manner determined by the inspector. Canvas tubes shall be placed in portable chest and installed in the places determined by the inspector.

When the windows or other outlets opening upon the safety staircases, are more than two feet above the floor, steps shall be placed so as to enable the occupants of the building to easily reach such outlets.

The safety exits shall always be kept in good condition, and free of all obstruction whatever.

The regulations contained in the Act affecting hotels and boarding houses is rendered especially interesting at this time, just after the fatal hotel fire at Tillsonburg. If such a law had been in force in Ontario every guest would have been safely conveyed from the burning building to the street.

It requires all hotels and boarding houses of three stories or more to be equipped with regulation fire escapes and that the doors from which exit is had, as well as all doors at the lower part of the staircase, shall open outwards and shall never be locked with a key, but shall be supplied with a lock which opens automatically by pressure from within the building.

It further provides that the inspector may require that there shall be a night guardian in every hotel or boarding house having fifty occupied rooms.

The passages and staircases shall be lighted throughout the night. The lamps indicating the safety exits shall be supplied with glasses of glass colored differently from that of other lamps.

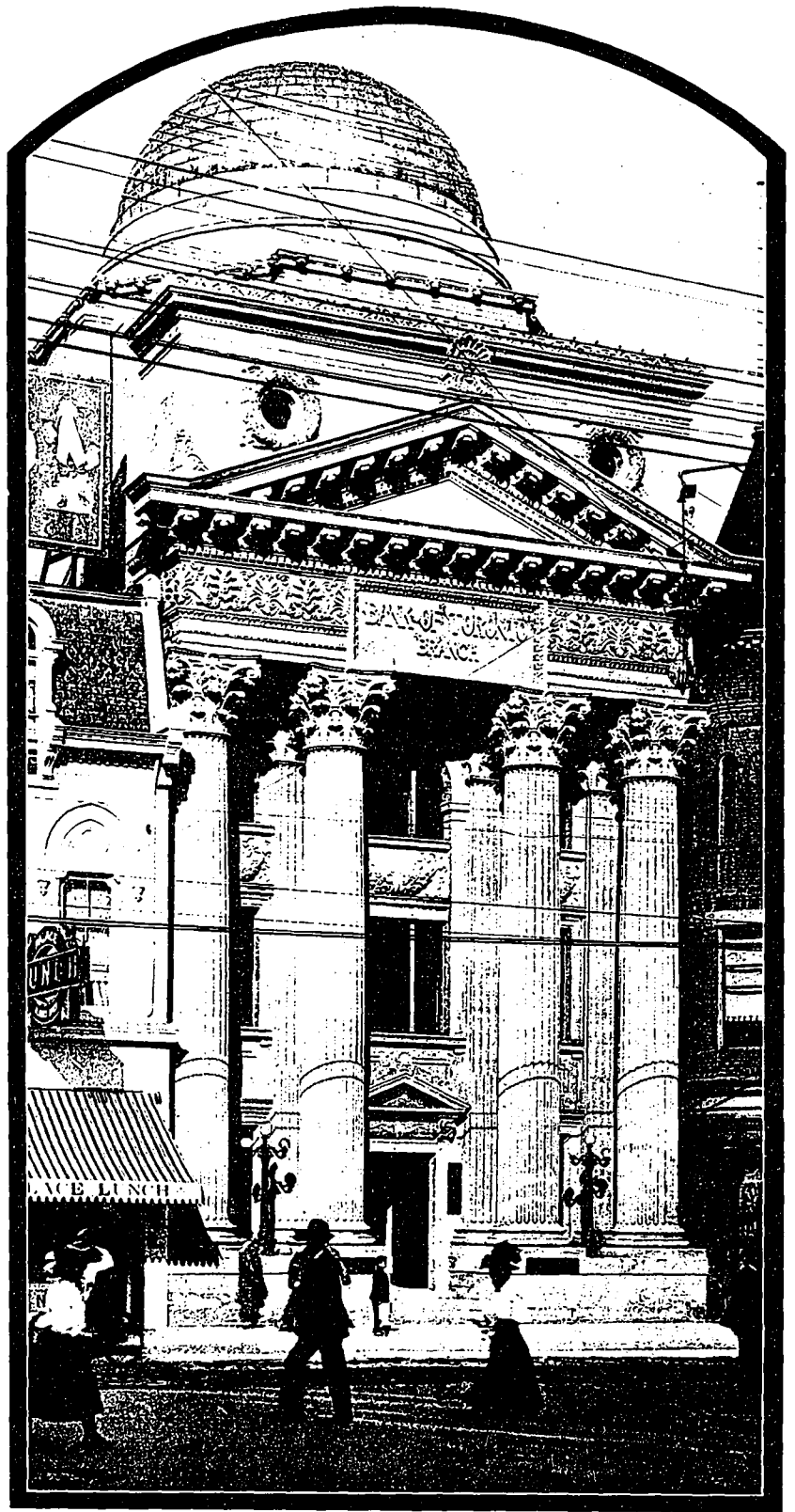
The proprietors are required to post in each room, a notice containing the information necessary to enable the occupants to find their way to the supplementary exits and to use the extinguishers and safety appliances.

There must be a sounding gong or other alarm appliance to wake the occupants at night in case of fire.

Proprietors of hotels which accommodate at least fifteen boarders are required to have their house inspected and obtain a certificate attesting that all the precautions for the safety of the boarders and employees have been taken, as required by law and by the regulations. The certificate shall be issued in duplicate, and the proprietor, after having posted one of them in a conspicuous place in his house shall keep the other at the disposal of the inspector of provincial revenue of the district. Such certificates are to be given by the inspector free of charge, and the collector of provincial revenue shall not grant a license until after the certificate has been obtained.

Another feature of the act is that portion which empowers the building inspector to close theatres and amusement halls, the proprietors of which do not comply with the regulations of the act, and to post at the entrance of such building, in a conspicuous place, a placard indicating that the building is dangerous.

The act generally is a step in the proper direction; and it should form the nucleus of broader and more far reaching legislation controlling building construction and equipment in the other provinces of the Dominion. Without such laws we can never expect to have buildings constructed along lines that give any measure of protection against the loss of human life.



FACADE OF YONGE ST. BRANCH, BANK OF TORONTO BUILDING, TORONTO. E. J. LENNOX, ARCHITECT.

CORINTHIAN DESIGN IN BANK BUILDING.---Bank of Toronto Branch, Toronto, Affords an Interesting Study in Classic Architecture.---Possesses Many Noteworthy Features in Combination Bank and Office Building.---Structure is Fireproof Throughout.

CLASSIC ARCHITECTURE is probably more rigidly adhered to in the designing of modern bank buildings than in any other type of commercial structures.

The many fine specimens of buildings of this character, which have come to adorn the streets of metropolitan cities, with their massive columns, detailed capitals and elaborate pediments, have more than once arrested

The structure has a frontage of 34 feet and a depth of 122 feet. The whole exterior face is built of Indiana limestone and the building throughout is absolutely fireproof, having been constructed according to the most approved methods known to modern building science.

The interior, especially on the ground floors, vies strongly with the exterior for richness and effect. Entrance to the banking room, which is, located on this floor, is gained through a spacious hall, the walls of which are lined with Italian marble from the floor to the vaulted ceiling. On the right of the hall, as one enters, is the manager's public and private offices, while on the left are situated the marble staircase and elevators, communicating with the upper floor, and the ladies' waiting room.

The banking room is thirty-one by forty-five feet in floor area, and thirty feet high. Here the walls to the height of sixteen feet, are lined with Pavanazzo and English veined Italian marble, the marble pilasters of the four walls extending up beyond this height to the Corinthian caps, above which a moulded and enriched frieze and cornice is carried around the four sides of the room. The floor of both the entrance hall and banking room is of mosaic marble tile with enriched border.

The ceiling above the cornice is divided into three large panels, the centre one having a large enriched cove



ENTRANCE TO BANKING ROOM, YONGE ST. BRANCH, BANK OF TORONTO BUILDING, TORONTO. E. J. LENNOX ARCHITECT.

the eye of the pedestrian, and caused him to gaze intently at their architectural grandeur and solidity of construction.

As to whether they can be consistently regarded as being a commercial success—that is to say, bring a fair return of interest on the amount invested, is a question entirely irrelevant to their general architectural treatment and the uplifting influence they exert in bringing the public to appreciate higher ideals in building design, and it is quite possible, with the architectural development in bank buildings, that the perversion of art in design which has so characterized the commercial structures built on the continent during the past score of years, will give way to a higher aesthetic expression in buildings of this type.

What has been attained in bank building design can be seen in the accompanying illustrations of the new branch institution of the Bank of Toronto, on Yonge street, Toronto.

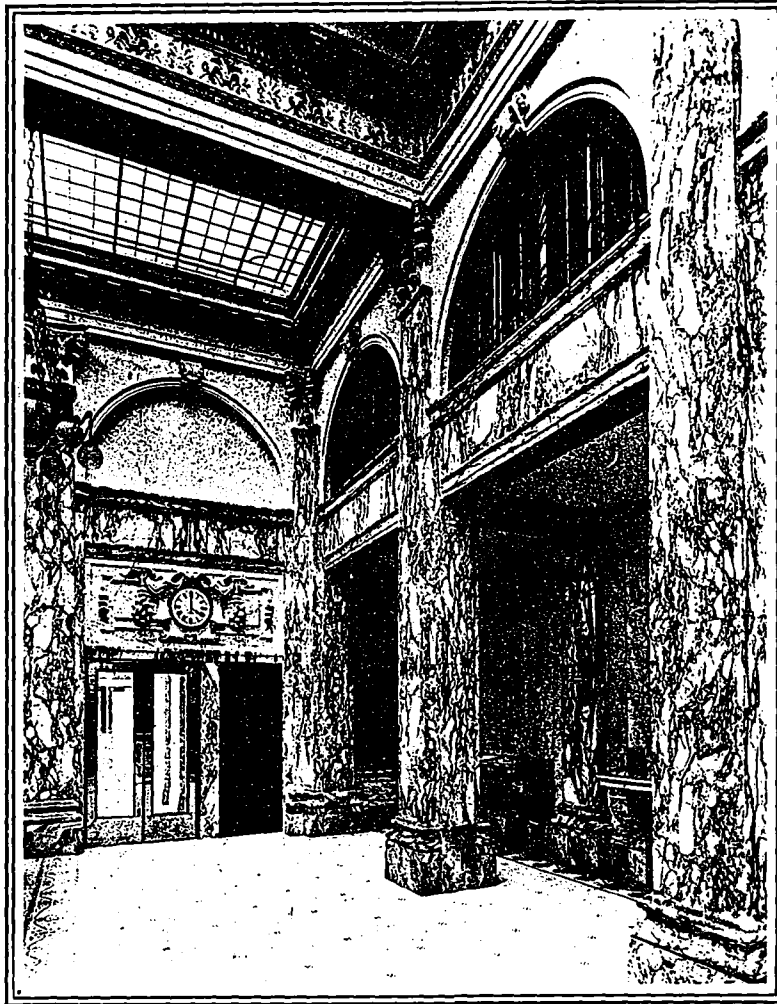
The exterior is treated in severe classic with large columns, ornate caps and enriched pediment, the whole being surmounted by a large dome. Its monumental character and dignified appearance—strongly contrasting with its surroundings—presents an interesting study in Corinthian Architecture.



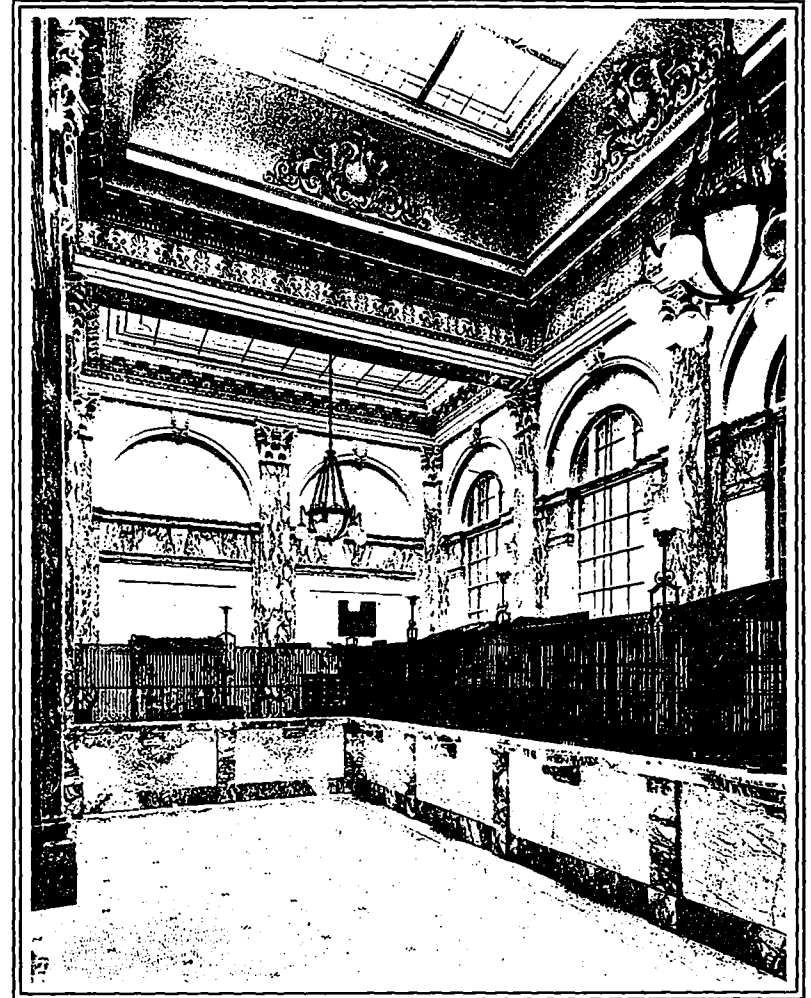
HALLWAY SHOWING ELEVATOR ENTRANCE AND MARBLE STAIRCASE LEADING TO OFFICES ON UPPER FLOORS. YONGE ST. BRANCH, TORONTO BANK BUILDING, TORONTO. E. J. LENNOX, ARCHITECT.

carried up from top of main cornice, and having an upper cornice enclosing centre ceiling light. The two outside panels of the ceiling have also ceiling lights on the level of the main cornice. These lights are of leaded muffled glass in rich plain patterns and pale colors.

Between the marble pilasters, the wall space is panelled in form of arcade, the marble dado caps forming im-



VIEW OF BANKING ROOM, LOOKING TOWARD MAIN ENTRANCE, YONGE ST. BRANCH, BANK OF TORONTO BUILDING, TORONTO. E. J. LENNON, ARCHITECT.



VIEW OF BANKING ROOM, LOOKING FROM MAIN ENTRANCE, YONGE ST. BRANCH, BANK OF TORONTO BUILDING, TORONTO. E. J. LENNON, ARCHITECT.

SEVERE TESTS OF A CONCRETE SLAB.

A SEVERE test of a concrete floor slab was recently made in Denver with results that astonished people not familiar with this type of construction. It took place at the Ideal Building, now being constructed by the Dome Investment Company at Seventeenth and Champa streets.

The Ideal Building is the first in Denver to be built entirely of reinforced concrete, all the supports, columns, stairways and walls being constructed entirely of this material.

The tests of the concrete floor slab of the first floor were conducted in strict accordance with the code and under the personal supervision of Building Inspector R. V. Willison and his assistants, Messrs. McPhee and Stuart. They were assisted by Alexander Simpson, Jr., Superintendent of Construction; F. C. Carstairsphen, Engineer of Construction of the Whitney-Stein Company, which has the contract for the building, and Messrs. Fallis & Stein, Architects.

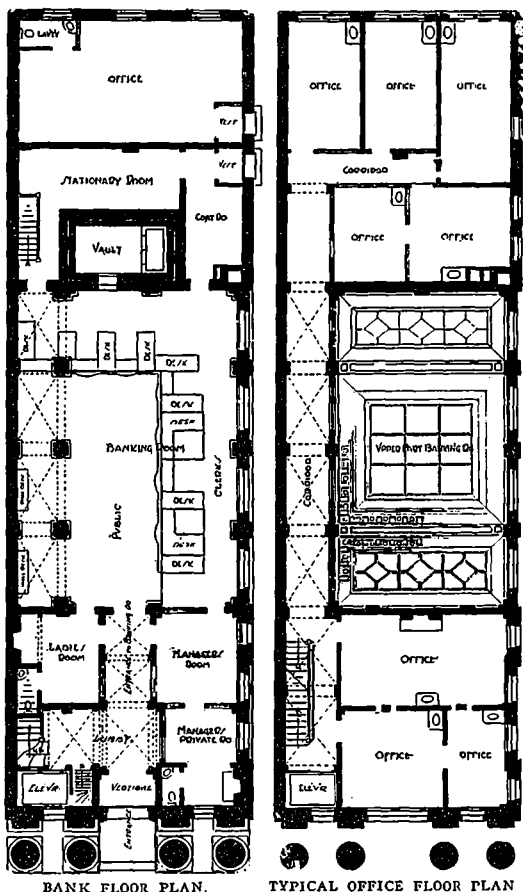
The floor was first loaded for the deflection test. A panel eleven feet by seven feet six inches and designed to carry a normal live load of 120 pounds to the square foot was chosen. This slab is five inches thick, reinforced by Johnson corrugated steel bars and having an ultimate breaking strength of 60,000 pounds per square inch. The dead load of the slab is 16,000 pounds. The slab was weighted to twice its normal load and supported in all over 65,000 pounds, under which weight the deflection of the slab was less than three one-hundredths of an inch.

When the floor was thoroughly loaded a fire was built under it and the slab heated to a temperature of 1,800 degrees Fahrenheit, and maintained for an hour. This fire was more intense than could possibly occur in the use of the building.

When the slab had been subjected to this intense heat for an hour and a quarter the fire hose was turned on the slab and it was cooled immediately.

A searching examination of the floor slab after all these tests failed to show a sign of failure or inherent weakness. It was entirely satisfactory.

This is but one of a number of exhaustive tests which will be carried out on the various floors of this building.



post mould to arches, the window and doors being so arranged that they centre in these panels. At the east end of the banking room is the large cash and storage vault, to the right of which is located a sitting and coat room for the clerks.

Immediately behind the vault is the stationery store-room and back of this are two large offices for renting.

Above the ground floor there are sixteen offices for renting, all of which are spacious and well arranged, and on the top floor are sleeping chambers and bathrooms for the clerks. The janitor's apartments and public lavatories are also located on this floor.

The building cost in the neighborhood of \$130,000, and has been finished without change or one cent of extras over the amount of the original contract price. It was erected under the supervision of and from plans prepared by Architect E. J. Lennox, Toronto

The various branches of the work were executed by the following firms:—Brick work, fire proofing, cut stone and marble work, Page & Co.; structural steel work, Canada Foundry Co.; ornamental and wrought iron work and counter grill work, H. R. Ives; plastering, J. M. Gander; carpenter and joiner work, Geo. Henry & Sons; painting and glazing, H. W. Johnson; ornamental glass work, R. McCausland; heating and plumbing, Keith & Fitzsimons; elevators, Otis-Pensom Co.; copper and galvanized iron work, A. Mathews; felt roofing, W. T. Stewart; marble work for staircase, Hoidge Marble Co.



MANAGER'S OFFICE, YONGE ST. BRANCH, BANK OF TORONTO BUILDING, TORONTO. E. J. LENNOX, ARCHITECT.

INDIAN BOND FOR BRICKWORK.---A Method of Laying Brick which Produces a Strong and Durable Wall.

THE majority of engineers and some builders frequently leave the question of bond in brickwork to the unhampered choice of the working mason. Such casual proceeding is seldom attended with any serious risk in case of walls whose thickness is the length of a single brick, for here the bricklayer will be pretty certain to adopt either the Flemish or the English bond, both of which are unobjectionable in the majority of cases, though the latter is distinctly the sounder arrangement, says Indian Engineering. When, however, as is the case in the majority of works which engage an engineer's attention, the thickness much exceeds that of a single brick, consequences of such neglect in detail are frequently deplorable. We have seen large masses of brickwork—notably in lock walls—consisting of nothing but headers, if we except those stretchers which appear on the exposed face of the wall, and which of course occupy but a minute fraction of the wall's cross section. Such a structure, if we ignore the adhesion of the mortar, has but little more longitudinal strength than has a huge faggot of short sticks without that string which is usually provided by the wood cutter.

It is scarcely surprising therefore that the majority of such walls develop transverse cracks, even when they are exposed to nothing more in the way of bending moment than is incidental to ordinarily careless construction.

The main desiderata of a good bond are three: 1. the bricks should overlap in each direction an aggregate extent which is approximately proportional to the bending moment or shearing stress to which the wall may be exposed in that plane; 2. the bond should not necessitate the cutting of bricks; 3. it should be applicable to walls of all thicknesses and yet sufficiently simple to be easily learned by the ordinary bricklayer. The "Habri," bond pre-eminently satisfies all these requirements; the first two demonstrably, and, concerning the last, we have never met a mason who did not readily comprehend the system as soon as it had been illustrated in his presence by the piling of a few dry bricks.

In the "Habri" bond every course, in a wall of indefinite thickness, is essentially identical with every other course, and consists of a cycle of three rows of bricks—two rows of stretchers followed by one row of headers. This arrangement in each course is, however, shifted half a brick in a direction at right angles to the rows, as compared with the course upon which it rests, the direction of the shift remaining constant throughout the wall's height. When, under the above clause of this rule, a row of headers would be divided by the plane of a face of the wall, a row of half bricks is not inserted, but a row of stretchers substituted.

In the case of a wall half a brick thick this bond necessarily reduces—as do all other bonds—to a wall consisting of stretchers only. When the wall is one brick thick we have one course of headers only, followed by three courses of stretchers only, the arrangement being here identical with common English bond, which is undoubtedly the soundest arrangement in a one-brick wall under ordinary circumstances.

It is, however, in walls exceeding one brick in thickness that the value of our systematic rule becomes evident. Starting from the face an arch abutment of indefinite thickness would have in its first course one row of headers followed by two rows of stretchers, and so on. The second course would show one row of stretchers followed by one row of headers and then two rows of stretchers, the last three rows being repeated indefinitely. The third course would consist of two rows of stretchers followed by one row of headers, and so on. The fourth course would have three rows of stretchers next the face

followed by the usual cycle of one row of headers and two rows of stretchers. This completes the cycle of courses, the fifth course being identical with the first not only in arrangement, but also in horizontal position. In the case of a wall under a vertical load, the direction in which the half-brick step by which each course has its arrangement shifted as compared with that of its predecessor is made, has no importance, though of course it should remain unaltered throughout the wall.

The name "Habri" is that of a distributary channel upon which the bond was first employed some 20 years ago.

COMPETITION FOR MONUMENT OF REFORMATION IN GENEVA.

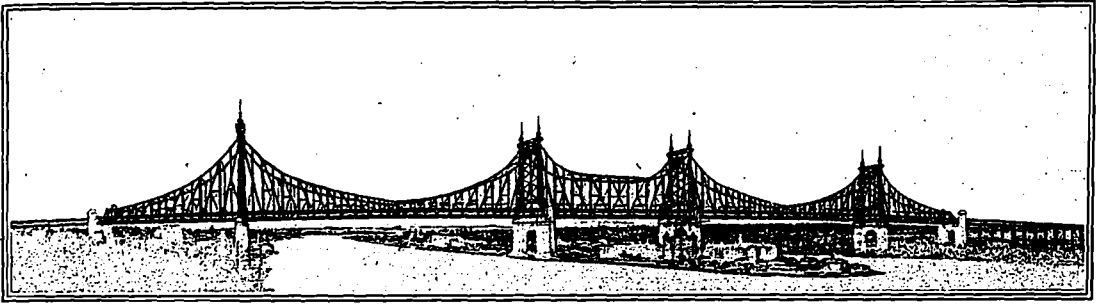
THE association organized at Geneva in 1906 for the purpose of preparing the forthcoming celebration, the 400th anniversary of Calvin, has decided to mark the event by the erection, in honor of Calvin's work, of a monument planned on broad historical lines, recalling to the public mind in a manner at once popular and durable, the names and influence of the Reformers in all parts of the world. The committee is not yet in a position to give an exact idea as to the sum of will have at its disposal, but entertains the hope that it may amount to from 400,000 to 500,000 francs.

According to the decision of the committee, the monument is to be historical in general character, the motif of which to be easily understood by all. As to the historical figures, the statue of Calvin will be conspicuous, but as the monument is not to be in the strict sense of the word a monument erected to Calvin, it is necessary that the figure of the Reformer should be surrounded by figures of his most influential fellow-workers and followers in Geneva and throughout the whole Protestant world.

It is intended that this group should only evoke the memory of the individual as dominated by the idea, and that the more comprehensive and representative it is, the more will it contribute to the commemoration of the work of the Reformers. Furthermore, it is intended that the statue should be international in its scope, and that around, or by the side of the Reformers, should be devised a memorial to those statesmen and soldiers from far and near who have been the great pioneers of the reformed faith, thus recalling in the most striking manner possible that important fact in modern history.

In accordance with the resolution adopted by the Geneva Town Council in December, 1907, the site of the proposed monument shall be that section of the Promenade des Bastions which lies between the main avenue and the Rue de la Croix-Rouge. The choice of the site, at the foot of the ancient ramparts which were constructed at the time of the Reformation for the defence of the liberty and independence of the city, emphasizes the historical character of the work. The monument itself shall include the statues of Farel, Calvin, Knox and Beza, the four Reformers who made Geneva the temporary or permanent centre of their activity. The surrounding statues are to be those of the great statesmen who were the leaders or protectors of Calvinism, viz.: Coligny, William the Silent, Oliver Cromwell, Frederick William of Brandenburg, the Great Elector, and one or two of the founders of the colonies in New England.

A competition for the plan of the proposed monument is now open to artists of all nationalities, and will be held until September 15 of this year, on or before which date all drafts and models must be delivered. The sum of 30,000 francs will be spent in prizes for the best drafts, the value and number of prizes being left entirely to the Jury of Awards. The programme of the competition is at the disposal of all artists interested and will be sent on request addressed to the Secretariat de l'Association du Monument de la Reformation, 56 rue du Strand, Geneva, Suisse.



PERSPECTIVE VIEW OF BLACKWELL'S ISLAND BRIDGE JUST COMPLETED ACROSS THE TWO CHANNELS OF THE EAST RIVER AND OVER BLACKWELL'S ISLAND, NEW YORK. IT COMPRISES FIVE MAIN SPANS OF 469½, 1,182, 630, 984 AND 459 FT., RESPECTIVELY; IT WEIGHS 53,000 TONS AND COST ABOUT \$25,000,000. THIS BRIDGE HAS THE LONGEST CANTILEVER SPAN IN THE UNITED STATES, AND WAS DESIGNED UNDER THE DIRECTION OF THE DEPARTMENT OF BRIDGES OF NEW YORK.

GREAT CANTILEVER SPANS CONNECTED---Practical Completion of Blackwell's Island Bridge, New York, Which Has Many New Features in Great Cantilever Bridge Construction. Heaviest Bridge in the World. Tension Member of Nickel Steel.

THE longest cantilever bridge on the American continent, and the second longest in the world, has been completed across the East river, New York.

The failure of the Quebec bridge and the report of the Royal Commission appointed to investigate the disaster has created a vast amount of interest in great cantilever bridge construction. The Royal Commission, in its comparative tables showing the relative size and strength of the important members in great cantilever bridges, showed the main trusses of Blackwell's Island bridge to be much heavier than those of the Quebec bridge.

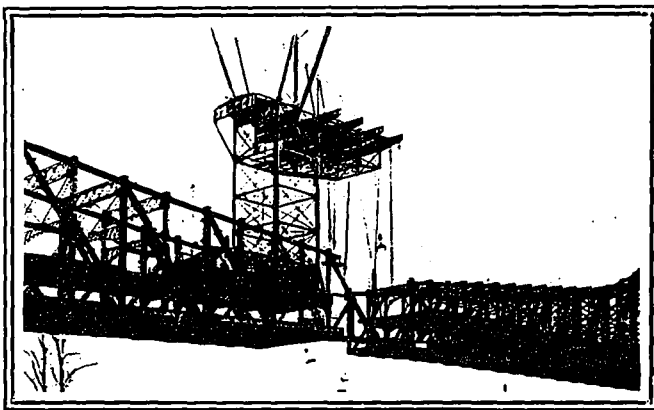
Blackwell's Island bridge, which cost nearly \$25,000,000, is 7,424 feet long, including approaches, and has five continuous spans, with an aggregate length of 3,724 feet between the anchorages, and a total weight of about 53,000 tons. The five main spans are 469½, 1,182, 630, 984, and 459 feet respectively, commencing at the New York end. The approach of the Manhattan end of the bridge is built of masonry and steel, and is 1,151 feet in length. About 550 feet in-shore from the East river is located the first anchor arm pier of the first cantilever. The other arm of this cantilever is 470 feet in length. The centre span over the westerly channel of the East river is 1,182 feet in length. Then follows the island span, which measures 632 feet between the towers. Beyond this is the cantilever span over the easterly channel of the East river, which measures 984 feet between towers. Then comes the shore arm of the easterly cantilever, which is 459 feet in length, and beyond this is the Long Island approach, 2,630 feet in length, which is built of steel bents and plate girders.

The bridge was designed under the former Bridge Commissioner, Gustave Lindenthal, who introduced for the first time in this bridge,

the use of nickel steel for the tension members of large bridges. The bridge was built partly of ordinary commercial structural steel, and partly of nickel steel, made to special specifications. Structural steel is used for the compression members, and floor system, and nickel steel for the eye-bars. Despite the many predictions of failure, the nickel steel eye-bars of the great size required were successfully and satisfactorily manufactured and placed into position.

The specifications called for structural steel with an elastic limit of 28,000 lbs. to the square inch, and an ultimate strength of 56,000 lbs.; the nickel steel eye-bars were required to show an elastic limit of 43,000 lbs., and an ultimate strength of 85,000 lbs. to the square inch. From these figures, it will be seen that the bars in this bridge are from 40 to 50 per cent. stronger than bars of the same weight, constructed of ordinary structural steel.

Preliminary surveys were made for the bridge in January, 1899. Work on the sub-structure was commenced in July, 1901. Contract for the superstructure was awarded in November, 1903, to the Pennsylvania Steel Co. The installation of the erection plant, costing several hundreds of thousands of dollars, was commenced on Blackwell's Island on August 6, 1904. The first steel was received at the site on February 17, 1905, and the erection of the



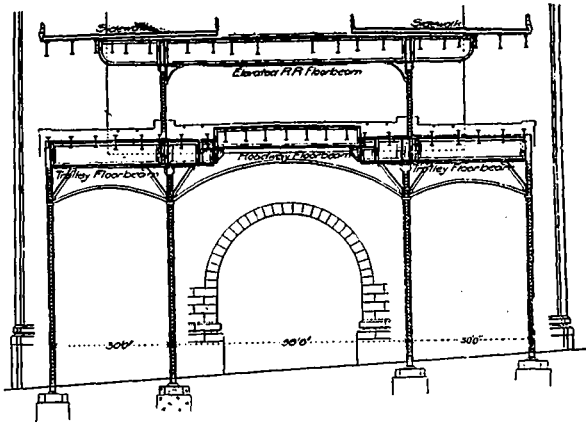
CONNECTING THE 984-FOOT EAST CHANNEL SPAN, BLACKWELL'S ISLAND BRIDGE, NEW YORK.

trusses of the Island span was commenced on September 9, 1905, after the pedestals and girders had been set on the Island piers. The final connections of the main spans have very recently been made, completing the difficult and intricate part of the work, and the erection of the viaduct, painting, riveting and minor operations are being pushed as rapidly as possible.

This great bridge is considerably the heaviest structure of the kind ever erected.

The great live or moving load which it was designed to carry, made necessary the massiveness of the individual members.

The traffic will be accommodated on two floors. On the lower floor, between the trusses, which are 69 feet



BENT ADJACENT TO ANCHOR PIER OF THE MANHATTAN APPROACH OF BLACKWELL'S ISLAND BRIDGE, SHOWING ARRANGEMENT OF TWO DECKS (15-FT. APART) TO PROVIDE FOR 2 SIDEWALKS, 2 ELEVATED R. R. TRACKS, 2 TROLLEY TRACKS, AND A 36-FT. ROADWAY BETWEEN THE TRUSSES.

apart from centre to centre, there is a roadway 56 feet wide, on which provision is made for two trolley tracks, one on each side, close to the trusses, as well as a central driveway for vehicles, which is 36 feet in width. Outside of the trusses, there will be two more trolley tracks, carried upon cantilever extensions of the floor beams. The upper floor is constructed to carry two elevated tracks, which are to be laid at once, and two additional elevated tracks to be laid when future demands are made for them. These four tracks will be placed between the trusses. Outside of the trusses will be two 13 foot sidewalks laid upon cantilever extensions of the floor beams. The maximum possible moving weight laid upon the bridge is estimated at 16,000 lbs. to the lineal foot.

The approaches are massive steel viaducts connecting the other ends of the anchor spans with the city streets at grade. They are built of tangents coinciding with the centre line of the main span, and provide for the same arrangement of decks and tracks, except as necessarily modified by the change of grade. They are, however, made considerably wider than the main span, and, although in the main conforming to standard high grade bridge work, they are of somewhat unusual design, and present features of interest due to the efforts made to give them a monumental and artistic appearance, under difficult conditions and numerous imperative requirements that necessitated somewhat elaborate construction.

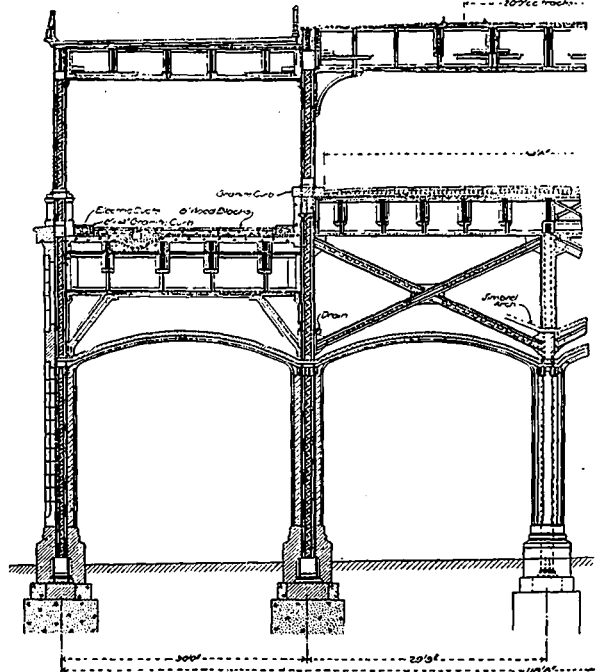
The Manhattan and Queen's approaches are of very different character and construction, the former having a much more massive appearance and architectural treatment. It extends two long city blocks and occupies an area of about 1,070 by 230 feet between the curb lines. The main entrance occupies nearly the full width of this area, but the approach is soon reduced to a width of 120 feet, which is maintained up to the anchor pier, leaving spaces of about 90 feet and 20 feet on each side, which are paved up to the curb lines. All of the steel work up to the lower deck is enclosed in granite and terra-cotta, giving it the effect of stone masonry treated to represent slender arches between the bents of the steel work.

The five main spans are notable for their dimensions and capacity; for the design of the main vertical post, nearly 200 feet high; for the use of nickel steel in the very large eye-bars; for the detail of pin-connected members of unprecedented magnitude; for the special anchorage adjustments and connections between the cantilever arms, and for many novel and important features in the method and plans developed, for their erection.

The channel spans are symmetrical about their centre points, as regards their general dimensions and design, but the opposite arms of the same span are not duplicates on account of the different stresses and deflections developed in the island span and in the shore anchor arm respectively. The most interesting features in the channel spans are the novel details for the connection of the adjacent ends of the cantilever arms, designed to afford continuity for roadways and railroad tracks; to provide for the transmission of lateral stresses, permit independent deflection and temperature movements, and secure accurate adjustment connection of the members in the field.

The cantilever structure proper consists of four cantilevers resting upon four towers. The first extends from the Manhattan anchor tower to the centre of the big westerly span; the next cantilever extends from the centre of the westerly span to the centre of the island span; the third cantilever reaches from the centre of the island span to the centre of the easterly span; the fourth cantilever extends from the centre of the easterly channel to the anchor pier on Long Island.

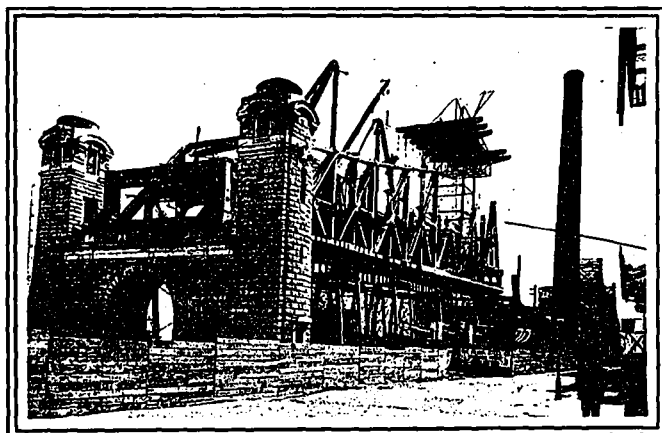
The channel spans are made of two continuous lines of pin-connected trusses, 3,724½ feet long from end to end, in vertical spans 60 feet apart. The maximum depth of the trusses is 185 feet, and their clearance above the mean low water is 135 feet. They carry two decks, the lower one having cantilever extensions increasing its width to



TYPICAL TRANSVERSE HALF SECTIONAL ELEVATION OF VIADUCT OF THE MANHATTAN APPROACH OF BLACKWELL'S ISLAND BRIDGE, SHOWING THE TERRA COTTA COVERING OF THE COLUMNS.

90 feet. It has a capacity for one highway, two sidewalks, and eight lines of railroad tracks, providing for an estimated traffic of 150,000,000 passengers annually. The

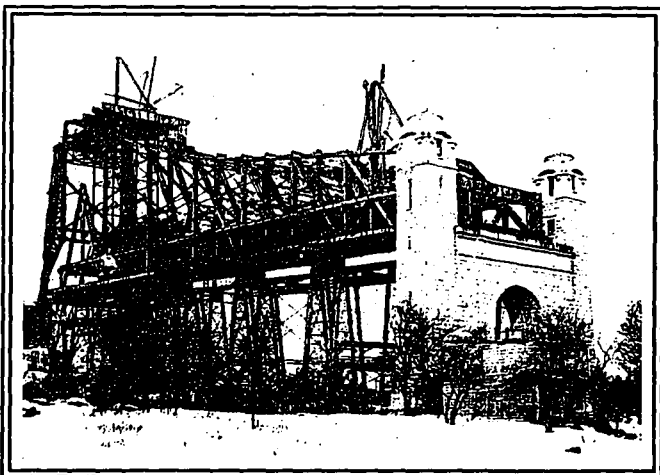
that the cantilever portion of the bridge alone weighs 53,000 tons. One single span, that of 632 feet across the island, weighs alone 10,400 tons, which is equivalent to sixteen and a half tons to the linear foot. This was the first portion of the cantilevers to be erected, and it was therefore necessary to carry the load during the erection upon false work. The ordinary timber work would have had to be designed in such massiveness, and there would have been such difficulty in providing suitable bearing surfaces for the steel work at the panel points, that the engineers decided to discard timber altogether, and design a special steel false work, consisting of latticed towers and plate girders erected upon especially prepared foundations. The steel work in this temporary structure weighed some 1,700 tons. This was the first time that steel was employed in work of this character, at least on such an extensive scale. After the span across the island had been completed, the arms of the cantilevers were built out from each end over the adjoining channels until half of each channel span had been completed. The anchor arms of the shore cantilevers were similarly erected upon steel false work, and the channel arms then built out by overhang until they



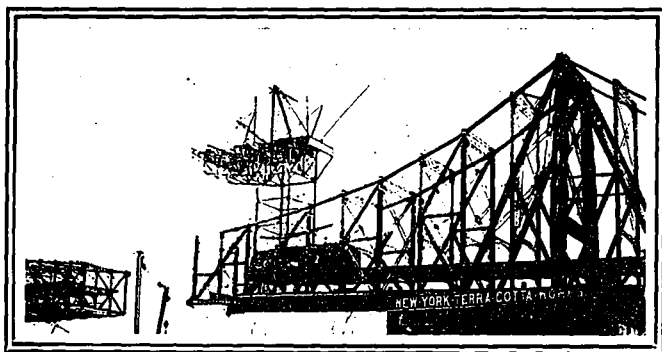
ERECTION OF MANHATTAN ANCHOR ARM, SHOWING THE ARCHITECTURAL TREATMENT OF THE ANCHOR PIERS AND THE TRAVELLER AT WORK. BLACKWELL'S ISLAND BRIDGE, NEW YORK.

pin-connected trusses are made of 16-inch high bars, the multiple web compression members of the latter being in two sections, each having a length of over 100 feet and weights of 78 tons. The secondary connections are field-riveted, and all members excepting the eye-bars, are of riveted construction. A notable feature of the design is the construction of all main vertical and diagonal members in two sections, each being pin-connected in the middle to facilitate handling and erection. The main transverse bents on the piers are exceptions in that their massive inclined posts are made in several sections, field-riveted together. The channel spans were connected very recently, which operation practically completed the construction of the main superstructure. The two main spans have a far greater capacity and are much more massive members than any other bridge.

In a bridge of this size and carrying capacity, the weight of the superstructure becomes so great as to necessitate a large amount of preliminary work for facilitating erection. This is evident when it is stated



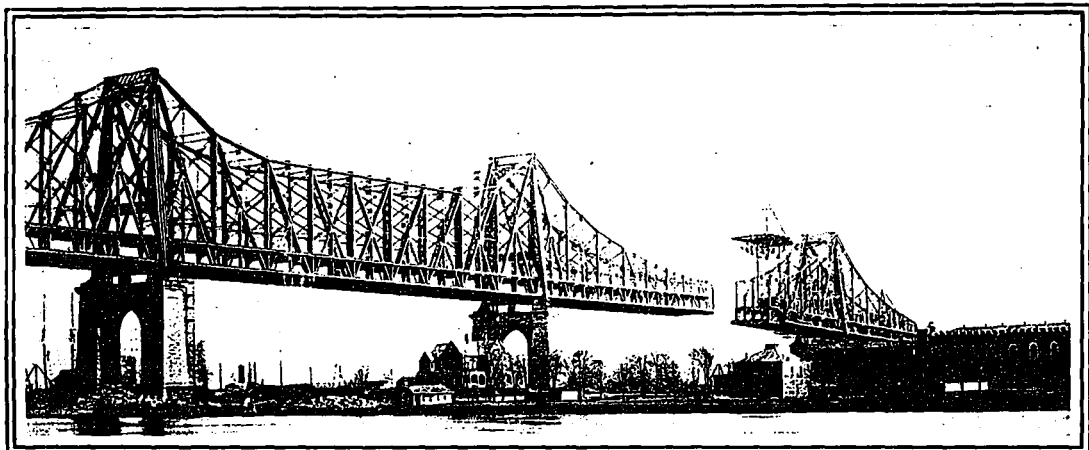
ERECTION OF UPPER PART OF QUEEN'S ANCHOR ARM WITH NO. 2 TRAVELLER. BLACKWELL'S ISLAND BRIDGE, NEW YORK.



EASTERLY CANTILEVER ARM OF EAST CHANNEL SPAN, ALMOST COMPLETED AND READY TO BE CONNECTED, BLACKWELL'S ISLAND BRIDGE, NEW YORK.

met the already completed cantilevers projecting from the island.

The appearance of the bridge crossing both river and the island, high above roofs, trees and city, is very impressive, and its importance as another artery for the enormous traffic between New York and Brooklyn, cannot be over-estimated. The principal dates in the calendar of the superstructure are, commencement of erection of island spans, Sept. 9, 1905; completion of island spans, Dec. 4, 1906. Completion of first island cantilever, April 13, 1907; completion of first shore cantilever, March 12, 1908, and completion of second shore cantilever and connection of entire main superstructure, March 18, 1908. Considerable time has been lost on account of bad weather and labor trouble.



VIEW SHOWING THE 630-FOOT ISLAND SPAN COMPLETED, AND THE 984-FOOT CHANNEL SPAN ABOUT TO BE CONNECTED. BLACKWELL'S ISLAND BRIDGE.

The bridge was designed and its construction was executed under the direction of the Department of Bridges, of which Mr. J. W. Stevenson is now commissioner; Mr. C. M. Ingersoll, Jr., chief engineer; Messrs. O. F. Nichols and Albert Lord Bowman, consulting engineers; Mr. J. D. Wilkins, assistant engineer in charge of design, and Mr. J. B. Knighton, resident engineer. The Pennsylvania Steel Co. is the contractor for the fabrication and erection of the steel work.

NEW TYPE OF ENGINE FOR MARINE WORK.

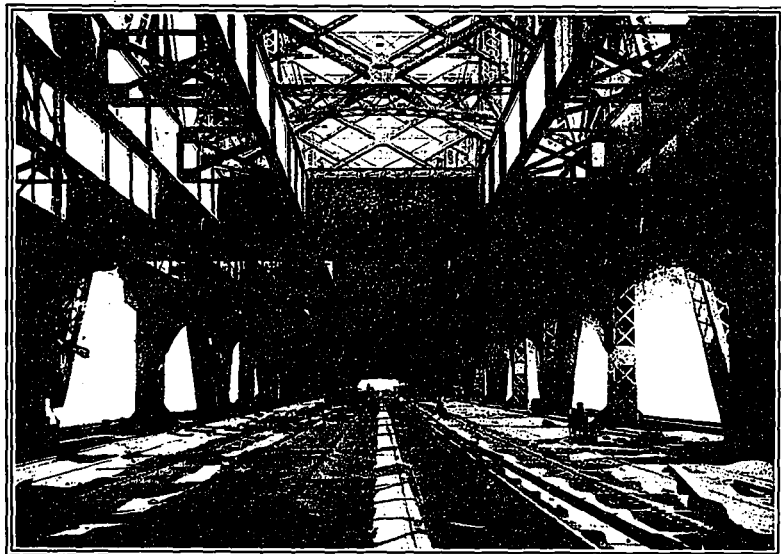
THE model of an engine invented by a Liverpool engineer and recently exhibited in that city attracted a great deal of attention, owing to its many distinct features.

It is described as a radial engine, and it is stated that in power and in economy in space and fuel it is superior to the turbine engine, and that it possesses the further advantage—especially for steamships—of reversing by almost instantaneous action. The engine is very simple in construction. All that is to be seen is a small cylinder securely bolted to a bed plate with a cylinder cover at each end and a shaft passing through two covers and supported on either side by a bearing. On the top of the cylinder is a small steam chest with a control valve. The important principle is that the steam pressure is direct on the piston from the boiler. The leverage is direct and unvariable, the part of its mechanism affected by the steam being always at the greatest distance from the shaft centre.

The engine has been designed primarily for marine work, and it is claimed by expert engineers who have examined it that it can be applied to any great ocean steamer, and that as compared with the turbine en-

gine there would probably be a considerable saving in space and weight and a saving of at least 25 per cent. in fuel. The small engine used in the test produced 30 revolutions per minute with 5 pounds of steam, 80 revolutions with 10 pounds, 200 revolutions with 15 pounds, 450 revolutions with 30 pounds, and 1,000 revolutions with 50 pounds. The inventor claims for this engine one-third more power than any other existing engine of the same piston area. It is thought that the radial engine, if applied to the railway service, would very largely increase the power of the present locomotives. It can be fitted to any axle. The model has been examined not only by representative English engineers but by engineers from other countries, and they have expressed the opinion that when the engine is built on a large scale it will prove a most useful and valuable invention and capable of very wide application.

CONCRETE PAVEMENTS are being tried in Frankfurt, Germany, on quite an extensive scale. They have not been down long enough as yet to furnish definite information concerning their wearing properties.



VIEW LOOKING THROUGH THE LOWER DECK OF BLACKWELL'S ISLAND BRIDGE, NEW YORK, SHOWING THE MASSIVE STRUTS AND BEAMS, ALSO THE HEAVY LATTICED VERTICALS AND DIAGONALS.



A JOURNAL FOR THE BUILDING AND
ENGINEERING INTERESTS OF CANADA

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Ivan S. Macdonald, Editor and Manager

Address all correspondence to "CONSTRUCTION," Saturday Night
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Telephone { Private Branch Exchange connects with all Departments } Main 6640
6641

BRANCH OFFICES:

MONTREAL - - - - Board of Trade Building (Phone Main 285)
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ADVERTISEMENTS.—Changes of, or new, advertisements must reach the Head Office not later than the first of each month to ensure insertion. Advertising rates on application.

CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 1 June, 1908 No. 8

Current Topics

TILLSONBURG'S HOTEL FIRE has demonstrated that license inspectors have important duties other than playing the "sleuth" in barrooms and cutting off licenses.

* * *

ENGLAND'S FIRST SKYSCRAPER will be erected at Liverpool, where the city has authorized the construction of an office building, 300 feet high. It will be located opposite the Princess landing stage on the bank of the Mersey.

* * *

BRITISH LOAN COMPANIES will be asked by the Canadian Manufacturers' Association to establish branches in the Dominion. The object of the Association is to secure British capital not only for the large demands of the railway builders, but also for the similar demands of the manufacturer and factory and house builder.

* * *

THE FIRST STONE-SAWING PLANT of its kind in Western Canada is being installed at Vancouver by Macdonald & Wilson, who have the contract for constructing the new provincial court house. The plant when complete will cost \$30,000, of which sum \$17,000 represents the value of two saws, one a gang saw and the other of the circular type. All the teeth of the latter will be set with diamonds.

* * *

AN EASTERN EXPERT, upon examining the property of the Nootka Marble Quarries, Limited, Nootka Island, B.C., reports that the surface indications of No. 4 quarry show that there is a solid bed of white marble of a superior quality. The bed, which is located at the water's edge, is 150 feet in width and of an indefinite length. On each side of it are beds of blue marble that cover a considerable distance. The company is installing machinery for the purpose of placing the product on the market.

PLUMBING FIXTURES of Canadian make have so improved within the past few years that hereafter they will be used in all civic buildings erected in Toronto. The City Architect informed the Board of Control to this effect at a recent meeting. Up to the present time only U. S. supplies have been used.

* * *

THE FERNIE BRICK COMPANY, a concern recently formed by local business men of Fernie, B.C., to exploit the clay deposits located a mile south of that city, is about to start operations at its new plant, which is one of the best equipped establishments of its kind in the West. The plant will turn out 50,000 bricks a day, and will be under the management of Mr. Freck, of Calgary, who has a wide experience in this particular line.

* * *

THE COURT OF APPEALS has sustained the decision of Chief Justice Meredith in favor of Architects Stewart & Witton, of Hamilton, who sued the Stratford Hotel Company for the value of their services in preparing plans for said defendant. The hotel company sold its property to a Mr. Gillespie, he agreeing to pay all debts of the company. The claim of the architects was for \$1,000. Judgment was rendered against the defendant Gillespie for \$750 and costs.

* * *

TORONTO PLUMBERS' STRIKE, lasting 51 weeks, has ended as the result of the Plumbers' Union having signed an agreement with the recently organized Master Plumbers' and Fitters' Association. The settlement was made on a basis of 37½ cents an hour for the first year, and 40 cents an hour the second year. The men were receiving 37½ cents an hour when they struck, May 15, 1907, for an increase of 7½ cents an hour. In addition to the wages lost, the struggle cost the Union \$75,000. Although the fight has been declared over, the plumbing firms connected with the Employers' Association have not come to any agreement with the strikers.

* * *

RAILWAY CONSTRUCTION IN ONTARIO at the present time is being prosecuted in an active manner. The C.P.R. is pushing the work on the Peterboro to Victoria Harbor (or Midland) branch, while the Grand Trunk Railway has started to double track the Midland division from Midland to Port Hope, a distance of 150 miles. A projected improvement is a 30 mile branch to be built by the James Bay Railway from the main line near Orillia to some point not yet named on Georgian Bay, the charter for this extension being recently granted. The Ontario Government is to guarantee bonds issued for the construction of this branch to the extent of \$2,500,000.

* * *

VANCOUVER'S NEW BUILDING BY-LAW, which recently went into force, is said to be one of the most perfect in existence for a city of its size. During the three years it has been under consideration, the building codes of the larger cities in Canada and the United States have been carefully examined so as to obtain the best regulations covering the erection of the various types of buildings. A feature of the new by-law is the restrictions placed on the number of structures to be erected on any one lot and of apartments to be located on any floor. In dealing with concrete block construction, the measure stipulates the proportion of aggregates to be used and provides that every block must be stamped with the date of its manufacture. Buildings in which hollow blocks are to be used can only be erected to the height of four stories.

C O N S T R U C T I O N

ACROSS THE BATTLE RIVER in Manitoba the longest bridge on the Grand Trunk System is now being built. It is to be 2,772 feet in length and 185 feet above the water. The superstructure is to be of steel, supported by concrete abutments and piers.

* * *

A POWERFUL LIFTING MAGNET to facilitate the handling of iron and steel is now in operation in the locomotive works at Kingston, Ont. The magnet which is thirty inches in diameter, and ten inches thick, is used in connection with a crane. The magnet raises the most heavy pieces of steel work, without the aid of chains as had to be used formerly.

* * *

STATISTICS PRESENTED by President Burchell in his annual address before the recent annual convention of the National Board of Fire Underwriters at New York City, showed that the total property loss in the United States for 1907 was just short of two hundred million dollars. The insurance loss on the Chelsea, Mass., fire of April 12, Mr. Burchell said, was \$8,846,879.

* * *

OPERATIONS ARE ABOUT TO COMMENCE at the new plant of the Canadian Zinc Company, near Nelson, B.C., for the reduction of zinc ores by the electric process. It is the first enterprise of its kind on the continent, although a similar plant is working successfully in Sweden. Heretofore the silver lead ores have been "penalized" for the amount of zinc which they contained, and the trial of the new method is being awaited with great interest by all western mining men.

* * *

WORK HAS BEEN COMMENCED on the new building for the International Bureau of American Republics at Washington, D.C. It is to be the gift of Andrew Carnegie, and will cost \$750,000. The site, which represents an expenditure of some \$250,000, was purchased by a fund to which the United States and all the republics of Central and South America contributed in proportion to their population. The new building is suggestive of the distinctive Spanish style of architecture, and will be built around an interior court patterned after the "patio" of the Latin-American countries.

* * *

A SYNDICATE COMPOSED of railroad men and capitalists of the middle Western States, has closed what is perhaps the largest single timber land transaction made in British Columbia. It consists of 49 square miles of timber limits in the centre of Graham Island, 40 square miles of Moresby Island, and an outright purchase of 8,000 acres of the choicest crown grant lands in Graham Island. The investment reaches several millions of dollars, the initial payment being \$250,000. The syndicate, which is to be known as the Moresby Island Lumber Company, will erect a sawmill, to cost \$400,000, on Cumshewa Inlet on Graham Island.

* * *

PRESS DISPATCHES STATE that the Government will, according to present intention, submit to Parliament shortly a bill providing for the construction of a railroad to Fort Churchill on Hudson Bay, thus providing a new outlet for rapidly increasing annual yield of western grain. The even numbered sections or railway grant lands in the West, aggregating some 30,000,000 acres, will shortly be released for homesteading. It is estimated that the proceeds from say 3,000,000 acres of these lands, reserved by the Crown for sale, would in a few years realize \$30,000,000, sufficient to pay the cost of the construction of the road, the building of elevators at Fort Churchill, and other necessary improvements that may be required.

A CABLEWAY being built in Turkestan is the greatest enterprise of the kind in the world. It will carry coal a distance of 140,040 yards over a route with gradients of 2,000 meters.

* * *

ABOUT 84 PER CENT. of the buildings damaged by lightning in Great Britain are low and unprotected structures. According to statistics only about 2 per cent. of the buildings equipped with lightning conductors have in recent years been struck.

* * *

WHAT IS SUPPOSED to be the largest turbine hitherto built in Europe has just been completed by a firm in Legnano, Italy. It is the first of three such engines destined for a generating station which a society is putting up at Buenos Ayres, in addition to its other plant there and at Santiago. While the new turbine is rated at 12,000 horse-power, the steam consumption guaranteed by the makers is 13.86 pounds per kilowatt hour, which is extremely low.

* * *

RUNNING UNDER A PRESSURE greatly in excess of its rated speed, a 10,000 horse-power generator, costing 50,000, recently went to pieces at the plant of the Niagara Falls Hydraulic Power and Manufacturing Company, Niagara Falls, Ont. The average speed of the generator, which had just been installed, is given as 350 revolutions per minute. During a demonstration the speed was increased to 450 revolutions when the machine burst, scattering fragments of steel and iron about the plant.

* * *

DRASTIC MEASURES have been adopted in Montreal by Louis Guyon, chief inspector of industrial establishments, and his colleagues to compel delinquent owners of factories and wholesale houses to properly equip their buildings with fire escapes. A complaint was recently laid before Judge Lafontaine against D. C. Brosseau & Co., charging them with failing to place fire escapes on a manufactory owned by them, and in which more than fifty women are employed. Similar actions will follow until all buildings in this class are more adequately provided with means of egress in event of fire.

* * *

WHILE THE NEW NO. 5 FIRE STATION, Montreal, so far represents an outlay of \$87,000, the building has been made the object of many condemnatory remarks on the part of the Fire Committee who recently inspected the structure. It is claimed that the station is defective in a number of respects, that the details have not been properly carried out and that the work in many instances has been poorly executed. The building has been in course of construction several years, the work being carried on intermittently. Ever since its inception it has been a source of friction between the Fire Board and the Finance Committee.

* * *

WINNIPEG IS EXPERIMENTING with a new type of fire escape for school buildings, known as the Kerker-Bender device. It consists of a perpendicular cylinder, 30 feet high and about 8 feet in diameter, having a spiral slide on the interior, which, it is said, permits of a rapid and safe descent. One of these escapes has been placed on the east and west sides of the Carlton school. They stand about six feet from the wall of the building and are reached by an iron platform leading from the window openings on the upper floors to apertures in the cylinder. These two fire escapes complete cost \$2,300, and if they prove to be up to the efficiency claimed for them, the Board of Education will in all probability equip the different schools in a similar manner.

IN PARIS, FRANCE, the Prefect of Police, has issued an ordinance forbidding the use of revolving doors in restaurants, hotels and other buildings capable of holding more than a hundred persons, on the ground that they are dangerous in the event of fire or panic. The Prefect's action was prompted by two or three instances of the door jamming and imprisoning the inmates of the building for a long time.

* * *

WITH A VIEW OF OBTAINING improved sanitary conditions the government of Chili has directed that a large number of the cities put in complete water and sewerage systems. This means a greatly increased demand for all plumbers' supplies. Heretofore the demand for this class of goods has been limited to Valparaiso and Santiago, while from now on it will be much more general and the demand should soon be doubled. The Chilean people are, in the main, progressive and quick to grasp improvements that can be brought within their reach.

* * *

THE STONE BRIDGE which was recently completed over the Connecticut River at Hartford, Conn., while not the longest of its kind, nor remarkable for its length of span, owing to the size of arch, length and breadth, combined with its symmetry of outline, is destined to take rank as one of the greatest structures of its kind in the world. It is composed of nine spans having maximum dimensions of a reach of 119 feet and a clear height of arch of 45 feet, and is 82 feet wide and has a total length of 1,192.5 feet. With its approaches it took nearly three years to build and cost about \$3,000,000.

* * *

RAW COPPER AS A SUBSTITUTE for wall paper is a new invention which is to be introduced in Calcutta to overcome the moist condition of the walls during the wet period. In writing to the Department of Commerce and Labor, Washington, D. C., Consul-General William H. Michaels, says: Much complaint has always been made by occupants of houses in Calcutta on account of damp walls, especially in the rainy season of the year. To remedy this it is proposed to use a new kind of damp-proof paper, made of "raw copper" and varying in thickness from 0.0012 of an inch to 0.006. It is said to be capable of being worked into all sorts of patterns. It is claimed to be insect-proof and damp-proof, and can go six or seven years without being cleaned. It is used in the same way as wall paper. Ordinary wall paper is of little use in the damp climate of Calcutta, and the new invention holds out many inducements.

* * *

STEEL BANDS to take the place of leather belting for the transmission of power, is stated by a German technical paper to have proved practicable after repeated tests by a firm in Charlottenburg. This new method, it is claimed, possesses many points of superiority over the style of belting now employed. On account of its solidity a much narrower band can be used, one-sixth of the width of the usual leather band being sufficient; as a result of this the steel band is not so heavy as the usual leather band, and, as it can be very tightly adjusted, the distance between the engine and the machine is not a matter of importance, as is the case with the leather belting, where the transmission of power is dependent upon the weight of the hanging belt; by a unique contact, the slipping is much reduced, experiments having shown that this does not exceed one-tenth of 1 per cent. Careful and repeated experiments have shown that the entire loss of power is very small, and as far as can be ascertained will not exceed 1 per cent. Further, owing to the lightness of weight of the steel belting, it is claimed, the influence of the centrifugal force is not so great and allows of a much increased velocity.

DESPITE THE ADVANCES made by concrete, iron, terra cotta, etc., within recent years, the report of the United States Geological Survey on the building operations for the year 1907 does not indicate that the use of these materials has reached such proportions as to encourage the belief that the use of lumber in building is fast disappearing. According to the report, based on forty-nine of the leading cities of that country, 59 per cent. of the construction was of wood. Even if the remaining 41 per cent. of the buildings were built of brick, stone and concrete, vast quantities of wood are consumed both in the construction and in the finish, though in the latter case metal is taking the place of wood to a very large extent. The amount of lumber given above does not take into consideration this item at all.

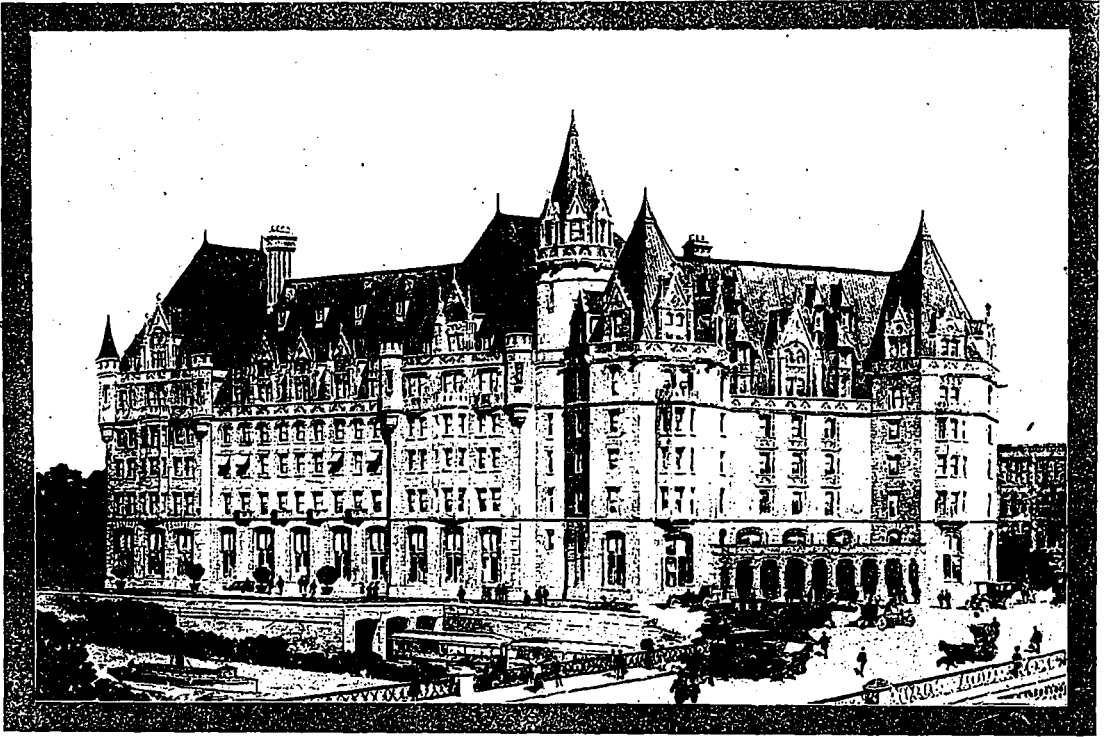
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IN VIEW OF THE DAMAGES caused by fire to previous international expositions, the Italian executive committee of the International Exposition to be held in Turin in 1911 has instituted an international competition to test the relative merits of various materials and processes, whereby the timber and textile tissues to be used in the construction of the buildings of the said exposition may be rendered noninflammable. For timber a speedy and cheap method of superficial coating will be preferred, although other processes will be given every consideration. The timber treated must not be rendered unfit for polychromic decoration of any sort. Materials must be furnished, free of all charges, to the "Direzione del Laboratorio di Chimica Docimastica del Regio Politecnico di Torino," before September of this year, and must be supplied in sufficient quantities to protect at least 538 square feet of timber. The executive committee reserves the right to purchase such fireproofing materials as shall have been judged worthy of an award, in quantities sufficient for the protection of all exposition buildings.

* * *

CABLE ADVICES FROM CAIRO state that the contract for the construction of a new bridge across the Nile at Cairo, which will cost more than \$1,500,000, has been let by the Ministry of Public Works of the Egyptian Government to the Compagnie de Fives-Lille of France. The new bridge, which will be located at the deepest part of the river and will lead direct to the site where the Boulac Museum stood, is to be built in accordance with plans prepared by the late Sir Benjamin Baker of London, the engineer of the great Forth Bridge, Scotland, and the Scherzer Rolling Lift Bridge Company, of Chicago, the latter company also furnishing consulting engineering services during erection. The entire work is to be executed under the charge of the Ministry of Public Works of the Egyptian Government and it is expected that the structure will be completed and in service before the end of the year 1910.

It has a total length between abutments of 274.5 meters. The total width of the bridge will be 18 meters, divided into two footpaths of 3 meters each, a tramway track of 5 meters, to carry double lines of electric tramway of 1 meter gauge, and 7 meters of road clearance. The structure will consist of a rolling lift bridge, with four fixed approach spans. On the Boulac side of the Nile quay walls will be constructed on masonry wells. The south end of the abutment on this side of the river will join the existing quay wall, and the north end will ultimately be joined to the quays under construction. The piers and abutments, which will be of Assouan granite, are to be built on foundations to be sunk by compressed air. The movable span of the bridge, allowing for the passage of boats will be 30 meters in length. It will be operated by electricity, and the time required to open or close it will be less than 30 seconds.



PROPOSED CHATEAU LAURIER AS IT WILL APPEAR ACCORDING TO PLANS PREPARED BY ARCHITECTS ROSS & MACFARLANE.

CANADIAN ARCHITECTS SELECTED---Proposed Terminal and Hotel at Ottawa to be Built from Plans of Montreal Firm. Design and Arrangement Possess Many Noteworthy Features. Buildings Dissimilar in Architectural Treatment.

AS the work of Canadian architects, the designs for the new Central Station and proposed Chateau Laurier to be erected at Ottawa, selected in lieu of those of Mr. Bradford Lee Gilbert, of New York, which were published in the last issue of CONSTRUCTION, intensifies the interest heretofore manifested in this extensive project. With all due respect to the admirable conception of the general scheme as worked out by Mr. Gilbert, the designs and plans of Messrs. Ross & McFarlane, of Montreal, for the proposed buildings, are such as to deserve the highest commendation, showing, as they do, careful thought and intelligent study and plainly demonstrating that Canadian architects are fully capable of executing designs and plans for the largest undertakings regarding new buildings.

While Messrs. Ross & McFarlane have also adopted the French Gothic in treating the exterior of the hotel, they have deviated from this particular style in designing the Central Station, which is purely classic in its outline, a style better adapted to the purpose for which the building is to be used, as it lends itself more readily to convenient and economical disposition of the various departments and offices.

According to the new plans the main entrance of the hotel is to open from a large portico, upon a spacious hall which will suggest in its decorations, the refinement, cheer and comfort provided within the building. Every consideration has been given to the arrangement of the interior: the administrative section, the guests' room, and the service and entertainment departments are each in a measure

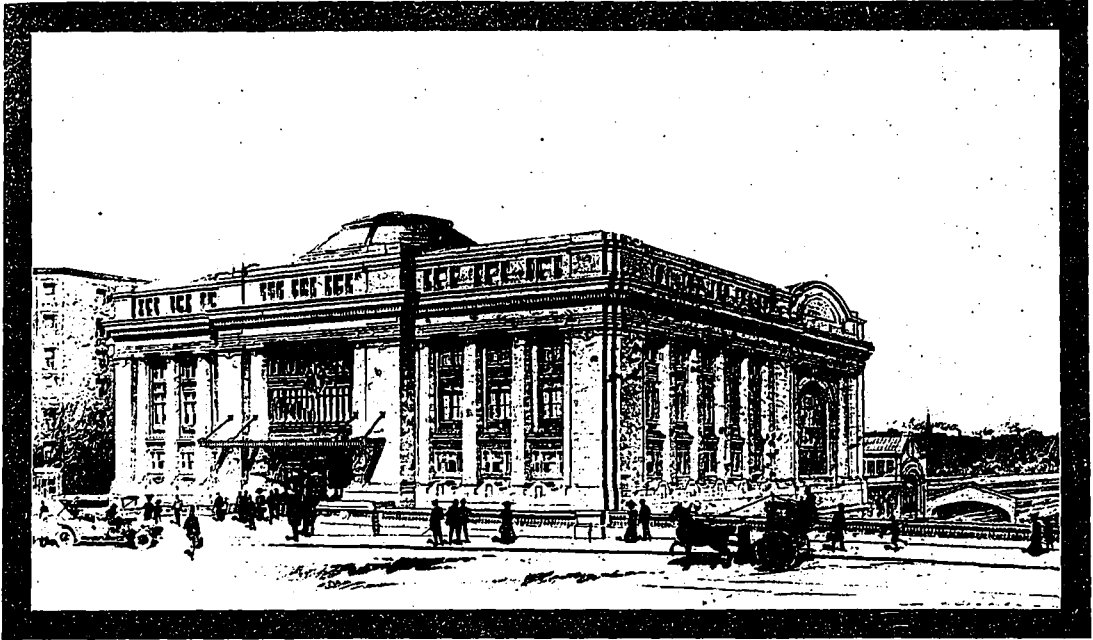
independent of the others. The office, which is so situated as to command a full view of all avenues of approach leading therein, will be select and pleasing in its general appointments. On the ground floor, also, will be the reception rooms, ball room and banquet hall, all of which will be arranged so as to in no way encroach upon or interfere with the privileges of the guests.

In planning the guest chambers, careful attention has been given to the allocation of the rooms, relative to their dimensions and shape, their means of communication with each other and convenience of access to and from the elevator, as well as their proximity to the fire escapes.

On the first floor there are to be thirty-five chambers, of which three will form the state apartments, and two will be parlors, while the plans provide for only one suite of state apartments; other rooms on this floor will be so adapted that they can be conveniently used for a like purpose.

On the second, third, fourth and fifth floors, there are fifty-eight chambers on each floor, two of which are suggested on the plan for use as parlors, and on the attic floor there are thirty-seven chambers for guests, two dormitories for men, and five dormitories for women. Of the total number of 302 sleeping apartments for guests, 155 are to be provided with private baths and an additional 104 with stationary washstands having hot and cold water connections. All rooms will have built-in wardrobes, and general toilets will be located on each floor.

All corridors on the upper floors will be of a uniform



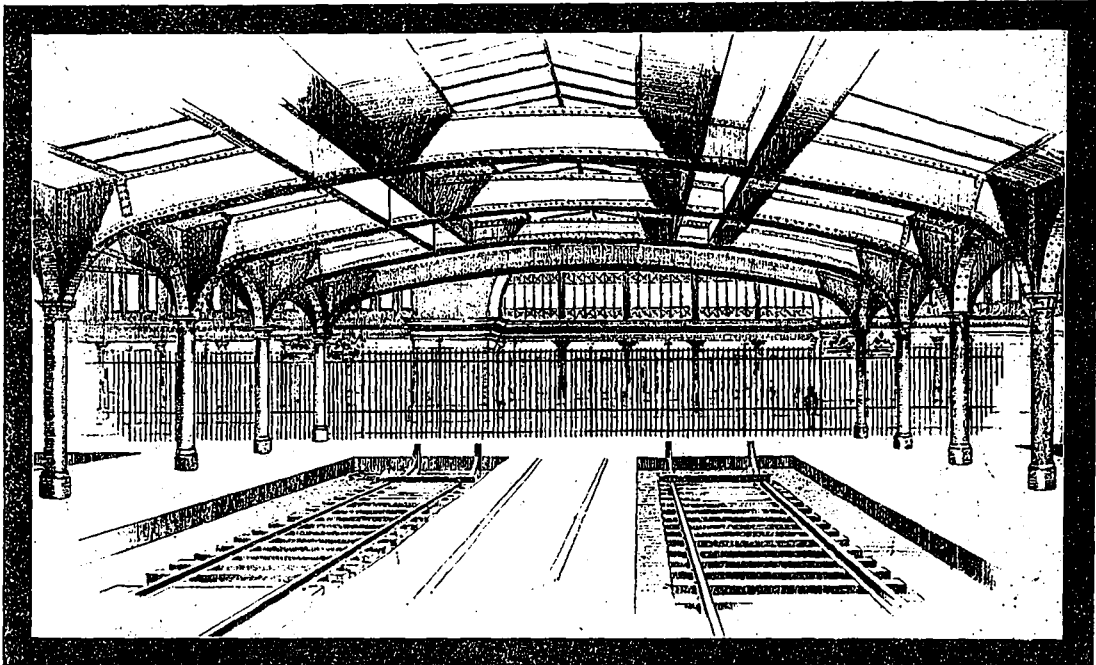
NEW TERMINAL BUILDING TO BE ERECTED AT OTTAWA IN CONJUNCTION WITH THE PROPOSED CHATEAU LAURIER. ROSS & MACFARLANE, ARCHITECTS.

width, measuring in this respect nine feet. They will be divided into sections by means of fire resisting doors of metal frame and wired glass which can be used for the separation of portions in case of emergency. The main corridors will lead directly to fire escapes, consisting of iron balconies and stairway, placed at each end.

The main dining room will be placed so as to afford a

pleasing vista of the park and Parliament Buildings. The ladies' cafe, which will also be arranged advantageously as to exterior view, will be well lighted and well proportioned.

Over the serving pantry between the ladies' cafe and dining room, will be a musicians' gallery opening on these rooms. The writing room, which will be located on the



VIEW OF TRAIN SHED WHICH WILL EXTEND FROM THE CONCOURSE AT REAR OF PROPOSED TERMINAL. ROSS & MACFARLANE, ARCHITECTS.

Mezzanin, will by means of arcade openings, overlook the ladies' cafe, the dining room and lounge.

Private dining rooms, as well as palm room, buffet, and smoking room, will be arranged for convenient access from the administrative section of the building. The interior appointments will be entirely in keeping with the dignity of the exterior. The color scheme and furnishings will be selected so as to be consistent with the purpose and location of the various rooms, and it is understood that such mural decorations as will be decided upon should be historical, educative and entertaining.

In the basement are to be located the stewards' offices, giving immediate supervision of the receiving, storage and disposal of the hotel supplies, and the kitchen which is assigned a central position and is to be equipped along the most modern sanitary lines. The walls are to be finished with a light impervious material, such as tile or enamelled brick. Provision has also been made in the arrangement of this floor for the employees' dining room, the laundry, nurses's and children's dining room, a room providing rental baggage space, billiard room, grill room and barber shop.

A stairway from the rotunda on the ground floor leads directly through the subway to the railway terminal, the entrance to the latter being placed slightly below the level of the basement floor.

Special attention has been given to the elevator service, which it is planned to have very complete, all cars being equipped with the latest safety appliances.

The proposed railway station, adjacent to the hotel, will be erected on the south side of Rideau street, at the intersection of the canal. The baggage and express building now under construction on Sussex street, directly across the track from the canal will be retained. It will contain in addition to these departments quarters for imming all heat, light, steam, hot water, compressed air, refrigeration, etc., for the use of the station building and train purposes.

In ground dimensions, the station building is to be 147 feet in width and 180 feet in depth. Between the building and the tracks, the plans provide for a concourse 60 feet for the general circulation of passengers. In the main building on a level with the railroad tracks will be located the general waiting room, which will be about the same size as that in the Grand Central Station in New York City. It is to extend to the height of four storeys, and with its massive columns, vaulted ceiling and arched windows, will present a stately appearance. grants and at the extreme easterly end of the structure a service building is to be provided for supply-

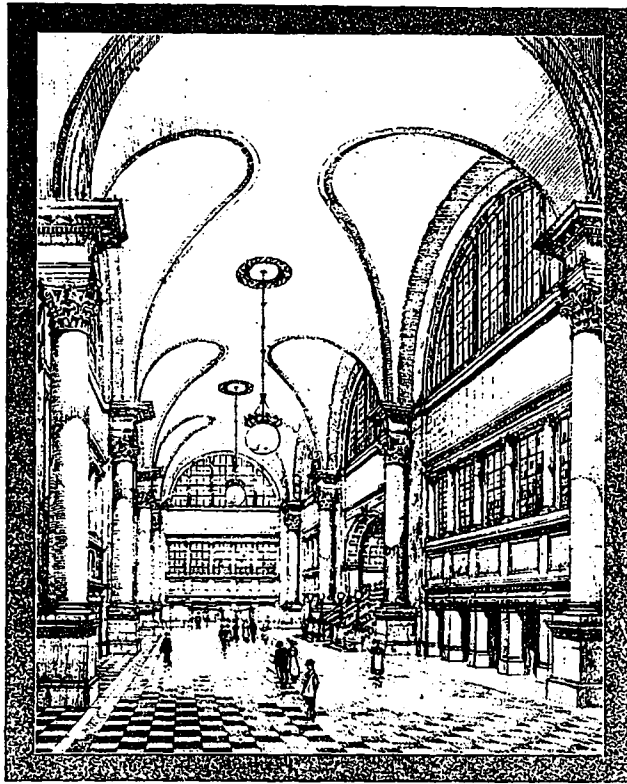
Along the four sides of the room are to be the ticket offices, telegraph and telephone booths, information bureau, news stand and parcel room.

Special provision has been made for waiting rooms for government officials, which will be furnished in keeping with the purpose for which they are to serve. Access and egress to and from the general waiting room have been carefully planned, spacious openings and wide stairways being used for this purpose.

On the Rideau street side of the general waiting room, are located the waiting rooms for men and women, barber shops, lunch counters and other conveniences.

A well lighted and ventilated subway, 20 feet wide, running north and south leads directly to the proposed hotel. The baggage and express building will be reached by a broad covered passage extending from the east end of the concourse. A large carriage court adjoining the concourse will be available for cab service and transfer companies.

The architectural treatment of the exterior has been designed with a view of expressing nearly the function of each part of the building. It is the intention to build the exterior of light buff Indiana limestone, or Ohio sandstone, the internal structure being of steel, concrete and terra cotta, giving absolutely fire proof results. Both buildings, together with their appurtenance, when completed will represent an expenditure of approximately \$3,000,000.



DESIGN OF GENERAL WAITING ROOM, WITH ITS STately HEIGHT, MASSIVE COLUMNS, AND LOFTY ARCHED WINDOWS. ROSS & MACFARLANE, ARCHITECTS.

TREATMENT FOR PINE FLOOR

IN describing the manner of treating a pine floor that has been varnished and in which the boards have shrunk, producing cracks, but which otherwise is in fair shape, a recent issue of The Painters' Magazine says: First have the floor thoroughly cleaned, examine it to see whether it is

marred so badly by wear, that it will not look well in the natural finish, in which case it is best to stain or paint it. If it is in fair enough condition for revarnishing, knock off any high gloss still remaining with sandpaper and dust. Clean out the cracks and wet the edges lightly with turpentine, then fill them with a good floor crack filler as per directions on the package. If you cannot readily obtain such an article, then prepare a filler by mixing and kneading well together to the consistence of putty, cornstarch and coach painters' or gold size japan. In the latter case, do not prepare more than is required and apply at once, as the preparation sets rather quickly. Press the filler firmly into the cracks, and should it shrink too much, go over the operation a second time.



ONE OF THE MORE RECENTLY CONSTRUCTED FIREPROOF SCHOOL BUILDINGS IN ST. LOUIS, MO., KNOWN AS THE WILLIAM CLARK SCHOOL. ARCHITECTURALLY THE BUILDING IS SIMPLE YET DIGNIFIED, AND LENDS AN ATMOSPHERE OF ELEGANCE. BRICK, HOLLOW TILE, CEMENT AND STRUCTURAL STEEL ARE THE MATERIALS WITH WHICH ST. LOUIS SCHOOLS ARE CONSTRUCTED. THIS BUILDING HAS 24 ROOMS, ACCOMMODATING 1,200 PUPILS AND COST \$188,902. WILLIAM B. ITTNER, ARCHITECT.

MODEL FIREPROOF SCHOOL BUILDINGS---Type of Structures Adopted by St. Louis, Mo., Accredited With Being the Finest and Most Complete in Construction and Equipment on the Continent By William B. Ittner, F.A.L.A.*

Recent events have brought about a partial realization of the necessity of an immeasurably better class of public school buildings (especially in our cities in Canada) than it has been our custom to build.

The Hochelaga fire in Montreal and the Collinwood disaster demonstrated the awful consequences of building school buildings of inflammable materials and failing to equip them with proper means for emergency exit in case of fire or panic. The advisability of using fireproof materials in the construction of public schools has been recognized by school boards in many cities in the United States, where we find laws or regulations in many places, providing for the erection of nothing but fireproof structures to be used as school buildings.

In Canada, however, we have been much slower to cast aside the antiquated "little red school house" idea and adopt modern fireproof materials, methods and equipment with which to construct our schools on scientific and hygienic principles. We have not only failed to make our school buildings fireproof, but either neglected or refused to make them safe in the least degree, through proper equipment in the matter of fire escapes, exits or fire-fighting apparatus.

A radical change in public opinion has taken place in Canada since the recent events mentioned above, and almost every municipality in the Dominion is interesting itself in the question of the character and equipment of its school buildings. Many old structures are being altered, many are being equipped with fire escapes and fire-fighting apparatus, and many new ones are being built or are contemplated.

Architects are being called upon to design these structures, and they are expected to make them as safe as the funds at hand will permit. Realizing the

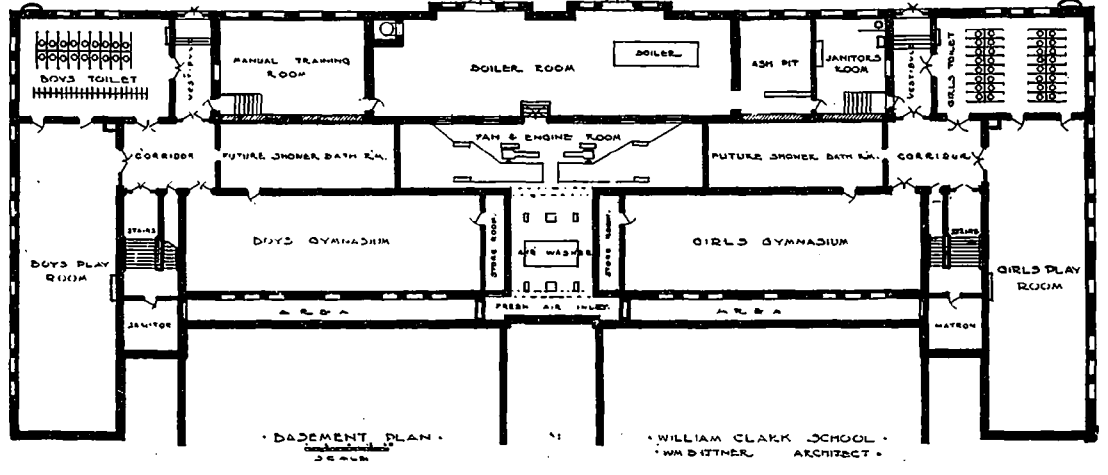
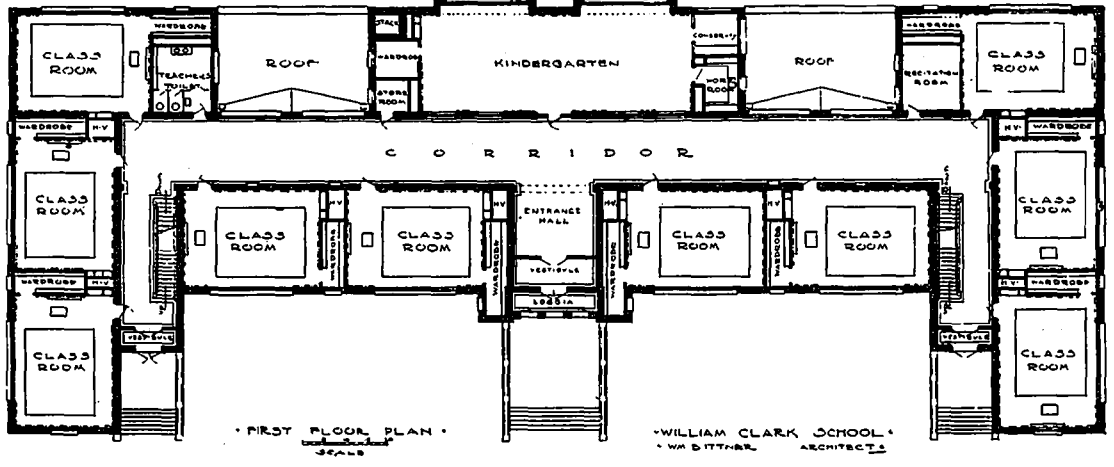
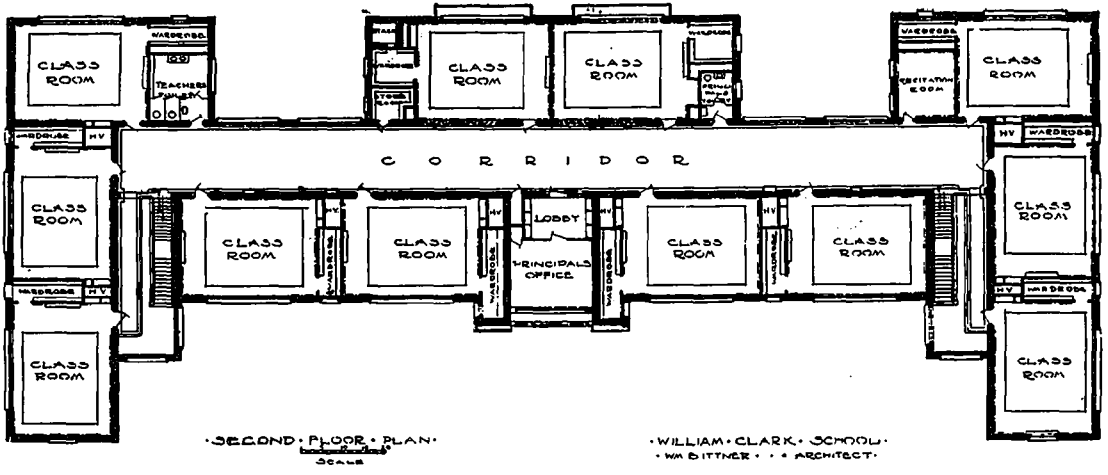
interest now manifested by the profession and public alike in school architecture, CONSTRUCTION sought for some good examples of fireproof school buildings, and after considerable correspondence found that St. Louis, Missouri, is credited with having the finest fireproof public schools on the continent from the standpoint of both design and construction. Upon learning this we wrote Mr. Ittner, commissioner of public schools in St. Louis, and he sent us the following article, which is illustrated with photos by Henry Fuermann, of Chicago.—EDITOR.

THE public-school buildings of St. Louis are built to accommodate all the grades; that is, pupils may pass through all the grades from the kindergarten to the eighth grade, from which they are prepared to enter the high or secondary school.

As a rule the buildings will accommodate about 1,200 pupils and contain twenty class-rooms, a kindergarten room, the equivalent of two class-rooms, a room for domestic science, a manual training room, a principal's office, two gymnasiums and play-rooms, toilets for pupils and teachers, and the necessary space for the heating and ventilating apparatus, fuel, etc.

In plan these buildings show a number of radical departures from the conventional type of school building, wherein the central corridor lined with rooms and wardrobes on either side is necessarily dark and without adequate ventilation. The effort has been to introduce outside light into the main corridor throughout the greater part of its length, insuring the penetration of sunlight to all parts of the building during some part of the day, and to arrange the wardrobes for outside light. It will also be noted that wardrobes are entered from class room only. This arrangement, though unusual, is found to give the teacher absolute control, adding to the decorum

C O N S T R U C T I O N



WILLIAM CLARK SCHOOL, ST. LOUIS, MO. BASEMENT, FIRST AND SECOND FLOOR PLANS, WHICH GIVE AN EXCELLENT IDEA OF THE GENERAL ARRANGEMENT OF THE ROOMS. THE GENERAL PLAN, APPROXIMATING IN FORM THE LETTER E, IS TYPICAL OF ALL THE RECENTLY BUILT SCHOOL STRUCTURES IN ST. LOUIS. THIS ARRANGEMENT INSURES PLENTY OF LIGHT AND FRESH AIR, THE SUNSHINE PENETRATING TO ALL PARTS OF THE BUILDING DURING SOME PART OF THE DAY. WILLIAM B. BITTNER, ARCHITECT.

of the school, as well as enabling their perfect ventilation; the air current entering the room at the inner wall, making the circuit of the room, passing through the opening to and along the entire length of the wardrobe to the vent.

The general plan developed by these requirements is necessarily more or less similar in all of the schools, ap-

grades, and are equipped with single seats. Natural slate blackboards are placed on the three inner sides of the rooms, are 3 feet 6 inches in height and range from 2 feet in the lower grades to 2 feet 5 inches in the upper grades from floor to the chalk rail.

The wardrobes are 5 feet 3 inches wide, 16 feet long, and are provided with shelves and sixty hooks on the

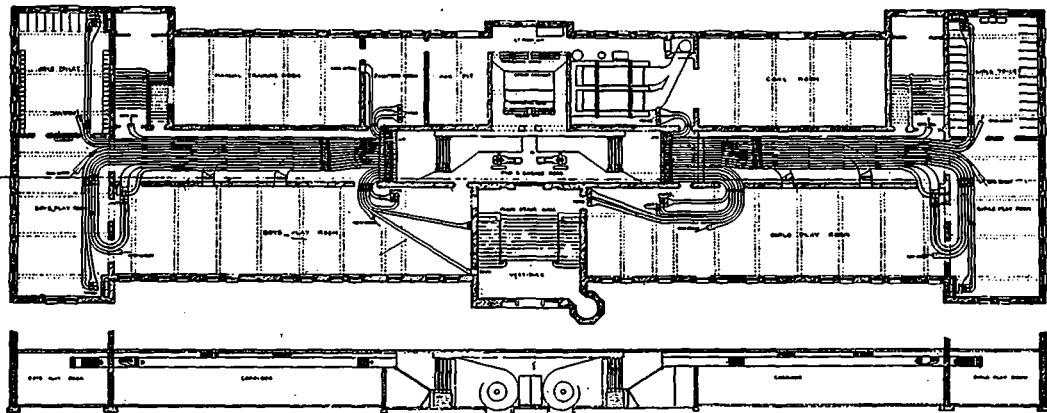


Fig. 1.—WILLIAM CLARK SCHOOL, ST. LOUIS, MO. BASEMENT HEATING PLAN, WITH VERTICAL SECTION AT A-B. WILLIAM B. ITTNER, ARCHITECT, AND CLAUDE A. BULKELEY, CHIEF ENGINEER.

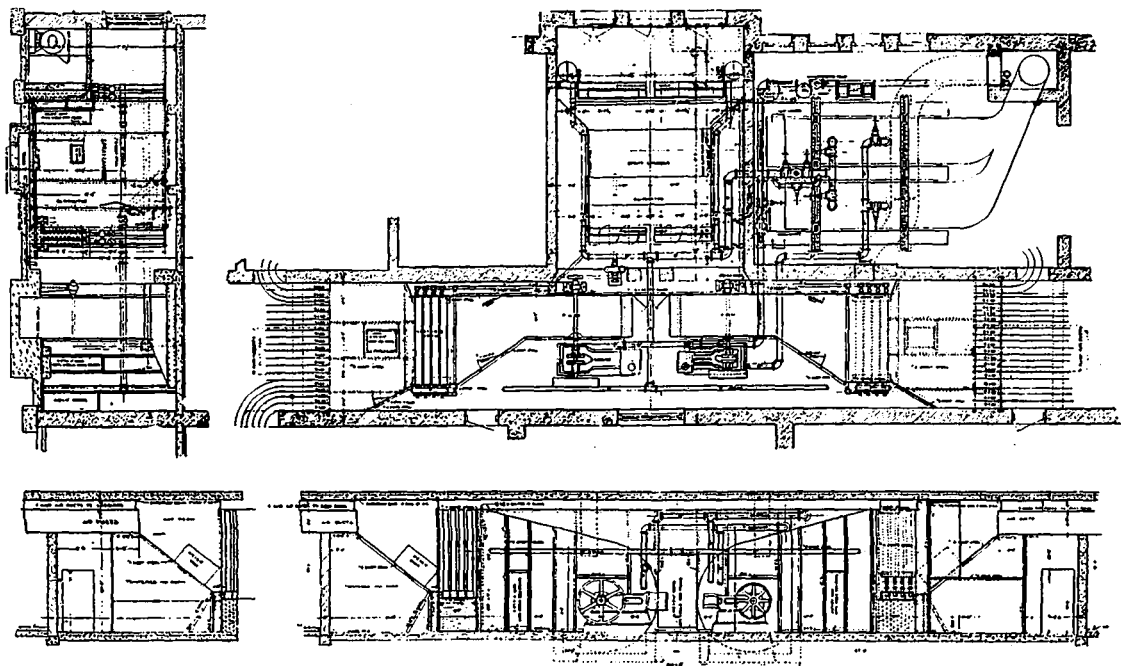


Fig. 2.—WILLIAM CLARK SCHOOL, ST. LOUIS, MO. PLAN OF HEATING AND VENTILATION, SHOWING DETAILED ARRANGEMENT OF FANS, BOILERS, ETC. WILLIAM ITTNER, ARCHITECT, AND CLAUDE A. BULKELEY, CHIEF ENGINEER.

proximating in form the letter E. In all cases the sites have been wisely selected to permit ample space surrounding the building, affording generous play-grounds, as well as good light and air.

The class-rooms are 24 feet wide, 32 feet 6 inches long, with a clear story height of 12 feet 6 inches; they are arranged for left-hand lighting only, the glass surface in no case being less than one-fifth of the floor area. The class-rooms accommodate 54 pupils in the lower grades and intermediate grades, and 48 in the higher

side walls, and also a portable umbrella rack for each wardrobe. A bookcase containing 65 running feet of shelving, a bracketed shelf over the blackboard at the front of the room, and a picture moulding completes the equipment of the class-room.

The corridors are 14 feet wide, with ample outside light, affording direct access to all class-rooms and stairways on each floor. Several lines of flush metal picture moulding are provided for the hanging of casts and pictures.

The stairways are placed at the ends of the main cor-

ridor and central to the group of rooms on either side of the central axis of the building.

In every case they are 5 feet wide, with ample landings, and are built with solid concrete balustrades; the risers and skirtings are of marble, while the treads are asphalt 1 inch thick. Treads of this character are not only non-slipping and practically noiseless, but are easily replaced when worn out.

The purchase of ample sites has made it possible to limit the height of the buildings to two storeys. The basements are 15 feet in height and are placed well out of ground. Where possible, a level entrance from playground to basement floor is provided, while the principal entrance leads directly to the first floor.

The first and second storeys are 12 feet 6 inches in height, the ceilings being unobstructed by beams and with window heads brought directly thereto.

All buildings are of fireproof construction, except the pitched roofs, in which cases, for economical reasons, the roofs are of mill construction covered with 1 3/4 in. matched sheathing and tile. All outer and interior bearing walls are of hard brick laid in Portland cement mortar. The interior non-bearing partition walls are of hollow tile, and the buildings are plastered with cement plaster.

The floors are constructed of armored concrete and finished with narrow maple flooring smoothed and oiled. The basement floors are either of granitoid or cement.

In exterior design the effort has been to avoid the use of extravagant material and ornamentation and the straining for effect not justified by the function expressed in the plan. In most instances the buildings are faced with ordinary hard and red brick mixed as to color and laid up with a large bed joint in garden wall or Flemish bond. Stone is used sparingly, and no attempt is made to accent any part of the building except the main entrance, which is generally dignified by fitting architectural treatment.

The interior finish is reduced to the minimum; such woodwork as is used is of oak in plain design. Class-rooms and corridors are painted in lead and oil, the colors being carefully selected with respect to the location of each room and its relation to the point of compass. A simple stencil frieze is provided for each class-room, while the kindergartens are decorated with mural paint-

ings typifying the life of childhood. Walls and ceilings in the basement are coated with cold-water paint.

The plumbing is of the most approved sanitary type. Individual seat action closets are provided in the general toilets in the basement, and the emergency toilets on each floor for the pupils. The urinals are of glass, are automatically flushed and are of the ventilated type. Special provision has been made for the ventilation of the toilet rooms. Drinking fountains are installed in the corridors in the basement and play-grounds.

Each room is provided with a self-winding electric clock, regulated from a master clock with programme ringing device located in the principal's office.

The entire building is wired for electric lighting, the fixtures used being of the short-stem cluster type, equipped with holophane shades.

Aside from their advantages regarding light and air, the large school sites have not only provided ample play-grounds, but have given opportunity in a modest way for object lessons in the art of landscape gardening, and each school ground has been made to present some distinct instructive feature, awakening an interest in the knowledge of decorative plants and their use in the embellishment of the home and the city at large.

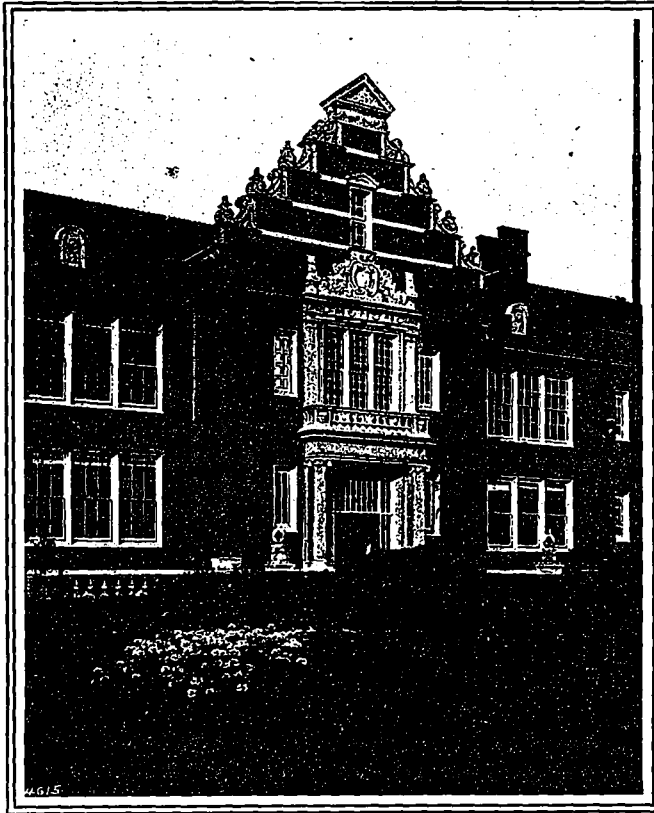
All buildings are designed for a low-pressure steam plenum system of heating and ventilation, this work being carried on simultaneously with the plans of the building.

Fig. 1 gives the general basement layout of the heating and ventilation apparatus for the New Baden school, now in course of erection. The main portion of this building is to be two storeys in height

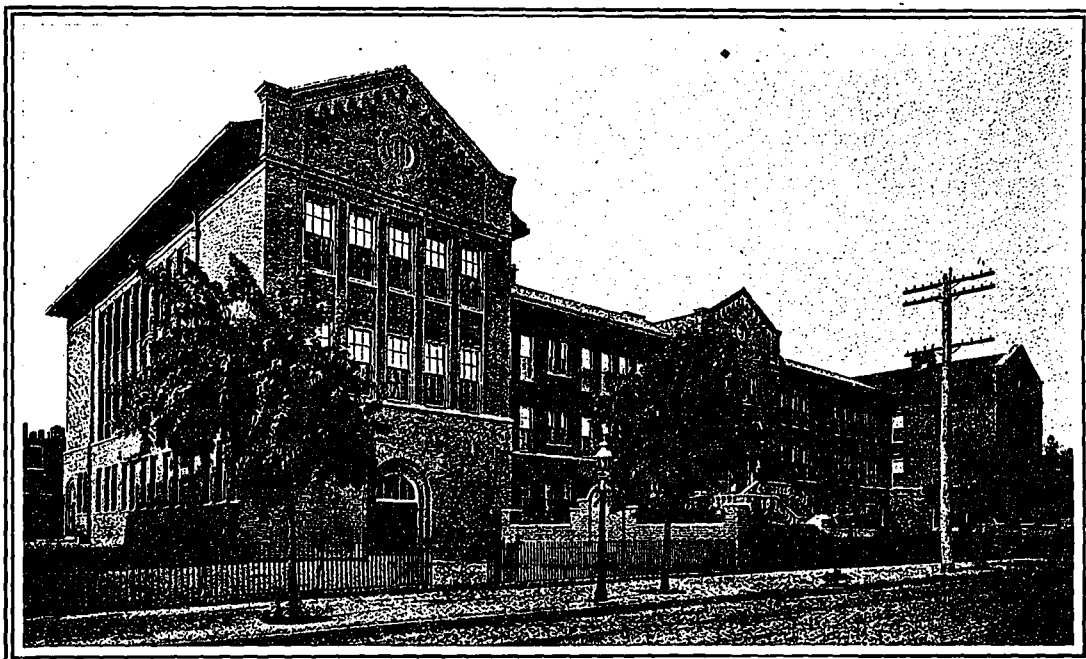
above the basement, with an ample lecture room located on the third floor. There are eighteen class-rooms, a kindergarten and domestic science rooms, making an equivalent to twenty-one class-rooms.

The mechanical equipment is designed to furnish the air for ventilation at a sufficient temperature to make up for all losses. Thus there will be no unsightly piping or radiators to contend with in any portion of the building. Each duct, with its sizes marked, runs to risers H-1 or H-2, according to whether it leads to a first or second floor room.

For a detail of the apparatus, reference is made to Fig. 2. The plant is designed to operate under a steam



DETAIL OF MAIN ENTRANCE TO NEW BADEN SCHOOL, ST. LOUIS, MO., SHOWING THE SIMPLE, INEXPENSIVE ARCHITECTURAL TREATMENT THAT RENDERS AN OTHERWISE PLAIN BUILDING RICH IN ITS GENERAL EFFECT. LARGE SITES HAVE BEEN SELECTED FOR THESE SCHOOLS TO PERMIT OF OBJECT LESSONS IN LANDSCAPE GARDENING WHICH IS EVIDENCED IN THE LAWN, FLOWER BEDS AND HEDGES IN THE FOREGROUND. WILLIAM B. ITTNER, ARCHITECT.

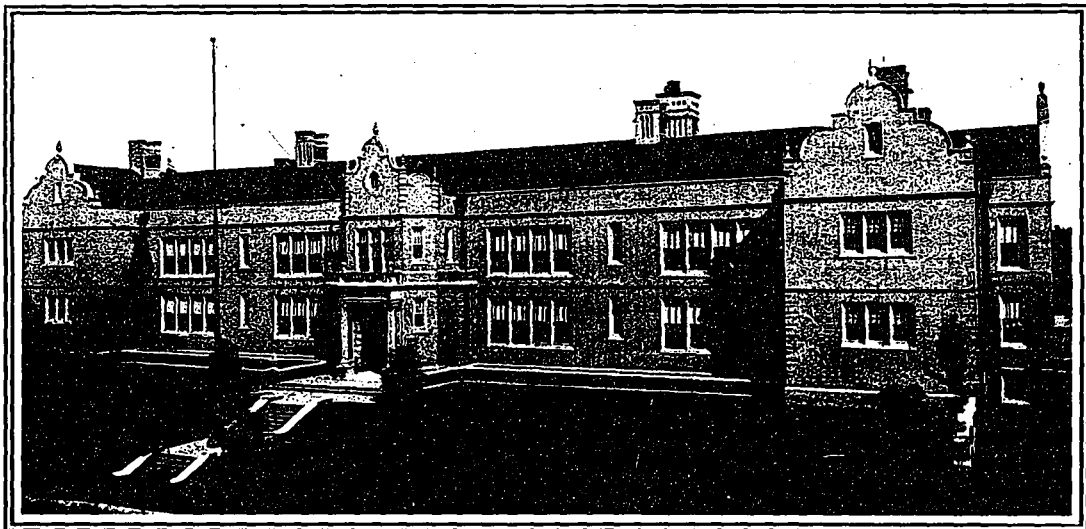


COTE BRILLIANTE SCHOOL, ST. LOUIS, MO. A SIMPLE, INEXPENSIVE, WELL LIGHTED, FIREPROOF SCHOOL BUILDING. THE PLAIN WALLS ARE RELIEVED WITH THE MIXED BRICK MASONRY AND THE ARRANGEMENT OF THE WINDOWS. THE GENERAL EFFECT IS GREATLY IMPROVED BY THE BRICK AND IRON FENCE AND THE TERRACED STEPS TRIMMED WITH STONE. IT CONTAINS 24 ROOMS, WITH ACCOMMODATION FOR 1,200 PUPILS, AND COST \$150,980.92. WILLIAM B. ITTNER, ARCHITECT.

pressure of 15 pounds, with a back pressure of 2 pounds in the coils. The installation consists of two 8 ft. x 4½ ft. fans, direct driven by 15 in. x 10 in. and 18 in. x 12 in. engines. The larger engine drives the centrifugal pump for the air washer, in addition to pulling its fan. This washer is located between the two sets of tempering coils in space marked "spray chamber."

This washer removes practically all foreign matter from the air by passing the same through finely divided sprays of water. An eliminator removes all excess free water from the air before it comes in contact with the next tempering coil.

The air enters through intake windows, indicated at top of plan, and immediately passes through the first



FRANZ SIGEL SCHOOL, ST. LOUIS, MO. DESPITE THE FACT THAT ST. LOUIS BUILDS ITS SCHOOLS OF ONLY FIREPROOF MATERIALS SUFFICIENTLY LARGE SITES ARE PURCHASED TO MAKE IT POSSIBLE TO LIMIT THE HEIGHT OF THE BUILDINGS TO TWO STOREYS. THE ARCHITECTURAL TREATMENT OF THIS BUILDING AND THE GENERAL LAYOUT OF THE GROUNDS, STANDS OUT IN STRONG CONTRAST WITH THE SHABBY FIRE TRAPS GENERALLY CONSIDERED SUFFICIENT FOR OUR SCHOOLS IN CANADA. THIS STRUCTURE HAS 24 ROOMS, ACCOMMODATING 1,200 PUPILS AND COST \$158,595.88. WILLIAM B. ITTNER, ARCHITECT.

tempering coils. The steam supply to these coils is controlled by a thermostat located in the intake and automatically turns steam into the coils at some point before the outside temperature reaches the freezing point, thus protecting the washer from freezing. By-pass doors are located at the side of coils and these are gradually opened or closed by a thermostat located immediately past the eliminator. Thus a constant temperature may be maintained for the air as it strikes the washer. This is a matter of considerable importance, as it has a bearing on the ultimate relative humidity of the air.

After passing the eliminator, the air meets the second set of tempering coils, which brings the air up to a temperature of 79 degrees. The air then divides and passes into the two fans.

Referring to the "Section of Fan and Engine Room," each fan drives the air through the heating coils into the "Hot Room," and under the same coils into the "Tempered Air Room." Thus the tempering air is not heated after leaving the fan. A thermostat is located in this latter compartment, for controlling the by-pass doors under the second set of tempering coils, thus maintaining a constant temperature of 70 deg. Tempered air, hot air, or a mixture of the two is forced by the fan into the "Air Ducts." A thermostat located in each class-room controls the proportionate quantities by means of mixing dampers, and thus a temperature is maintained varying not in excess of one degree either side of a given point.

A fresh air supply of 30 cubic feet per minute is allowed for each pupil. This necessitates about eight complete changes of air per hour in every class-room. Since the corridors and basement are occupied intermittently, four changes per hour are planned for these localities. All plants are designed to secure these results with a safe margin of reserve in case it should be required for any reason.

The boiler installation consists of two 60 in. x 16 ft. return tubular units equipped with down-draft furnaces. One boiler will do the work at all times except in extreme weather, when both will be required. The installation of two smaller instead of one larger boiler is advantageous in a number of ways, namely: The small boiler will be more economical of fuel, as it will work close to its rated output, a reserve unit is on hand most of the time, and less headroom is required, thus reducing the cost of general building construction.

Numerous smoke tests have been made to accurately

determine the distribution of air in class-rooms of various schools. These tests were made by burning a quantity of red fire powder in the duct where the same leaves the hot and tempered air rooms. This particular powder was selected on account of both its pungent odor and the quantity and color of the smoke, the former attribute making it very easy to determine when a room was thoroughly cleared.

The tests indicated quite clearly the air movement. The fresh air entering the room at a velocity of about 300 feet per minute was evenly distributed over the rear two-thirds of the room, and was gradually driven downward by the continued entrance of fresh air from above, and by the law of diffusion of gases. From the breathing line the air gradually worked both downward and forward to the wardrobe opening, and passed out and into the vent.

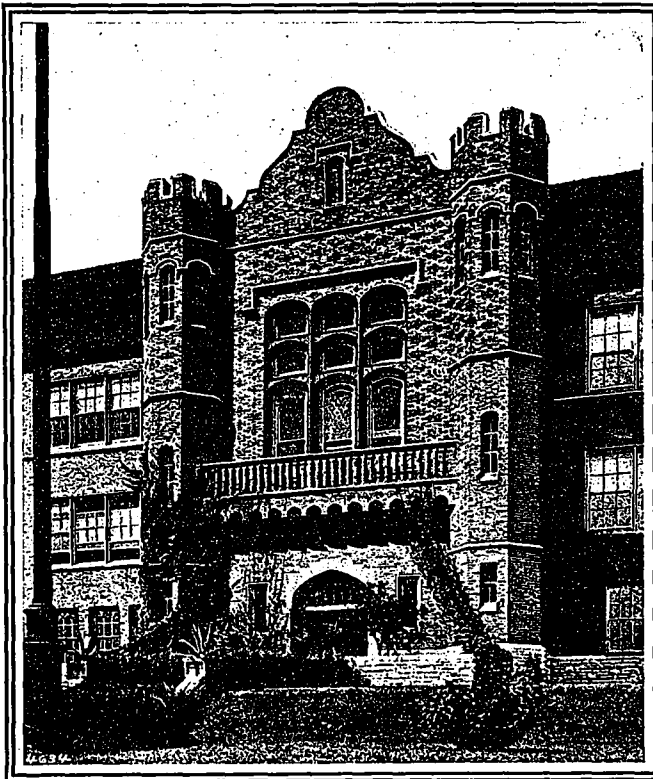
During the Christmas holiday recess of '06 and '07 extensive tests of the heating and ventilating were made in five newly constructed schools. Especial attention was given to the matter of air volumes, velocities and distribution. The smoke tests previously described were made at that time.

It may be interesting to note a few figures on fuel cost of heating and ventilating some of the schools. One matter drawing special attention is the fact that a new school requires above 10 per cent. more fuel to operate the first year than is required for succeeding seasons. A cause for this might be found in the fact that the walls are not thoroughly dried out at the start, and act as a better conductor for the heat.

The figures given are for nine schools, and extend over a period of four heating seasons. All these schools are equipped with ventilating fans. During the four

years the average mean temperature for the months requiring heat was one degree lower than the average for thirty-four years. The temperature figures are, of course, taken from the United States Weather Bureau statistics.

The total contents of the nine buildings amount to 5,755,000 cubic feet. The average coal consumption per season for the four years amounted to 1,936 tons, or 673 pounds per 1,000 cubic feet contents. The average price paid for this coal was \$1,905 per ton, thus making the fuel cost per season for heat and ventilation amount to a little over 64 cents per 1,000 cubic feet. The coal was of the ordinary Illinois variety mined in the district immediately east of the city.



MAIN ENTRANCE OF EDWARD WYMAN SCHOOL, ST. LOUIS, MO. THIS BUILDING IS FACED WITH ORDINARY HARD AND RED BRICK, MIXED AS TO COLOR, AND LAID UP WITH A LARGE BED JOINT IN FLEMISH BOND. THE DECORATIVE EFFECT DERIVED FROM THIS METHOD IN ADDITION TO THE ARCHITECTURAL TREATMENT OF THE MAIN ENTRANCE IS THE ONLY ATTEMPT AT ORNAMENTATION. WILLIAM B. ITTNER, ARCHITECT.

C O N S T R U C T I O N

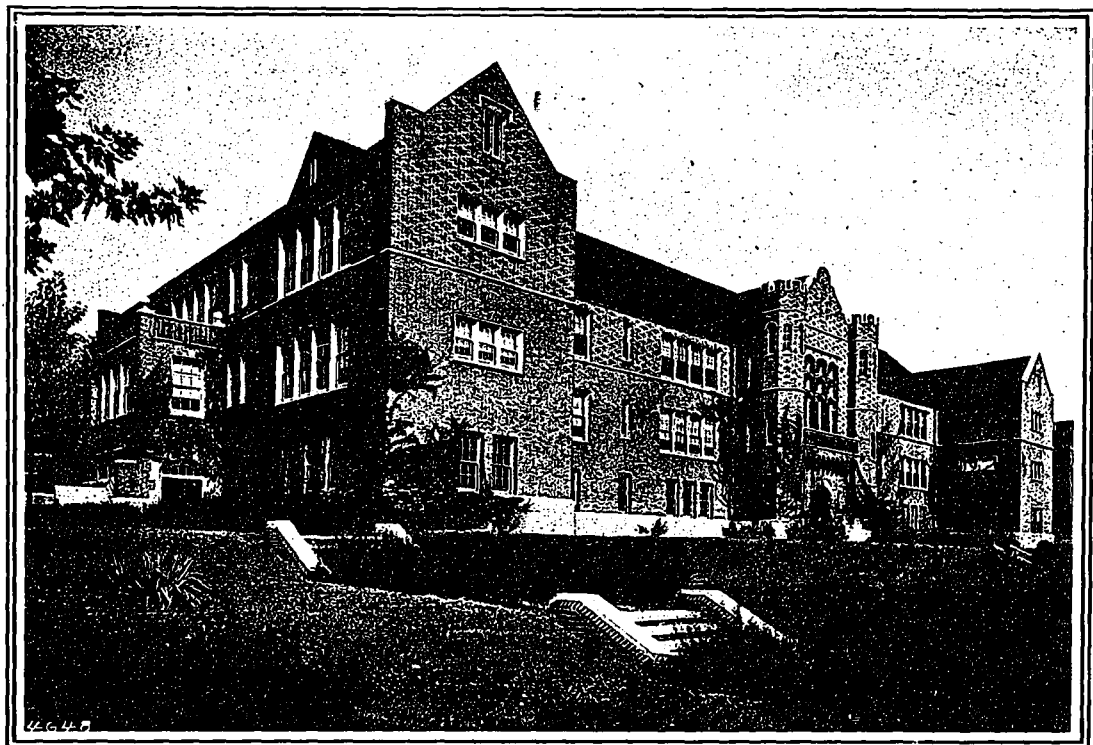
The above fuel cost of heating and ventilating amounted to about 12½ cents per seat. Even if this entire amount were chargeable to ventilation alone (the item of heating being neglected), the fallacy of arguing against ventilating on account of extra fuel required is immediately shown, when an adequate supply of fresh, wholesome air can be provided for each child at so insignificant a sum as 12½ cents for an entire heating season.

The foregoing brief description of the schools will not be complete without a statement as to costs. It will be seen by the following table that the cost, though fairly uniform, fluctuates somewhat more than might be expected in buildings of uniform character. The difference, aside from the fact that the building and labor market has advanced steadily since the first schools were erected, is due mainly to the difference in the sites purchased, some of them requiring an abnormal amount of

Sigel—				
March, 1905	24 1,200	158,595.88	.17	132.16
Hempstead—				
January, 1906 . . .	24 1,200	180,560.80	.171	150.47
Wm. Clark—				
February, 1906 . .	24 1,200	188,902.00	.191	157.41

SCHOOL CONSTRUCTION and EQUIPMENT--- Hygienic Requirements---Glazed Surfaces in Class Room Condemned. Conditions on which Effective Lighting and Ventilation Depend

The following is an extract from an address delivered by Mr. Thomas E. Colcutt, President R.I.B.A., who presided over the section on "The School Build-



EDWARD WYMAN SCHOOL, ANOTHER OF THE RECENTLY CONSTRUCTED SCHOOLS IN ST. LOUIS, MO., SHOWING THE MANNER IN WHICH EXTRAVAGANT MATERIAL AND ORNAMENTATION HAS BEEN AVOIDED. THE PRAISEWORTHY POLICY OF ST. LOUIS IN PROVIDING ITS SCHOOL BUILDINGS WITH BEAUTIFUL SETTINGS IS PLAINLY SHOWN IN THE ABOVE ILLUSTRATION. THE GENERAL LANDSCAPE EFFECT, WITH ITS SPACIOUS LAWN, TERRACED STEPS, HEDGES, FLOWER BEDS, AND VINES, CANNOT HELP BUT HAVE AN ELEVATING INFLUENCE ON THE MINDS OF THE CHILDREN. WILLIAM B. ITTNER, ARCHITECT.

grading and preparation for the buildings. The cost here given includes the preparation and improvement of the sites and the buildings complete, ready for their equipment of furniture.

Name of school with date of contracts.	No. of rooms.	No. of seats.	Total cost.	Cost per cubic ft.	Cost per pupil.
Blow—					
January, 1904	24	1,200	\$150,980.92	\$0.157	\$125.81
Cote Brillante—					
September, 1904 . .	24	1,200	162,829.01	.17	135.69
Clay—					
September, 1904 . .	24	1,200	159,406.54	.194	132.84
Shepard—					
January, 1905	24	1,200	162,228.92	.165	135.19
Patrick Henry—					
January, 1905	23	1,145	203,312.65	.180	177.56

ing and Its Equipment" at the last International Congress on School Hygiene held at the London University.

IN designing school buildings, the architect is generally obliged to limit his expenditure so that there are seldom opportunities for much ornament or display. This in itself is not a disadvantage. There is no necessity for elaboration of design, but fine architecture is always desirable, and is quite possible without rich and expensive detail. In every school building, however simple in general construction, there should be at least one feature of architectural worth. Should this be a fine doorway or any other detail, let it be good enough to be a source of pride to the school. An important factor in education is the development of that appreciation of beauty in art or nature which is latent in most of us. If

school teachers can learn to be proud of some part or feature of their building they will be able probably to inculcate some such feeling in their scholars. I believe that a sense of admiration for the handicraft of others leads to emulation of the right kind, and a fine example in stone or woodwork may prove of great educational value to our budding craftsmen.

Another point on which I should like to touch is the finishing of the walls in class rooms, etc. With all deference to sanitary and hygienic opinion, I feel I must protest very strongly against the use of glazed surfaces in schools and class-rooms. Perfect as glazed tiles are in every way when used in legitimate positions for lining lavatories, cloakrooms, etc., they are inappropriate and unsightly as wall decoration for living-rooms. My own experience in a certain room lined with faience has been that of discomfort and irritation. Being, as you will allow, something of an expert where domestic architecture is concerned, I was able to trace the cause of my discomfort to the glaze of faience. Surely children, without knowing whence the depressing influence arose, might be quite as much affected by it. Too much stress cannot be laid upon the importance of having warm and pleasant coloring upon the walls: the cold and drab colors which are so much used should be avoided.

In London and large towns there is too much that is dismal and smoke-defiled outside, and the interiors should be cheerful. Children's eyes wander even when their attention is supposed to be engaged, and they should surely have something pleasant to look upon. Their school-rooms, in fact, ought to be such rooms as we would not mind occupying ourselves. To illustrate my point, let me draw attention to the Doss-house in Parker street, which I saw after it had been occupied for two years. This building is a common lodging-house for the poorest classes, the charge being 5d. a night for a bed. The common-room is decorated in a way that might by many be considered inappropriate to the class of persons by whom it is used, but I consider that the money spent on beautifying it has not by any means been thrown away. The whole of one end of the room is occupied by a carefully designed fire-place surmounted by a mural picture. The woodwork of the walls and of the fixed seats is of equal merit with the other work, and is painted in rich and pleasant green.

This sort of decoration, without being expensive, is highly effective. When you consider the exceedingly low charge for a bed, and for the use of this room, you will realize that Doss-house is occupied by the poorest of the poor. The casual occupant may be anyone, from the young hooligan to the most hardened vagrant, and yet after two years' continual use I saw absolutely no sign of rough treatment. The painted woodwork and the walls were all in as good condition as if the room had been dwelt in by educated people. Any signs of wear visible were certainly not caused by malice, or even carelessness. It seems to me that the fact of this respect shown to a good building proves that even the minds of the very poorest may be accessible to feelings of beauty. If adults of the degraded though not criminal classes are sensitive to the influence of beauty, how much more must this be the case with the plastic mind of childhood.

There is nothing more necessary to the wellbeing of children than good ventilation. Of all the systems at present in use, some of which are certainly excellent, not one can be said to approach perfection. In forthcoming papers you may hear many methods strongly advocated, but I venture to assert that, whatever may be the virtues of such systems, all will leave something to be desired. Architects agree that open fireplaces and open windows are essential supplements to any other kind of ventilation. All who have to do with children know that they thrive best in the open air. Doctors insist on open air for anemia and chest diseases and for

minimizing the risk of any sort of infection, and no system of ventilation has yet been discovered to supersede the open-air treatment for consumptives.

If prevention is better than cure, it behoves us to see that the children of the nation are taught as much as possible in fresh air. As a matter of example, it is desirable that children see frequent changing of the atmosphere is insisted on in the class-room. No patent system of ventilation will teach them the valuable lesson that they may learn by seeing the importance of having the windows open. As well teach them to cook by electricity, and then let them go back to their own cheap stoves, as expect them to learn the rudimentary hygienic truth that fresh air is essential in a class-room where the windows are all kept shut.

LIGHTING AND VENTILATION OF CLASS-ROOMS.

Sir Ashton Webb, R.A., opened the set discussion on this subject at the International Congress on School Hygiene, and delivered the following address:

I am afraid there is nothing new that can be written on this subject, and I make no claim to any originality in these remarks, merely recording my own experience and what I believe to be the present practice in England. The reason, I presume, that led to this subject being selected for discussion at this Congress is the importance of the class-room as that section of the school building in which the scholastic portion of the teaching is carried on. Here the scholars spend practically all their school hours, and here their mental powers are put to the greatest strain, so that it is desirable that everything possible should be done to place them under the best physical conditions.

The size of the class-rooms is obviously closely related to the subject of lighting and is necessarily regulated by the size of the classes. These vary from the fifty or sixty scholars or more allowed in a public elementary school to the fifteen to thirty in a secondary school. The size is also regulated by the seating arrangements adopted, single seats taking more space than dual, the width of gangways and master's platform being also factors in the case. The purpose to which a class-room is put will also necessarily affect its size, but I am assuming that the class-rooms at present under discussion are the ordinary ones in which general subjects are taken.

The Board of Education lays down an average of not less than ten square feet of floor space for each scholar in public elementary schools, and in this country this is generally adhered to; while in secondary schools, where single desks are used, a floor area of from seventeen to eighteen square feet is required, though, under certain circumstances, a minimum allowance of sixteen square feet will now be accepted by the Board of Education. Given, therefore, the number of scholars to be provided, the above requirements fix the floor area of the class-room; but there still remains the comparative length, breadth and height to be determined, matters on which the effective lighting and ventilation must largely depend. The breadth and length are, to some extent, governed by the type of seat employed, but the nearer a room approaches a square the better, with the limitation that a room can hardly be satisfactorily lighted if more than twenty-four feet wide, while twenty-two feet is better.

We will assume that the room is lit, as it should be, from one side only, which at once limits the depth from twenty to twenty-four feet; the length will then depend upon the number to be seated. The height of the room is also an important factor in the lighting, as the deeper the room the higher it should be, if the seats farthest from the window are to be properly lighted. For the purposes of acoustics and ventilation twelve feet is generally a sufficient height, though, if a large number are

to be accommodated, thirteen to fourteen feet in height may be necessary. These regulations work out for a class-room in a secondary school for twenty-five scholars at twenty-three feet six inches by nineteen feet by twelve feet high.

Having settled the size of the class-room, the question of lighting has to be considered more in detail. It seems hardly necessary to mention that it should be lighted from the left hand of the scholar only. The size of glass area to be provided is more difficult to lay down. This will be affected by two considerations—the aspect and the situation. To take the latter first, it is obvious that a town school in a crowded part would not obtain so much light from a window of a given area with buildings opposite as a building situated in the open country with an unobstructed prospect. The same applies in some degree to the aspect, windows quite satisfactory for a northern aspect being unsuitable for a southern one. Class-rooms should be so placed that they have sun in them during part of the day, but not always; north, west and southwest, if unprotected, should be avoided.

The Board of Education lays down one-fifth as the approximate area of window glass to the floor area to light a class-room satisfactorily. In very confined sites, however, one-quarter is sometimes found necessary, and in open and exposed sites one-sixth will sometimes suffice. Anything beyond the amount of glass actually necessary to give a satisfactory light is undesirable, as it tends to make the room cold in winter and hot in summer, and adds considerably to the difficulty of the effective treatment of the room, both externally and internally. The glass line should not be more than four feet above the floor, with the heads of the windows carried up as near the ceiling as possible.

The windows should be so arranged in the wall that all the seats are equally well lighted. This is apt to leave the master's desk somewhat underlighted, and in order to rectify this Mr. Bell and I provided in the class-rooms at Christ's Hospital a small window to light the master's desk, kept low down so that he can also see out of it, and I believe this has been appreciated. Under no circumstances should there be windows facing the scholars, and windows in the opposite wall facing the master are almost equally objectionable. Mullions, transoms, and window bars are, in my opinion, unobjectionable if the glass area is calculated independently of them. Plain sheet or plate-glass is the best for glazing, and the view of the sky should not be shut out from the scholars.

Glazed brick or tiled walls, except as dados, are not suitable for class-rooms of the character we are considering; the reflected light is trying to the eyes, and being non-porous they are not considered hygienic for crowded rooms. A white plaster ceiling is the best, with light green or grey walls, according to aspect, the woodwork painted white or, better, left its natural color. A glare in a class-room is to be as carefully avoided as gloom.

The artificial light of class-rooms, perhaps, hardly comes under consideration to-day, but is of equal importance when much evening work is done. Carefully regulated incandescent electric lighting is the best, and greatly simplifies ventilation. Gas is better avoided. Perhaps the best illuminant is composed of inverted arc lights with the room lit by reflection from the ceiling, but it is extravagant in current. Single incandescent lamps equally distributed over the ceiling give a pleasant and well-diffused light. Groups of lamps in electroliers should be avoided in class-rooms. One eight-candle lamp, if not hung too high, should light sufficiently twenty-four feet super. of floor area.

For the ventilation of class-rooms it is more difficult to lay down any definite rules. The problem may be simply stated as follows:

The time required to contaminate the air in a class-

room of an elementary school of the capacity required per scholar—i.e., ten feet per scholar—is eight minutes, while for that of a secondary school it would be a quarter of an hour. The temperature of the room, according to the rules of the Board of Education, has to be kept at from 56 degrees to 60 degrees Fahr. The problem, therefore, is how to change the air of a class-room from four to eight times an hour, and, at the same time, to avoid draughts and keep the temperature at from 56 to 60 degrees.

In discussing ventilation it is not possible to exclude altogether the question of heating. This can be done by open fireplaces, hot water, or steam and warm air. In one set of competition conditions sent to me I was surprised to find a condition, drawn up by an eminent architect, stating that the top of the fireplace openings should be four feet six inches high above the floor. I subsequently learned that this was provided on the strength of an instance where it appears such openings were provided, and it was noticed the boys did not progress so well after they had grown above this height, the idea being that the air in the room was better at the lower level through the ventilation of the fireplace. Whether this was a fact I cannot say, but the regulation was not insisted upon when the building came to be erected.

Still there is, I think, undoubtedly in England a strong preference for the open fireplace and the open window, and no doubt there is much to be said for them, especially in small schools; in larger ones it is impracticable. At the same time, I am strongly of opinion that an elaborate system of heating and ventilation such as may be very necessary in such buildings as law courts or hospitals is not necessary in a school for healthy boys and girls. The open fireplace not only provides heat, but also a means of ventilation, and should be placed in the angle on the inner wall near the door, not on the window side, which is an outside wall, and which in such a position must place the unhappy master in a draught between the door and the fireplace. An extract can be obtained by another flue in the chimney-stack, and fresh air may be admitted at the back of the grate and from the corridor.

By this means, however, it is impossible to insure with any certainty a regular change of air in the class-room or an even temperature. All extracts which are worked by what are called natural causes are, in my opinion, unreliable, and under certain variable conditions of temperature or wind pressure, work uncertainly and sometimes even in directly opposite direction to that intended. To obtain results unaffected by these variations, mechanical means must be employed in the shape of rotary fans or other contrivances to move the air by either extraction or propulsion. If extraction is adopted, probably the best plan is hot-water radiators under the windows fitted with bafflers, behind which the fresh air admitted from outside is warmed by passing over the radiators and the foul air is mechanically extracted at the ceiling level in the wall opposite. By this means, and with regulators on the inlets and outlets, the system can be sufficiently regulated, but it is as well also to supply an open fireplace, though the mechanical extract may interfere with its draught at times. The size of both the inlet and outlet depends upon the power of the fan employed.

The alternative is the propulsion of warm air into the room by a fan, the air being admitted into the room about two feet below the ceiling, the outlet being at the floor level into the corridor immediately below the inlet over. The advantages of this system are the more equal distribution of the heat throughout the room, the absence of all heating apparatus, such as radiators, in the room, the avoidance of draught, the air in the room being under slight pressure, and the ease with which the apparatus can be used for ventilation purposes in summer time. The system requires to be planned with the building, and cannot, therefore, well be applied to old buildings.

DAMP COURSES AND THEIR TREATMENT.---Methods Adopted in the Construction of Brick and Stone Structures to Prevent Moisture from Permeating Walls. . . . By W. M. BROWN, C.E.

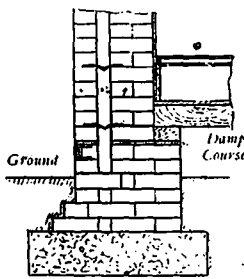


W. M. BROWN, C.E.

THE question of damp courses in building operations is of great importance, especially in locations where the climate is wet and variable. When damp arising from the soil is absorbed into the brick or stone wall of a building it ascends gradually until it penetrates the inner surface, affecting the timber and plaster work, and consequently causing a moist atmosphere in the interior. It may also arise from imperfect joints at window lintels and sills, from unfilled and unpointed

joints on the face of the wall, from moisture forced into the walls during heavy rain storms, and from several other causes. All building materials, with very few exceptions, are porous and capable of absorbing and transmitting moisture in large quantity. The two main purposes for which damp preventing devices are adopted in connection with buildings are to prevent the moisture from getting into the walls and, if any be within the walls, not to hinder its extrusion. The former is accomplished by an absolutely waterproof covering, such as asphalt or tar, or the complete isolation of the wall from any sources of dampness (exception being made here to the moisture which is put into the walls in buildings, and which should be allowed a proper opportunity to dry out). The latter will eventually be accomplished by the perfect ventilation of the walls on all sides.

There are several methods for preventing moisture from entering the cellar walls, which may be divided into, first, applications to the outside of the walls, and, second, constructive devices. The efficiency of the former depends greatly on the care and thoroughness with which they are applied. Of this class we have rock asphalt, tar and cements. The first and second are applied to the wall with a large brush, and should be boiling hot. The coating must be not less than three-eighths of an inch thick, covering every joint, and be carried down to the bottom of the footings. In order to obtain perfect protection the wall should have been built as carefully as possible, the joints well pointed, the whole thoroughly dried, and the asphalt or tar applied in two or more coats. These coatings should not stop with the face of the wall, but be carried entirely over the top. Some builders recommend that the asphalt be mixed with linseed oil. Regarding cement as a preventive against absorption of water there are differences of opinion. That it is an excellent protective covering, when thoroughly applied, goes without question. It is, however, often fractured by the settlement of the walls, and, being somewhat porous, suffers from the action of the frost. In either case it has no further value as a protective. In order to lay it properly, all the beds and joints of the walls should be raked out at least one-half inch deep. The coating should not be



Section
Fig. 1—SHOWING DAMP COURSE IN WALL.

less than one-half inch thick, and should, as far as possible, be applied all at one time. If it is necessary to make a joint it should be vertical and not horizontal. The last precaution is that the earth must not be filled in against it until the cement has thoroughly set. A similar protective covering is made of a concrete or one-half lime mortar and one-half good cement (Portland preferred).

Of the constructive devices adopted to guard against dampness we have first those that are in the wall itself, (Fig. 5.) and which comprise the horizontal damp courses, hollow brick lining and facing, and hollow wall (Figures 5 and 6). There are several kinds of horizontal damp courses, which are placed at the bottom of the wall, either on top of the footings or a short distance above them. That which is considered the most effective damp course is one of asphalt or tar, applied in coats in the same manner as described for the facing of the walls.

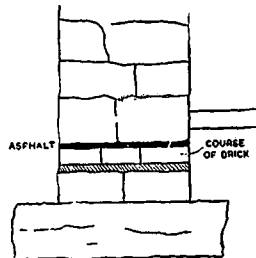


Fig. 2—SHOWING ASPHALT AND COURSE OF BRICK.

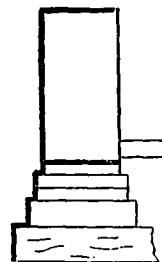


Fig. 3—SHOWING SLATE AND CEMENT COURSES.

A great degree of efficiency is obtained by laying the course of bricks immediately above the damp course, while the last coat is still hot and soft. When this damp course is set in a stone wall it would be better to lay a course of bricks (Fig. 2), and, on this, place the asphalt course, starting the stone course above the latter. A layer of slate (Fig. 3) set in cement has often been adopted as a damp course. The disadvantage, however, of using this method is because of it being very liable to fracture under unseen pressure.

Sheet lead also is an excellent protective from damp and has been applied for that purpose for about two centuries. It is precluded, however, from being used for ordinary work because of its cost.

Perforated terra-cotta bricks (Fig. 4) may be also used as an excellent damp course. These are made the same size as the ordinary brick, and can be readily bedded into the wall. A course may be set immediately above the footings, and another at, or near, the top of the wall. The bricks should be laid so that the openings run through the wall, and so allow of ventilation and evaporation of any moisture that might rise in the hollow bricks themselves. The perforated bricks are also

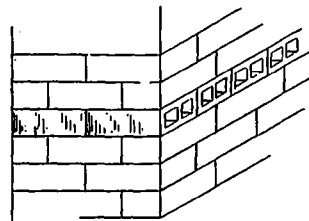
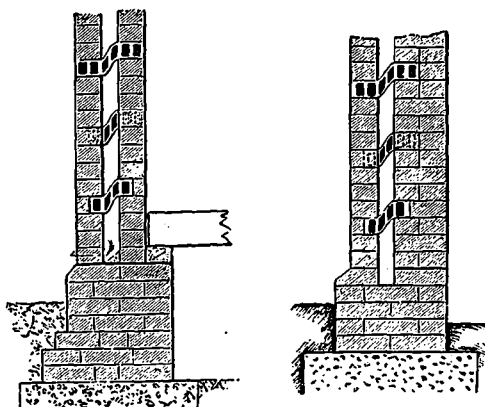


Fig. 4—PERFORATED TERRA-COTTA BRICK METHODS.

used to form a vertical damp course. They may be placed either on the inside or outside of the wall and may be laid as stretchers, as there is not the same liability to collect an d retain moisture as there is in the horizontal course. Headers

should be placed at frequent intervals to bond the facing of the body of the walls.

A simple and somewhat inexpensive system of rendering walls absolutely damp proof, and of adding much to their strength and stability, is to build the brick work into two four and one-half inch thicknesses, with a half-



Figs. 5 and 6—SHOWING HOLLOW WALL METHOD IN BRICKWORK.

inch or three-quarter inch cavity kept clear of mortar. Thin boarding is inserted in the cavity as the work advances, the space being afterwards filled with rock asphalt compositions. The compositions answer the double purpose of binding the two thicknesses together, and making the wall impervious to moisture. In general, damp proof courses should be six inches or more above the level of the external ground, but where possible, under the wall plate carrying the joists for the floor. In buildings finished with a parapet wall, a damp proof

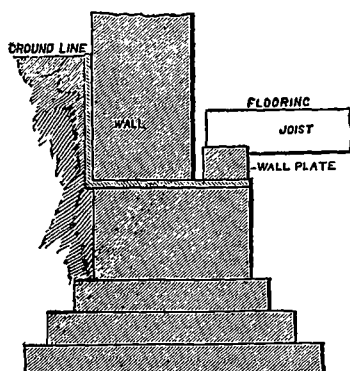


Fig. 7—SHOWING VERTICAL DAMP COURSE ON WALL.

course should be inserted just above the flashing of the gutter, so as to prevent the wet which falls upon the top of the parapet from soaking down into the woodwork of the roof and into the walls below. In some localities courses are formed with slates, set in cement. These are sometimes liable to crack, and thin impervious stones are better.

Sometimes vertical damp courses are used, particularly when the ground outside is higher than the wall plate inside, to prevent the damp penetrating through the wall. The damp course is bedded in the wall directly under the wall plate. This prevents the moisture rising and destroying the wood. The vertical damp course (Fig. 7) acts in a similar manner in excluding the damp through the side of the walls. The joints of brickwork should be raked out to receive this damp course.

There is another method of preventing damp from getting into a wall and that is by what is known as the "dry area method," which consists of building a dwarf wall (Fig. 8) all around the building and leaving a space of two or more feet between the dwarf wall and the walls of the building. The dwarf wall is finished with a brick-on-edge coping, built in cement. The floor of the area is usually covered with cement concrete paving, to prevent the water soaking in.

Hollow or cavity walls (Fig. 9) should be adopted for external work in damp situations exposed to driving rains. These walls are generally built of brick or stone, having a cavity of two or two and one-half inches. The

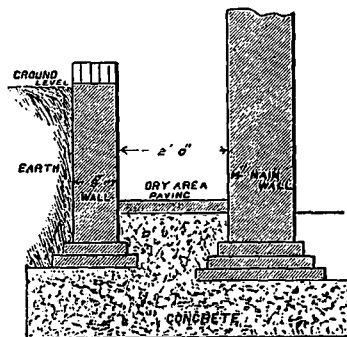


Fig. 8—SHOWING "DRY AREA METHOD" BETWEEN MAIN AND DWARF WALL.

outer wall should be four and one-half inches, the thicker portion being inside, false headers being used in the outer wall. The thick wall inside will carry the doors and roof, the woodwork being kept clear of the outer portion, which is liable to be damp. The cavities should be ventilated by airbricks in the external portion at top and bottom, care being taken that no mortar or other drippings get into them. The wall ties, usually of cast or wrought iron, galvanized or well tarred and sanded, should be employed to tie the two walls together, or a tie or bonding brick constructed especially for the purpose may be used. Walls constructed after this manner not only exclude the damp, but the layer of air they contain, being a non-conductor of heat, tends to keep the building warm.

There is another method sometimes adopted because

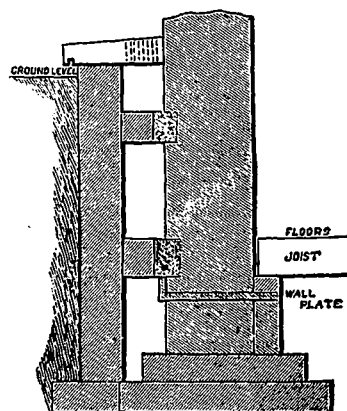
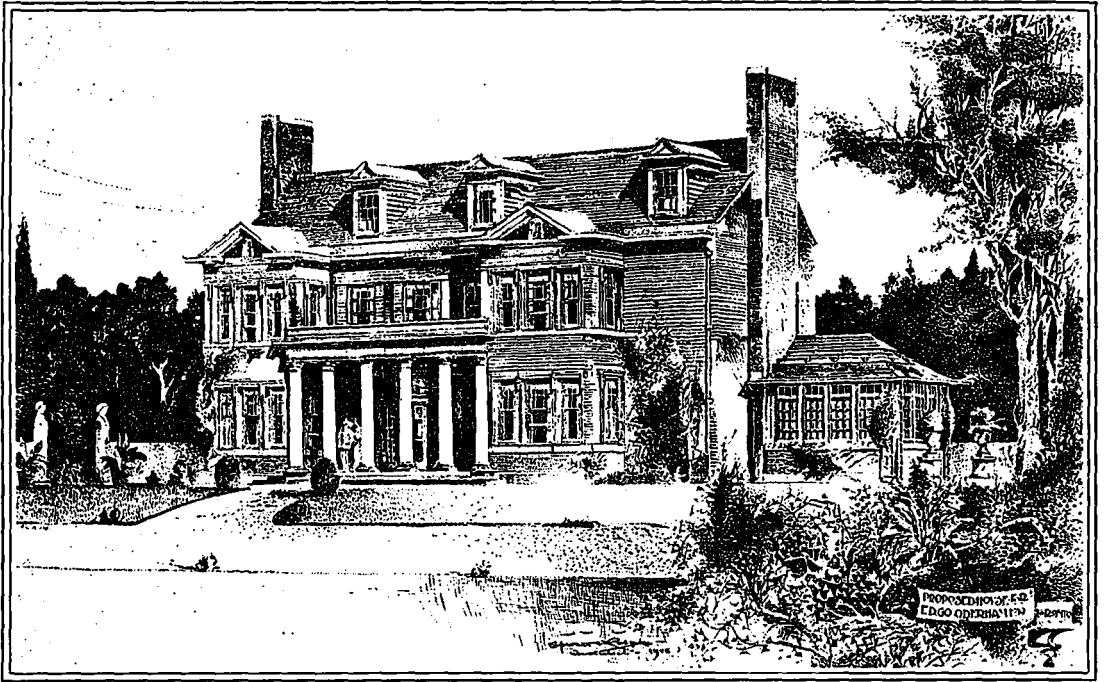
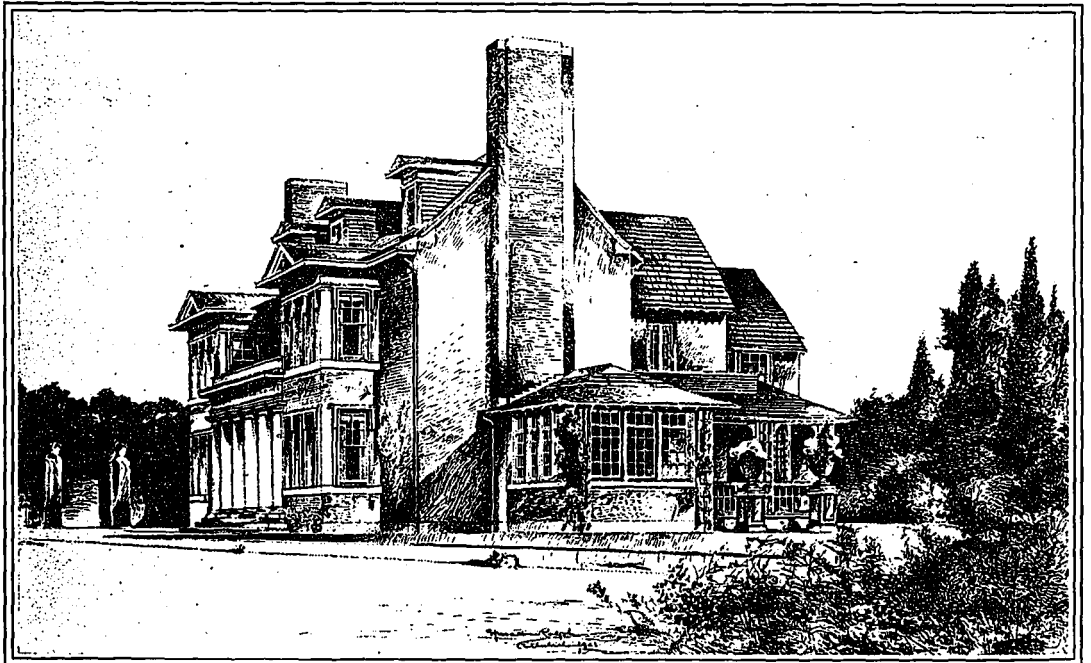


Fig. 9—SHOWING HOLLOW OR CAVITY METHOD IN STONE WORK.

of its cheapness, and that is to lay common field tiles all around the walls, both inside and outside, and connect them by drain to the sewage system or some low spot where the drainage will be effective.



PERSPECTIVE VIEW OF THE NEW RESIDENCE NOW BEING ERRECTED AT TORONTO FOR E. D. GOODERHAM. THE GENERAL TREATMENT OF THE EXTERIOR HAS PRODUCED THE SIMPLE HOMELIKE EFFECT SO ADMIRABLE IN DOMESTIC ARCHITECTURE. MES. RS. SPROATT & ROLPH, ARCHITECTS.

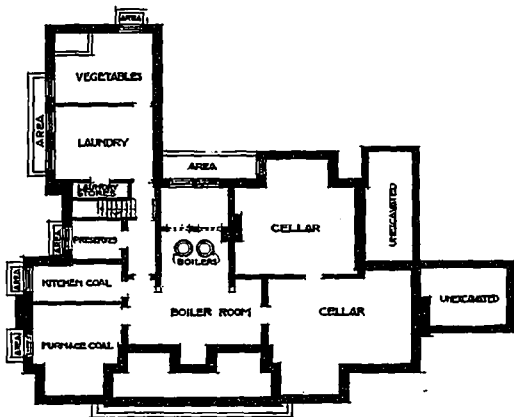


SIDE VIEW OF THE NEW RESIDENCE NOW BEING ERRECTED AT TORONTO FOR E. D. GOODERHAM, SHOWING THE LARGE VERANDAH AT THE REAR WHICH IS SECLUDED FROM THE FRONT OF THE HOUSE BY THE FLOWER ROOM SHOWN IN THE FOREGROUND. MESSRS. SPROATT & ROLPH, ARCHITECTS.

SIMPLE DESIGN OF PALATIAL RESIDENCE--A Recent Conception of the Georgian Period Type of Architecture.

THE residence of E. D. Gooderham, now in process of construction, will be one of the many fine homes which will adorn the residential districts of Toronto. An excellent idea as to how the structure will appear when completed is shown in the accompanying illustrations. The general treatment of the exterior has produced the simple-homelike effect so much sought in domestic architecture, the large portico adding a suggestion of comfort and hospitality to the whole.

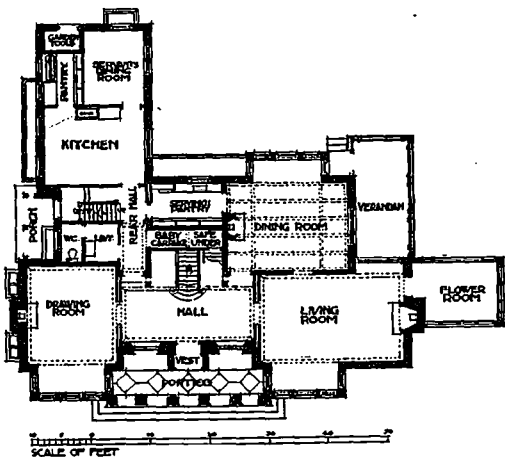
In disposing of the floor space the general scheme has



BASEMENT PLAN, RESIDENCE FOR E. D. GOODERHAM, TORONTO. MESSRS. SPROATT & ROLPH, ARCHITECTS.

been admirably worked out, all the rooms being arranged in an economical and convenient manner.

Especially is this the case in the layout of the first floor, where direct access is obtained from the entrance hall to all the main rooms, the front staircase and the

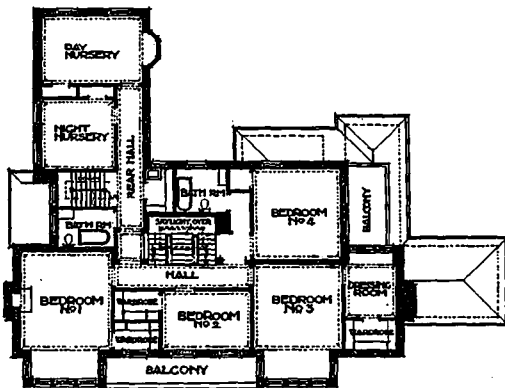


FIRST FLOOR PLAN, RESIDENCE FOR E. D. GOODERHAM, TORONTO. MESSRS. SPROATT & ROLPH, ARCHITECTS.

rear passageway. Both the drawing room and living room are advantageously located at the left and right hand sides, respectively, as one enters, the latter having a large fireplace situated at the right of the doorway

leading to the flower conservatory, which opens off this room.

Entrance to the dining room, which has a beamed ceiling and also a fireplace, can be gained from either the reception hall, living room, or serving pantry, which connect it at the rear of the front staircase with the kitchen. The kitchen and servant dining room, which are located in the wing extending to the rear at the left hand side, are practically isolated from the other portion of the house. A large verandah off the dining



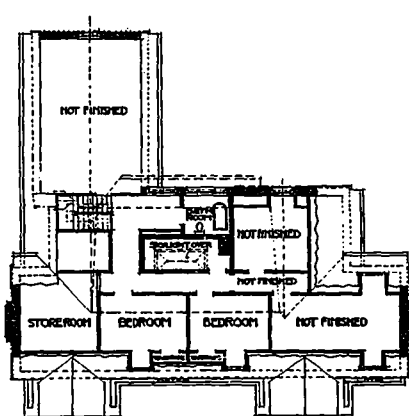
SECOND FLOOR PLAN, RESIDENCE FOR E. D. GOODERHAM, TORONTO. MESSRS. SPROATT & ROLPH, ARCHITECTS.

room is secluded from the front of the building by the flower room in the wing at the right.

All the bedrooms on the second floor have an outside exposure. They are provided with built-in wardrobes and are placed convenient to the bath rooms. The day and night nurseries open off the rear hall and are located above the kitchen.

The third or attic floor contains sleeping chambers, store-room, toilet, and several unfinished rooms which will be used as the occasion demands.

In the basement are provided cellars for various uses,



ATTIC PLAN, RESIDENCE FOR E. D. GOODERHAM, TORONTO. MESSRS. SPROATT & ROLPH, ARCHITECTS.

laundry facilities, a place for preserves, compartments for coal and boiler room. Throughout the house the space has been well utilized and the general arrangement has been intelligently executed.

Messrs. Sproatt and Rolph, Toronto, are the architects and the building when completed will cost \$20,000.

COLOSSAL CHIMNEY CONSTRUCTION---One of the Tallest Chimneys in the World Recently Completed at Rochester, N. Y.--- Specially Designed to Resist Influence of Acid Fumes---Measures 366 Feet From Base to Summit.

ALTHOUGH the tall chimney has become more or less a common thing in the large manufacturing centres, the exact purpose for which it is often constructed is little known to the average person. The general opinion is that the tall chimney is intended to serve solely as a means to abate the smoke evil, and while it is adopted to a great extent as an agency in this respect, its chief function, however, in many instances, is to carry strong acid fumes to a sufficient height so as to prevent them from becoming an obnoxious element in the vicinity in which the plant is located.

Tall chimney construction, therefore, has resolved itself into a science, which not only requires a knowledge of this particular class of construction, but also a knowledge of the action of certain chemicals on the materials which enter into its make-up.

A chimney of special construction, designed and built primarily for carrying off strong acid fumes, has recently been completed at the Kodak Park Works of the Eastman Kodak Company, Rochester, N.Y. Aside from the noteworthy features of its construction, it bears the distinction of being the tallest chimney that has up to the present time been erected in America, measuring 366 feet from base to summit.

As the Eastman Kodak Company not only makes the nitric acid with which the silver is nitrated, but also makes the sulphuric acid, which is one of the principal components of nitric acid, this great height was necessary to prevent the fumes from the acid plant becoming a serious nuisance in the neighborhood of the works. While the company's acid plant is one of the largest of its kind on the continent, it is so thoroughly ventilated that scarcely an odor of acid is perceptible, so completely is every aperture in the apparatus closed. The cotton for making the base of the transparent films is treated in great open vessels of acid, over which the workmen stand to stir the mixture, and above these large fans rapidly withdraw the air into big receptacles and carry the acid fumes into the flue leading to the chimney.

These acid fumes have a temperature of 200 degrees

Fahr., and condensate to a great extent, destroying concrete or ordinary brickwork in a short time, and it was therefore necessary to make the flue connections as well as the chimney entirely acid proof. The chimney is lined throughout from top to bottom with a special lining of radial brick which has both heat and acid resisting properties. It was at first decided, after a thorough investigation,

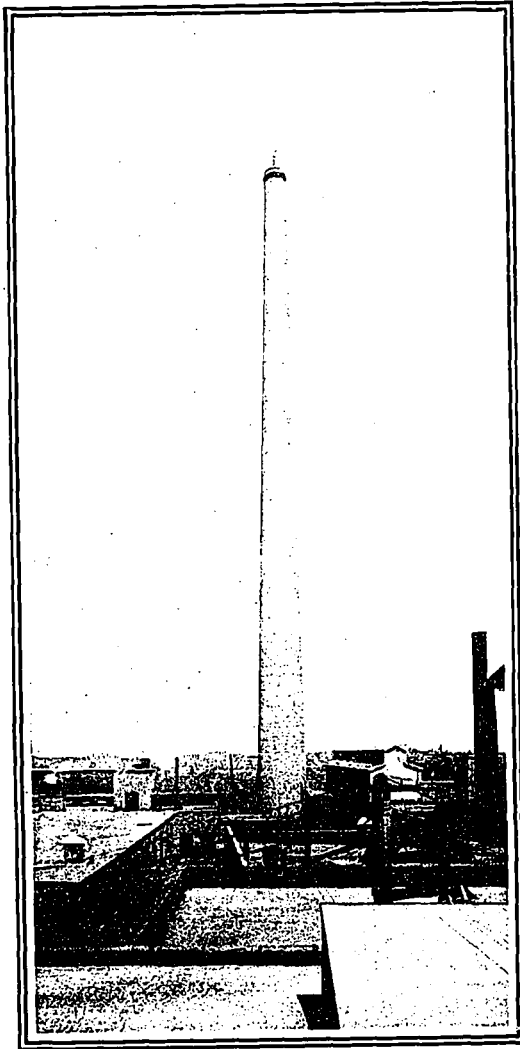
to build a chimney 350 feet high, but as the tallest chimney in America was then 365 feet high, that at the works of the Orford Copper Co., at Constable Hook, N.J., the Eastman Kodak people thought to exceed this height and make the chimney 366 feet high, therefore getting the tallest chimney in the world.

It was first intended by the Eastman Kodak Co. to have only the acid fumes enter into this chimney, but as a new power plant was being erected and a chimney needed for 2,000 h.p. of boilers, it was decided to utilize the chimney for the gases from the boilers, thereby reducing the condensation of the acid fumes in the chimney. The chimney was made of ample capacity in area to take care of this additional work, and the height was amply sufficient to create the necessary draft.

As rock strata underlies the site at depths of from 20 to 30 feet the foundation of the chimney was carried down about 30 feet below the surface of the ground to solid rock. The foundation was built of concrete, consisting of one part of Portland cement, three parts of sand and five parts of broken stone, and is of octagonal form, 30 feet in width at the top and about 45 feet at the bottom. The concrete is protected at the top by an acid proof pavement from the influence of the acid fumes in case of condensation. The base contains approximately 23,000

cubic feet of cement and weighs 1,600 tons.

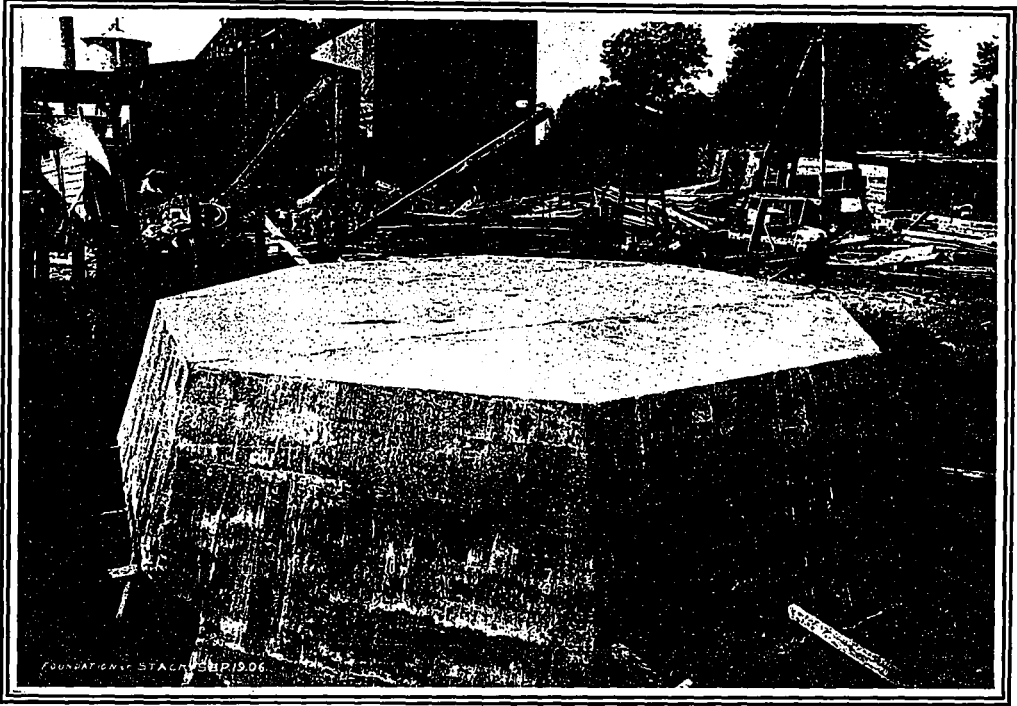
The chimney proper is a brick cone, having a uniform taper of 4.6 in 100 feet for both sides, the outside diameter at the foot of the chimney being 27 ft. 10½ in., and at the top of the chimney 11 ft. 0¼ in. The construction is of special perforated chimney blocks of radial or segmental form, which are made in five different lengths, 4 in.,



HUGE CHIMNEY, 366 FEET HIGH, RECENTLY COMPLETED AT ROCHESTER, N. Y., SAID TO BE THE TALLEST STACK IN AMERICA.

5½ in., 7¼ in., 8¾ in. and 10¾ in., and in this manner a very strong bond is secured in the chimney walls. Blocks of varying radii are used for the various diameters of the chimney structure and are 4½ in. thick and 6½ in. wide

of mortar between perforated bricks is 61½ lbs. per square inch, as against 21½ lbs. per square inch with solid brick blocks, or nearly three times as much. The blocks are laid up in cement mortar with sufficient quantity of lime added

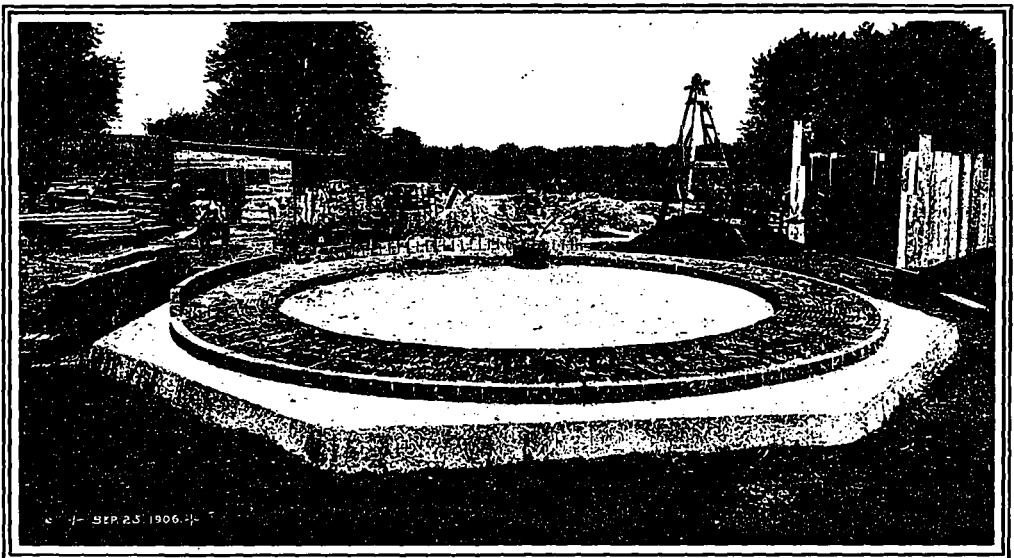


MONOLITHIC BASE OF CHIMNEY CONTAINING APPROXIMATELY 23,000 CUBIC FEET OF CONCRETE AND WEIGHING 1,600 TONS.

on their external faces. These blocks are formed with perforations, which perforations not only facilitate the proper burning of the brick in manufacture, but also permit a much stronger bond with the mortar than with solid bricks. Tests have shown that the adhesive power

to make the structure elastic to withstand the vibration caused by strong wind storms.

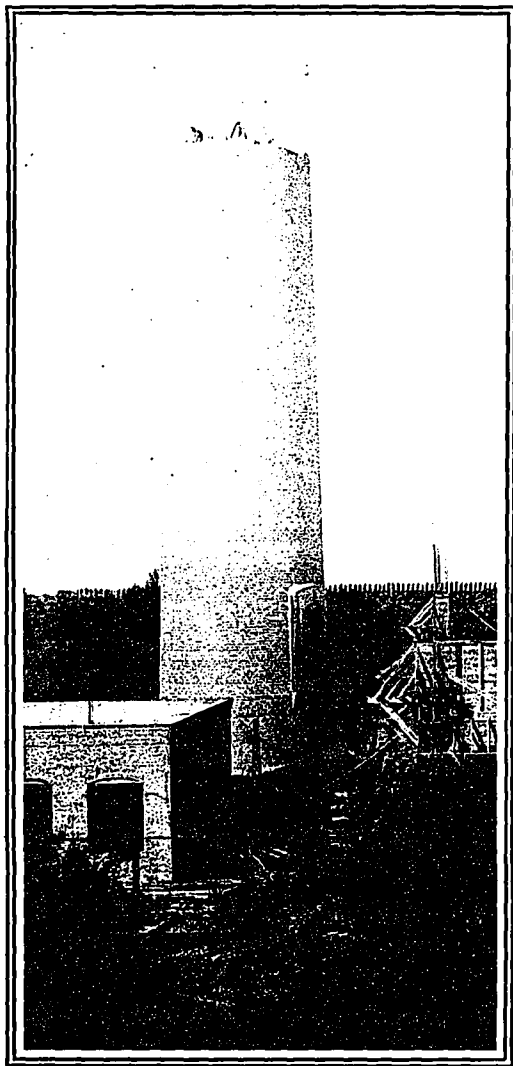
The walls of the chimney vary in thickness from 42 in. at the foot of the column to 7¼ in. at the top, exclusive of the acid proof lining, which is of uniform 4 in. thick-



FIRST COURSE OF MASONRY, SHOWING THE PERFORATED BLOCKS OF VARYING RADII USED FOR THE VARIOUS DIAMETERS OF THE CHIMNEY. THE LINING CONSISTS OF 4 INCH RADIAL BLOCK, ESPECIALLY MADE TO RESIST THE INFLUENCE OF ACIDS.

ness throughout. The chimney is of sufficient width and taper to eliminate any tension in the brickwork at any point under a maximum wind storm of 100 miles per hour, which is equal to a pressure of 50 lbs. per square foot of flat surface, or 25 lbs. on the projected area of a cylindrical surface. A maximum compression due to the weight and wind pressure is computed at 21 tons per square foot, on the leeward side. The wall thicknesses are changed every 20 feet, the difference being 2 in., thus dividing the entire structure into 19 sections, the lower two of which are 16 and 10 feet high.

The acid proof lining consists of a 4 in. radial block which was especially made to resist the influence of the



ONE-FIFTH THE DISTANCE TO THE TOP. AT THIS POINT THE DIMINUTIVE FORMS OF THE WORKMEN GIVE A GOOD IDEA OF THE MAGNITUDE OF THE CHIMNEY.

strong acids. Tests showed that the blocks, after being submerged in muriatic, sulphuric and nitric acids in diluted and concentrated form for several days, had not been damaged to the least extent. The lining is supported on corbels extending from the main walls of the chimney at every offset, thus increasing the stability of the chimney greatly, by having the weight of this lining rest on the main walls of the chimney. The lining is separated from

the main wall by an air space of 2 in., and the top of each section of lining is protected from the influence of the acid which might possibly, through condensation, flow down on the inside of the chimney by a special form brick. The lining is laid up in an acid proof mortar which is capable of resisting successfully the influence of the strongest acids in diluted or concentrated form. This mortar has a great binding power and can withstand a temperature of 200 degrees Fahr. The mortar consists mainly of silicate of soda and asbestos wool and is tempered to the consistency of fire clay mortar, thus enabling the blocks to be laid with mortar joints of a minimum thickness. The lining is constructed so that it is entirely acid proof, but if at any time any part should wear out or become damaged, it is only necessary with this sectional construction to repair one section where the damage is located without disturbance to the rest of the lining as would be the case with a self-supporting lining.

The top of the chimney is protected by a terra cotta cap of acid proof clay, for the purpose of resisting the corrosive action of acid condensation. The cap is formed of 30 terra cotta tiles of radial form with overlapping joints on the radial edges and downward projecting lips on both inner and outer edges to cover both shell and lining. The tiles have inclined radial ribs so placed near the outer edges as to rest on the outer shell blocks and give the cap an inclined position sloping outward. The tiles rest entirely on the top of the outer shell blocks, to which they are cemented, and merely overlap the top of the lining, which is thus permitted free expansion and contraction with ample protection of the lining from the weather. The overlapping radial joints are made tight and with acid-proof mortar. The letters "KODAK" on the stack, are 7 ft. 3 in. high and are spaced 9 ft. 9 in. centre to centre, the bottom of the lower K being 294 and top of the top K being 250 ft. above top of foundation.

Protection from lightning is afforded the stack by a four-point lightning arrester consisting of a $\frac{1}{2}$ in. stranded copper cable, fastened to the chimney by means of copper clamps and connected in the ground at the base of the chimney to a copper plate. The four points at the top are connected with a copper ring that encircles the head of the chimney and connects to the main conductor. The points themselves are of retort graphite, fitted in brass sleeves and supported on copper mountings, copper and brass being used throughout in preference to galvanized iron in order to resist the corrosive effect of the acid fumes which might descend on the outside of the chimney in rainy weather. The chimney has an outside ladder and the name, Kodak, is worked in the outer shell, with colored blocks, which color is burned in the clay to make the color weather proof.

There is at present under construction at Great Falls, Mont., an acid proof chimney which will be, when completed, the tallest and largest chimney in the world, as it is to be 506 ft. high and to have an internal diameter at the top of 50 ft. The duty of this immense chimney will be to carry off 4,000,000 cubic feet of sulphur gases per minute. It will take about a year and a half to complete this structure.

A BRICK FACED CONCRETE DAM

A BRICK-FACED dam is the most interesting feature of the new waterworks of Swanzy, Wales, which were recently put in service. The dam is a masonry structure, 1250 ft. long, 144 ft. in maximum height from foundation to crest, and 13 $\frac{1}{2}$ ft. wide on the crest. The upstream face is vertical for 70 ft. from the top and battered 1 in 20 below this; the downstream face is vertical for 15 ft. and then curved to a maximum width of 75 $\frac{1}{2}$ ft. The dam is built of concrete and faced throughout with blue Staffordshire bricks.

CONCRETE SHAFTING PIERS--A Practical Solution of the Problem of Transmitting Power to the Upper Floors of a Modern Factory Building Without Creating Vibration ∴ ∴

WHEN the architect is called upon to design and plan a modern factory building, he finds himself confronted with many engineering problems that have been created or rendered more difficult, during the past decade by the introduction and adoption of heavier and improved machinery.

It is not many years since the plan and construction of the average factory building was carried out almost entirely independent of the nature, weight and character of machinery to be installed. In the scientifically constructed factory building of today, every detail of the machinery and power equipment is carefully worked out before even the plan for the foundation of the building is made, and in cases where the machinery is heavy, it is placed in position, very often, on an independent foundation before the roof of the building is on. If the best results are to be obtained at the lowest reasonable cost, the location and nature of every machine should be definitely determined before the architect can intelligently draw his plans for the foundation and the frame work of the building; he must know where his shafting is to be located, the number of machines to be driven from each shaft, the amount of power required to drive successfully each machine. He must also know the weight of each machine, as well as the exact amount of floor space covered by it. To successfully provide for these conditions the factory building designer is often obliged to work out many original ideas that call for considerable engineering knowledge.

The elimination of vibration is one of the important problems in modern factory building construction, as it is vibration that constitutes one of the greatest factors in waste of energy in the transmission of power and in the wear and tear of the building. Every competent engineer or architect, when planning an industrial plant, is constantly striving to minimize to the greatest possible

degree the waste of power and the effect of the motion of the machinery on the structure. Buildings of solid monolithic construction are almost immune from the vibratory effect of the equipment, but it is in the structure of ordinary mill or steel frame construction that this problem becomes one of a more serious character.

Vibration is created in a building by the effect of the motion of a machine upon the base to which it is fastened, as well as by the effect of the motion of the pulleys and shafting on the frame to which the shafting is hung or fastened. Vibration created by the former cause is often eliminated by placing all the heavier machinery on an independent foundation that very often is built to a greater depth than that of the building. This plan, however, is only feasible where it is possible to confine all heavier machines to the ground floor. Bracing of various kinds is often very effectively used, that minimizes vibration from machinery on the upper floor.

It is, however, vibration produced by the motion of the pulleys and shafting that presents the most difficult task to the factory building designer.

The accompanying figures illustrate a very ingenious and effective solution of this problem as worked out by Mr.

R. B. Andrew, of the Union Trust Co. Toronto, when superintending the erection of the factory of the Compensating Pipe Organ Co., Limited, of Battle Creek, Mich.

The idea was original with Mr. Andrew, and it worked out with such complete satisfaction that it has been adopted in many large factory buildings erected by manufacturers who have had an opportunity of visiting the factory and seeing the success which has attended this ideal method for the transmission of power without subjecting the framework of the building to the ruinous effect of vibration.

The building is a two storey and basement structure, 290 ft. by 60 ft. in dimensions. It is of standard mill con-

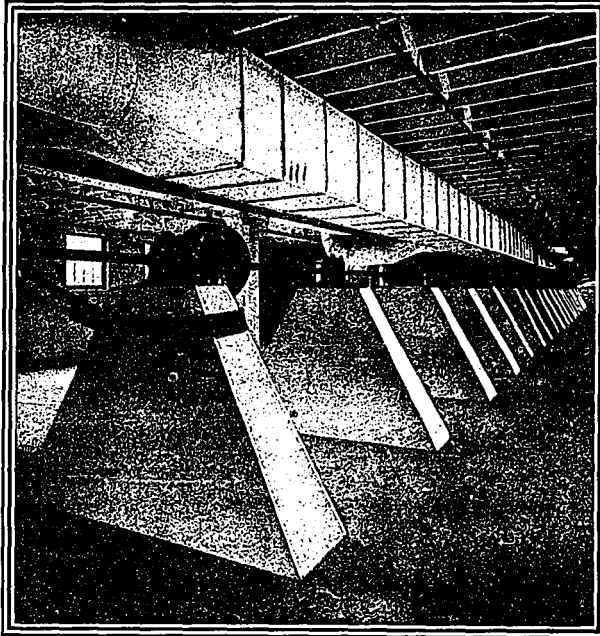


FIG. 1--A NOVEL METHOD OF TRANSMITTING POWER FROM A SHAFT ON CEMENT PIERS, IN THE BASEMENT OF A MODERN FACTORY TO THE MACHINERY ON THE FLOORS ABOVE, WHICH MINIMIZES VIBRATION. THIS VIEW SHOWS THE ROW OF 18 PIERS LOCATED UNDER THE BLOW PIPE TO ECONOMIZE IN HEAD SPACE.

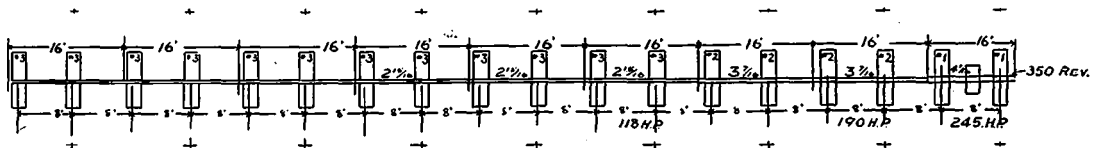


FIG. 2--LINE SHAFT PLAN, SHOWING LOCATION OF PIERS AND THE VARYING DIAMETER OF THE SHAFT TO PROVIDE FOR THE POWER REQUIRED FOR THE HEAVIER MACHINERY.

struction and has a stone foundation with cement floor in basement. It is equipped with all kinds of heavy and light modern wood working machinery used in the manufacture of pipe organs. All of the heavy machinery, and in fact practically all of the machines, were placed on the

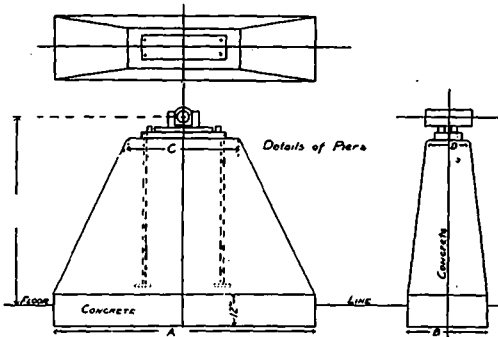


FIG. 3.—DETAILS OF CONCRETE PIERS, TAPERING IN FORM AND OF SUFFICIENT HEIGHT TO GIVE 8 FT. CLEAR BETWEEN FLOOR LINE AND SHAFT.

ground floor, the upper floor being used mostly for finishing, and the problem presented was to drive these machines with the minimum amount of vibration possible.

This Mr. Andrew successfully solved by the erection of 18 cement piers (see Fig. 2) on independent foundations which extended below the basement floor (see Fig. 3). To the tops of these piers were attached the boxings for the 175 ft. shaft which, extended the full length of the space covered by the machinery on the ground floor. These cement piers were made in wood forms in position from a mixture of 1 of cement to 5 of clean sand and gravel. They are pyramidal in shape and are situated 8 ft. from centre to centre, and are high enough to give 8 ft. clear between the floor and the shafting. Mr. Andrew considers it quite essential that these piers should be sufficiently high to give room for safe passage under the shaft. To economize in head space the blower pipes, attached to the ceiling, were placed directly over the piers (see Fig. 1). The engine room was located at the right end of the shaft, as shown in Fig. 2, and the ma-



FIG. 4.—VIEW OF GROUND FLOOR SHOWING THE ARRANGEMENT AND LOCATION OF THE MACHINERY DRIVEN FROM THE SHAFT ON THE CONCRETE PIERS IN THE BASEMENT. THE ABSENCE OF BELTING AND SHAFTING IS AT ONCE NOTICEABLE.

chinery that required the greatest amount of power was placed at this end of the building. The shaft varied in diameter from 4 7-16 in., 3 7-16 in., down to 2 5-16 in.

Pulleys were attached to this shaft at the necessary

points to drive the several machines on the ground floor. One large pulley served to drive the shaft for the few light machines on the upper floor, the drive belt being enclosed in a wood protector through the ground floor.

Not only did the method eliminate almost entirely all vibration but, as will be seen by Figs. 4 and 5, the ground and upper floors were free from belting and shafting which invariably takes up much valuable space as well as being a constant source of danger and nuisance.

In this age of scientific factory building the suggestions embodied in this idea should be of great value to the architect or engineer who aims to specialize in this class of work. The system does not involve much additional expenditure. It minimizes vibration. It does away with a complicated mass of dangerous pulleys, belts and shafting, and it reduces friction to a minimum and transmits power with the least amount of waste.

Its advantages are many and we consider it a most valuable suggestion that may be enlarged upon to suit different types of buildings and varied conditions.

We are indebted to Mr. R. B. Andrew for the drawings and photographs from which the accompanying illustrations were taken.



FIG. 5.—ANOTHER VIEW OF GROUND FLOOR OF FACTORY IN WHICH VIBRATION HAS BEEN ALMOST ENTIRELY ELIMINATED BY PLACING THE MAIN SHAFT IN THE BASEMENT, ON CEMENT PIERS BUILT ON INDEPENDENT FOUNDATIONS.

THE EDISON IDEA NOT A NEW ONE

THE idea of casting a whole building in a single piece is not novel, writes Nikola Tesla to the New York Globe in discussing the "monolithic" house construction. It was advanced years ago by the famous gun manufacturer, Krupp, of Essen, Germany. Engaged in founding and casting on a vast scale and confronted with the necessity of constructing cheap dwellings for his army of workmen, the scheme presented itself quite naturally to his mind.

To what an extent he applied it in practice I do not know, but I recall distinctly that at one time he proposed to cast an entire fort in one piece. The plan is fascinating and appears at first practicable, but it is more likely to prove an *ignis fatuus* than my Martian telegraphy.

It is the universal experience in building and manufacture that the most economical and satisfactory results are obtained by producing separate parts and joining them into a whole. This also applies to a cement house. Quite apart from this general principle, however, the "monolithic" process is by no means a safe one, and a single bad casting, necessitating breaking up and removal, will offset the profits on a great number of good ones. Taking everything into consideration, I think that a dwelling manufactured in suitable parts would be decidedly cheaper and for many reasons preferable.

PROSPECTIVE CONSTRUCTION

The following information is obtained from our correspondents, from architects, and from local papers. These items appear in our Daily Advance Reports and are herein compiled for the use of subscribers to the monthly issue of "CONSTRUCTION." Should any of our readers desire this information oftener than once a month, upon receipt of request, we will be pleased to submit prices for our Daily Service.

Mills and Factories

Toronto, Ont.—The Canada Paper Company, Toronto, will in all probability make extensive alterations to two of its mills. Sir Montague Allan is president of the company.

Welland, Ont.—A. F. Bemis, of the Bemis Bag Company, Boston Mass., is completing arrangements for the erection of a branch factory at this place. The company has agreed to expend the sum of \$150,000 in buildings and equipment before the end of next year.

Kingston, Ont.—The Kingston Milling Company, Kingston, Ont., will erect an addition to its mill at this place.

Port Robinson, Ont.—The Dane Manufacturing Company, of Iowa, is contemplating the erection of a \$40,000 plant at this place for the manufacture of "Dane" farm implements. Option has been taken on the Aaron Johnson property, just north of the station.

Morrisburg, Ont.—The loss of the Imperial Stove Works, Limited, Morrisburg, recently damaged by fire, is estimated at \$25,000, fully covered by insurance. The machinery in the polishing room, nickeling and mounting rooms and carpenter shop was completely destroyed. The plant will be rebuilt at once.

Owen Sound, Ont.—J. T. McInnis has been awarded the contract for the Tedd Shoe Company's factory which is to be erected on West street.

Cornwall, Ont.—Therres J. Meigs, of New York city, general manager of Santa Clara Lumber Company, and Walter Meigs, of Tupper Lake, N.Y., have purchased 14 3-4 acres of land lying between the Front road and the Cornwall Canal, and have also taken an option on six acres of land immediately east of the Robertson place. The company propose to establish at this point a large roasting mill, which, when in full operation, will employ 100 to 150 men.

Merriton, Ont.—The Carbide Company, of Merriton, is contemplating making extensive alterations and additions to its buildings at this place. The work will include a large brick storeroom and the construction of a tunnel connecting storeroom with furnace room.

Kenora, Ont.—The Allis-Chalmers Company, Toronto, have been awarded the contract for the erection of a 2,500 barrel mill at Kenora, Ont.

Alliston, Ont.—The Crosslin Piano Company, of Toronto, has made application to the Town Council for a loan of \$25,000 for ten years, in return for which they promise to erect a plant to cost \$40,000 and employ at least 50 hands.

Galt, Ont.—Mayor Patterson, of Galt, has received a proposition from a Detroit firm regarding the location of an automobile factory at this place. R. M. Jaffray has been appointed to inspect the factory at Detroit and report to the Board of Trade.

Dorchester, Ont.—Mr. Croker, Inger-

soil, has been awarded the contract for constructing a new brick smoke stack and remodelling the engine room for the Morris Milling Company, of this place.

Ingersoll, Ont.—The Reid Foundry and Machine Company has decided to take over the business of the Ingersoll Foundry Company and will locate in the Bell Mill, Victoria street. The plant will be enlarged and altered at once. David Reid is manager of the company.

St. Marys, Ont.—A by-law has been passed by the ratepayers of St. Marys authorizing the loan of the sum of \$20,000 to the Canada Smallware Company to assist them in establishing a factory at this place. W. C. McCrimmon, 19 Alexander street, Toronto, represents the interests of the company.

Brantford, Ont.—J. H. Hall & Sons have secured a site near the Hampel Box Company on which they propose to erect a two-storey 90x40 feet machine shop.

Brantford, Ont.—A. E. Petty, Hamilton, will establish a factory in Brantford for the manufacture of emery wheels providing he can procure a suitable site.

Brantford, Ont.—It is reported that the Dominion Soap Company, Hamilton, Ont., will establish a factory in Brantford, Ont.

Wallaceburg, Ont.—The Wallaceburg Sugar Company will expend the sum of \$40,000 in additions and improvements to its plant at this place. The work will include the erection of a new engine room at the pulp drying plant, a brick or cement cooper shop and two large storehouses.

Wallaceburg, Ont.—The Sydenham Glass Works will erect a new factory in the near future. It is estimated that the plant will cost from \$50,000 to \$60,000. The Owens Automatic and O'Neill-Gordon blowing machines will be installed.

Fort William, Ont.—The Imperial Steel and Wire Company, Toronto, will in the near future erect a factory building here for the manufacture of wire, nails, etc. J. A. Currie, Temple Building, Toronto, is president of the company.

Fort William, Ont.—A proposition has been submitted to the city Council for the establishment of a car works in this city, to be known as the Fort William Car Company. The promoters are at present in Paris negotiating bonds for \$1,250,000 for the enterprise. If they are successful in floating these bonds the company will proceed with the erection of the buildings this summer. The plant will cover 40 acres. Chas. E. W. Smith and A. H. Sissons, of the St. Louis Car Works, are the chief promoters. The addresses of these parties are 115 Broadway, New York, and 74 Broadway, New York, respectively.

Peterboro, Ont.—The factory of the Peterboro Cereal Company has been badly damaged by fire. That part of the building containing the machinery has been completely destroyed. Loss estimated at \$50,000, of which \$35,000 is insured.

Niagara Falls, Ont.—The contract for the plant to be erected for the American Cynald Company has been awarded to the Westinghouse Church, Kerr Company, of New York and Pittsburg, who will also install the plant. Frank A. Washburn, of New York city, is president of the company.

Chippewa, Ont.—The British-Canadian Smelting and Refining Company will erect a smelter at this place which will employ from fifty to one hundred men.

Montreal, Que.—The Beaudry machine shop, Bleury street, has been damaged by fire to the extent of \$5,000.

Quebec, Que.—Contractor E. Morisset has the contract for the new work-

shops to be erected on Bridge street for F. X. Drolet at a cost of \$50,000. The building will be of brick construction.

Sydney, N.S.—C. V. Wetmore and F. A. Crowell, Sydney, have promoted a company which will erect a plant to be known as the National Rolling Mills.

Little Bras d'Or, N.S.—The Colonial Coal Company has purchased the coal property adjoining the Nova Scotia Steel & Coal Company's areas at Little Bras d'Or, N.S., and will install electric machinery for haulage and mining. W. A. Mackay, North Sydney, N.S., and R. S. Cottrell, of Sydney, N.S., are at the head of this company.

Moncton, N.B.—John Abrams & Sons' machine shop, on Foundry street, has been completely destroyed by fire.

New Westminster, B. C.—The British Columbia Pottery Company, of Victoria, B.C., has taken an option of several blocks of land on the Burnette River, at Burnaby, with a view of erecting a large manufactory.

Vancouver, B.C.—The Vancouver Sash & Door Company has secured a site from the C.P.R. on which it will erect a new plant.

Vancouver, B.C.—The Enamel Concrete Company, of Des Moines, Iowa, has signed preliminary agreements with a group of Vancouver capitalists to erect an extensive brick-making plant which is to be in operation in four months' time. Oren Ruffcorn is secretary of the company.

Vancouver, B.C.—The Crane Company, of Chicago, manufacturers of plumbing supplies, has purchased the interest of the Boyd, Burns Company and will take possession on July 1st. The building will undergo extensive alterations, which will include the addition of two storeys.

Vancouver, B.C.—M. J. Scanlon, of Minneapolis, Minn., of the Scanlon-Brooks Lumber Company, will erect two large sawmills in British Columbia next year at a cost of \$750,000. One of the mills will be located on Harrison Lake, about fifty miles east of Vancouver, and the other at Vancouver or New Westminster.

Victoria, B.C.—The Moresby Island Lumber Company, a syndicate which it is said represents the Chicago, Milwaukee & St. Paul Railroad, will erect a large sawmill at Queen Charlotte on Moresby Island, five miles from Bearskin Bay.

Fernie, B. C.—Mr. Stanley, of Spokane, has been awarded the contract for the erection of the new brewing plant at Fernie, B.C., for the Fernie Fort Steele Brewing Company, at contract price \$200,000.

Bella Coila, B. C.—Field Bros., Victoria, B.C., have purchased fifty sections of timber at Bella Coila, B.C., and will erect a sawmill at this place.

Vancouver, B.C.—E. J. Skeans, of Vancouver, has completed arrangements for the erection of a large sawmill on the Alberni Canal, to be in operation this coming fall. The mill will have an initial capacity of 75,000 feet per ten hours. Estimated cost of plant, \$75,000.

Prince Albert, Sask.—The Saskatchewan Harness Company will erect a new building on Solkirk street.

Regina, Sask.—The Regina Flour Mill Company will erect a new mill to replace the one recently destroyed by fire. Mr. A. T. Hunter, Regina, is manager of the company.

Red Deer, Alta.—The Edmonton Cement Company is negotiating with the town council of Red Deer regarding the establishing of a cement works on the river banks near the electric power house. The company proposes to install a plant which will employ ten men.

Edmonton, Alta.—The Edmonton Iron

Works have purchased a site, 390 x 120 feet, on the corner of Clark street and Kintaline avenue. A new foundry, to cost between \$12,000 and \$15,000, will be erected and new machinery will be installed.

Ketchikan, Alaska.—The New England Fish Company, of Vancouver and Boston, propose to erect a large cold storage plant at Ketchikan, Alaska.

Norman, Ont.—A large pump mill will be established at Norman in connection with the big power dam, recently constructed for the W. R. Hurst Newspaper Syndicate. Work on the proposed mill will be started about August 1st.

Owen Sound, Ont.—The sawmill belonging to Nichol Bros., Owen Sound, has been destroyed by fire. The loss is estimated at \$12,000.

Montreal, Que.—The Canada Iron Company, Limited, has been incorporated with a capital of \$3,000,000. The company's headquarters will be in Montreal. Among the incorporators are W. J. White, K.C., J. A. Cameron, H. J. McKeon, A. W. P. Buchanan and J. H. Dillon, all of Montreal.

Victoria, B. C.—The three machine shops of the Victoria Machinery Company, Victoria, B.C., have been totally destroyed by fire. Loss estimated at \$180,000, covered by insurance to the amount of \$30,000.

Gas Plants, Elevators and Warehouses

Toronto, Ont.—The Massey-Harris Company has been granted a permit for the erection of a four-storey warehouse on the south-east corner of Strachan avenue, at a cost of \$20,000.

Cayuga, Ont.—J. J. Murray & Company will erect a new storage house on a site near the Grand Trunk Railway station.

Sarnia, Ont.—The Grand Trunk Railway Company's icehouse, situated just south of the corporation limits, has been completely destroyed by fire.

Toronto, Ont.—The Imperial Storage Company, Toronto, has been granted a permit for the erection of a four-storey warehouse on Clinton street near College street, at a cost of \$20,000.

Fort William, Ont.—The Grand Trunk Pacific has had plans prepared for what is to be known as the Mission Terminal at this place. Plans call for six elevators, four of which will have a storage capacity of 10,000,000 bushels; three large freight sheds, 900x100 feet; a coal dock plant with a capacity of about 1,500,000 tons, and a roundhouse to contain 64 stalls. Other improvements include an extension to the yard system to accommodate 3,600 cars.

Napanee, Ont.—The Napanee gas house has been badly damaged by fire. The whole interior and roof of the building and gas reservoir were destroyed. Loss is about \$5,000, fully insured. The building was owned by Sir R. J. Cartwright.

John, N.B.—At a meeting of the Board of Public Works it was decided to have plans prepared for the erection of the new No. 6 warehouse at this place. Tenders will be called for in the near future.

Portage la Prairie, Man.—The Implement warehouse and offices of T. W. Prout and the livery barns of D. A. Roe and Jas. McTeague, at Portage la Prairie, have been totally destroyed by fire, entailing a loss of \$40,000, with insurance of \$20,000.

Saskatoon, Sask.—The A. McDonald Company, wholesale grocers, Winnipeg, are negotiating for a site on First ave. on which to erect a three-storey warehouse, 50x100 feet.

Stockholm, Sask.—The Smith Grain Company's elevator at this place has been destroyed by fire.

Saskatoon, Sask.—Soldan & McLaughlin will erect a new two-storey cement block building on the site of their present building at the corner of Twentieth street and Third avenue, which is being moved.

Electrical Construction

Toronto, Ont.—Tenders will be received by the undersigned until July 15th, inclusive, for the construction of (a) steel transmission towers; (b) transmis-

sion line cable; (c) erection completion of transmission system, according to plans and specifications on file at Commissioner's office, Continental Life Building. Tenders must be made on form supplied. Mon. Adam Beck, chairman Hydro Electric Power Commission, Toronto, Ont.

Toronto, Ont.—The Board of Control has awarded the contract for the supply of copper wire for the electric fire alarm system to the Wire & Cable Company at 145c. per lb. and to the Canadian General Electric Company for the supply of iron wire at \$14.15 per hundred lbs.

Toronto, Ont.—Architects Chadwick & Beckett, 18 Toronto street have awarded the following contracts for a one-storey brick sub-station to be erected at the north-west corner of Tecumseh and De foe streets, at a cost of \$20,000, for the Toronto Electric Light Company: Masonry and concrete work, J. C. Claxton & Sons, 123 Bay street; carpentry, John McKerracher, 339 Berkeley street; painting and glazing, H. W. Johnson, 209 Church street; plumbing, Taylor & Read.

Listowel, Ont.—The town of Listowel is calling for tenders, to close June 18th, for electric lighting equipment, consisting of gas producers, engines, boilers, generators, switchboards and transmission supplies. For further information apply to J. L. Aiken, consulting engineer, 1003 Traders Bank Building, Toronto.

Merriton, Ont.—The village of Merriton has decided to construct an electric lighting plant at a cost of \$5,600.

Sault Ste. Marie, Ont.—The following buildings in Sault Ste Marie, Ont., have been destroyed by fire, viz.:—Power house of the Lake Superior Power Co.; Tagona Water and Light power house; the Lake Superior Company's power plant and the Soo Pulp and Paper Mill storeroom. Loss estimated at \$300,000, fully covered by insurance.

Niagara Falls, Ont.—The Electric Light Committee of the council has awarded to the Canadian Westinghouse Company, Hamilton, the contract for transformers at \$376 each and a circuit breaker for Amusement Park service, \$103.

Port Hope, Ont.—The Port Hope Electric Light and Power Company's plant has been completely destroyed by fire, entailing a loss estimated at \$50,000.

Winnipeg, Man.—A by-law will be submitted to the ratepayers at the next municipal election for the authorization of the expenditure of \$50,000 for placing wires in underground conduits in the congested parts of the city.

Ladysmith, B.C.—The ratepayers of Ladysmith, B.C., have passed a by-law authorizing the borrowing of \$25,000 for the installation of an electric light system at this place.

Vancouver, B.C.—M. K. Rogers is about to erect a \$40,000 power plant in connection with the development of the Hidden Creek group, located at Goose Bay, Observatory Inlet. Mr. Rogers bonded this group last year and two payments have already been made to the owners, the Hidden Creek Mining Company, of Vancouver.

Edmonton, Alta.—Excavation for the new power house at the foot of Fourth street has been completed and the city will in the near future call for tenders for the erection of the building, which it is estimated will cost \$13,000. The gas producer plant will be installed by the Allis-Chalmers Company.

Calgary, Alta.—The Light and Power Committee has awarded to the Allis-Chalmers-Bullock Company, of Montreal, Que., the contract for supplying an exciter, generator, regulator, etc., for the municipal light plant. Contract price, \$100,000.

Calgary, Alta.—The Light and Power Committee has awarded to the Robb Engineering Company, of Amherst, N.S., a contract for a vertical cross-compound engine for the municipal light plant, at a cost of \$10,226.

Bridges, Wharves and Subways

Ottawa, Ont.—The Railway Commission has decided that a viaduct on Richmond street will have to be provided for without delay. Plans for the proposed viaduct were submitted to the Commission by City Engineer Kerr. The esti-

ated cost of the structure including land damages is \$50,000, of which \$30,000 is to be contributed by the C. P. R. and G. T. R. companies.

Ottawa, Ont.—The Civic Waterworks Committee, Ottawa, has approved the recommendation of the city engineer for the immediate construction of that section of the new aqueduct which is to be built near Kopean Bay, at estimated cost of \$74,000. It is proposed to apply to the city and Municipal Boards for authority for a debenture issue to that amount.

Niagara Falls, Ont.—The Dominion Government has been asked for a franchise authorizing the construction of a new bridge across the river one-half mile above the Cantleiver bridge. The structure will be the connecting link in the proposed Toronto-Buffalo electric railway. Frederick Nicholls, Toronto, represents the Canadian interests in the project.

Gorrie, Ont.—Hill & Co., of Mitchell, Ont., have been awarded the contract for the erection of a new steel bridge at this place at a contract price of \$3,000.

Cobourg, Ont.—Tenders will be received by the undersigned up to 4.30 p.m., June 29th, for the construction of two breakwaters at Cobourg, Northumberland County, Ont., according to plans and specifications to be seen at offices of H. J. Lamb, resident engineer, London; J. G. Sing, resident engineer, Confederation Life Building, Toronto; on application to postmaster, Cobourg, and at Department of Public Works, Ottawa. Fred Gellinas, Secretary, Department of Public Works, Ottawa, Ont.

Clinton, Ont.—The Huron County Bridge Committee met here recently to look over a site for the new bridge to be constructed over the Maitland River near Holmesville.

North Temiskaming, Ont.—The Ontario, Quebec and Dominion Governments will, in all probability, erect a bridge across the Ottawa River at North Temiskaming, which is situated on the river a short distance from the north-east arm of Lake Temiskaming.

Peterboro, Ont.—The Dominion Government has granted the sum of \$5,000 for the construction of two wharves, one at the Wolfe street landing, and one at Mark street landing, in Ashburnham. Work will be commenced at once. A. D. Phelan, chairman of the Board of Works, Peterboro, may be addressed.

Owen Sound, Ont.—The Board of Works has recommended that the city engineer be instructed to prepare estimates and that a by-law be submitted to the ratepayers for the construction of a cement bridge at Union street.

St. John, N.B.—At a meeting of the Board of Public Works a committee was appointed to take up the matter of re-facing the wharf at the Charlotte street extension, which it is estimated will cost from \$6,000 to \$7,000.

St. Andrew's Rapids, Man.—Tenders will be received by the undersigned up to 4.30 p.m., July 8th, for the construction of movable dam, steel service and highway bridge, repair shop, etc., at St. Andrew's Rapids, Red River, Province of Manitoba. Plans and specifications can be seen at this department; at the offices of A. R. Dufresne, resident engineer, Winnipeg; J. G. Sing, resident engineer, Confederation Life Building, Toronto; C. Desjardins, clerk of works, post-office, Montreal, and Ph. Beland, clerk of works, post-office, Quebec. Fred Gellinas, Secretary, Department of Public Works, Ottawa, Ont.

Portage la Prairie, Man.—The city of Portage la Prairie has decided to ask the Railway Commission to compel the Grand Trunk, Canadian Pacific, Canadian Northern and Midland Railways to erect an overhead bridge or a subway on Campbell street.

Vancouver, B.C.—The Dominion Bridge Company, Montreal, Que., has been awarded the contract for the steel superstructure of the two new bridges over False Creek at this place.

Phoenix, B.C.—Engineers will arrive here shortly to lay out the site of the extensive tunnel project to be driven by the Greenwood-Phoenix Tunnel Company, Limited, which will incorporate with a capitalization of \$5,000,000. It is expected that actual operations will be commenced in the near future.

Macleod, Alta.—Hon. W. H. Cushing, Minister of Public Works, Alberta, has made a statement to the effect that the construction of a bridge across Old Man River, at Macleod, will be commenced in the near future.

Red Deer, Alta.—A new steel bridge will be built over the river at this place, which has been made a new divisional point of the C.P.R.

Waterworks, Sewers and Canals

Toronto, Ont.—A by-law will be submitted to the ratepayers of Toronto on June 27th for the purpose of authorizing the expenditure of \$2,400,000 for the construction of a trunk sewer and septic tanks.

Toronto, Ont.—A by-law will be submitted to the ratepayers on June 27th for the purpose of authorizing the expenditure of \$750,000 for the installation of a filtration plant in this city.

North Toronto, Ont.—Mayor Fisher will submit plans and estimate to the council for a filtration bed for the waterworks station. It is also proposed to construct a dam to save the water now lost by the overflow of the springs.

London, Ont.—The City Council has decided to submit to the ratepayers on June 22nd, a by-law to authorize the expenditure of \$60,000 for a new waterworks system.

Welland, Ont.—At a meeting of the Town Council it was decided to expend the sum of \$50,000 on sewer improvements.

Brampton, Ont.—The plans made by Willis Chipman, C.E., Toronto, have been accepted for the construction of a new sewer system in Brampton. The council has been authorized to borrow \$10,000 for the purpose of carrying out this project.

Waterloo, Ont.—The Provincial Railway and Municipal Board has confirmed the by-law of the town of Waterloo to raise \$5,000 by debenture for a waterworks system.

Port Elgin, Ont.—The Provincial Railway and Municipal Board has confirmed the by-law passed by Port Elgin to raise debentures to the amount of \$10,000 for a waterworks system for Port Elgin, Ont.

St. Thomas, Ont.—City Engineer Bell, St. Thomas, has prepared plans for the installation of a filtration plant at Kettle Creek. Estimated cost, \$30,000.

Montreal, Que.—At a meeting of the Montreal Road Committee it was decided to call for tenders for the construction of the fourth section of the Black River sewer, to cost \$60,000; also the Delorimier sewer, to cost \$18,000.

Victoria, B.C.—Tenders will be received by the undersigned up to 4 p.m., June 15th, for supplying and laying certain steel riveted pipes, and also for the installation of two electric driven power pumps in the Yates street pumping station.

Railway Construction

Toronto, Ont.—Contracts have been awarded as follows by the Temiskaming & Northern Ontario Railway Commission Toronto, for the following work: Siders-tracks, North Bay and New Liskeard, O'Boyle Construction Company, Limited, Sault Ste. Marie; two or more water tanks to same firm; freight shed at Valleybury, H. C. Dunbar, Halleybury; waiting room at Thornloe, L. C. Wideman, Guelph; stations at Moose Lake and Dane, J. K. McConnell, Sturgeon Falls; icehouse at Englehart, H. R. Woods, Latchford; five section houses, J. K. McConnell, Sturgeon Falls; brick office and stores at Englehart, O'Boyle Construction Company, Sault Ste. Marie; two 10-foot concrete culverts at mileages 210 and 212, one 16-foot culvert at mileage 113, one 40-foot concrete arch at mileage 184, one 6-foot culvert at mileage 64, three concrete abutments at Englehart, Messrs. Fraser & Clemens, New Hamburg.

Kingston, Ont.—Chas. M. Hays, second vice-president and general manager of the Grand Trunk Railway, has notified the Kingston Board of Trade that extensive improvements will be made to the railway system at Kingston. Mr. Hays also states that the Kingston, Smith's Falls and Ottawa Railway will

be pushed through just as soon as funds permit.

Stratford, Ont.—According to a statement given out by the directors at a recent meeting, the Stratford, St. Joseph Radial Railway is an assured fact. It is understood that the greater portion of the sum of \$500,000 necessary for carrying out this project, will be subscribed by New York capitalists. The directors of the company are Messrs. J. W. Vincent, J. M. Lavlie and J. P. Prudhomme, of Ottawa; Wm. Proudfoot, K.C., Goderich; and G. G. McPherson, K.C., Stratford, Ont.

Toronto, Ont.—The Toronto and Northern Ontario Railway has awarded Fraser & Clemens, New Hamburg, Ont., contracts to the amount of \$70,000 for the construction of its railway.

Ottawa, Ont.—Vice-President Hays, of the Grand Trunk Railway, has submitted plans, prepared by Architects Ross & McFarlane, 61 Bank of Ottawa Building, Montreal, for the proposed Central Station and Chateau Laurier to be erected at Ottawa, at a cost of between two and three million dollars. Plans are to replace the ones prepared by Bradford Lee Gilbert, of New York, N.Y.

Brockville, Ont.—A party consisting of C. Beresford Fox, a member of the firm of Sir Douglas Fox, civil engineers, London, Eng.; C. P. Stuart Morgan, Bristol, Eng.; Dr. A. T. Sillington, Ottawa, president of the Brockville-Ottawa Electric Railway, and Geo. E. Kidd, solicitor, Ottawa, made a tour of inspection over the route of the proposed Ottawa and Brockville Electric Railway. It was authoritatively stated that the line would be built in the near future. Excellent water-power for generating purposes is to be found along the proposed line.

Ottawa, Ont.—At a meeting of the Railway Committee, Ottawa, it was ordered that the Manitoulin and North Shore Railway Company spend \$25,000 on the Manitoulin section before July 15th, at which date it must satisfy the Board of Railway Commissioners of its financial ability to complete the work within two years.

Hull, Que.—The Hull City Council has made an agreement with the C. P. R., whereby the latter will be given double track privileges in connection with its electric system in this city. The company will do the work of lowering the water pipes under the direction of the city engineer. The work will mean an expenditure of at least \$125,000.

Halifax, N. S.—Plans for the improvement of the Cunard property, now owned by the Government, call for the construction of a pier more than 700 feet in length, on which a two-storey building will be erected. The frame of the building will be of steel and the walls and roof of corrugated iron. The floors will be of concrete, and a double track will run the entire length of the building.

Bathurst, N.B.—The freight and coal sheds of the Intercolonial Railway have been destroyed by fire. The loss is estimated at \$15,000.

Winnipeg, Man.—Peter Lyall & Son, Montreal, have been awarded the contract for the construction of the new union station at this place, which will be used conjointly by the Canadian Northern, the Transcontinental and the Grand Trunk Pacific Railway Companies. The building, exclusive of furnishings, will cost \$286,000.

Cardston, Alta.—E. Hoffman, of New York city, is at the head of a Canadian syndicate which proposes building a railway from the American boundary to the south-east of this town to Dawson city. The company, which will be known as the Northern Empire Railway Company, is seeking permission to bond the railway to the extent of \$30,000 per mile. Associated with Mr. Hoffman are H. Roy and R. Balfour, Ottawa, Ont.; C. J. B. Gossekubm, Notre Dame de Stanbridge, Que.; J. J. Flutot, Frank, Alta. It is expected that preliminary surveys will be started at once.

Public Buildings

Toronto, Ont.—The Board of Management of the Toronto Public Library has awarded the following contracts for the erection of the new Western Branch Free Library, at the corner of Queen and

Lisgar streets: Masonry, Thos. Fussell, 63 Poplar Plains road, \$15,649; carpentry, Thos. Lewis, 320 Davenport road, \$3,795; roofing, Flowers & St. Leger, \$635; plastering, Holdge & Sons, 100 King street west, \$1,430; plumbing, Bennett & Wright, 72 Queen street east, \$395; hot water heating, G. Syme, 36 Henderson avenue, \$1,260; painting, Percy Taylor, 3304; electric wiring, Bennett & Wright, \$297.

Montreal, Que.—The governors of Laval University have purchased the Hospice St. Joseph, at the north-west corner of St. Hubert and Demontigny streets, and will convert the building into a public library.

Meaford, Ont.—Plans have been prepared by Architect Forster, Owen Sound, for the erection of the proposed new town hall at this place. The structure will cost \$17,000.

Dresden, Ont.—It is reported that the Dominion Government will erect an \$18,000 post-office at this place.

Ottawa, Ont.—Contracts for the new Arts and Ladies' Building at the Central Canada Exhibition have been awarded as follows: Mason and concrete work, E. A. Rivers, \$5,400; carpenter work, F. Smith, \$1,668; steel work, Dominion Bridge Company, \$2,100; galvanized iron work, McKinley & Northwood, \$326; electric wiring, J. A. L. Eliacont, \$62. Work will be commenced at once. Architects Northwood and Noffke, 26 Central Chambers, prepared the plans.

Port Arthur, Ont.—A by-law will be submitted to the ratepayers of Port Arthur for the purpose of authorizing the expenditure of \$175,000 for the erection of a new municipal building and opera house.

Calgary, Alta.—Plans for the new library to be erected at Calgary, Alta. have been prepared. Options have been taken on two different sites for this building and a by-law authorizing the purchase of same will be submitted to the ratepayers in the near future.

Edmonton, Alta.—The contract for plumbing and installation of heating apparatus in the new post-office building has been awarded to Bennett & Wright, Toronto, at contract price of \$5,000.

Edmonton, Alta.—Tenders were received by the undersigned up to noon, June 13th, for the erection of a court house at Edmonton, Alta. John Stocks, Deputy Minister of Public Works, Edmonton, Alta., can be addressed.

Winnipeg, Man.—Claydon Bros. have been awarded the contract for the construction of the Assiniboine Park Pavilion, at contract price of \$17,360.

Regina, Sask.—Tenders will be received by the undersigned up to 4.30 p.m., June 22nd, for the erection of the Legislative and Executive Buildings on the south side of the Wascona Lake at Regina, Sask. Plans, specifications and forms of tender may be seen at the office of the undersigned, or at the office of E. W. S. Maxwell, architects, Montreal. E. F. Robinson, Deputy Commissioner of Public Works, Department of Public Works, Regina, Sask.

Regina, Sask.—The plans prepared by Architects Storey & Van Egmond, Regina, have been accepted for the new market building to be erected on Oster Square at a cost of \$15,000.

Prince Albert, Sask.—A by-law will be submitted to the ratepayers for the purpose of authorizing the expenditure of \$3,000 for the erection of a new market building at this place.

Battleford, Sask.—The Hub Roofing and Cornice Works, Saskatoon, Sask., have been awarded the contract for the sheet metal work on the Battleford court house. This includes the metal roofing, cornices and ventilating system.

Saskatoon, Sask.—An appropriation of \$34,000 has been made for the erection of an Inland Titles Office at this place.

Vancouver, B.C.—Plans are being prepared for the addition of two storeys to the Court Building, at a cost of \$30,000.

Rosthern, Sask.—A by-law has been passed providing for the expenditure of \$25,000 for the erection, completion, and furnishing of a town hall at this place.

Winnipeg, Man.—Andrew Carnegie has made an additional grant of \$35,000 for an extension to the Winnipeg Public Library.

Grand Forks, B.C.—At the next session of the Dominion Government an appropriation of \$35,000 or \$40,000 will be

made for the erection of a new post-office at Grand Forks, B.C.
St. John's, N.S.—Mr. E. D. Arnaud, Canadian Trade Commissioner in Newfoundland, reports that the Legislature has voted the sum of \$20,000 for the establishment of an experimental farm near this place.

Magog, Que.—The Public Works Department has awarded to Robert Cameron, Almonte, the contract for the erection of a public building at Magog, Que., to cost \$20,000.

Business Buildings

Ottawa, Ont.—Thomas Robertson has been granted a permit for the erection of a wholesale house on Queen street, at a cost of \$20,000.

Sudbury, Ont.—I. B. Laberge has been awarded the contract for the erection of a brick veneer block for Moses & Magder, at a cost of \$7,000. The building will have concrete foundation, flat roof, hardwood and pine interior finish, hot water heating, electric lighting, plumbing, fire escapes, sheet metal work, metal ceiling, and plate glass. E. F. Head, Sudbury, is the architect.

Sudbury, Ont.—M. Luckie has been awarded the contract for the erection of a brick block for G. A. Burroughs, after plans prepared by architect E. F. Head. The building will have stone foundation, flat roof, hardwood interior finish, hot water heating, electric lighting, plumbing, and will cost \$7,000. Specifications also include cut stone, fire escapes, metal ceiling, plate glass.

Sudbury, Ont.—Architect E. F. Head has prepared plans for the erection of a store building, to cost \$5,000, for Jas. McNeal. It will be of brick veneer construction, with concrete foundation, hardwood interior finish, hot water heating, electric lighting, and will be two stories in height. Specifications include sheet metal work, metal ceiling and plate glass. Tenders will be called for about June 15.

Peterborough, Ont.—Patrick Hogan will erect two store buildings on the lot on Hunter street formerly occupied by John Craig's blacksmith shop.

Brantford, Ont.—Negotiations have been closed whereby Messrs. Benedict and Cusin will take over the Mohawk Park for amusement purposes and provide same with the conventional attractions to be found in places of this kind. In addition, this concern is contemplating the erection of a theatre building for concerts and theatrical purposes. Messrs. Benedict and Cusin are connected with Balmly Beach, Buffalo, N. Y.

Brampton, Ont.—The Dale Estate will this summer erect five new greenhouses in Brampton. They will each be 325 feet in length.

Brantford, Ont.—Architects Taylor & Taylor have prepared plans for the Misses Witty for a business block to be erected at the corner of Chatham and Market streets. The building will include three stores, a suite of offices and two dwellings.

Chatham, Ont.—Architects J. L. Wilson, Son & Arnold have prepared plans for the complete renovation of the Oldershaw Block, King street. The ground floor will be fitted up to be used as stores and a new front will be installed.

Renfrew, Ont.—The contracts for the proposed Ellis Block have been awarded as follows: Stone and brick work, Ed. Lafans; carpenter work, W. W. Roberts; plumbing, John Conley.

Cobalt, Ont.—Architect W. R. Graham has prepared plans for the erection of a 66x60 ft. two-story building, to contain three stores and large hall for Graham and Todd. It will be of frame construction, metal clad, piles foundation, Phillip Carey roofing, electric lighting, ornamental iron and plate glass. Cost of building, \$5,000.

Hespeler, Ont.—H. F. Craig is contemplating the erection of a large business block in the near future.

Montreal, Que.—Jesse Applebach has purchased George H. Featherstone's store at 479 St. Catharines street west, and will expend about \$20,000 in renovating the same.

Montreal, Que.—Architect G. A. Moneth, 97 St. James street, has awarded to Joseph Mercure, corner Mt. Royal and Parthenais, the general contract for the erection of a store and dwelling at the

corner of Lafontaine and Pourpart, for Mrs. A. Lamer.

North Hatley, Que.—The Johnston Block has been completely destroyed by fire. The building contained four stores and forty furnished rooms. The insurance of \$5,000 does not cover the loss.

Calgary, Alta.—J. Short has been awarded the contract for the erection of a \$3,000 livery stable in East Calgary for J. Landreville, 401 Sparks street, Ottawa, Ont. It will be two-stories in height, of frame construction, 45x75 ft. Architects, Lowler & Michie.

Strathcona, Alta.—The Public Works Department, Edmonton, Alta., has purchased two lots in Strathcona for the erection of a local telephone exchange building at a cost of \$10,000.

Medicine Hat, Alta.—Oakes & Everard have been awarded the contract for the erection of a \$20,000 store building for James Mitchell.

Prince Albert, Sask.—The Hudson's Bay Company will erect a \$20,000 store building on First street, opposite its present quarters. The building will be of pressed brick with cement basement, and will have all modern conveniences.

Prince Albert, Sask.—T. E. Baker & Sam. McLeod will erect a large business block on Central avenue just south of the Avenue Hotel.

Vancouver, B.C.—J. L. McTaggart has been granted a permit for the erection of a frame store and rooming-house on Hastings street, to cost \$15,000.

Vancouver, B.C.—The National Construction Company has been awarded the contract for the erection of a \$350,000 building in Vancouver, which will be used for general offices, banking, and will have safe deposit vaults. The building will be five stories in height, 10x120 feet, of steel, concrete and stone construction. Architects, Hooper & Watkins, Vancouver, B.C.

Vancouver, B.C.—A permit has been issued to W. T. McMullin for the erection of a three-story brick business block at the corner of Pender street east, and Westminster avenue, at a cost of \$20,000.

Montreal, Que.—The Bible House Company, 76 Union avenue, has been granted a permit for the erection of a store and dwelling to cost \$7,000. The building will be of stone, with concrete foundation and stone cornices; hot water heating. Architect, G. T. Hyde, Ottawa Bank Building; builder, T. Ward, 326 Laval avenue.

Banks

Toronto, Ont.—The Bank of Nova Scotia has been granted a permit for the erection of a four-story brick bank building on Melinda street, near Bay street, at a cost of \$50,000. Architects, Darling & Pearson.

Toronto, Ont.—Architect Eustace G. Bird, Canadian associate with Carraro & Hastings, of New York, has prepared plans for a \$500,000 bank building to be erected at the south-west corner of King and Bay streets for the Bank of Toronto. The building, which will be two or three stories in height, will be constructed of stone and monumental in style. Preliminary sketches have been drawn.

Toronto, Ont.—The Metropolitan Bank has been granted a permit for the erection of a one-story brick bank building on the north-east corner of Queen street and Lee avenue, at a cost of \$10,000. Architects, Darling & Pearson.

Hamilton, Ont.—Thomas Crooks will erect a large bank and apartment building at the corner of King and Macanab streets. The building will be constructed of Bedford lime stone and Kianning brick, with terra cotta cornices. It will be three stories and basement in height. The first floor, which will be occupied by the Dominion Bank, will have marble counters, with brass grill work and floors of mosaic tile. The structure will be equipped throughout with hot water heating and both gas and electric lighting.

Fraserville, Que.—M. Ray Baldwin, Montreal, Que., has been awarded the contract for the erection of a brick bank building at this place for the Bank of Montreal. It will be two stories in height and is to be completed by Nov. 14th. Architects, Peden & McLaren, Montreal, Que.

Winnipeg, Man.—The Dominion Bank Building at this place will be altered at a cost of about \$7,000.

Strathcona, Alta.—The Canadian Bank of Commerce will erect a \$30,000 bank building at Strathcona. Tenders for excavation have been received. The first floor will be used for office purposes and the second floor for the accommodation of the bank staff.

Prince Albert, Sask.—The Imperial Bank is contemplating the erection of a new building on a site opposite the city hall.

St. John, N.S.—The contracts for the erection of the building for the Carleton branch of the Bank of New Brunswick have been awarded as follows: Masonry, H. Mooney & Sons; carpenter work, A. E. Hamilton; painting and glazing, Geo. B. Craigie; heating and plumbing, G. & E. Baker; galvanized iron work, J. E. Wilson; electric lighting, F. E. Jones. All the above firms are of St. John, N.B.

Moncton, N.B.—James Reid, Truro, N. S., has been awarded the contract for the erection of a one-story brick bank building in Moncton, N.B., for the Bank of Montreal. The building is to be completed by Feb. 10, 1909. Peden & McLaren, Montreal, are the architects.

Vancouver, B.C.—E. Cook has been awarded the contract for the erection of additions to the Bank of British North America on Richard street, at a cost of \$30,000. C. O. Wickenden is the architect.

Clubs and Societies

Toronto, Ont.—Architect J. N. Cowan has prepared plans for a club building to be erected at the corner of Bathurst and Adelaide streets for the St. Mary's C. L. and A. A. The building will be a two-story structure, 40x107 feet, of brick construction, with stone front. It will be provided with steam heating, open plumbing, hardwood floors, and will cost approximately \$15,000. The necessary sum to defray the cost of the building will be raised by subscriptions.

Toronto, Ont.—The Board of Control will be asked for a special grant for the erection of a four-room addition to the Boys' Home on George street.

Toronto, Ont.—It is reported that the local Young Men's Christian Association will erect a new building in the future. Wm. Garside, president of the Y.M.C.A., cannot be addressed.

London, Ont.—Parish and, the proposed building, which will be the club quarters of the young men of St. Peter's Catholic Church, will be erected on Richmond street. It will be of brick construction, 150x100 feet, and three stories in height.

Kenora, Ont.—McDiarmid & Co., Winnipeg, have been awarded the contract for the new Y.M.C.A. building to be erected by the C. Y. R. at this place. The company has appropriated \$30,000 for this purpose. The plans call for a building 35x35 feet, three stories and basement in height. The basement will be of stone and the first two stories of pressed brick.

St. Thomas, Ont.—The Locomotive Engineers' Company, capitalized at \$10,000, has purchased a site, having 67 feet frontage and 110 feet depth, on Talbot street, on which they will erect a three-story pressed brick building with grey stone trimmings. The top story will be used as lodge rooms, second story as ball room, cloak rooms, etc., while the ground floor will contain three stores.

Ottawa, Ont.—The Board of Management of the Home for the Friendless is contemplating the erection of an addition to its building. Mrs. Arthur Lindsay, Ottawa, may be addressed.

Montreal, Que.—The Princess Hall Company, 125 Ontario street west, has been granted a permit for the erection of a hall two stories in height, with a concrete foundation, Roman stone and Buff brick front, flat gravel roof, galvanized iron cornices and hot water heating. Cost, \$20,000. Architect, D. Vian, 76 St. Gabriel street; contractor, J. H. Maher, 57 Guardian Lane Building.

Montreal, Que.—The Montreal Amateur Athletic Association is contemplating the erection of a new clubhouse and double decker steel structure for spectators on their grounds here.

St. John, N.B.—Architect H. Mott, St. John, N.B., has prepared plans for a new Temple of Honor Hall to be erected on Main street, north end, for the Alexandra Temple No. 6. The building will cost approximately \$10,000 and will be of brick construction. The ground floor will be used for stores.

St. John, N.B.—St. John the Baptist Society has purchased a site on St. James street, between Charlotte and Germain streets, on which they will erect a clubhouse. The lower portion of the building, consisting of meeting room, bowling alley, billiard room, etc., will be used by the society, while the upper floor will be used for an auditorium.

St. John, N.B.—The Building Committee of the Seaman's Institute has awarded to B. Mooney & Sons the contract for the erection of its new building, which will be located on Prince William street between Princess and Duke streets.

Winnipeg, Man.—The Winnipeg Beach Club purpose constructing a clubhouse on the south side of Boundary Creek at the mouth of the stream. Work on the building will be started next spring. The Provincial Government has been asked for a grant of \$15,000 for the erection of a pier extending out into the lake at this point, and the C.P.R. has undertaken to dredge the creek at its mouth so as to form a harbor.

Nelson, B.C.—Competitive plans will be received up to June 20th for the Eagles' Hall to be erected on Baker street for Aerle No. 22, Nelson. The structure will be two storeys in height, 50x100 feet, of brick and stone construction. For further particulars apply to J. E. Taylor, Chairman of Building Committee, P. O. Box 3, Nelson, B. C.

Coleman, Alta.—The contract for the Coleman Miners' Hall and Opera House has been awarded to Edmond Disney. The contract for the heating system has been awarded to J. Hill. The hall will have a seating capacity of about 700.

Opera Houses and Rinks

Montreal, Que.—J. A. Christian has been granted a permit for the erection of a frame roller rink on St. Catherine street. The building will be 293x130 ft. and will cost \$20,000. F. Tremblay & Co. are the contractors.

Port Arthur, Ont.—H. B. Dawson has received tenders for the erection of a new opera house to seat six hundred at this price.

Edmonton, Alta.—Carl Berch, manager of the Peoples' Theatre, Vancouver, will erect a \$90,000 theatre building here for Vancouver capitalists. The building will be 75x150 feet, with seating capacity for 2,000. The site has been purchased.

Asylums and Hospitals

Welland, Ont.—Marcus Vanderburgh has been awarded the contract for the masonry work on the hospital to be erected at this place.

Brantford, Ont.—The Ontario Government has decided to erect a new building in connection with the Ontario Institute for the Blind at Brantford, Ont. A new heating system will be established throughout the institution.

Brantford, Ont.—At a special meeting of the Six Nations Indians' Council, held here, it was decided to erect a hospital building on the reservation, at a cost of \$5,000.

Quebec, Que.—The following contracts have been awarded for the erection of the St. Sauveur Orphanage for the Gray Nuns, 1 St. Olivier street: Masonry, cement work and plastering, Joseph Chevallier; carpenter and joiner work, Pierre Garneau; structural iron work, L. H. Gaudry & Co. Contracts for heating and plumbing will be awarded in about a month's time. The building will be five storeys in height, of stone and brick construction, 160x45 feet, and will cost \$46,000. Ouellet & Levesque, 115 St. John street, are the architects.

Calgary, Alta.—Tenders were received up to June 8th for all trades in connection with the erection of a new General Hospital building at this place. F. J. Lawson, of this city, is the architect.

Strathcona, Alta.—The Alberta Sanitarium, at Edmonton, will, in the near future, be moved to Strathcona. A site will be procured on the river bank, some distance west of the city, on which a new \$35,000 building will be erected. The sanitarium is controlled by the Seventh Day Adventists.

Regina, Sask.—The city of Regina has invited competitive plans and specifications for the new General Hospital in

connection with the present Regina Victoria Hospital and also a separate Infectious Diseases Hospital. The building will be of fireproof construction. The entire improvement is not to exceed \$100,000 in cost. Particulars can be obtained on application to the city clerk, J. Keiso Hunter.

Ponoka, Alta.—The new asylum for Alberta will be built at Ponoka at estimated cost of \$200,000.

Victoria, B.C.—Plans have been prepared by Architect Dalton, of Dalton & Everley, Vancouver, B.C., for the main building of the sanitarium to be erected at Tranquille, B.C. Dr. Fagan, Provincial Health Officer, estimates that the sanitarium will cost in the neighborhood of \$80,000.

Vernon, B.C.—The directors of the Vernon Jubilee Hospital have awarded the contract for the construction of the new building to T. E. Crowell, of this place, at contract price of \$43,143. The contract for heating and plumbing has been awarded to the Vernon Hardware Company, at contract price of \$14,202.

Victoria, B.C.—The Government of British Columbia has invited competitive designs for the proposed Jubilee Hospital for the Insane, which is to be erected at Coquitlam, near New Westminster, B.C. Printed conditions governing the competition can be obtained on application to undersigned, F. C. Gamble, Public Works Engineer, Lands and Works Department, Victoria, B. C. The competition is limited to architects of the above province.

Schools and Colleges

Toronto, Ont.—The Board of Governors of the University of Toronto have received plans for the new building to be erected for the Department of Domestic Science. The structure will be located at the south-east corner of Bloor street and Avenue road.

West Toronto, Ont.—The Public School Board has commissioned Architects Ellis & Connery, Toronto, to prepare plans for a new school building to be built at the corner of Louisa and Elizabeth streets. It will be two storeys in height and contain eight rooms.

Toronto, Ont.—The University authorities are considering a plan whereby they propose to erect a large heating plant for the heating of all the buildings of the Toronto University. It is estimated the cost would be \$250,000.

Toronto, Ont.—Tenders were received up to June 12th for an addition to Leslie street school, addition to Perth avenue school, alterations to Wellesley school, heating and ventilating system for Lansdowne school and various other repairs, etc. W. C. Wilkinson, secretary-treasurer, Board of Education; M. Rawlinson, chairman of committee.

Toronto, Ont.—The management of the St. Alban's School for Boys will erect a new school building in Weston in the near future. A twenty-acre site, situated on the banks of the Humber river, has been secured.

Toronto, Ont.—Queen's University will erect an observatory of stone construction at the corner of University avenue and Stewart street.

Toronto, Ont.—A site has been purchased on the south-east corner of St. Clair avenue and Avenue Road for the new Methodist Deacons Home and Training School. It is estimated that the building will cost \$100,000, of which \$17,000 has been already subscribed.

Hamilton, Ont.—Tenders have been received for the erection of a school building in School Section No. 8, Saltfleet, according to plans and specifications prepared by F. J. Rastrick & Sons, Architects, 30 King street east, Hamilton.

Hamilton, Ont.—The Board of Education has decided to erect a \$75,000 technical school in rear of the Collegiate Institute.

Ottawa, Ont.—The Garth Company, of Montreal, Que., has been awarded the contract for the installation of the heating and ventilating system for the new collegiate institute building. A contract price of \$15,045.

Dundas, Ont.—The City Council has been authorized to issue debentures to the extent of \$18,000 for the erection of a new high school on the site of the present building.

Fort William, Ont.—The School Board has been granted the sum of \$69,000 for

the erection of an eight-room school building in the Wiley addition, a four-room school in Ward Three and a four-room addition to Ward One school.

Woodstock, Ont.—Plans prepared by Architect McNichol have been accepted for the erection of an eight-room school building in the West End to replace the Delatre street school. The structure will cost \$20,000.

Mimico, Ont.—The Board of Management of the Victoria Industrial School has approved plans for the erection of the workshops to replace those recently destroyed by fire. The new shops will be similar to the old ones, with the exception that they will have concrete floors and roofing will be of fireproof construction. Estimated cost, \$10,000.

Sudbury, Ont.—Architect Ed. F. Head has prepared plans for a \$35,000 school building to be erected here. The building will be two storeys in height, of stone and brick construction, hopper roof, hardwood interior finish, steam heating, electric lighting and plumbing, structural iron, metal ceiling and fire-escapes.

Waterloo, Ont.—The Waterloo School Board has awarded the following contracts for improvements to the public school building: Plumbing and heating, Jacob Conrad sr., \$2,500; mason work, Mook & Krampl, \$9,500.

Niagara Falls, Ont.—Tenders were received up to June 11th for the various works required in converting the upper storey of the Niagara Falls Collegiate Institute into class rooms. Nichols & Robertson, 16 Erie avenue, are the architects.

St. Catharines, Ont.—The City Council has passed a resolution approving of the issuing of \$10,000 in debentures for the construction of a new school building in the north-eastern part of this city.

Oakville, Ont.—A by-law has been passed authorizing the expenditure of \$26,000 for the erection of a new high school building.

Wilkesport, Ont.—Tenders were received up to June 3rd for the erection of a new brick school house at this place, also for repairing the old school building.

Mount Dennis, Ont.—Architects Ellis & Connery, Toronto, have prepared plans for a one-storey brick addition to the superstructure of the public school at this place. A new hot air system will be installed. Estimated cost, \$6,000.

Sherbrooke, Que.—Robert Bennett, Dunnville, has been awarded the contract for the erection of a new school building in Sherbrooke, Que.

Montreal, Que.—A permit has been issued for the erection of a new wing to school building in the Hochelaga Ward, at estimated cost of \$50,000. The addition will be of brick and stone construction, with concrete foundations, tin roof, and will be 75x42 feet, ground dimensions. J. Venne, 402 Pleassis street, is the architect.

Montreal, Que.—The Royal Institute for the Advancement of Learning, McGill University, will make the present Mechanics Building fireproof by replacing the wooden floors, etc., with steel and concrete, at estimated cost of \$45,000. Dryers & Anglin, 18 St. Alexis street, have the contract for the work.

Quebec, Que.—Architects Ouellet & Levesque, 115 St. John street, have prepared plans for enlarging the Catholic school on Bayard street.

Fraserville, Que.—W. Laclanche & Son have been awarded the contract for the erection of the proposed two-storey school building. It will be of brick construction, with stone foundation, galvanized iron roof, wood interior finish, open plumbing, and will cost \$7,550. Architects Ouellet & Levesque, 115 St. John street, Quebec, have prepared the plans.

Moncton, N.B.—The School Board has decided to ask for legislation to empower it to issue bonds to the extent of \$37,500 for the erection of a new school building.

Wolfville, N.S.—Tenders were received up to June 11th for the erection and completion of the new Carnegie Science Building at the Acadia University. Plans and specifications for the proposed structure were prepared by Architect C. H. McClare, of this place.

St. John, N.B.—Architect H. A. Mott has prepared plans for the new Winter street school, to be erected on the lot north of the present building.

Halifax, N.S.—Messrs. Faulkner & McDonald, of Sydney, N. S., have been

awarded the contract for the erection of the new Technical College at this place.

Winnipeg, Man.—The School Board has awarded to John Saul the contract for the erection of an addition to the Malvey street school, at a cost of approximately \$56,000.

Winnipeg, Man.—A by-law has been passed by the ratepayers of Kildonan, Winnipeg, authorizing the expenditure of \$6,000 for the erection of a new public school building.

Winnipeg, Man.—The Manitoba Agricultural College, Winnipeg, has decided to erect a machinery hall, having a tower for the installation of meteorological apparatus, and an engineering and mechanical building. The latter building will be of white brick and stone, three storeys in height, 100 feet square.

Minnedosa, Man.—The plans prepared by Architect W. W. Blair, Winnipeg, Man., have been accepted for the new high school building to be erected here at a cost of approximately \$20,000.

Elgin, Man.—An additional storey will be built to the public school building this summer at an estimated cost of \$3,000.

Morris, Man.—A by-law has been passed authorizing the issue of debentures to the extent of \$11,000 for the erection of a new school building at this place.

Regina, Man.—The plans prepared by Architects Storey & VanEdmond have been accepted for the new Collegiate Institute which is to be erected at a cost of \$100,000. The building will be of brick construction, with white stone trimmings and will have glass rooms, physical and chemical laboratory, reception room, assembly hall, principals' room, teachers' rooms, cloak rooms, etc. All stairs are to be enclosed by fire walls and provided with automatic fire doors. The structure will be equipped with fire escapes. Ground dimensions, 75x170 feet.

Moose Jaw, Sask.—A by-law has been passed authorizing the expenditure of \$10,000 for the erection and equipment of a new collegiate institute at this place.

Asquith, Sask.—Architect W. W. Lachance, Saskatoon, Sask., will receive tenders up to June 15th for the erection of a two-storey school building at this place. The building, which will cost \$1,000, will be of frame construction, with concrete foundation, galvanized iron roof, interior finish, hot air heating, metallic bath and steel work.

Whitewood, Sask.—Plans and specifications have been prepared for a six-room solid brick school to be erected at this place. S. B. Gillis, sec-treas. School Board, can be addressed.

Francis, Sask.—The contract for the erection of the new public school building at this place has been awarded to the McCartney-Fowler Co., of Regina, at contract price of \$10,250.

Lang, Sask.—Plans prepared by Architects Storey & VanEdmond, of Regina, Sask., have been accepted for the erection of a new solid brick school building at this place.

Craik, Sask.—T. J. Brocklebank, Brandon, Man., has been awarded the contract for the erection of a school building at Craik, Sask. The structure will cost \$19,000.

Prince Albert, Sask.—Plans prepared by Architect Roland V. Lines, of Edmonton, have been accepted for the \$75,000 school building to be erected here. The building will be two storeys in height, of brick construction, with stone trimmings. Plans provide for seven class rooms, chemical and physical laboratories, library, museum, auditorium, reception rooms, teachers' rooms, toilet rooms, with shower baths.

Humbolt, Sask.—Architect W. W. Lachance, Saskatoon, Sask., will receive tenders up to June 15th for the erection of a school building in Humbolt, Sask. The building will be two storeys in height, of frame construction, with stone foundation, single roof, fire interior finish, hot air heating. F. H. Wilson is secretary-treasurer of the School Board. Estimated cost of structure, \$5,000.

Vermilion, Alta.—Tenders will be received by the undersigned up to June 20th for the installation of a steam heating plant in the Vermilion Centre School. Plans and specifications may be seen at the office of H. A. Fieldhouse, secretary-treasurer of School Board.

Vancouver, B.C.—The plans prepared by Architects Pearce & Hope have been

accepted for the new school building to be built on Sixteenth avenue.

Vancouver, B.C.—The plans prepared by Architect Stanley Milton have been accepted for the additions to be built to the Grandview and McDonald Schools.

Everett, B.C.—The Board of Education has called a special election for June 13th to vote on the proposition of bonding the district to the extent of \$200,000 for the erection of a new high school at this place.

New Westminster, B. C.—The plans prepared by Thornton Sharp, Vancouver, have been accepted for the new west-side school to be erected at this place.

Churches

Toronto, Ont.—Architect C. F. Wagner, 15 Toronto street, has recently received tenders for the erection of a church at the Beach for the Baptist congregation. The building will be of brick construction, with stone trimmings, hot air heating and electric lighting, stucco and plaster relief work and art glass windows. Ground dimensions, 60x60 feet. Estimated cost, \$15,000.

Toronto, Ont.—The congregation of the Westmoreland Methodist church has been granted permit for the erection of a two-storey brick church on the corner of Westmoreland avenue and Hallam street, at a cost of \$30,000. Architects, G. M. Miller & Co. Builders, Elgie & Page.

Ottawa, Ont.—Joseph Bourque, Hull, Que., has been awarded the contract for the erection of the new Sacred Heart Church, on Laurier avenue, Ottawa, at contract price of \$103,000.

Hespeler, Ont.—The Presbyterian congregation will erect a new church building in the near future.

Carleton Place, Ont.—The contract for rebuilding Zion Church and Sunday School annex has been awarded to Cavris & McRae, at contract price of \$14,075. This does not include excavation, seating, heating or finishing, which it is estimated will cost at least \$2,500.

Lakefield, Ont.—Abel Hendron has been awarded the contract for the erection of the new Methodist church on Regent street. The building will cost \$10,000.

Eglington, Ont.—The congregation of the Methodist church is contemplating enlarging their church and Sunday school room at estimated cost of \$10,000.

Derwent, Ont.—Contracts have been awarded as follows for the erection of the new Salem Methodist church at this place: Carpentry work, W. J. Robinson & Co., Lambeth, Ont.; masonry, Wm. Scott, London, Ont.

Stratford, Ont.—Tenders have been received for the erection of a building for the Lutheran congregation. Plans for the structure were prepared by J. S. Russell.

Peterboro, Ont.—The Methodist congregation will erect a new church building at the corner of Romaine and Aylmer streets.

Brucefield, Ont.—S. S. Cooper, Clinton, Ont., has been awarded the contract for the erection of the new Presbyterian church at this place.

Chatham, Ont.—Tenders have been received for the erection of a Sunday school building for St. Andrew's church. Plans and specifications were prepared by Architects J. L. Wilson, Son & Arnold.

Montreal, Que.—The German Lutheran congregation has awarded to J. E. Moore the contract for the erection of their new church. The building will be two storeys high, with frontage of 36 feet and depth of 73 feet, will have concrete pile foundation, stone front, pitch roof of slate, cornice of wood and iron, hot water heating. The building will cost \$21,000. Architect R. Rodden, 3 Beaver Hall Sq., prepared the plans.

Brownburg, Que.—Contracts have been awarded as follows for the erection of a new Presbyterian church to be erected here: Brick work, cement work and plastering, Jas. W. Cottingham, Lachute, Que.; carpentry work, J. Lalande, St. Andrew's Que.

Inverness, N.S.—F. L. Dixon, Sydney, N.S., has been awarded the contract for the erection of the new Presbyterian church building at this place.

Winnipeg, Man.—The congregation of All Saints' church have decided to rebuild their church and parish house on the present site.

Roblin, Man.—Architect J. H. G. Russell, Winnipeg, has prepared plans for a church building to be erected here for the Presbyterian congregation. The building will be two storeys in height, of frame construction, with single roof, interior finish, hot air heating and electric lighting.

Winnipeg, Man.—Plans have been prepared by Architect Herbert E. Matthews, for the new church building to be erected on Maryland street, between Ellice and Portage for the congregation of St. Matthew's church. The building will be 62x90 feet, of brick and stone construction, and will cost about \$25,000.

Winnipeg, Man.—Rev. Father Cordes has taken out a permit for repairs to the extent of \$12,000 on St. Joseph's church, Winnipeg, which was recently gutted by fire.

Lethbridge, Alta.—The following contracts have been awarded for the erection of the new Presbyterian church at this place: General contract, with exception of heating and plumbing, Wm. Oliver; heating and plumbing, Hunt & Nicholson. The structure will cost \$31,000.

Vancouver, B.C.—V. O'Dell has been awarded the contract for the enlargement of St. Michael's church, at contract price of \$4,700.

Vancouver, B.C.—Tenders have been received for additions and alterations to Christ church on George street. Plans and specifications for the improvements were prepared by Architects Dalton & Eveleigh, Davis Chambers.

Vancouver, B.C.—Architect W. W. Carley has prepared plans for addition and alterations to be made to the St. Andrew's Presbyterian church.

Residences and Flats

Toronto, Ont.—Dr. Harvey Vaux, 15 Gerrard street east, has been granted a permit for the erection of a two-storey concrete and stone residence at the corner of Roxborough and Chesnut Park road, at a cost of \$10,000. Architect, H. Townsend, 15 Gerrard street east, builders, Elgie and Page, 21 Havelock street.

Toronto, Ont.—Alfred Johnston, Spadina road, has been granted a permit for the erection of a two-storey and attic brick dwelling on east side of Park road, near Crescent road, at a cost of \$12,000. Architects and builders, Darling & Pearson.

Toronto, Ont.—Architect W. Fletcher Stephens, Toronto, has prepared plans for a block of residences to be erected at the corner of Shaw and Moor streets, at a cost of \$150,000. The structure will be two storeys and attic in height, of solid brick construction, with stone foundation, slate roof, hot water heating, electric and gas lighting, the work, mantels, structural iron, sheet metal work and art glass. Owner's name withheld.

Toronto, Ont.—Architects Spratt & Rolph have awarded the following contracts on the \$20,000 brick residence to be erected at 23 North Sherbourne street, near Elm avenue, for E. D. Gooderham, 55 Prince Arthur avenue: Carpentry, A. Willer & Co.; plumbing, heating and wiring, W. J. McGuire, 54 King street W.; painting, F. E. Phillips, 49 Richmond street E.; plastering, John Boyce, 39 Kensington avenue.

Toronto, Ont.—Architect F. H. Pinney, 43 Victoria street, has prepared plans for a two storey and attic, 26x12 ft., residence to be erected on Palmerston Boulevard for C. Coulter. The building will be of brick construction, with hardwood interior finish, brick mantels, open plumbing, electric lighting and hot water heating; (Daisy Boller specified). Cost, \$7,000.

Toronto, Ont.—Architects Simpson & Young, 15 Toronto street, have prepared plans for a two storey and attic residence to be erected on Dundonald street for Miss J. Semple. The building will be of brick construction, with slate roof, hardwood interior finish, mantels, electric lighting, open plumbing and hot water heating.

Toronto, Ont.—Architect J. H. Galloway has awarded the following contracts on a two-and-a-half-storey brick and stone residence to be erected on Avenue road for Dr. W. S. Grimshaw, at a cost of \$6,000: Masonry, Cooney & Rider; carpentry, Sim & Smart, 372 Markham street; trimmings, Elmbra Interior Woodwork Company; plumbing, H. W. Rob-

son, 99 Westmoreland avenue; painting and glazing, Robert Morse, 61 Marlborough avenue.

Toronto, Ont.—Sir Wm. Meredith, Alexandra Palace, University avenue, has been granted a permit for the erection of a two storey and attic stone and brick residence on the south side of Binscarrth road (Rosedale), at a cost of \$17,000. Architects, G. M. Miller & Co.; builders, Ham & Reid, Brock avenue.

Toronto, Ont.—William Haws, Toronto, has purchased the property on the north-east corner of College and Robert streets with frontage of 170 feet on College and depth of 132 feet, on which he will erect a large apartment building to cost approximately \$45,000. Mr. Haws is controller of the apartment house on Sussex avenue and Spadina road.

Toronto, Ont.—Dr. Geo. E. Cook, 502 Board of Trade Building, has been granted a permit for the erection of a two storey and attic brick dwelling on the north-east corner of St. George street and Bernard avenue, at a cost of \$18,000. Architect, J. Francis Brown; builders, Denev Bros.

Toronto, Ont.—Architects Ellis & Conery have prepared plans for a one-storey and basement, 34x50 ft. dwelling, to be erected on Oriole road for A. Johnson. The building will be of grey stone construction, with slate roof, hardwood floors, brick mantel, plumbing, electric lighting, hot water heating and will cost \$4,500.

Toronto, Ont.—Architects Stroud & Saunders have completed plans for a ten room residence to be erected on St. Clair avenue, near Avenue road, for T. P. Stewart, who will construct the building by day work. It will be of brick and stone construction, with stained shingle roof, hardwood interior finish, mantels, tile work in bathroom, electric and gas lighting, plumbing and hot water heating. Cost, \$6,000. Building will be two storeys in height, 26x39 feet.

Toronto, Ont.—Architect P. H. Finney, 43 Victoria street, has awarded the masonry contract for the erection of a two-storey, 22x35 feet, brick and stone residence to be erected on Rouge Hill, Kingston road, for E. Morgan, to E. White, 129 John street. The building will be provided with hardwood interior finish, two brick mantels, hot water heating and will cost \$5,000.

Port Arthur, Ont.—Architect H. B. Aylesworth has prepared plans for the erection of a large apartment building in this place. The structure will be three storeys in height, of fireproof construction and will contain sixty rooms, bathrooms, etc.

Ottawa, Ont.—Architect W. E. Noffke has received tenders for a \$7,000 residence to be erected on Daly avenue for Mr. S. Myers. The building will be two and a half storeys in height, of brick construction, with stone foundation, stain shingle roof, hardwood interior finish, hot water heating, electric lighting and open plumbing, mantels and art glass.

Ottawa, Ont.—Architect W. E. Noffke, 26 Central Chambers, has prepared plans for a \$3,500 residence to be erected on Rideau street for E. G. Lavandure. It will be two and a half storeys high, of brick construction, with galvanized iron roof, pine interior finish, mantels, sheet metal work, metal ceiling, electrical work and open plumbing.

Sudbury, Ont.—Architect E. F. Head has prepared plans for a \$6,000 residence to be built for James McCool, Sudbury. The building will be of solid brick construction, with stone foundation, shingle roof, hardwood interior finish, hot water heating, electric lighting, plumbing, the mantels, art glass, refrigerator.

Sudbury, Ont.—Architect E. F. Head has prepared plans for a pair of semi-detached dwellings for Mrs. (Dr.) Irwin, to be erected at a cost of \$12,000. The building will be of brick veneer construction, stone foundation, shingle roof, hardwood and pine interior finish, hot air heating, electric lighting, plumbing. Specifications include cut stone, tile, mantels.

Waikerville, Ont.—Williams Bros., architects, Curry Block, have prepared plans for a two and a half storey residence to be erected for A. Bartlett. It will be of frame construction, with brick foundation, shingle roof, oak interior finish, combination lighting and heated with

furnace, tile work, mantels, ornamental columns or caps, plate glass, art glass plastic relief work. Estimated cost, \$3,500.

Hamilton, Ont.—Architect Chas. Mills has taken out a permit for the erection of an office and apartment building on the corner of King and Macnab streets for Thomas Crooks. It is understood that the building will cost \$40,000.

Ottawa, Ont.—Architect W. E. Noffke, 26 Central Chambers, has prepared plans for a \$5,000 residence to be erected on the Driveway for Chas. Routh. The building will be two and a half storeys in height, of brick veneer construction, stone foundation, stain shingle roof, hardwood interior finish, hot air heating, electric lighting and open plumbing.

Chatham, Ont.—John G. McKenzie has been awarded the contract for remodeling the residence on Park street belonging to R. Riddell & Sons.

Montreal, Que.—C. G. Eadie, 804 Sherbrooke street west, has been granted a permit for the erection of a residence to cost \$10,000, after plans prepared by Architects Hoyle & Davis. The building will have stone foundation, stone front, and flat gravel roof. J. Morrison, 207 Guy street, has the general contract.

Montreal, Que.—Architect G. A. Moquette, 97 St. James street, Montreal, has designed six dwellings to be built on St. Andrew street for J. A. Labrique.

Montreal, Que.—La. Fabrique de St. Charles, Montreal, has been granted a permit for the erection of a \$25,000 residence according to plans prepared by Architects Marchand & Haskell, 164 St. James street. Boileau Freres are the contractors.

Cap Rouge, Que.—Architects Oullett & Lesvesque, 115 St. John street Quebec, have prepared plans for a two-storey residence to be erected for J. Bourbon. The building will be of brick construction, with stone foundation, galvanized iron roof and will cost \$5,000.

Fraserville, Que.—W. Luchance & Son have been awarded the contract for the erection of a two-storey presbytery for the Roman Catholic congregation. The building will be of brick construction, with stone trimmings, stone foundation, galvanized iron roof, hot water heating, electric lighting, open plumbing, and will cost \$18,500. Oullett & Lesvesque, 115 St. John street, Quebec, are the architects.

Winnipeg, Man.—Plans for a large apartment block, to be erected at the corner of River avenue and Tache streets, have been prepared by Architect V. W. Horwood. The building will be 70x50 ft., three storeys and basement in height, and will contain fourteen apartments. Specifications call for tile floors in the vestibule, marble wainscot in main hall, wrought iron balconies, sound-proof partitions and hardwood finish throughout. The structure will cost in the neighborhood of \$60,000.

Winnipeg, Man.—L. Jorundson has been granted a permit for the erection of a three-storey apartment block on the north-east corner of Qu'Appelle and Kennedy streets at a cost of \$56,000. It will be 40x120 feet and contain twenty-nine suites. Architect D. W. Bellhouse designed the structure.

Winnipeg, Man.—Geo. H. Walton has been granted a permit for the erection of a brick apartment block at the corner of Hargrave street and Broadway. The building will be four storeys and basement in height and will cost approximately \$100,000.

Winnipeg, Man.—H. A. Mullins will, in the near future, erect a large apartment block on the corner of Donald street and St. Mary's. The property has a 50 ft. frontage on St. Mary's and 120 ft. in Donald street.

Winnipeg, Man.—The Davenport Apartment Company, Limited, has been granted a permit for the erection of a four-storey apartment block on the corner of Broadway and Edmonton street, at a cost of \$110,000. The building will be 118x115 ft., and will contain 44 suites.

Winnipeg, Man.—F. Thorpe will erect four frame cottages on the north side of Alloway street, at cost of \$400 each.

Winnipeg, Man.—R. V. Deniston has awarded to Davidson Bros. the contract for the erection of a \$15,000 brick veneer residence on Roslyn road.

Winnipeg, Man.—Architect W. W. Blair has prepared plans for an apart-

ment block to be erected on the s. w. corner of Qu'Appelle and Carlton streets. The proposed structure will be 120 by 100 ft., five storeys and basement in height, and will provide for sixty-four apartments of four to seven rooms each; finished throughout in oak. It will be as nearly fireproof as possible, with walls of brick and stone construction, floors of reinforced concrete or tile and partitions of hollow tile. The vestibule of the main entrance will have marble steps and wainscoting. An elevator service will be installed.

Calgary, Alta.—The Calgary Building Company has been awarded the contract for the erection of a two and a half storey residence for H. A. Sinnott. Architects Dowler & Michie prepared the plans.

Red Deer, Alta.—Contracts have been awarded as follows for the erection of a Roman Catholic presbytery at this place: Masonry, Julius McIntosh; carpentry, McKee & Cruickshank, both local contractors.

Calgary, Alta.—Architects Dowler & Michie have prepared plans for a pair of semi-detached residences to be erected for Wm. Hunter, 313 6th Avenue, at a cost of \$3,500. The structure will be of frame, with concrete foundation, shingle roof, hot air heating, electric lighting, enamel plumbing.

Saskatoon, Sask.—Architect W. W. LaChance has prepared plans of a two-storey frame residence to be erected for F. J. Johnston, at cost of \$3,000. The building will have stone foundation, shingle roof, fir interior finish, hot air heating, electric lighting, tile work mantels, ornamental columns or caps and plate glass. Tenders will be received up to June 15th.

Vancouver, B. C.—Architect Henry B. Watson has prepared plans for a six storey apartment block to be erected at the corner of Georgia and Alberni streets.

Hotels

Ottawa, Ont.—The City Council has referred to a committee the revised plans for the Chateau Laurier, which will be erected at Ottawa by the Grand Trunk Railway Company. The new plans call for a building to cost \$1,500,000.

North Bay, Ont.—The proprietors of the Atlantic Hotel have decided to enlarge their establishment by the erection of an addition which will be three storeys in height, and will contain thirty-five rooms. Plans have been prepared by H. Angus.

Caledonia Springs, Ont.—The Canadian Pacific Railway Company is contemplating the erection of a \$2,000,000 hotel building at Caledonia Springs this coming summer.

Chapleau, Ont.—Architect Ed. F. Head, Sudbury, Ont., is preparing plans for additions and alterations to hotel building of H. A. West at this place. The addition will be of brick veneer construction, with stone foundation, flat roof, hardwood interior finish, metal ceilings, hot water heating, electric lighting, and plumbing, and will be three storeys in height. Estimated cost of improvement, \$5,000.

Edmonton, Alta.—The Palace Apartment Co., Ltd., will erect a \$135,000 hotel building on the s.e. corner lots of Fifth street and Jasper avenue. It will be 100 by 120 ft., of solid brick and stone construction, and will have 120 bedrooms, 16 sample rooms, dining room, etc. F. W. Lannic is president of the company. E. E. Hopkins, of Hopkins & James, is the architect.

Alameda, Sask.—Edward Shore, of Estevan, Sask., is having plans prepared for the erection of a \$20,000 hotel building, in Alameda, Sask., on a site which he recently purchased.

Langain, Sask.—Architect W. W. LaChance, Saskatoon, will receive tenders up to June 15 for the erection of a hotel building in Langain, Sask., at a cost of \$20,000. The building which will be erected for J. A. Hartmann, New Hamburg, Ont., will be three storeys in height, of frame construction, with stone foundation, composition roof, fir interior finish and steam heating, mantels, escapes, sheet metal work, plastic relief work, plate glass, ornamental columns and caps, and refrigerator.

Banff, Alta.—It is stated that next year's C. P. R. estimates will provide

for alterations and additions to the C. P. R. hotel at Banff, Alta., at cost of about \$2,000,000.

Parrrsboro, N.S.—The summer hotel belonging to John Broderick, Parrrsboro, N. S., has been completely destroyed by fire. Loss estimated at \$10,000, with insurance of \$5,000.

Vancouver, B.C.—Architects Dalton & Eveleigh, have been commissioned to prepare plans for a hotel to be erected at the head of North Arm, for the Indian River Park Company.

Vancouver, B.C.—Hayter Reed, Inspector of the C. P. R. hotels, has stated that a new wing will be added to the Hotel Vancouver, but that work will not be commenced until next spring.

Fire Stations and Jails

North Toronto.—A by-law will be submitted to the rate-payers of North Toronto, for the purpose of authorizing the expenditure of \$5,500 for the erection of a fire hall, and installation of a fire alarm system.

Richmond, Ont.—A by-law will be submitted to the rate-payers of Richmond, Ont., in the near future, for the purpose of authorizing the expenditure of the sum of \$20,000 for fire stations, sidewalks, and sewers.

Prince Albert, Sask.—A by-law will be submitted to the rate-payers for the purpose of authorizing an expenditure of \$8,300 for the erection and equipment of a second fire hall in this city.

Saskatoon, Sask.—Architect W. W. LaChance has prepared plans of a two story brick fire hall to be built at a cost of \$20,000. It will have stone foundation, composition roof, steam heating, fir interior finish, electric lighting, structural iron, ornamental iron, vaults, sheet metal work, and plate glass.

Calgary, Alta.—At a recent meeting of Chairman Mitchell's committee it was decided to recommend to the Council that the offer of the C. P. R. to donate a site for a fire station on Seventeenth avenue west, on condition that the city would immediately build and install the necessary apparatus, be accepted.

Lethbridge, Alta.—The Hon. W. H. Cushing, Minister of Public Works, has been in Lethbridge looking over a site for the new jail. Mr. Cushing states that both a jail building and court house will be erected this year.

Richmond, Ont.—A by-law will be submitted to the rate-payers of Richmond, Ont., in the near future, for the purpose of authorizing the expenditure of the sum of \$20,000 for fire stations, sidewalks and sewers.

Civic Improvements

Toronto, Ont.—The following contracts for pavements have been awarded by the Board of Control: Gosson Company, Hamburg, Bloor street to Van Horne, \$12,120; Bloor street, Dufferin to Lansdowne, \$14,353; Parliament street, Winchester to Westport, \$8,639; Wakeley avenue, Dufferin to Lansdowne, \$7,939; Conduit street, Dundas to west city limits, \$3,300. Constructing and Paving Company, Northumberland, Ossington to Delaware, \$1,980. City Engineer, Gore street, Clinton to West end, \$1,263; Steeles avenue, Conduit to Chelsea, \$2,998. All the above contracts are for asphalt pavements. City Engineer, Wickson avenue, Yonge to West end, bitulithic, \$7,988. Constructing & Paving Company, Bathurst street, King to Queen, vitrified block, \$13,923. City Engineer, Parliament street, King to Mill, vitrified block, \$8,372; Keele street to Howard Park road, grading, \$4,000.

Gananogue, Ont.—W. A. Dolan has been awarded the contract for the laying of 50,000 square feet of granolithic walks in Gananogue this coming summer, at contract price of 13 1-2 cents per foot.

Petawawa, Ont.—The Militia Department has awarded to Elliott Bros., of Kingston, the contract for the plumbing work at Petawawa Camp.

Winnipeg, Man.—The Provincial Telephone Department has awarded the contract for telephone wire to the Wire and Cable Company, and for weather-proof iron wire, to the Canadian General Electric Co., both firms of Montreal.

Calgary, Alta.—The citizens of Calgary have passed a by-law providing for the expenditure of \$25,000 for public improvements, as follows: Installation of

sewers, extension of water system, and improvements to the new island park. The sum of \$15,000 will also be expended for the construction of two subways under the C. P. R. tracks.

Lethbridge, Alta.—Hon. W. H. Cushing, Minister of Public Works, Alberta, states that 700 miles of telephone lines will be installed in Lethbridge this year.

Calgary, Alta.—At a meeting of the City Council it was decided to expend the sum of \$125,000 for pavement on the following streets: Eighth avenue, from Fourth street west to Second street east; First street west, Centre street, First street east, Second street east.

Strathcona, Alta.—Tenders have been received for the new local telephone exchange building, to be erected by the Public Works Department of the Provincial Government. The building will be a two storey brick structure, 23 by 67 ft., and will cost approximately \$10,000.

Prince Albert, Sask.—A by-law will be submitted to the rate-payers of this place for the purpose of authorizing the expenditure of \$12,500 for the grading and filling in of certain streets, and the building of wooden sidewalks.

Sattleford, Sask.—The Town Council will expend the sum of \$9,000 on sidewalk construction this summer. They will also make extensive improvements to the waterworks system.

Edmonton, Alta.—The Public Works Department has awarded to the Northern Electric Company, of Montreal and Winnipeg, the contract for 700 miles of long-distance telephone material.

Speculative Building

The reason why a man buys a house instead of, as formerly, buying a lot and building, is accounted for by the fact that the practice of speculative building, as it is called, has increased to such an extent that it is now claimed a man can buy a house already built for better terms than it is possible for him to build one, and, naturally, the great bulk of people do the thing that apparently costs them the least trouble and expense.

When a young man takes up the question of building a home in a great city, says The Record and Guide, he discovers that a less sum of ready cash is needed when buying from a builder than when building for one's private order. Most men are not so situated that they can pay all cash for a lot and have means enough left also to erect a house thereon without borrowing funds.

The builder will take a small cash payment and instalments thereafter until the second mortgage is paid off, and one of the reasons for the great building boom in the suburbs of recent years has been the aid which builders have given to homeseekers.

In other words, the individual builder of houses has disappeared and the large operator, the man who puts up rows of houses, has taken his place. It is, of course, said that houses put up in this way are not well built, and the same might be said of a good many of the houses built by people for their own use; for, while a man who is building a house which he intends to occupy as his home is supposed to have stronger reason for making it substantial than one who is merely building to sell, yet that does not always prove to be the case.

It will probably be recognized as true that in proportion to the entire number built there were quite as many shoddy houses put up under the old system as is the case at present; for the building regulations are more stringent and exacting and run into more money than those which were enforced some years ago. Then, also, materials are higher and labor is better paid, so that altogether it costs more to build now than it did a few years ago. But the cost is still not prohibitive to the individual builder, and as far as the more elaborate houses are concerned they are still put up directly by the families which intend to occupy them. It is also possible to build houses of a modern character and at an expenditure that will show some profit to the builder when he comes to place them on the market.

Of course, the main call for houses lies within the range of prices from \$4,000 to \$5,000 or \$9,000, and the problem is how

to furnish houses that can be offered within that range. In trying to solve this, builders have been on the hunt for ground which can be had on such terms as to bring the cost within such limits. This fact of the demand for houses and the efforts made to meet it explain the remarkable extension of the city in all directions. New suburbs of the city have sprung up with a rapidity that seems almost marvellous, and a person who does not move about a good deal with his eyes open is apt to find in the city where he lives a good deal that is to be seen that he never saw before.

In this period of the city's growth there seems to have been but very little question as to the market for houses when once built. The principal question is the securing of ground on such terms as to make it possible to put up houses that can be sold so as to show a small profit. The latter is also a feature of the modern movement, for that has been the practice right along, and, in fact, in view of the competition and the advance in wages and in materials, the main source of profit for such enterprises has been in the land, and then also the saving due to the wholesale method of building.

A New Industrial Township

An inland town, surrounded by the mountains of western North Carolina, is now the home of one of the most striking examples of the phenomenal industrial growth of the South. At Canton, N.C., the erection of an industrial township has just been completed. The entire plant which forms its nucleus will be devoted to the production of wood fibre, and was erected at a cost of more than \$2,000,000. The capacity of the plant is rated at 250 tons a day, making it the largest wood-pulp factory in the United States, if not in the world.

The various buildings, which comprise this industrial plant, are twenty-five in number, and an especially significant feature of the undertaking is the fact that the township was created rather than developed. The projectors of the plant, whose whirling machinery now furnishes employment for half a thousand men, were confronted some few months ago by the unbroken solitude of a forest country. Three or four rough log huts represented the sum total of the evidence of previous human activity. The contrast of such a picture with the scenes of industry which now obtains gives an inkling of the magnitude of such a transformation.

Canton is in Hayward County, on the Murphy branch of the Southern Railway, eighteen miles from Asheville, N.C. The site of the plant includes some forty acres of the valley country, lying between two parallel mountain ranges; surrounding it is the small town of buildings necessary to care for the material needs of the workmen. Over 10,000,000 brick and 50,000 barrels of cement alone were used in the construction work, and the erection of railroad spurs were necessary in order to obviate long cartage, and its incident expense and delay. During the course of operation nearly 4,000 cars of material were received.

The many buildings which make up the plant offer some interesting illustrations of modern fireproof mill construction. Constructed of concrete, steel and brick, some of the structures present almost the appearance of character of some of the modern buildings which are found in our first-class cities.

Notice to Contractors

Sealed proposals for construction, complete, including plumbing, heating and electrical work, endorsed "Proposals for Civic Hospital" will be received by the City Clerk, J. H. Trusdale, Saskatoon, Sask., up to 10 o'clock July 3rd, 1908. Proposals shall be accompanied by a cheque for 5 p.c. of the amount of the tender, and the contractor to whom the work is awarded will be required to furnish surety bond in the sum of \$5,000. The right is reserved to reject any and all tenders. Drawings and specification may be consulted and blank forms of proposal obtained at the offices of the City Clerk, or W. W. LaChance, architect, Saskatoon, Sask.

THE PULLMAN VENTILATOR.

THE subject of good office ventilation is receiving much more attention to-day than has been the custom in the past, and well, indeed, is it that such should be the case. Men spend nearly half of their lives in offices and it is essential that good, pure air be provided to ensure health. Breathing pure air makes people strong, energetic, optimistic, successful, happy and long-lived.

At a recent meeting of the Tuberculosis League one of our prominent doctors pointed out how industriously some people foster the growth of tuberculosis in maintaining irrespirable atmosphere in their homes through fear of opening their windows. The Pullman Intakes at the bottom of the window admit the fresh air without a draught, dust, smoke or other extraneous matter. The air is deflected and diffused through the room, replacing the columns of foul, vitiated, expired air which have arisen to the top of the room and expand themselves out through the Pullman Exhausts. The size and number of intakes and exhausts to be installed are determined by the size of the rooms, the number of their occupants, and the atmospheric conditions, both inside and outside.

Often in presenting this system of ventilation the question is asked whether the admitting of outside air directly, that is, without first being heated, effects the temperature of the room to an appreciable extent. It does not because of two special facts: First, by the Pullman System of Natural Ventilation only 100 cubic feet of fresh air per person per hour is required, and this amount is admitted gradually, and not all at once. Secondly, because of the great affinity cold air has for heat. The importance of securing a supply of fresh air without first being heated is not fully realized by the layman. Indeed, air which has been heated before admitted to the rooms is not fresh air. By such methods it has been forced over coils of heated pipes, causing a large percentage of oxygen to be burnt and the residue forced into the rooms as fresh air. Such air, by common experience we know, has lost its freshness, its enervating qualities.

Previous to the past ten years the Pullman System of Ventilation was not in use. At that time the alarming increase of mortalities from lung troubles led scientific men to inquire into the cause. Governments appointed special committees who conducted investigations in all directions. Sanitation, foods and ventilation were some of the channels of inquiry. The latter received probably the greatest amount of attention, and the conclusions of all the elaborate reports were that a natural system of ventilation was the most healthful and only proper one.

The report of the select committee on ventilator appointed by the British House of Commons gives the most decided approbation of the natural system of ventilation. It says: "When natural ventilation is properly and scientifically applied it invariably proves more successful than mechanical or other forms of artificial ventilation, and it has the advantage that it cannot get out of order or break down, costs but little to apply and nothing to maintain." This view is confirmed by another high authority, Dr. John Hayward, who says: "Natural ventilation certainly is much to be preferred to any and every artificial system, and it is, of course, much less complicated. It also involves very little original outlay and no permanent cost of maintenance." Sir Douglas Galton, F.R.S., gives like testimony: "It is far better to trust to ventilation by nature—natural ventilation—than to the artificial methods of pumping in of air." The ordinary

lay mind would naturally ask what is meant by a natural system of ventilation. As its name implies it is a system which aids and allows nature to take its course. In summing up his report on ventilation before the Special Committee of the House of Commons, Professor Wade, of Oxford University, drew the following conclusions:—

"Ventilation can only be successfully accomplished at all times when it is effected without assistance from mechanical or artificial contrivances. However perfect these may appear they can never achieve results superior to those insured by judicious and intelligent adaption of natural means." The Pullman System of Natural Ventilation is becoming very popular in Canada. Many important buildings are already equipped with this system and stand to prove the claims of the selling agents, Messrs. William Stewart & Co., of its efficiency. This firm has offices at 224 Board of Trade, Montreal, and 20 Saturday Night Building, Toronto.

FIRE-PROOF BOX FOR MOVING PICTURE MACHINE.

IT seems as though man's ingenuity always asserts itself whenever a necessary improvement is met with or a new difficulty is to be overcome. Where there is an element of danger present he immediately becomes active to counteract it, prevent it, or render it impossible. Whether or not he is actuated by the desire of accomplishment or a commercial motive is of little concern to those who are benefited by his invention. He has done his community or the people a good service and is entitled to his just recompense.

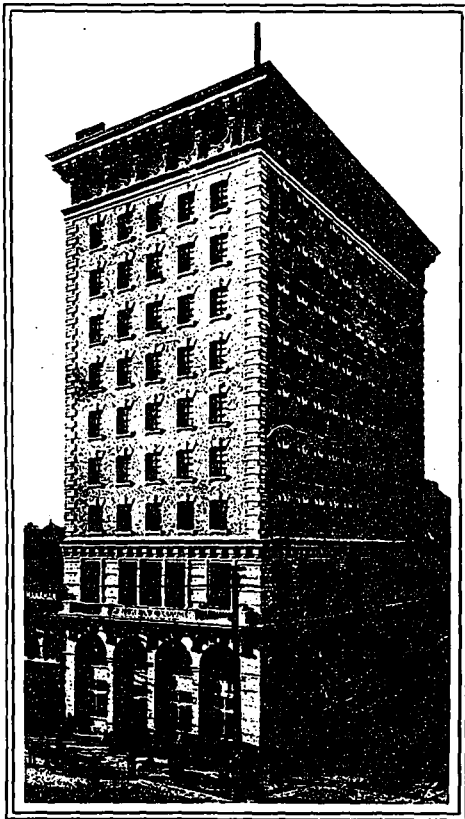
The peril of fire has commanded no little attention and numerous devices and appliances have been evolved to either overcome the flames or to arrest their progress. The latest addition, in this respect, is a fireproof box for enclosing moving picture machines. Since the Boyertown theatre disaster and several recent accidents of a similar nature, less fatal, moving picture resorts have come to be regarded as a great menace to both life and property. As the machine is invariably situated over the front entrance of buildings devoted to this form of entertainment and as it is at this point where a fire generally starts, the lives of the patrons are placed in the greatest jeopardy.

Underwriters have given the matter grave thought and in some instances have not only threatened to cancel all insurance on buildings utilized for this purpose but have increased the rates on adjoining properties to no little extent. The danger of fire seemed omnipresent, due in the main to the need of a proper enclosure for the machine, which in event of an explosion or ignition would confine itself to the compartment which contains it and prevent the flames from spreading to the auditorium and creating a panic or endangering other portions of the structure. It is claimed that the greatest danger in these resorts is from the machine as the high rate of speed at which the films travel produces a friction that is generally the cause of the fire starting. With a view of remedying the existing condition, A. B. Ormsby, Limited, of Toronto and Winnipeg, some time ago applied for a patent on a fireproof box which practically assures places of this kind, a new lease on life. The box is built strictly to the Fire Underwriters' requirements and is both endorsed and recommended by this body. It is made of a wooden core, covered with kalamined iron, which is

drawn into the wood at a very high pressure, the wood and the iron practically becoming one. The advantage of its construction over iron put on by hand is, that the latter would bulge from the wood allowing an air space in which, under severe exposure, gases would form resulting in combustion and the exposure of the wood to the flames. In addition the box is equipped with an automatic sprinkler which at a certain degree of heat opens and pours forth a deluge of water, thereby extinguishing the flames. There is also a door for the escape of the attendant. This firm has already installed a number of these boxes in Toronto and, judging from the many enquiries received, it is likely that the demand for this device will be large. The A. B. Ormsby, Limited, has also established a reputation as manufacturers of fireproof windows, and enjoy a patronage in this line which extends all over the Dominion.

TERRA COTTA FIRE-PROOFING

THE NATIONAL FIREPROOFING CO., reputed to be the largest organization in the world, whose business is the manufacture of materials for, and the construction of, fireproof buildings, has opened offices in the Traders Bank Building, Toronto. The company manufactures terra cotta, hollow tile fireproofing, and its standard system of floor construction, partitions, and columns and girder covering, has met all the requirements for safe fireproofing and structural strength for the past thirty years.



BUILDING OF THE UNION BANK OF CANADA, WINNIPEG, IN WHICH THE NATIONAL FIREPROOFING COMPANY'S MATERIALS AND METHODS OF FIREPROOFING HAVE BEEN ADOPTED.

In long span floor construction, the demand for which has greatly increased during the last few years, the

company's "Johnson System of Long Span Floors" is said to be the strongest, lightest and most economical fireproof floor and roof construction that can be specified; over five million feet of it has been laid in modern fireproof buildings throughout the United States alone.

No higher tribute could have possibly been paid to any concern dealing in fireproof materials, than that accorded to the National Fireproof Company by the insurance companies in adopting its material and methods in the construction of the Fire Insurance Underwriters' Laboratory at Chicago. The building as it stands to-day, completed, serves as a standard for safe construction and a model of safety from fire.

The many fine structural features of this building and the double purpose for which it is intended, are ably set forth in a handsomely illustrated booklet issued by the company for architects and builders, under the title of "The City Unburnable." One of the buildings in Canada in which the company's methods and materials have been employed, is the Union Bank Building in Winnipeg, shown in the accompanying illustration. It incorporates every essential of fireproof construction, and is without a doubt one of the finest structures in the Dominion.

The rapid growth of Canada and the increasing demands for a high type of fireproof buildings, has led the company to establish itself in this country. The excellent quality of this concerns tile is unquestioned and its facilities for the manufacture, delivery and erection of terra cotta fireproofing materials are the best.

The National Fireproofing Company is always prepared to demonstrate the efficiency of its materials and methods of fireproofing and the services of its corp of engineers are placed at the disposal of those interested in the design and construction of buildings of this character. The company has issued a number of interesting booklets, containing colored plates showing typical shapes of terra cotta hollow tile blocks for floor and column protection and perspectives of typical floor arch, together with much other valuable information. These booklets will be furnished the architects and prospective builder upon request.

MONTREAL MAN PROMOTED

MR. T. E. RYDER, manager of the Transmission Department of the Canadian Fairbanks Company, Limited, Montreal, has been appointed manager of the company's St. John, N. B., house. Mr. Ryder is well known to the trade and his many friends will be pleased to learn of his advancement. The eastern district offers a wide field for the products of the Canadian Fairbanks Company, particularly gas engines, scale and mill supplies, and the company is to be congratulated in having a man of Mr. Ryder's ability to promote its interests at the St. John branch.

CHANGE OF ADDRESS

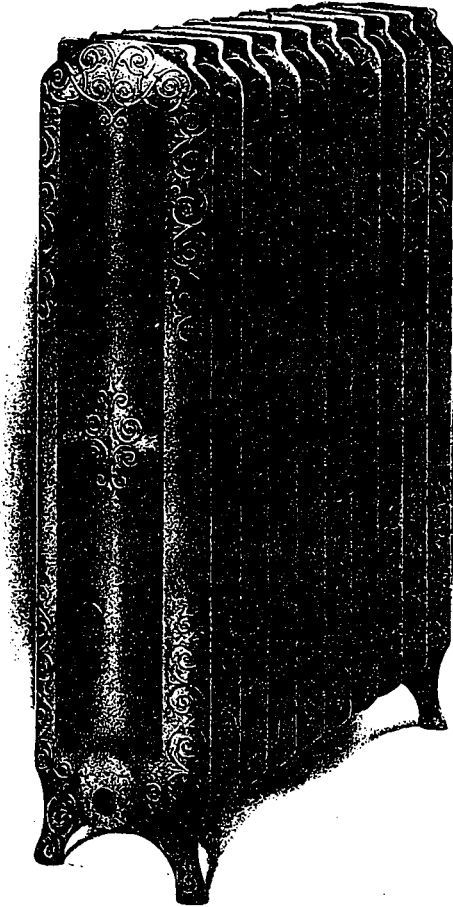
THE firm of Pitt & Robinson, who have had offices in the Manning Chambers, Toronto, have changed their address, and the firm hereafter will be known as Pitt & Company, with offices at Niagara Falls, Canada. It will be remembered that this firm of engineers recently completed the large reinforced concrete factory for Clarke & Clarke, of Toronto, in which building they demonstrated not only their ability as structural engineers in reinforced concrete, but proved the practicability of the "Niagara System."

It is announced that they recently have been awarded the contract for the chemical mills to be erected in Haliburton, Ont., for the Wood Products of Canada, Limited. The plant will comprise four buildings, a water-tower 75 feet high, with 50,000 gallon tank on top, and a dam 200

THE KING RADIATOR

Scientifically, Practically and Mechanically
IS A MASTERPIECE

and is, without question, the most perfect Steam and Hot-water Radiator
on the Canadian Market.



King Radiators are graceful and artistic in design, are honestly built and UNEXCELLED in performance—full rated surface guaranteed—measure them, then compare with others.

THE KING RADIATOR CO., Limited

St. Helens Ave. near Bloor, TORONTO

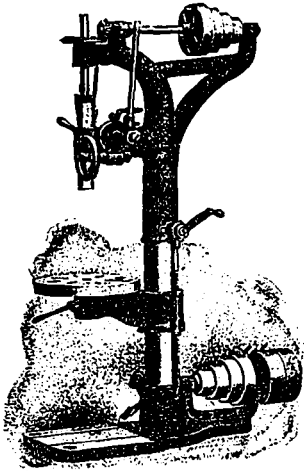
CLUFF BROTHERS, - TORONTO

SELLING AGENTS

feet long, all of which will be of concrete construction, reinforced with "Niagara Bar" throughout. This contract is a large one, and Pitt & Company are to be complimented upon their success in securing same. All future correspondence with this firm should be addressed to Pitt & Company, Imperial Bank Chambers, Niagara Falls, Canada.

NEW 20-INCH UPRIGHT DRILL

THE CANADIAN FAIRBANKS CO., LTD., has brought out a new 20 in. plain wheel and lever feed upright drill, an illustration of which we show herewith. It is compact and convenient, strong and serviceable, and meets all the requirements of a general utility machine. Among the characteristic features are noted the combined lever and wheel feed, each independent of the other when in use; the feed mechanism which is very strong and adapted for heavy or light drilling; and the cone pulleys which provide for four speeds. The spindle is counterbalanced, and has quick return. Provision is made for taking up lost motion. The table has vertical adjustment on the column by means of a screw and can be swung to one side allowing the use of base plate, when necessary. A clamp table is provided insuring quick



CANADIAN FAIRBANKS COMPANY'S NEW 20-INCH PLAIN WHEEL AND LEVER FEED UPRIGHT DRILL.

action, and the drill is controlled by a foot lever giving the operator the free use of his hands.

The dimensions of this drill are as follows: feed of spindle 8 in., spindle to base 42 in., diameter of table 16 in., diameter of spindle in bearing 1 5/16 in., diameter of column 5 1/4 in., driving pulleys 9 1/2 x 2 1/4. Its speed is 300 revolutions per minute, and its weight 600 lbs. The floor space necessary is 18x46 in. The hole in spindle is Morse taper No. 3. Such drills as this usually sell in the neighborhood of \$100 but the Canadian Fairbanks Co., Limited, are offering this machine at a special price of \$75 complete. Further details may be had by addressing the above company at any of its warehouses, which are located at Montreal, Toronto, St. John, Winnipeg, Calgary and Vancouver.

ACCEPTS NEW POSITION

MR. WILKINSON, formerly with The Eureka Mineral Wool Company, has accepted the assistant managership of the Canadian branch of the Lunkenheimer Company, of Cincinnati, manufacturers of valves, brass goods, etc.

SEMI-ANNUAL MEETING OF N.A.B.M.

THE semi-annual meeting of the National Association of Brass Manufacturers was held at the King Edward Hotel, Toronto, June 9-10, about 65 delegates being present from all parts of the United States. Among the more important business transacted was an amendment to the constitution, enlarging the scope of the association so as to take in Canada. This will undoubtedly meet with the approval of Canadian manufacturers in this line, as heretofore the organization has not gone beyond the American borders, and previous efforts to have the association enlarge its territory were unsuccessful.

The question of altering the tests on brass goods was thoroughly gone over and referred to a committee consisting of Messrs. Webster, Ryan and Hoelscher, with instructions to have their recommendations issued July 1, 1909, the same to become effective January 1, 1910. A number of other topics of general interest to the trade were also discussed, and the many valuable papers, dealing with modern methods of manufacture, were well received.

Among the applicants who were admitted to membership were several Canadian manufacturers, and the numerical strength of the organization in Canada promises to be substantially increased in the near future.

A special vote of thanks and appreciation was extended to Torontonians, and to Mr. Fred Somerville especially, for the hospitable and courteous treatment received while in Toronto. The next meeting of the association will be held in Detroit, Mich., September 15th-16th of this year.

The officers of the organization are:—President, C. J. Hills, of the Haydenville Co., Haydenville, Mass.; Vice-President, Edward F. Neidchen, of the Hoffmon & Billings Mfg. Co., of Milwaukee, Wis.; Directors, Edward C. Register, of F. C. Register, Jones & Co., Baltimore, Md.; E. J. Seitz, Union Brass Metal Mfg. Co., St. Paul, Minn.; H. M. Hoelscher, of Wolff Mfg. Co., Chicago, Ill.; J. W. Sharp, jr., of Haines, Jones & Cadbury Co., Philadelphia, Pa.; E. L. Strauss, Central Brass Mfg. Co., Cleveland, Ohio; Commissioner, Wm. M. Webster.

REGINA ARCHITECTS WIN IN COMPETITION.

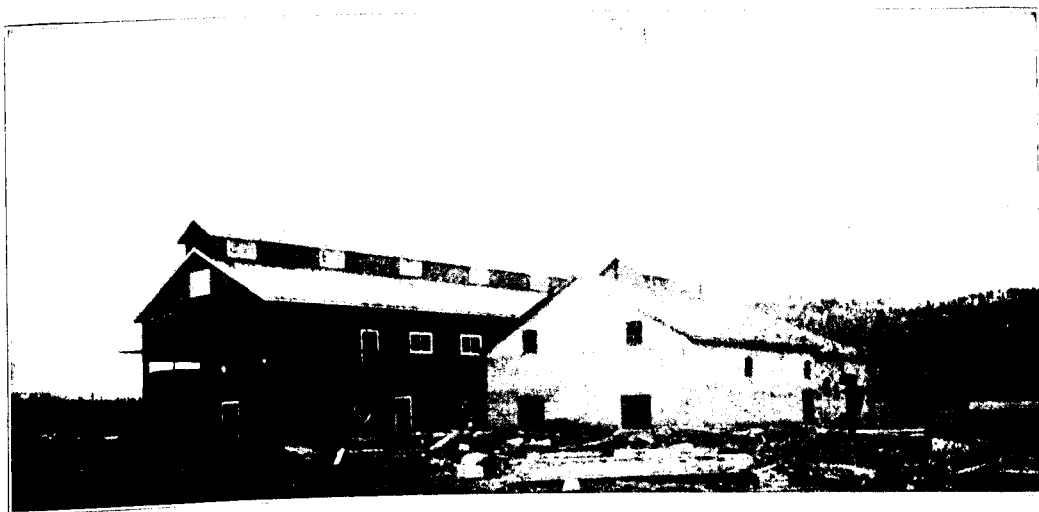
STOREY AND VON EGMOND, of Regina, have been selected as the architects for the new Collegiate Institute to be erected in that city. This firm's design was accepted in a competition in which a number of prominent architects participated.

The plans call for a red pressed brick and stone building, 170x75 ft., two storeys and basement in height. It will contain ten class rooms, two laboratories, teachers' rooms, principal's room, reception room, manual training department, recreation rooms, lavatories and large assembly hall. The interior walls will be of brick. All rooms will be finished in oak and will have maple floors. The floors in the corridors will be of tile. The plaster throughout the building will be applied on metal lath and the stairways will be of iron with slate treads.

A low pressure direct and indirect system of steam heating with fan system of ventilation and water spray cleanser will be installed, as will also a temperature regulating system. Final plans and specifications will be ready about June 15, when tenders will be invited. The building will cost approximately \$100,000.

Storey and Von Egmond have also been successful in the competition for the new Regina market building to cost \$15,000. Their design provides for a building 36 ft. x 130 ft. one storey and basement. Common white brick walls, concrete floors, metal tile roof, wire screen partitions, steam heating and a brine system of cold storage.

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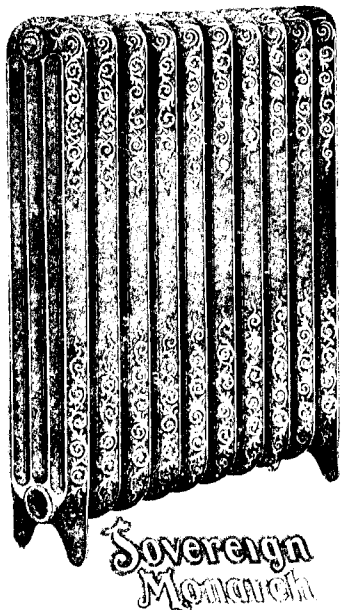
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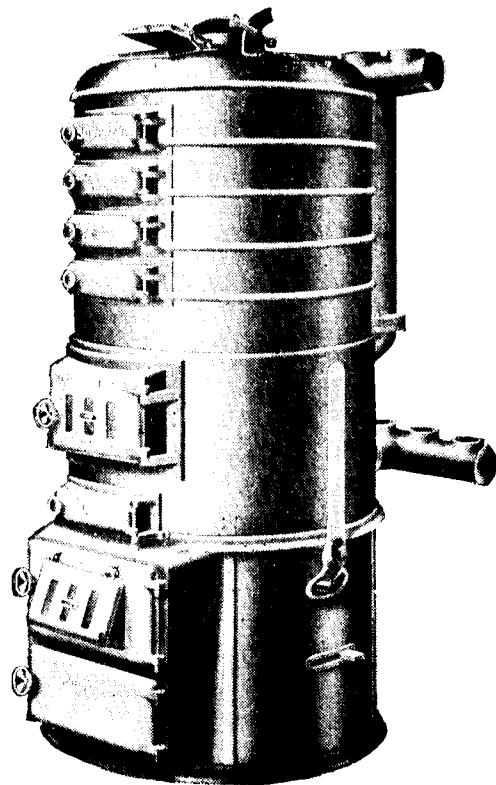
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IN a previous advertisement in "Construction" we went into the question of low-cost construction in NIAGARA SYSTEM of Reinforced Concrete. In this number we wish to give particular attention to the SIMPLICITY, and what we call the "ELASTICITY OF APPLICATION" of the NIAGARA BAR to the problems of construction in concrete.

☐ Under the "Niagara System" the shear members may be attached to any form of plain or deformed tension bar now on the market with only slight variation in the shape and size of the clip such as "Ransome," "Johnson," "Thacher," "Twisted Lug," or "Kahn Cup," bars, making the simplest method of attaching stirrups which it is possible to devise, and increasing the efficiency of any one of these bars.

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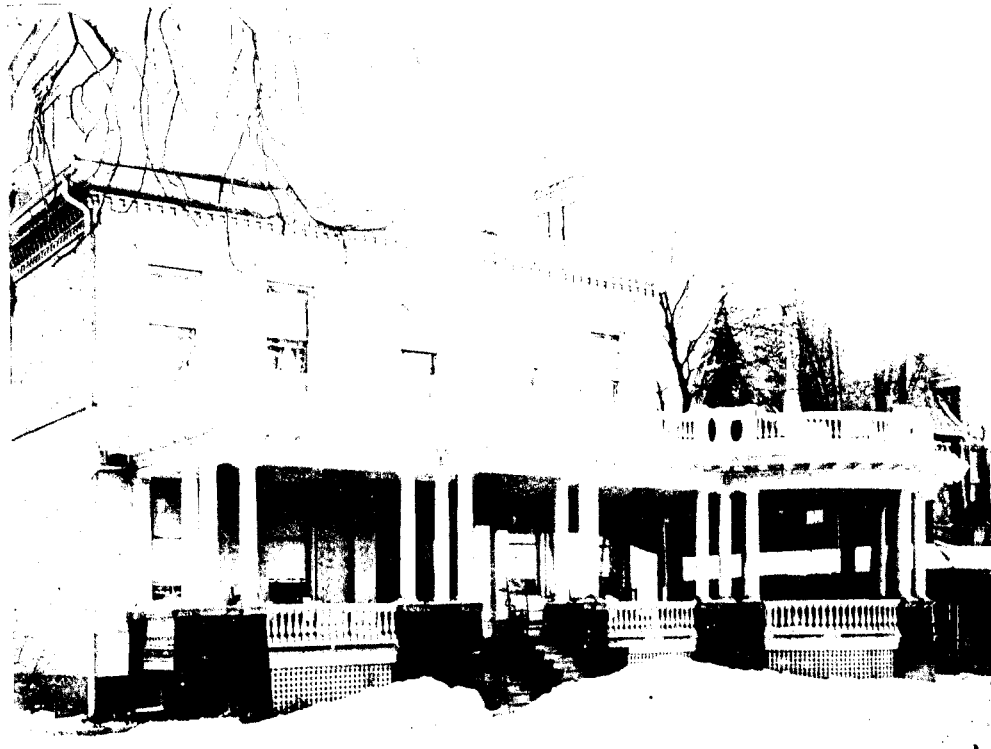
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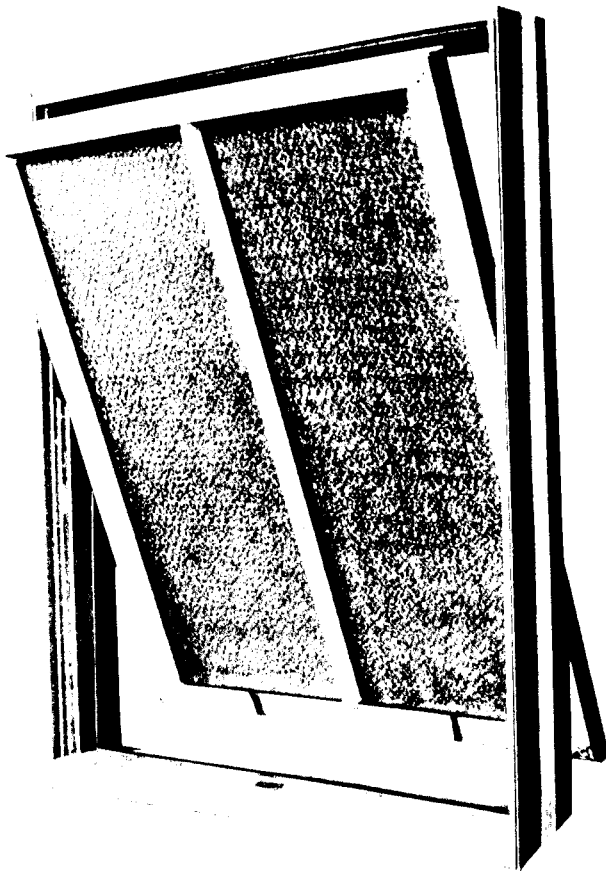
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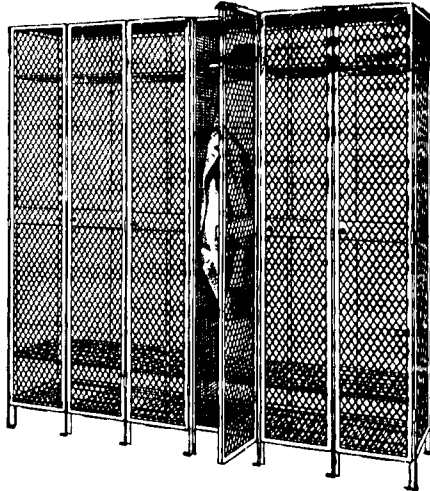
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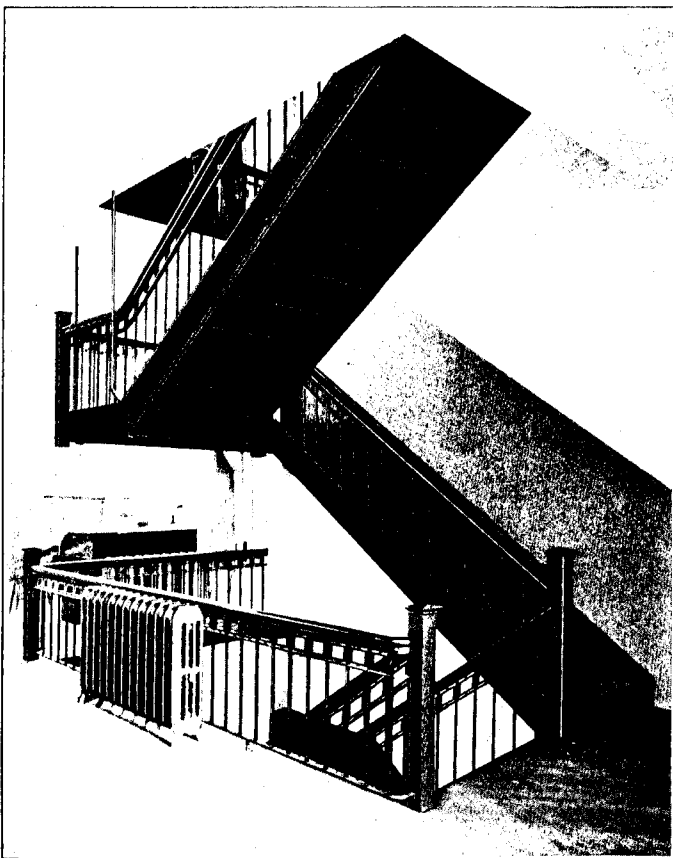
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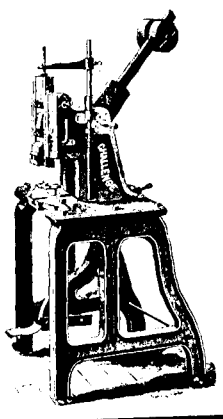
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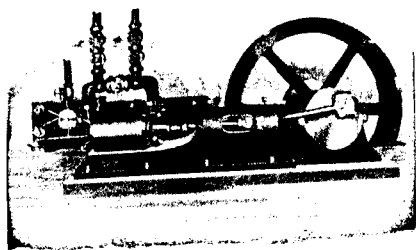
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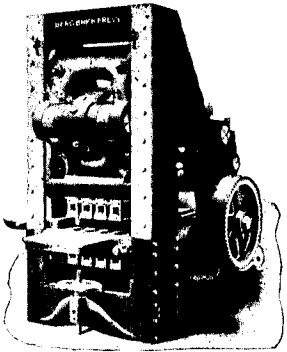
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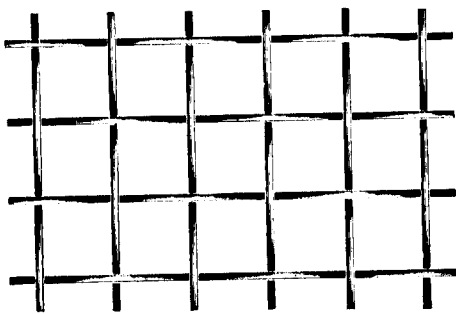
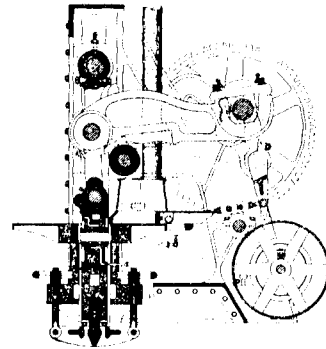
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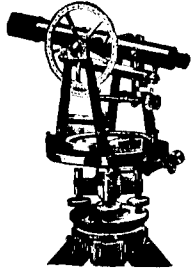
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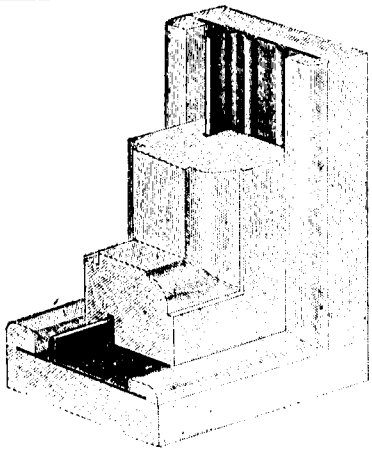
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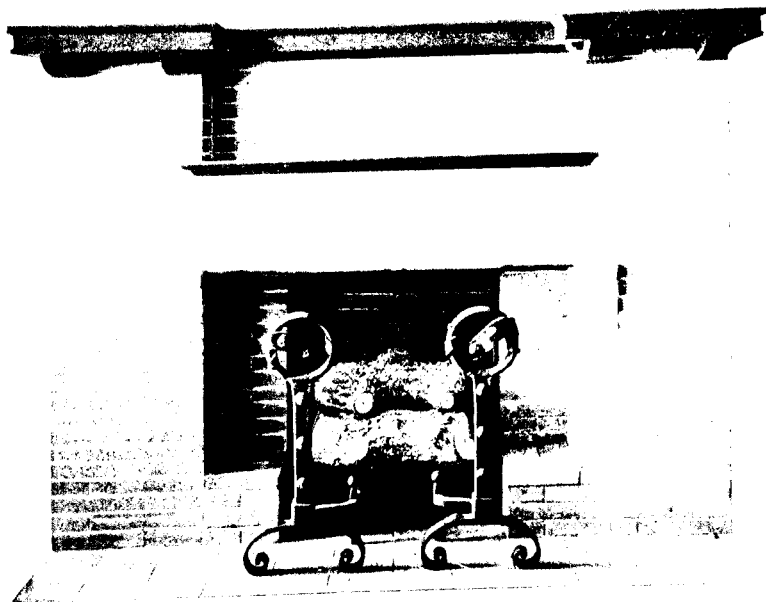
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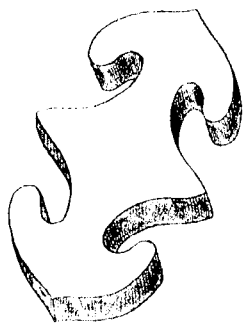
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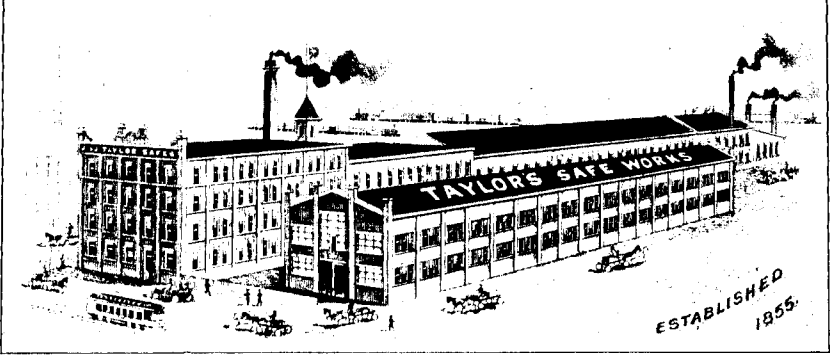
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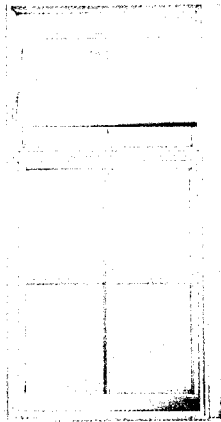
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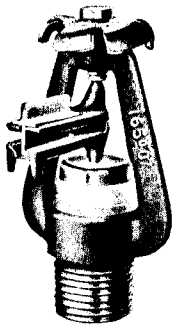
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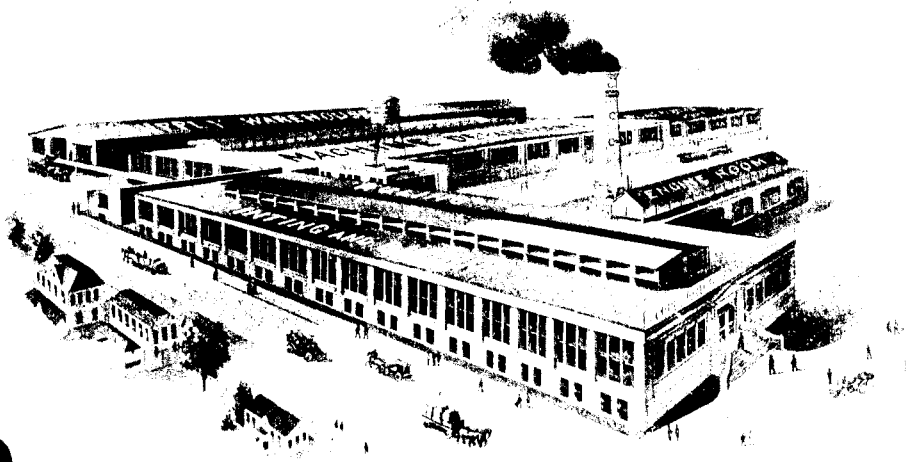
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STRUCTURAL STEEL.

Gaudry & Co., L. H., Coristine Building, Montreal; 76 Peter Street, Quebec; Roy Building, Halifax.

SWITCH GEAR (Electrical)

Gas, Electric & Power Co., Stair Bldg., Toronto.

TERRA COTTA FIREPROOFING.

Eadie-Douglas Co., 22 St. John St., Montreal.
 Don Valley Brick Works, 36 Toronto St., Toronto.

E. F. Dartnell, 157 St. James St., Montreal.
 Francis Hyde & Co., 31 Wellington St., Montreal.

The Milton Pressed Brick Co., Milton, Ont. 75 Yonge St., Toronto. 204 St. James St., Montreal.
 David McGill, Merchants Bank Chambers, Montreal.

TILE (FLOOR AND WALL).

Canada Plate & Window Glass Co., Limited, 49 Richmond St. East, Toronto.
 David McGill, Merchants Bank Chambers, Montreal.

WALL HANGINGS.

Deecker & Carlyle, 26 Yonge St. Arcade, Toronto.
 The Thornton-Smith Co., 11 King St. West, Toronto.

WATER HEATERS.

Canadian Fairbanks Co., Montreal, Toronto, St. John, Winnipeg, Calgary, Vancouver.
 Somerville, Limited, 59 Richmond St. E., Toronto.
 Drummond McCall & Co., Montreal, Toronto.

WATER WORKS SUPPLIES.

Somerville, Limited, 59 Richmond St. E., Toronto.
 Canadian Fairbanks Co., Montreal, Toronto, Winnipeg and Vancouver.