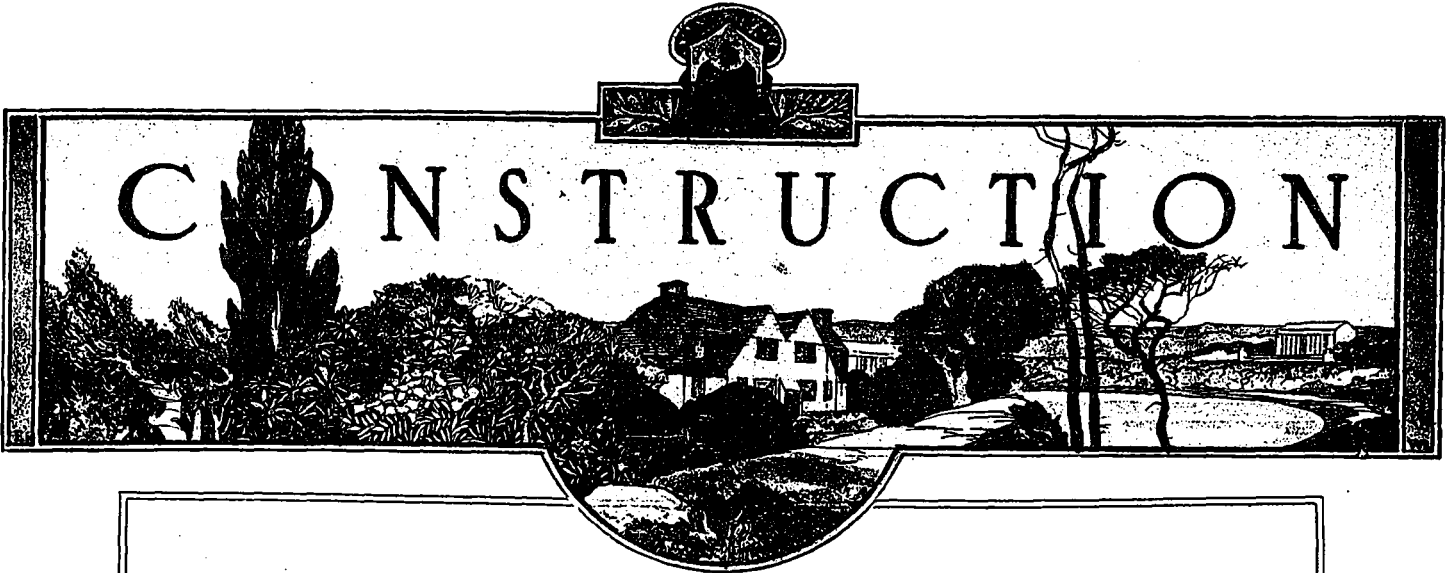


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March, 1917

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H. GAGNIER, Limited, Publishers

GRAPHIC ARTS BLDG., TORONTO, CANADA

MONTREAL

BRANCH OFFICES

NEW YORK



IMPERIAL OIL BUILDING, TORONTO, ONT.

CLINTON & RUSSELL, ARCHITECTS; J. L. HAVILL, RESIDENT ARCHITECT.



The Imperial Oil Building, Toronto, Ontario

Imposing Steel Structure Faced With Lime Stone. The Latest Addition to Toronto's Office Structures. Splendidly Equipped and Modern in Every Detail.

THE Imperial Oil Company's building is an eight-story office building, erected on the south-west corner of Church and Court streets, Toronto.

What undoubtedly will appeal to the residents of Toronto, and visitors, is the handsome exterior of this building, the style being an adaption of the Italian Renaissance.

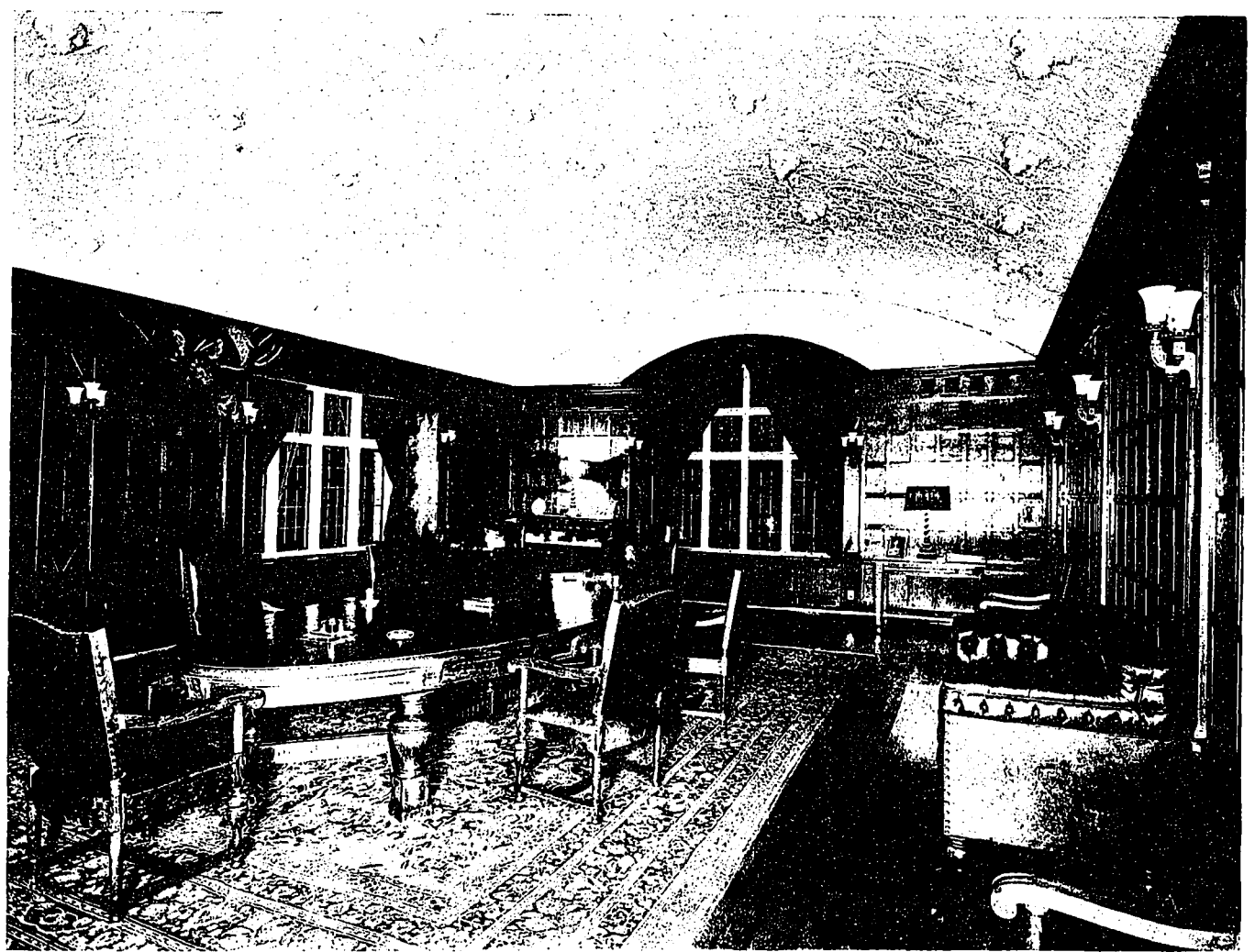
From sidewalk to coping the Church and Court street elevations are of buff Indiana

The roofs are covered with tile, and all exterior metal work is of copper.

The tenders for this building were received up to 1 p.m., November 22nd, 1915, and at 4 p.m. the same afternoon the general contract was awarded to the lowest tender.

Work was commenced a week later on the excavation for the basement, which is a depth of twenty feet below the level of the curb.

The column foundations are on rock at an



VIEW OF BOARD ROOM, IMPERIAL OIL BUILDING, TORONTO, ONT.

CLINTON & RUSSELL, ARCHITECTS; J. L. HAVILL, RESIDENT ARCHITECT.

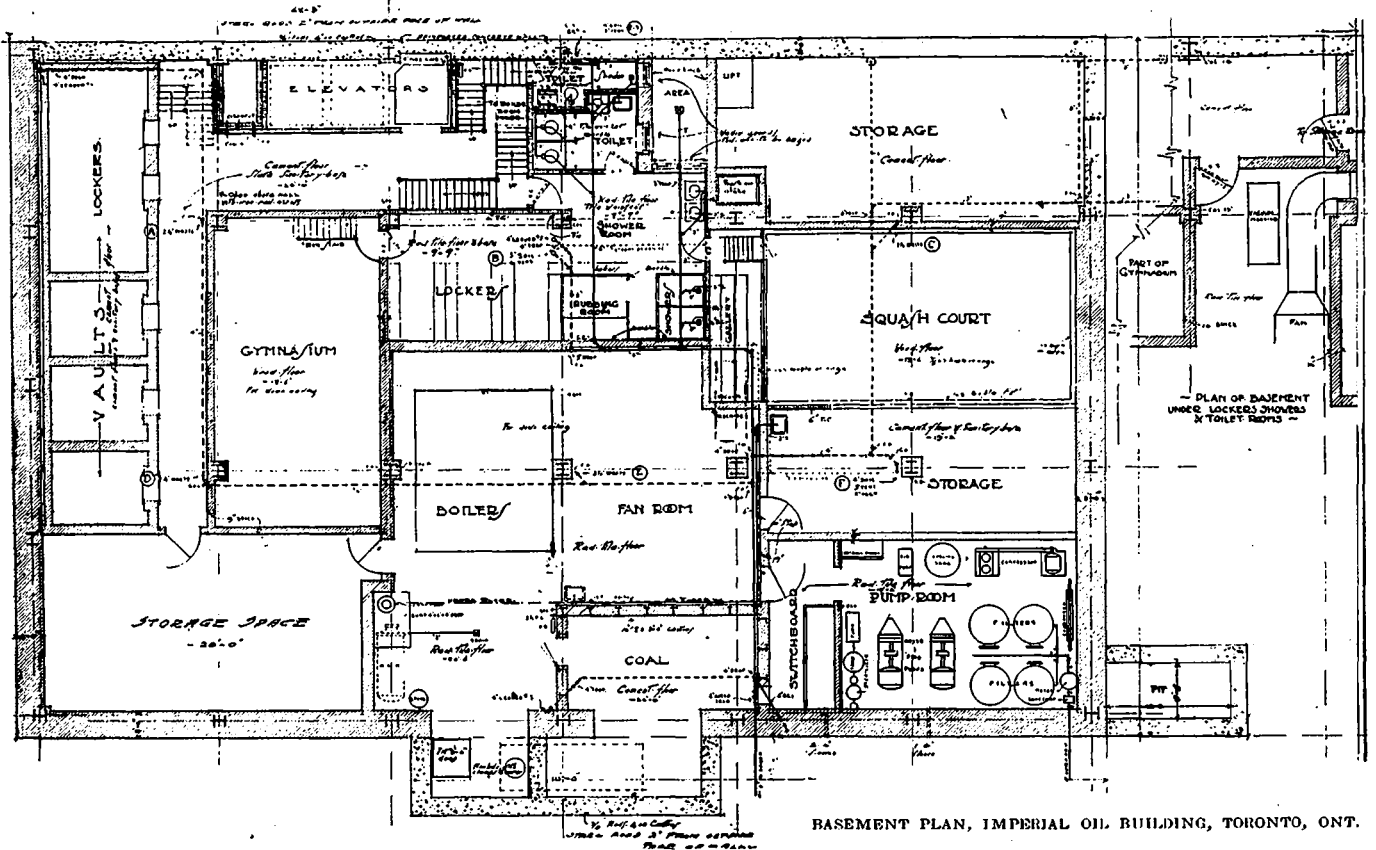
limestone, and the rear and Court elevations of buff pressed brick.

The window frames and sash, except on the ground floor fronts, which are of steel, are of wood covered with fourteen-ounce bronze on the two street fronts, and of hollow steel on the rear and the court elevations. The sash are all carefully weather-stripped, and are weather and wind proof. All window glass is plate, except on rear and in Court elevations, where clear plate wire glass is used.

average depth of thirty-two feet ten inches below curb level.

This part of the contract was carried on and concrete footings put in during the months of December and January, and the erection of steel was commenced February 28th, 1916.

The rapidity with which the erection of the steel frame and exterior steel work progressed is shown by accompanying progress photographs taken on March 2nd and April 25th, 1916.



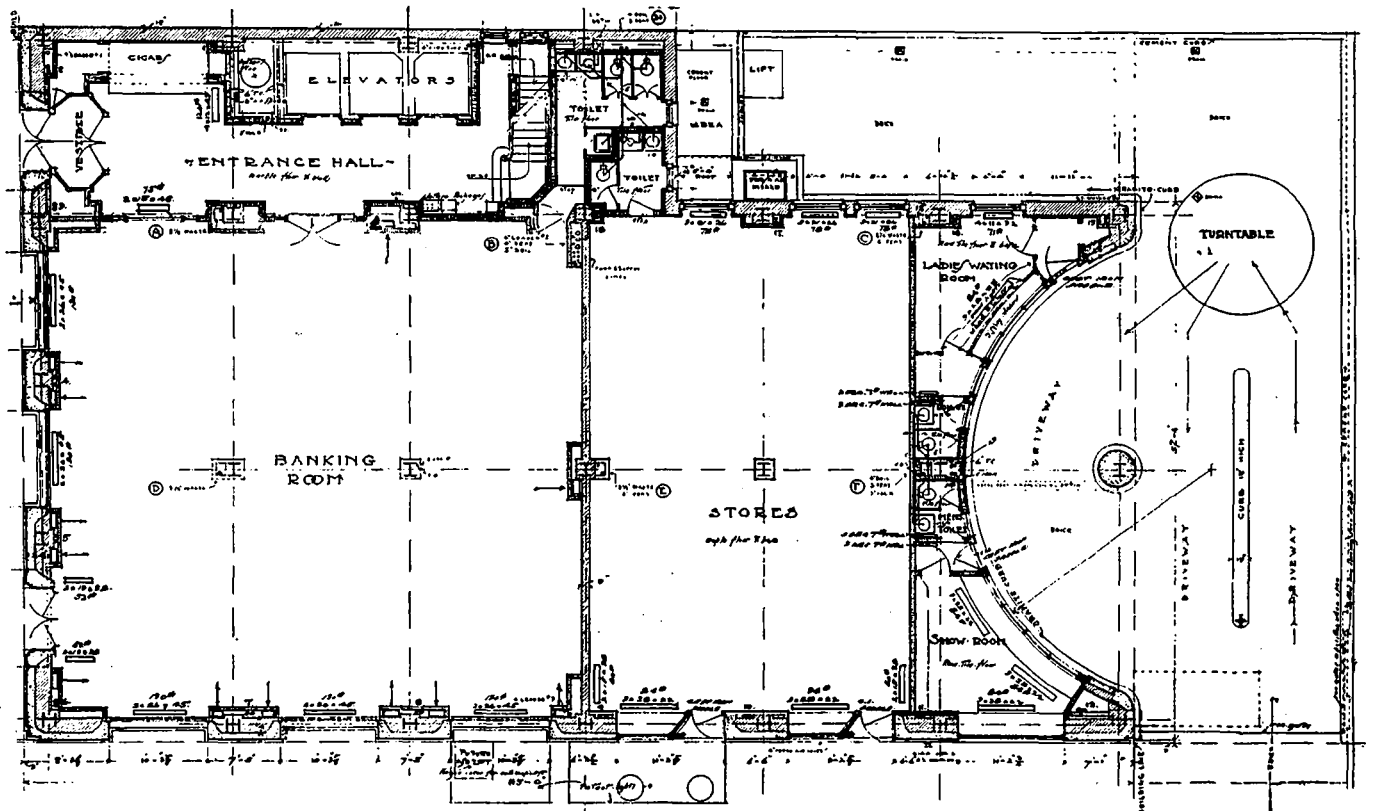
BASEMENT PLAN, IMPERIAL OIL BUILDING, TORONTO, ONT.

The contract for completion of the building called for July 23rd, 1916, and the tenants commenced to move into the building about this time and were really settled in their offices the first week in August, 1916.

Before the plans were started a careful estimate of the situation was made by the architects; the heads of all departments were consulted and sketches prepared and changes made from time to time. The very excellent advice

of Mr. G. L. Olney, of Cleveland, was sought, and in connection with all departmental heads, working through their president, Mr. Walter Teagle, definite plans were finally made and the contract awarded for the execution of the work. After due consideration, it was decided to award the most of the sub-contracts to local men, and this policy turned out to be most satisfactory.

The general contractors at once established



FIRST FLOOR PLAN, IMPERIAL OIL BUILDING, TORONTO, ONT.

CLINTON & RUSSELL, ARCHITECTS; J. L. HAVILL, RESIDENT ARCHITECT.

a local office in Toronto, with experienced men who took charge; everything functioned so well that the building was completed on time, and within the estimated cost. Great credit must be given the Canadian sub-contractors for their diligence and excellent work. The problem was really a most easy one to solve. Given a certain lot area, easements to adjacent property for light and air, the planning was easy.

In the basement is contained the mechanical equipment, consisting of two water tubular boilers, equipped either for coal or fuel oil consumption, the pumping, ventilating, filtering refrigerating and hot water plants, and a large storage space for both coal and oil.

In the basement there is also a standard-sized squash court, a gymnasium, locker rooms, shower baths and lavatories to accommodate the tenants, who have organized The Imperial Club and use these quarters constantly.

The ventilation of the basement and the banking room on the first floor is by a large motor-driven fan in the basement, the air being drawn from the rear court through water screens, and delivered through ducts to the various rooms. All toilet rooms throughout the building are also ventilated through ducts to a fan located on the roof.

On the first floor is located the main entrance on Church street, a branch of the Royal Bank of Canada, a room about fifty-two feet square and twenty-four feet in height and fully equipped throughout.

There are two stores on Court street and a display room of the Oil Company. The driveway and service station in the rear of the building is a feature. The entrance to service station from Court street is twenty-one feet in width, and at the extreme end of the driveway is a fifteen-foot steel turntable, which is easily manipulated, and with its in and out passages, as shown on the accompanying plans, is easily accessible.

The service station is entirely covered with a large steel and glass roof, which is much appreciated by the automobile public.

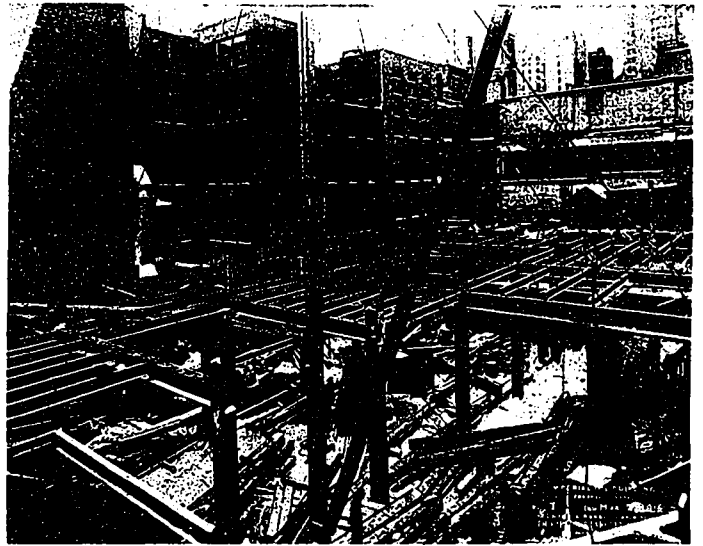
In the centre of driveway is located the gasoline and oil pumps, so arranged that four automobiles can be served at one time, and it is the most modern filling station in the Dominion of Canada.

Rest rooms have been provided for both men and women, and every convenience can be found there.

There has also been installed a free air station just outside the service station on Court street.

In fact, the covered driveway and its adjoining partly covered court yard is one of the most unique and at the same time, practical features of the construction.

The upper seven stories of the building con-



PROGRESS VIEW OF WORK, MARCH 2ND, 1916.

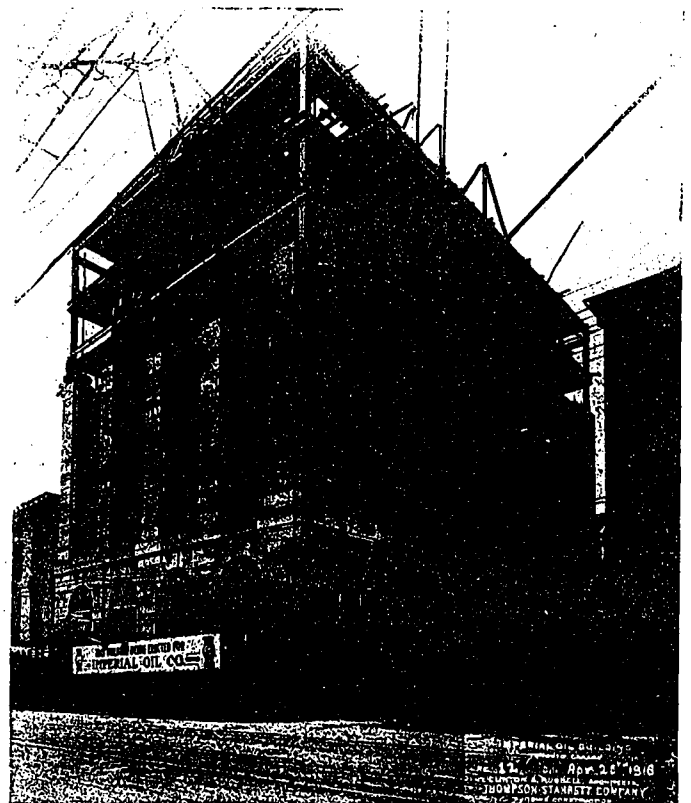
tain the offices of the company and some space rented to other tenants.

The main entrance hallway is trimmed throughout with bronze and tavernelle marble and Tennessee marble floor; banking room, Tennessee marble floor, boulder grey wainscot.

Above the first story, the elevator fronts and stairways are of cast iron, and all doors, trim, chair, rail, picture and wire moulds throughout are of steel with paint and enamel baked on to represent mahogany.

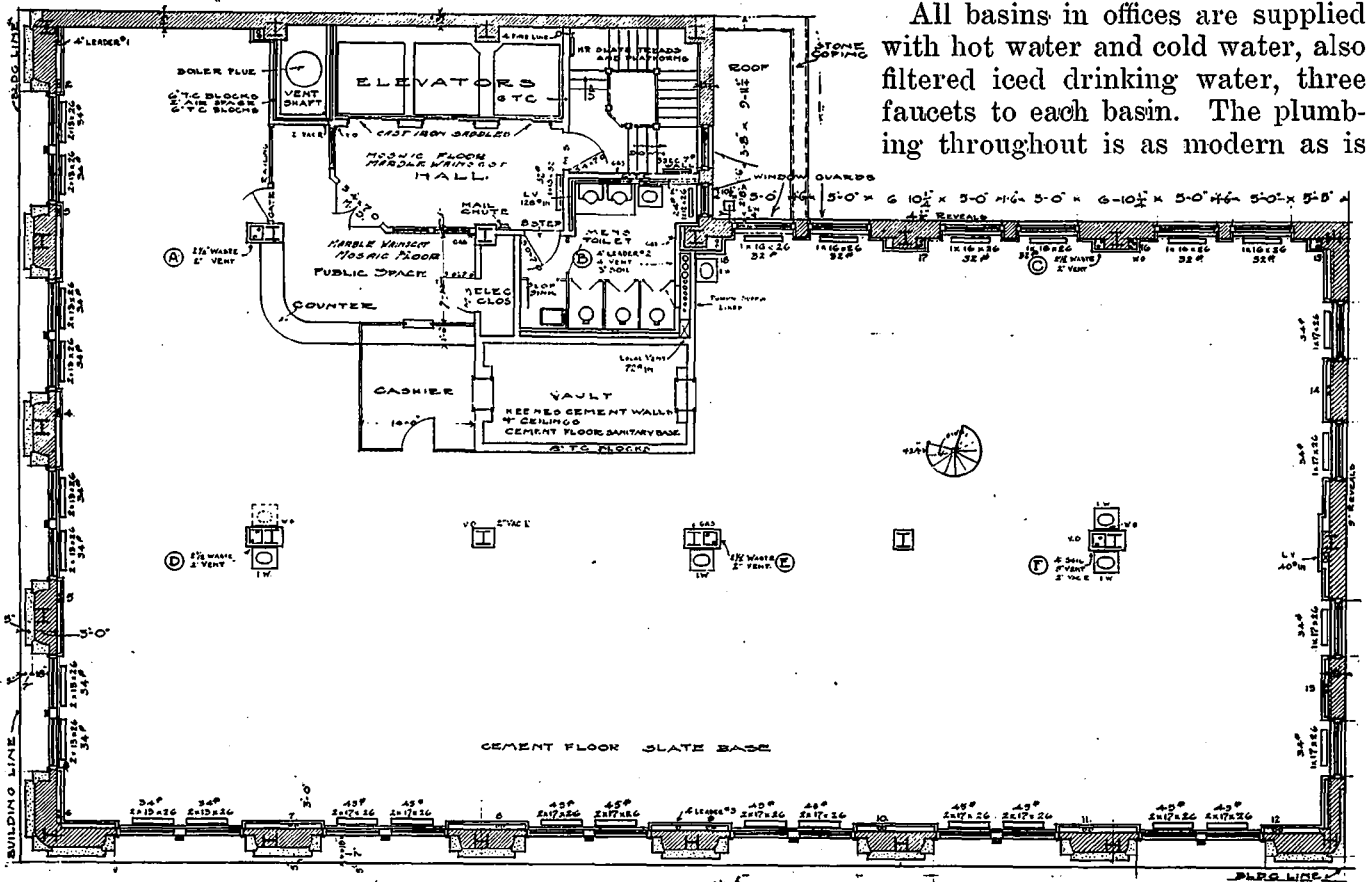
The floors of all offices are of cement, and the base of slate.

The halls and corridors have boulder grey marble wainscot four feet six inches in height and Terrazza floors.



PROGRESS VIEW OF WORK, APRIL 25TH, 1916.

59-3



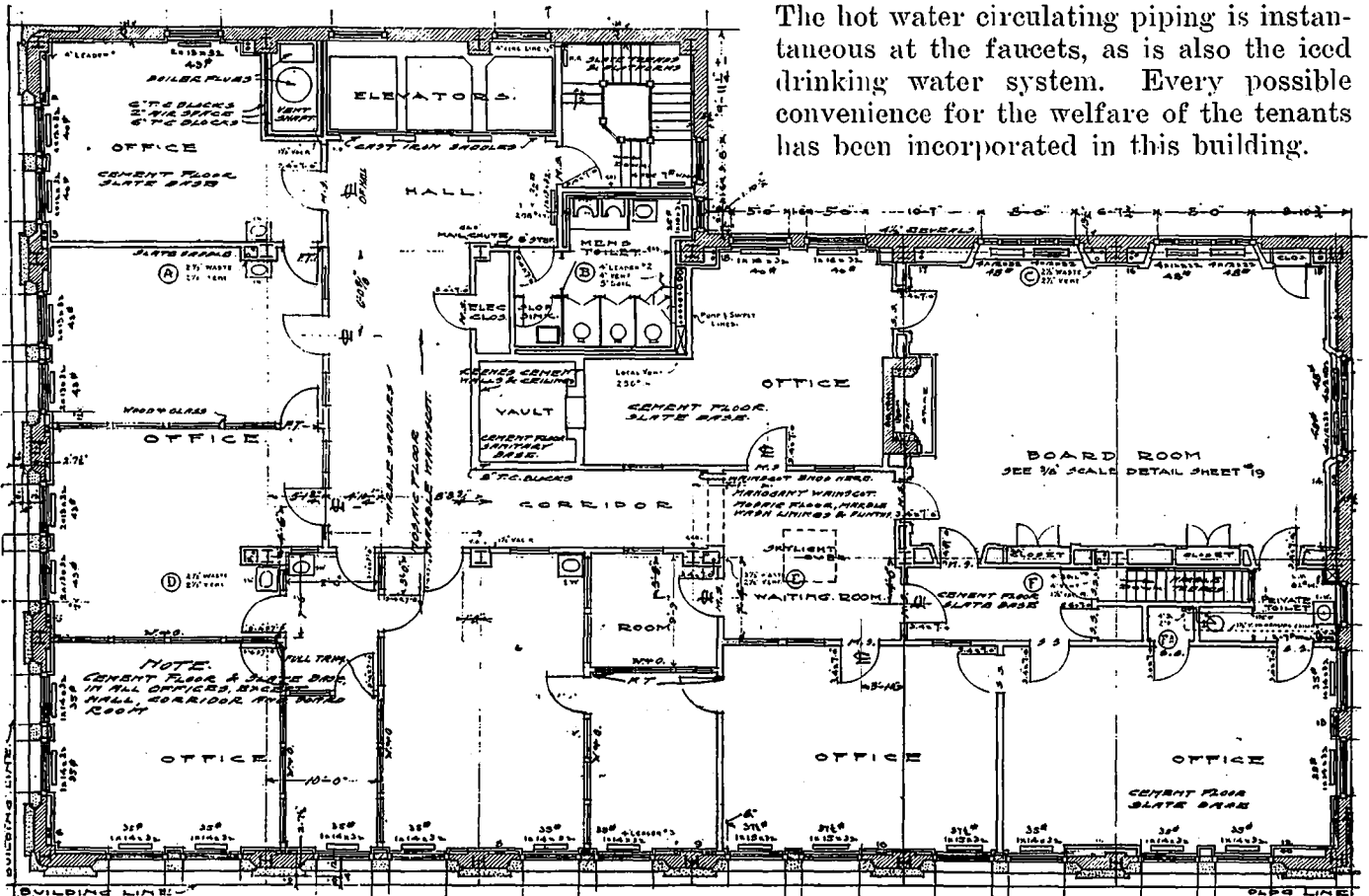
All basins in offices are supplied with hot water and cold water, also filtered iced drinking water, three faucets to each basin. The plumbing throughout is as modern as is

THIRD FLOOR PLAN, IMPERIAL OIL BUILDING, TORONTO, ONT.

Stairways are enclosed in fireproof partitions, and cast iron elevator fronts are glazed with clear plate wired glass. All toilet rooms have tiled floors and walls, and marble partitions.

possible in sanitary practice. The plumbing fixtures are all of porcelain with heavy nickel-plated brass fittings and piping, self-closing faucets, valves and other modern appliances.

The hot water circulating piping is instantaneous at the faucets, as is also the iced drinking water system. Every possible convenience for the welfare of the tenants has been incorporated in this building.



EIGHTH FLOOR PLAN, IMPERIAL OIL BUILDING, TORONTO, ONT.

There is a complete fire appliance system, water lines, hose and racks, pumps, 5,000 gallon tank in roof house, and exit lights to all staircase door openings, fire alarm system, Siamese hose connections for fire engines on both Court and Church streets.

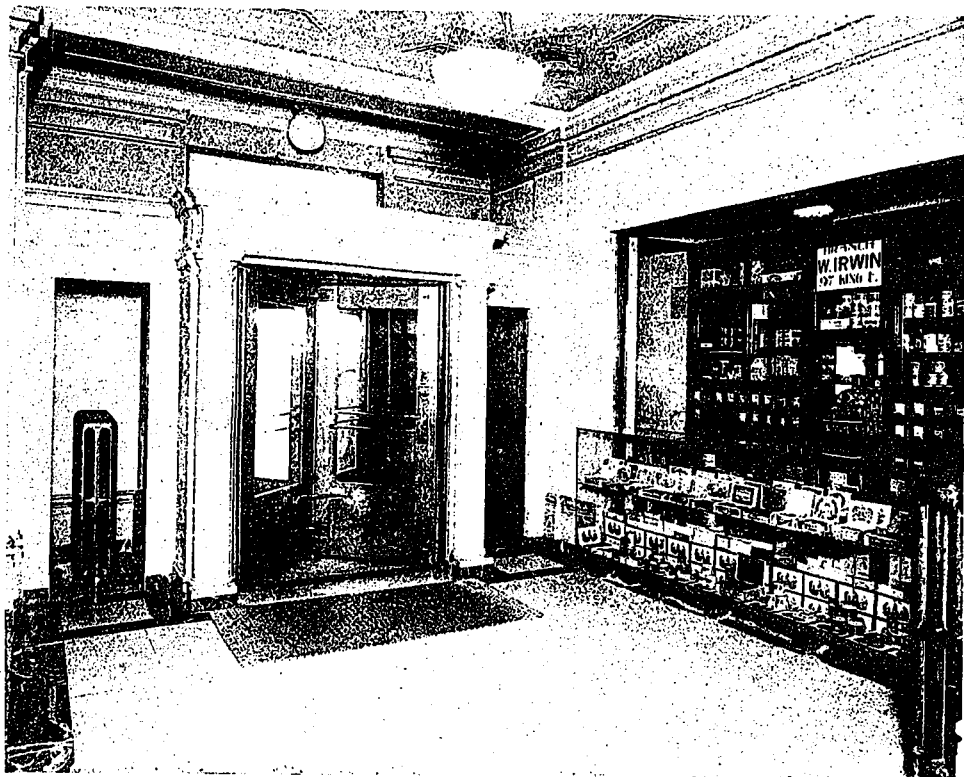
The building is heated throughout by steam, and the radiating surface is so designed and distributed as to heat all parts of the building to 70 degrees in 10 degrees below zero weather.

The first floor and portion of the basement are heated by means of heaters and reheaters with air forced through by a fan as hereinbefore described. All return valves are of the vacuum

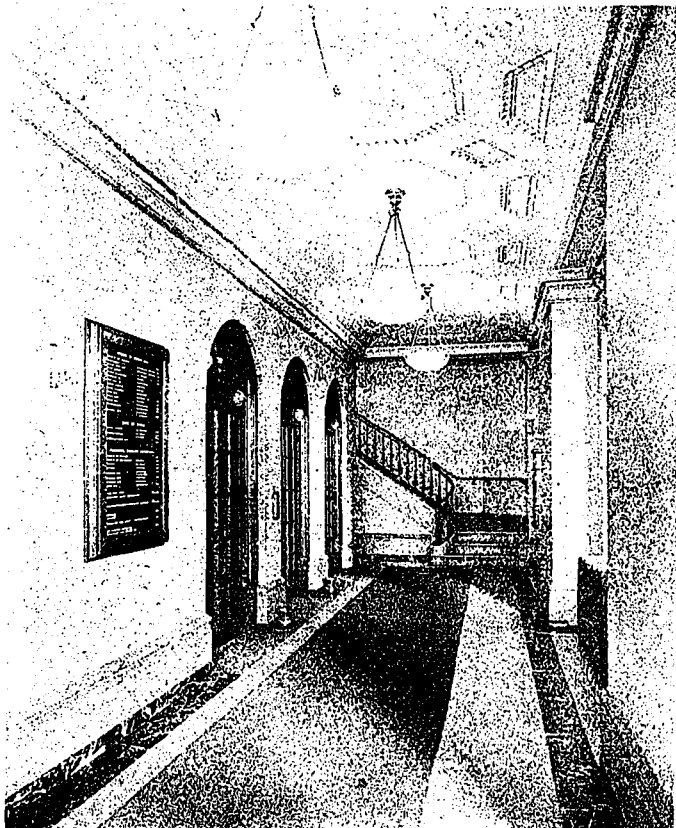
type. The heat in the board room on the eighth floor and the banking room on the first floor is controlled by temperature regulation.

The electrical layout was given most particular consideration. In the arrangement of lighting for the general offices throughout

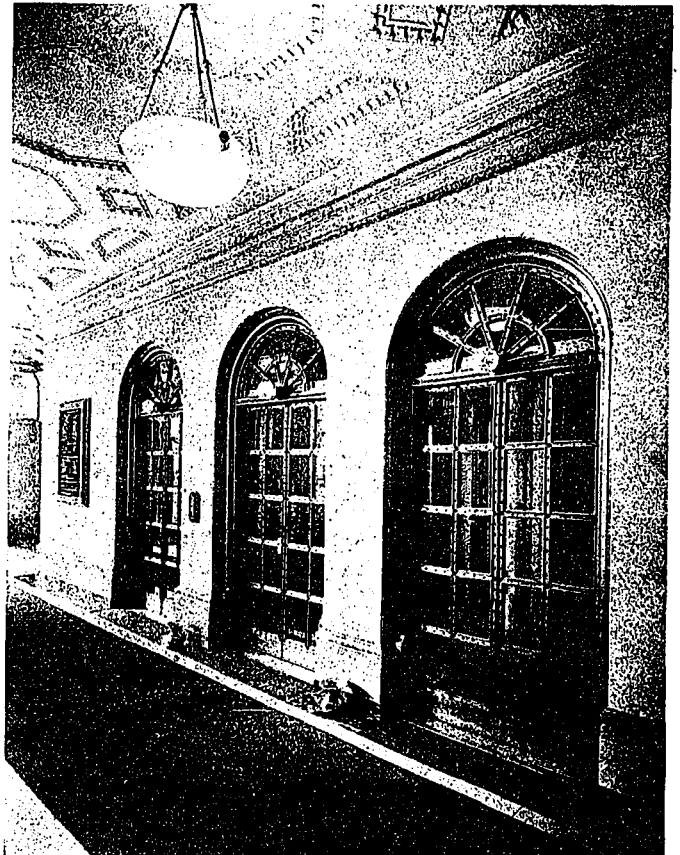
the building, the lighting fixtures were designed and calculated to give sufficient and splendidly distributed light throughout the various rooms, so that none of the clerical force have been obliged to use portable desk lamps. Whilst this building is wired to base receptacles, none of them are used.



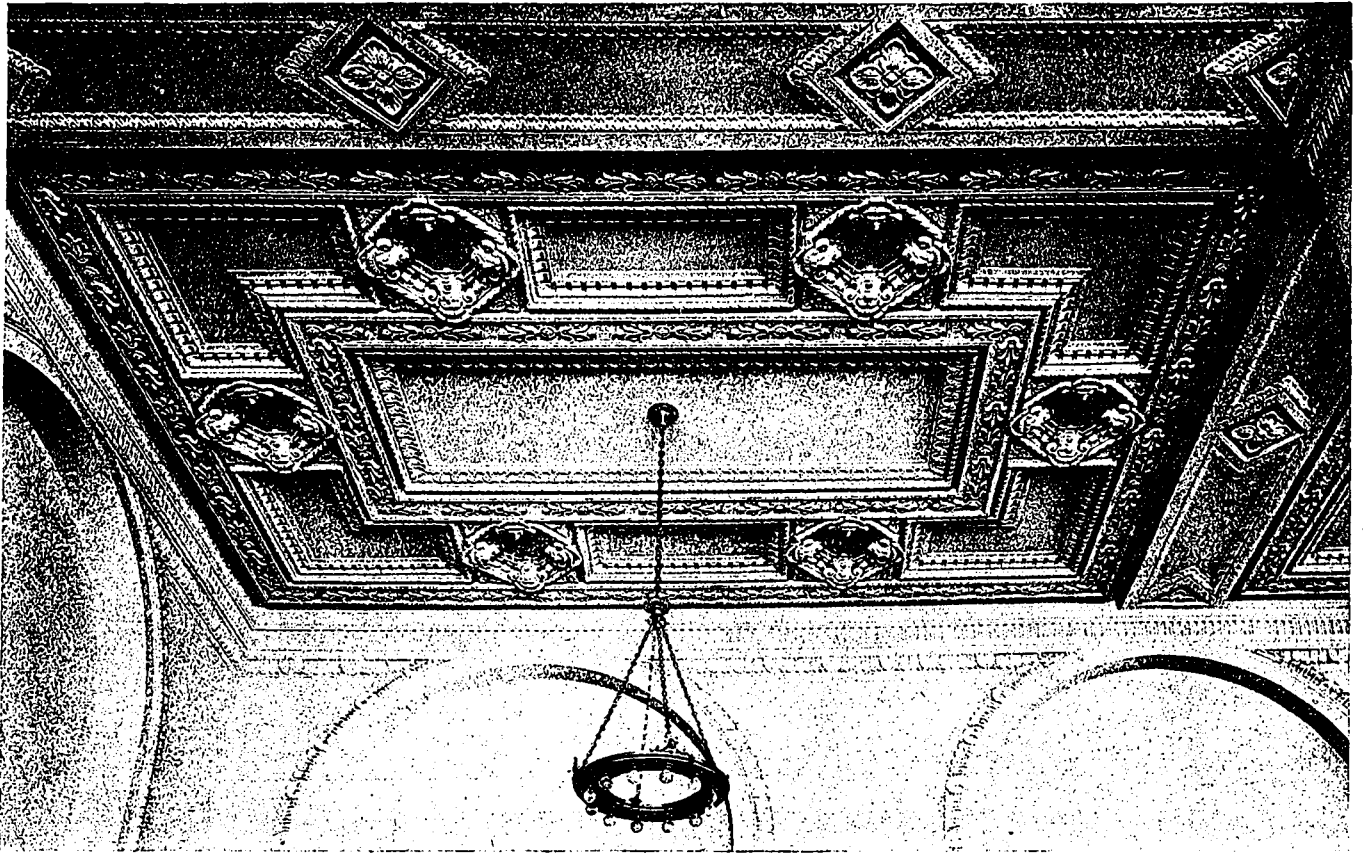
INTERIOR VIEW OF MAIN ENTRANCE.



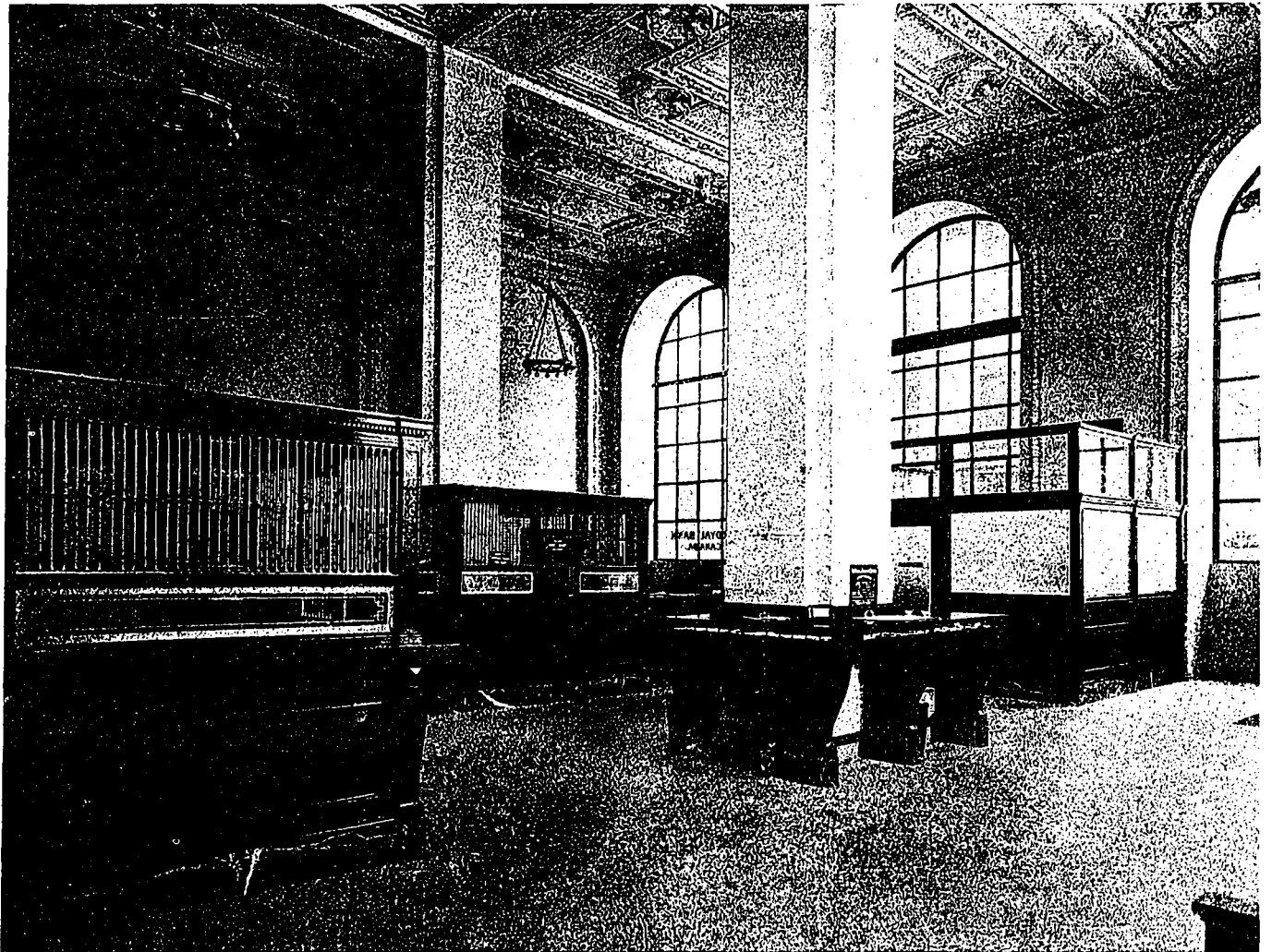
VIEW OF MAIN ENTRANCE HALLWAY.



VIEW OF ELEVATOR ENTRANCES, MAIN FLOOR.

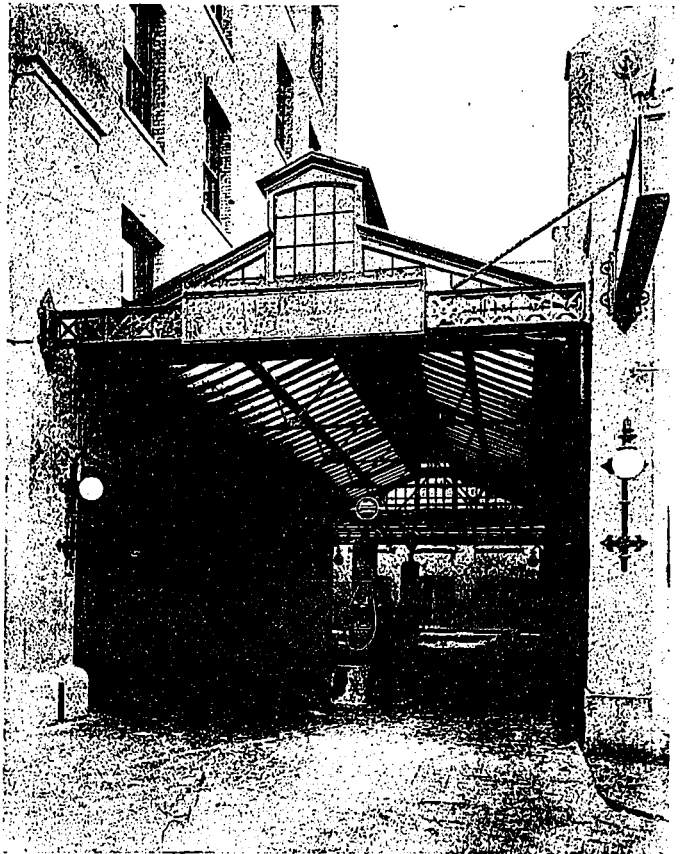
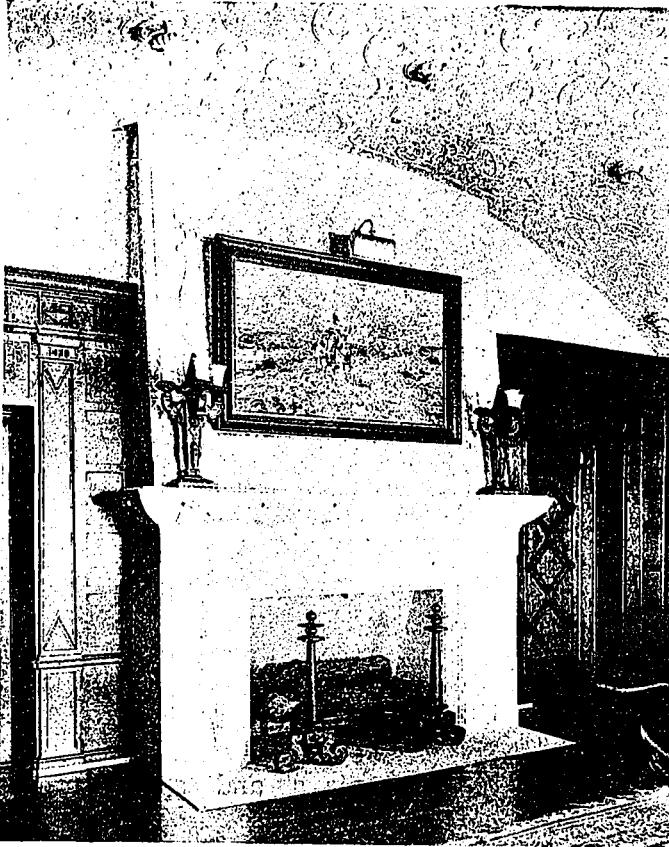


CEILING DETAIL, BANKING ROOM, IMPERIAL OIL BUILDING, TORONTO, ONT.



VIEW OF BANKING ROOM, IMPERIAL OIL BUILDING, TORONTO, ONT.

CLINTON & RUSSELL, ARCHITECTS; J. L. HAVILL, RESIDENT ARCHITECT.

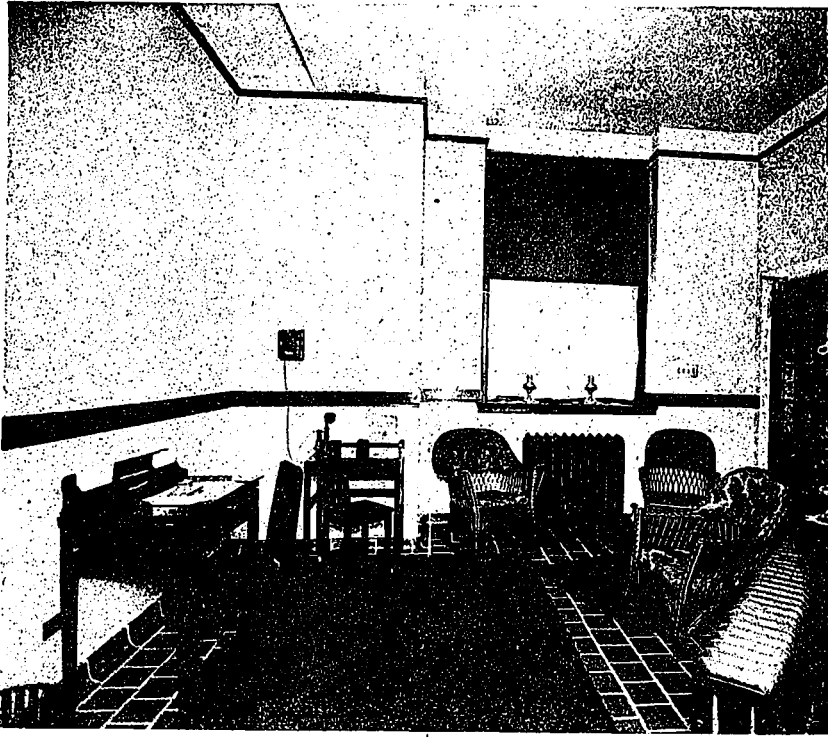


INTERIOR VIEW SHOWING ENTRANCE TO BOARD ROOM AND FIREPLACE.

ENTRANCE TO SERVICE STATION.



VIEW OF SERVICE STATION, SHOWING TURN TABLE, OIL AND GASOLINE PUMP, IMPERIAL OIL BUILDING, TORONTO, ONT.



VIEW OF LADIES' WAITING ROOM IN SERVICE STATION.

The building is also wired completely with a low tension system both for bells and dictagraphs, telephones and telegraph. The electric light and elevator current are taken from street service, 110 volts for lights and 240 volts for elevators, both direct current. There are three high-speed duplex worm gear traction elevators, with machines set overhead in pent house on roof. They are completely equipped with modern flash light stop systems and with every modern safety appliance known to the art.

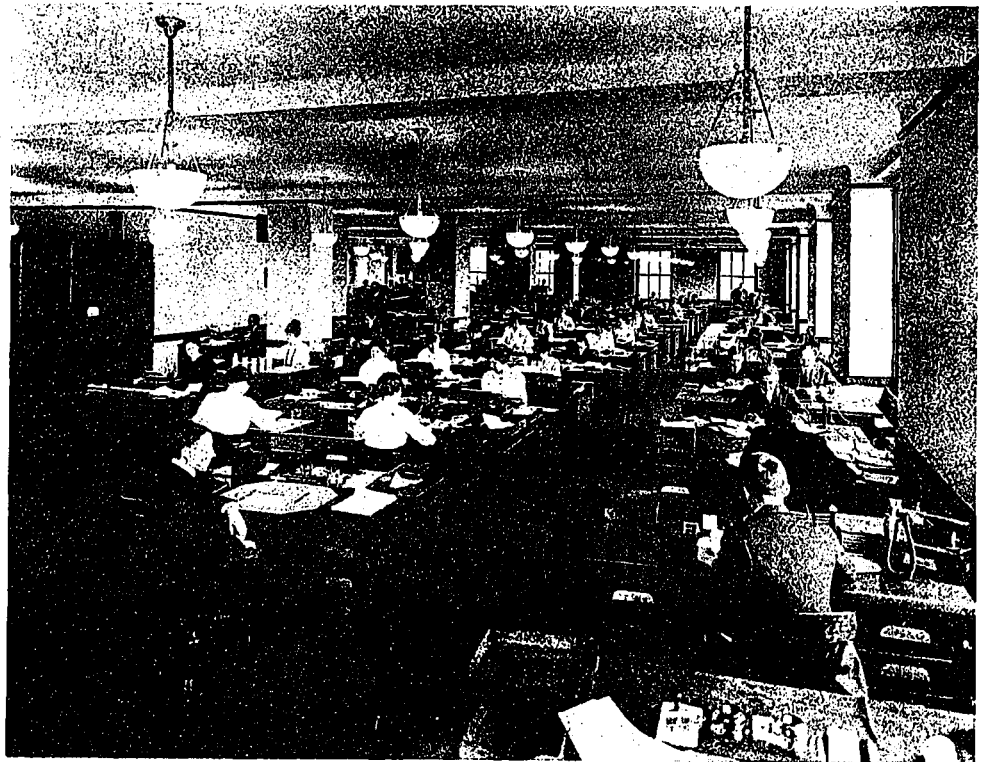
The board room on the eighth floor is a feature of the building. It is an English room in every respect. The floor is of quartered oak; the walls are panelled with English oak to the ceiling. The ceiling is arched and simply but handsomely decorated. The three large windows have steel frames and sash of English manufacture, divided into small panes of leaded lights of clear glass; the mullions of windows are of limestone. The handsome fireplace in the east end of the room is of Caen stone, and over this hangs a large painting. The lighting fixtures of the board room, consisting of brackets, candelabra, mantle shelf and table lamps

with silk shades, were specially designed and made of carved English oak of a slightly darker tone than the wood work of the room, with the highlights furnished in gold leaf, thus affording a pleasing contrast with the enriching tones of gold enhancing their beauty. The furniture is English oak, and the whole room with its hangings and lighting has an air of refinement and beauty. It is a masterpiece of its kind.

Clinton & Russell, of 32 Liberty street, New York, were the architects, and James L. Havill, of Toronto, was their representative on the work. All plans and specifications

were made in the Toronto office of the architects.

Area of land, 8,730 sq. ft.; floor space, 70,156 sq. ft.; cubical contents, 1,029,209 cubic feet; number of stories, 8 and basement and mezzanine; number of elevators, 3; tons of steel, 770; foundations started, Dec. 9th, 1915; column bases started, Feb. 17th, 1916; steel to grade, March 2nd, 1916; steel topped out, April 15th, 1916; masonry above grade, March 21st, 1916; building enclosed, May 29th, 1916; building completed, July 23rd, 1916.

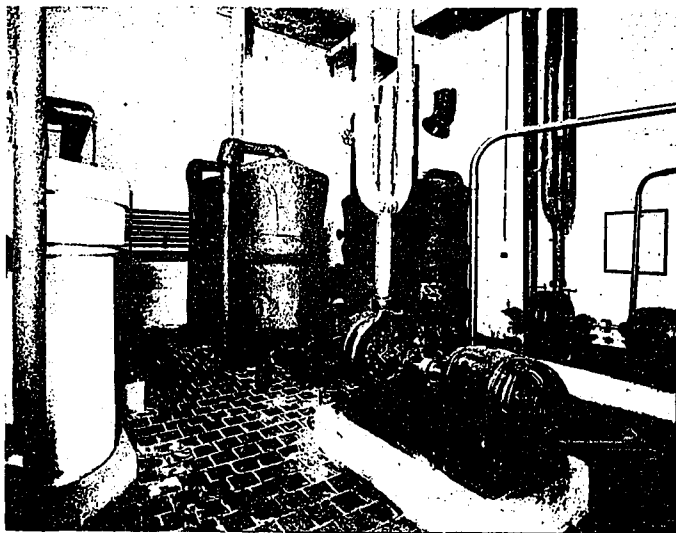


GENERAL VIEW OF OFFICE FLOOR.

The Engineer and The Architect

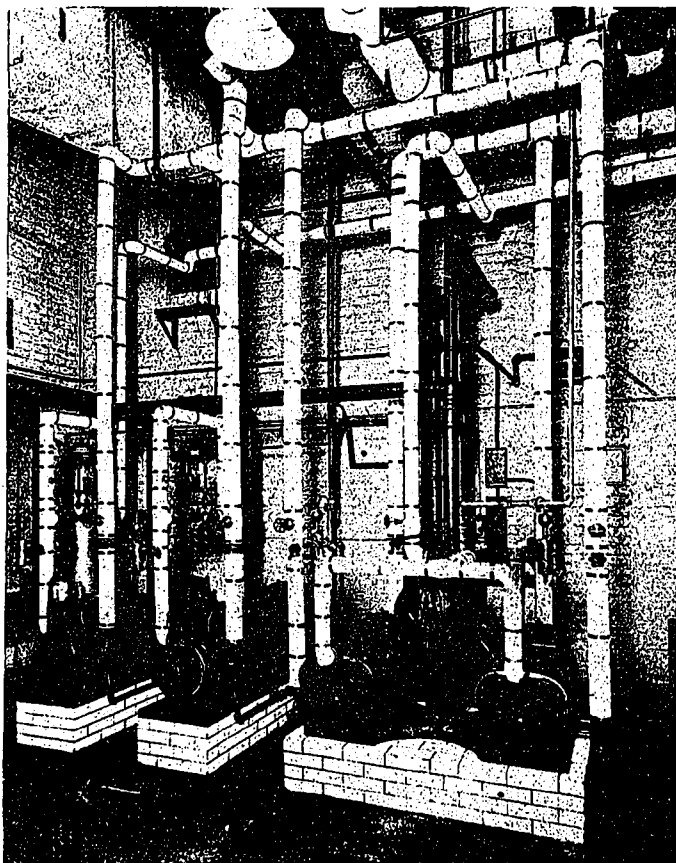
We have often heard the respective positions of the architect and engineer discussed, but have never read a terser or more apposite analysis of their relation to one another than that contained in an article in a recent number of the *Brickbuilder*, a great part of which we quote:—

“The architect is always an engineer, but the engineer, even though he has charge of the construction of a building, is seldom an architect. The greater always includes the lesser. Both the engineer and the architect have had their share of the world’s work. The great spectacular achievements, such as railroads and canals, have fallen to the engineer, and his practice has crystallized into an exact science. Architecture, on the other hand, always has been an art. That is what makes architecture more than engineering, and keeps it perennially alert and ready for changes—a condition which rarely exists in the engineering profession. It is but fair, also, to admit that because of the readiness with which the architectural profession welcomes new ideas, because of its constantly changing point of view, it is apt to lag behind in attention to the exact sciences and the so-called practical work. This has been strikingly manifested during the past generation. The architectural profession was offered the enormous possibility of steel construction. The æsthetic side of it was immediately appreciated and developed to an extent which has produced results of which we may well be proud; but the so-called engineering features were in a measure ignored, not because architects could not master them, but because the really architectural solution had first to be sought. The engineers speedily usurped one side of the architectural problem, and our earlier steel-frame buildings were designed wholly by engineers with the result, unfortunately, that sometimes the construction was made more of than the architecture, and efficiency of the hidden was substituted for complete efficiency of the whole. During the last few years the conditions have been changing, and to-day it is fair to say that in most of the properly organized architectural offices the mechanical and so-called engineering problems in building construction are handled by the architect, and handled in a better, a more consistent, a more economical, and a more logical manner than the same problems were handled by the engineers in the earlier years. This is not saying that all architects are qualified to do their work. A profession is not judged by even its average attainment, but by its best work; and applying this measure to architecture it is fair to say that architects have outgrown any necessity of depending upon the engineers for construction.



VIEW OF WATER FILTERS.

“Structural engineering, as a profession, has not been very profitable of late years, and this fact has awakened many engineers to the possibilities of combining architecture with their own work. Since, unfortunately, the only requirement to be an architect is the ability to pay for a sign on the door, anyone who can get a job can call himself an architect, and we have in many of our cities engineers who simply hire draughtsmen, trust to their artistic luck, and get by with a good deal of building. In a few cases such engineers have developed real architectural talent, which the profession has been glad to recognize; but in more cases the result has



VIEW OF PUMPS IN POWER ROOM.

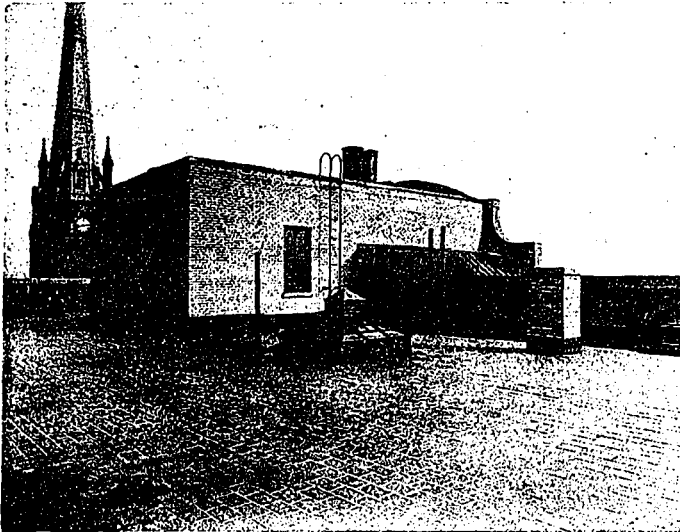
meant a distinct lowering of architectural standards, and it is to be regretted that men who could be good engineers should choose to be poor architects for the sake of a little increased earning capacity. Most property owners would very naturally and very rightly prefer a good engineer to a poor architect, and as so many people fail to appreciate that architecture is not merely construction, heating, and ventilating, plumbing and electric equipment, but is fundamentally an orderly, logical and artistic solution of a practical problem, it



VIEW OF CUSTOMERS' ROOM.

and striving to clothe engineering with a thin veneer of architecture. That, as far as it goes, is good. Anything which relieves the crass materialism and crude efficiency of an engineering structure is a benefit to the community, and we would hope that the relation between the two professions may continue to be one in which the architect will point the way to better, more orderly, and more

logical building, without any sacrifice of the innate architectural properties, and the engineer will be more willing to appreciate that real effi-



VIEW OF ROOF SHOWING TILE ROOF AND PENT HOUSE.



VIEW OF GENERAL OFFICE.

is not to be wondered at that the engineer-architect has thrived of late years; but this does not mean a limitation of architecture. Anything that makes for better building of any kind, practically or artistically, is welcomed by any right-minded architect; and if an engineer can do better work than an architect, it is up to the architect to mend his ways.

“The architect has learned his constructive lessons, and the relation now between the professions is that the engineers are learning to follow the architect’s footsteps

ciency does not stop with a well-constructed skeleton.”

The above paragraphs contain the kernel of the matter, and while artists like Mr. Pennell may state that engineering is architecture, we hold with the writer we have quoted that architecture includes engineering as the greater includes the less, and engineering can never displace architecture from the position she holds as the greatest of the arts, though engineering science may, and ought to, give greater scope to architectural skill.



VIEW OF A LAVATORY.

The Bank of Toronto New Building, Montreal

A Substantial and Pleasing Example of a Bank Office Building.

THE new Bank of Toronto building, corner St. James and McGill Streets, Montreal, replaces the former building, which the bank had outgrown. It occupies a larger site, made possible by acquiring the neighboring property.

The main ideas in carrying out this building were to get the maximum amount of floor space for the banking room, and to carry out the whole in a substantial and pleasing manner without going in at all for elaborate and expensive ornamentation.

The building covers the whole of the property, with a frontage of ninety feet on St. James Street and sixty-two feet on McGill Street, and rises to ten storeys, the full height allowed by the Montreal building by-laws.

The base course is of plain polished granite to the line of the banking room window sills. From this line, up to the top of the cornice, is carried out in white glazed terra cotta.

The first storey shows a complete Doric order

with large circular headed windows, this fairly elaborate detail marking the banking room.

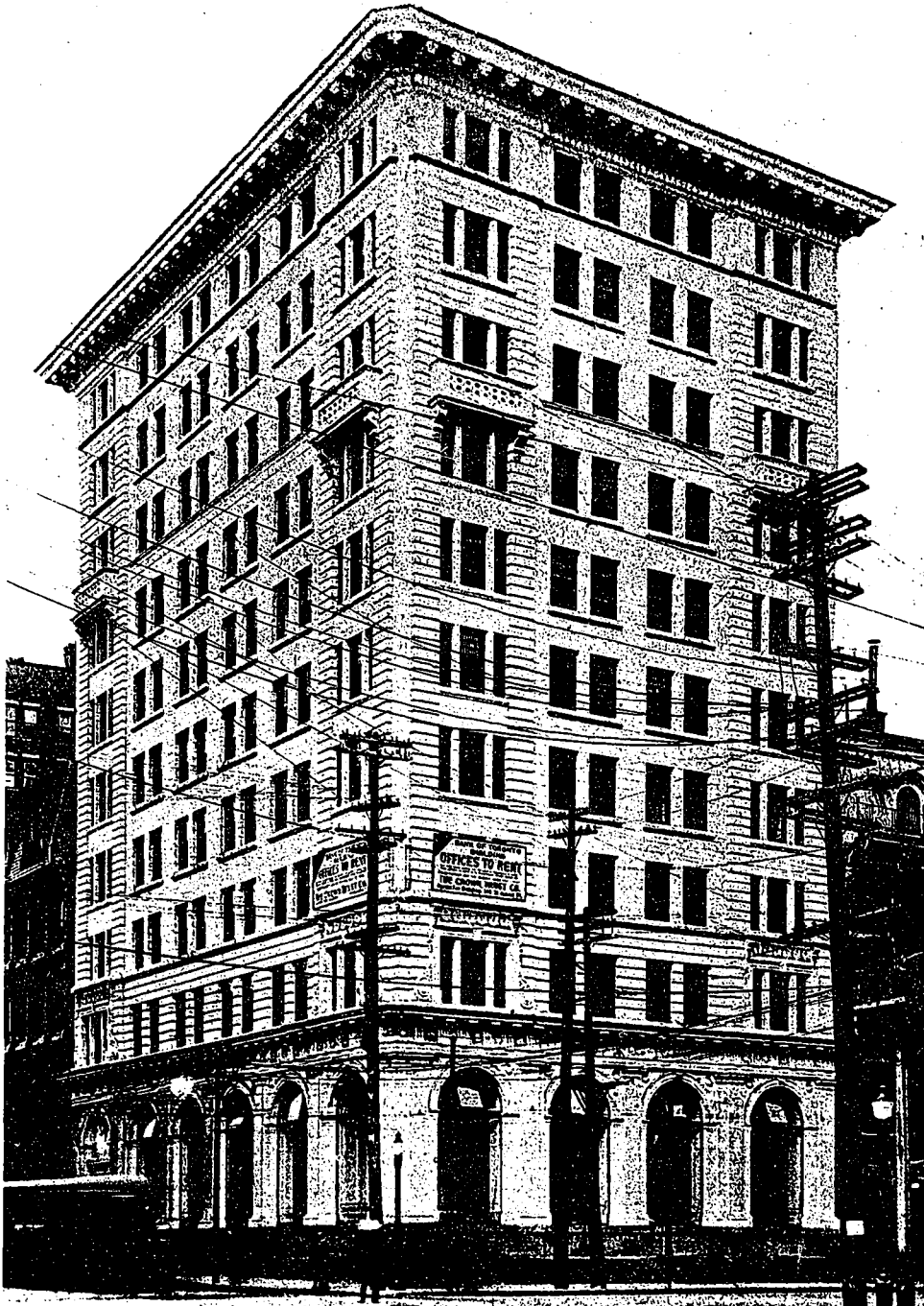
Above the ground floor the walls are carried up in plain block courses with a small amount of ornamentation on the first floor windows and

small projecting balconies on the seventh floor. The top floor has flat ornamentation between the windows, and the whole is crowned by an elaborate Corinthian cornice. This treatment gives a dignified and substantial building without any appearance of elaboration.

The two party walls are faced with buff brick above the adjoining buildings with the name "Bank of Toronto" in large five foot letters in green glazed brick, which although

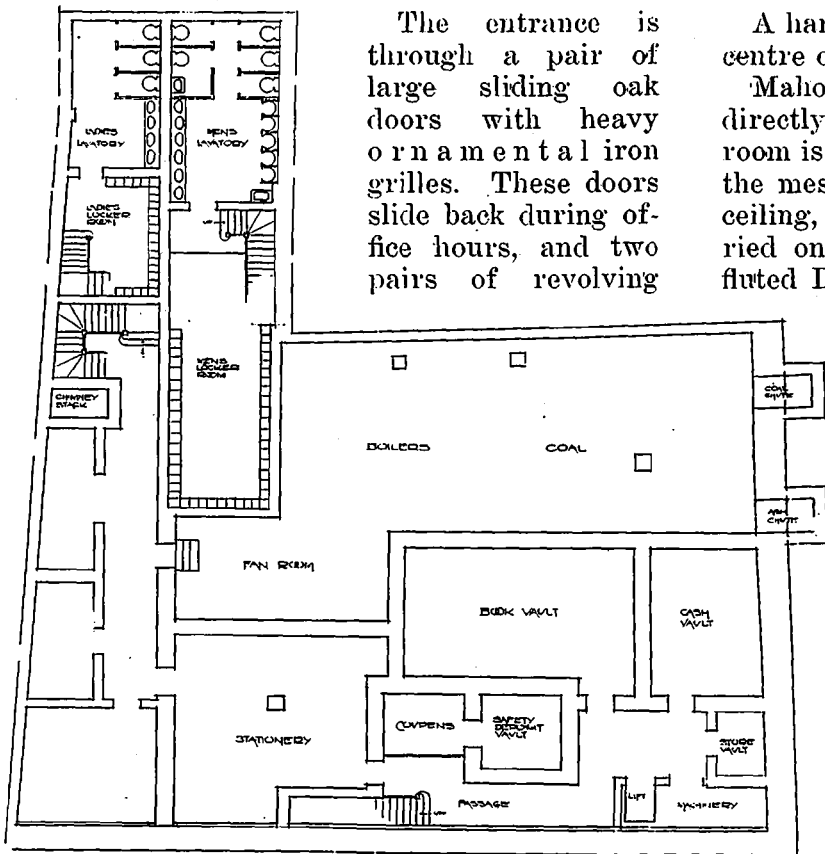
visible for a long distance, is not too striking.

There is only one entrance to the building, next the party wall on the St. James Street front; by this arrangement the whole ground floor, except the entrance hall, elevator hall and stairs, is devoted to the banking room.



BANK OF TORONTO BUILDING, MONTREAL.

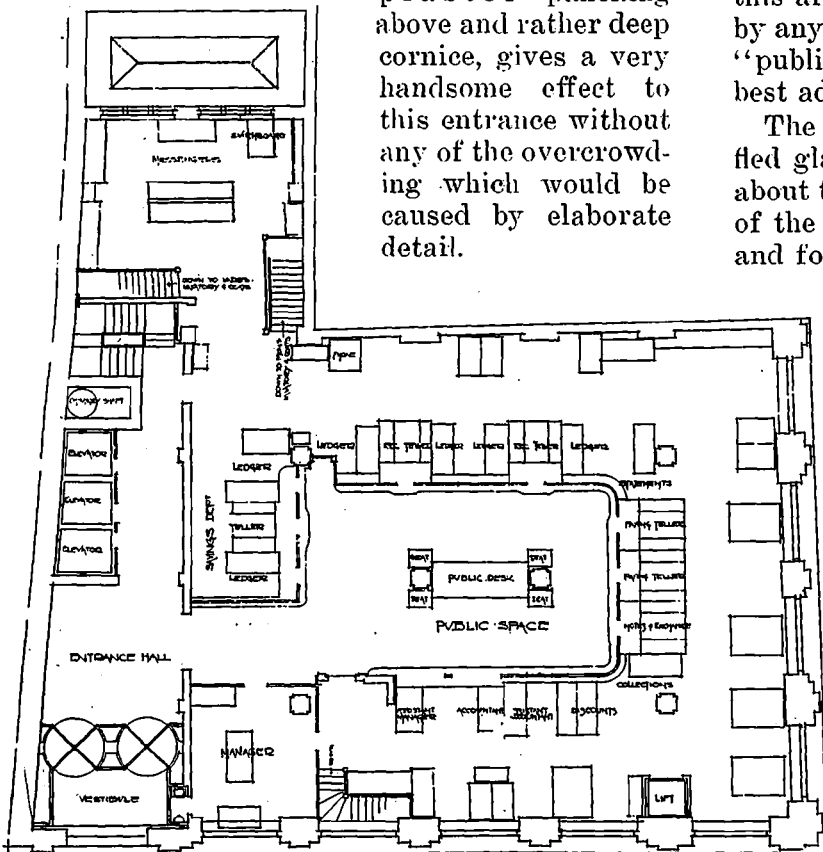
HOGLE & DAVIS, ARCHITECTS.



BASEMENT PLAN, BANK OF TORONTO, MONTREAL.

doors lead directly into the main entrance hall.

This entrance hall and the elevator hall beyond are lined with grey Sienna marble to the height of about nine feet. This marble, which is "booked" in panels, together with the simple plaster panelling above and rather deep cornice, gives a very handsome effect to this entrance without any of the overcrowding which would be caused by elaborate detail.



GROUND FLOOR PLAN, BANK OF TORONTO, MONTREAL.

HOOLE & DAVIS, ARCHITECTS.

A handsome cast bronze lantern hangs in the centre of this entrance hall.

Mahogany doors with bronze grilles open directly into the banking room. This banking room is sixty-seven feet by fifty-eight feet, with the messengers' department at the rear. The ceiling, twenty-two feet above the floor, is carried on six large piers, each formed of four fluted Doric pilasters. These piers are so arranged that they interfere in no way with either the "public" or the layout of the counter.

The counter is formed of tavernelle marble and a dado of similar design and marble is carried around the walls of the banking room and forming covers to the radiators in the windows.

The windows are exceptionally large, and no artificial light is necessary in the banking room, except in one or two places, as long as daylight lasts. The walls above the marble panels are finished with hard plaster in simple panels, and the ceiling is beamed in square panels with a simple cornice.

The whole color of the banking room is finished in deep creams and buffs to correspond with the tavernelle marble.

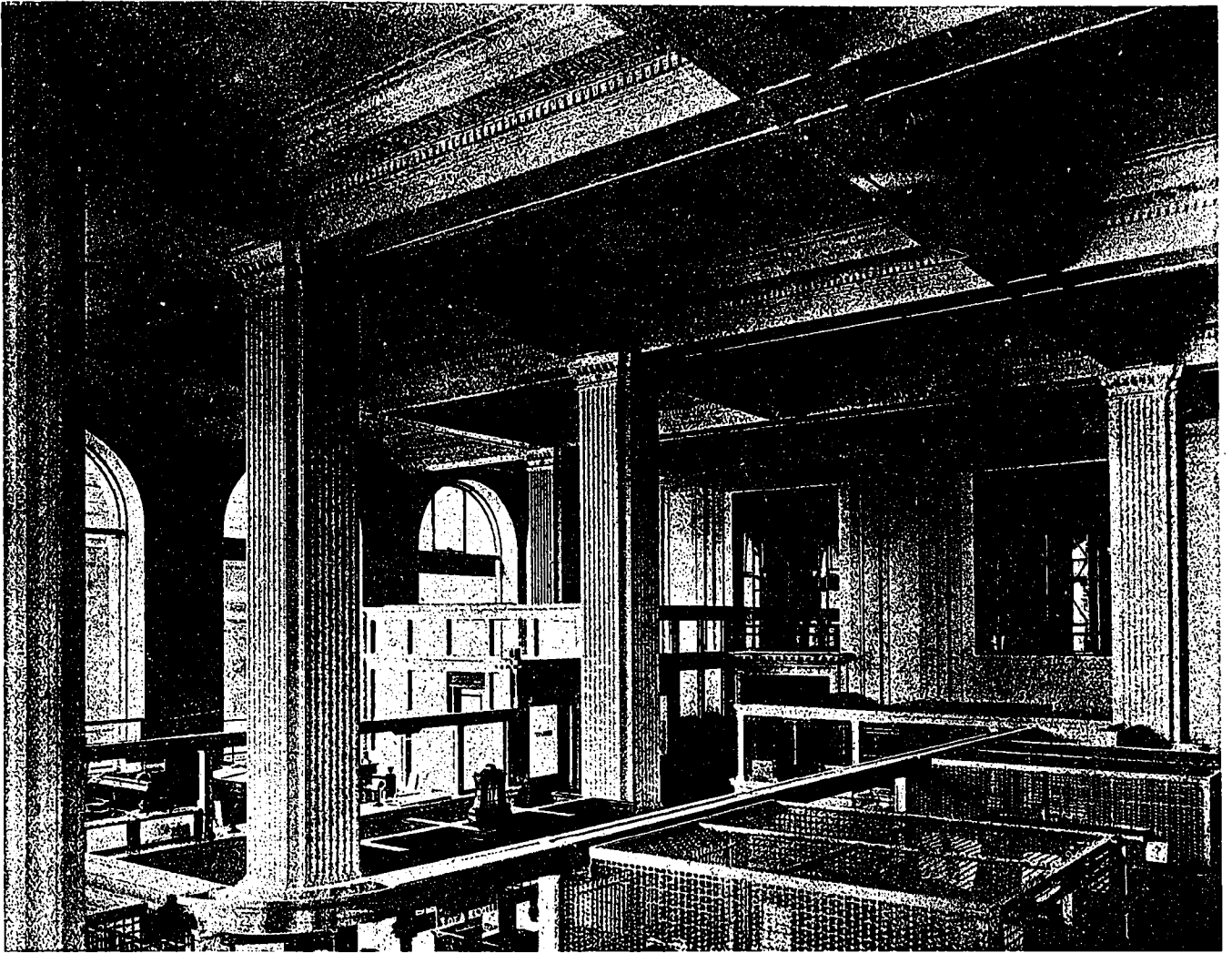
The manager's room is on the right of the entrance, and beyond the ante-room and counter form one continuous line around three sides of the "public" space to the entrance doors. By this arrangement no part of the staff is cut off by any "public" space from the others, and the "public" space being a rectangle, shows to the best advantage.

The manager's screen is in marble with muffled glass panels, and is carried to a height of about twelve feet. A handsome marble doorway of the Corinthian order leads to the ante-room and forms the main entrance to the manager's room.

The counter screen is formed of tavernelle marble colonettes with simple entablature. The tellers' cages have simple bronze grilles with revolving wickets, the balance of the counter being open with glass shelves on bronze supports at the "ledgers."

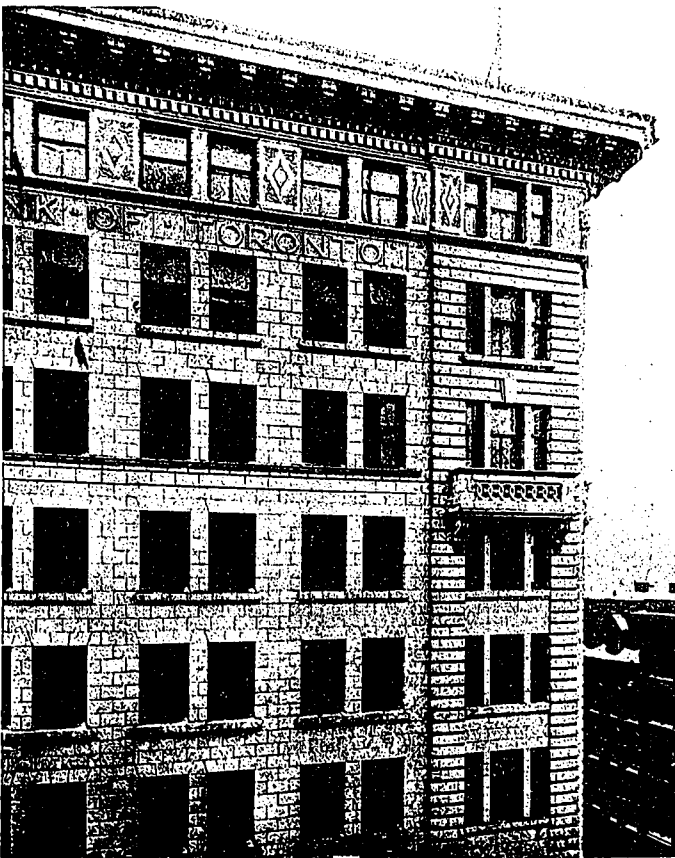
There are no electroliers in the banking room, as the whole is done by a special system on top of the manager's screen and counter. This arrangement does away with the necessity of large fixtures cutting the view of the banking room and gives an even reflected light over the whole ceiling.

In order to afford the greatest amount of room to the bank proper, all the vaults, lavatories, coat rooms,

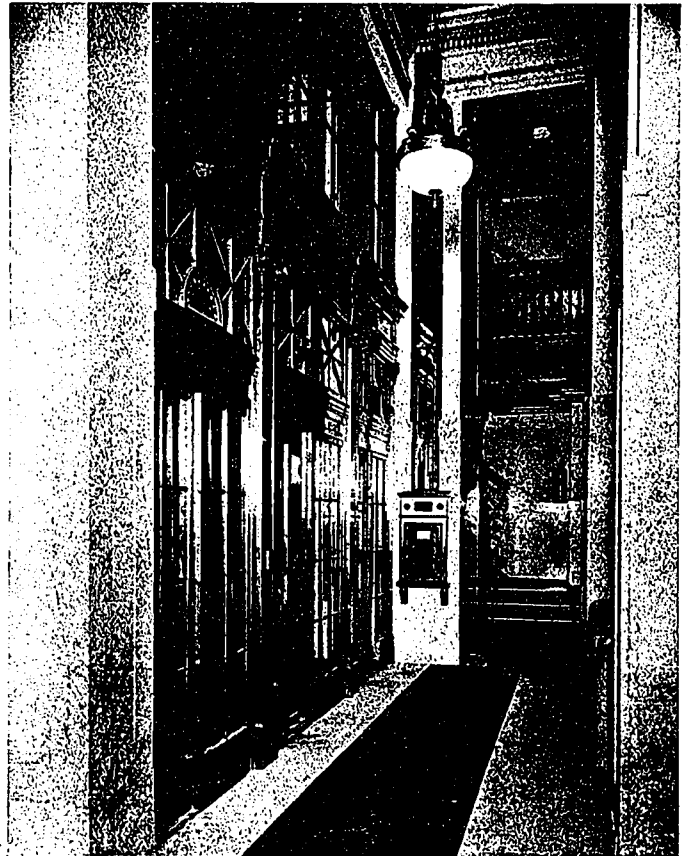


VIEW OF BANKING ROOM, BANK OF TORONTO BUILDING, MONTREAL.

HOGLE & DAVIS, ARCHITECTS.



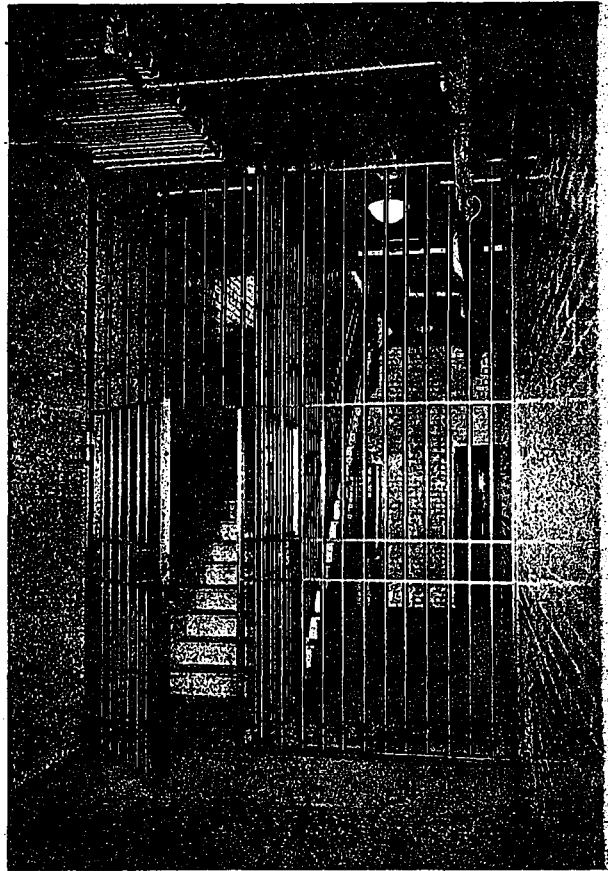
DETAIL VIEW OF CORNICE.



MAIN HALLWAY, SHOWING ELEVATOR FRONTS.



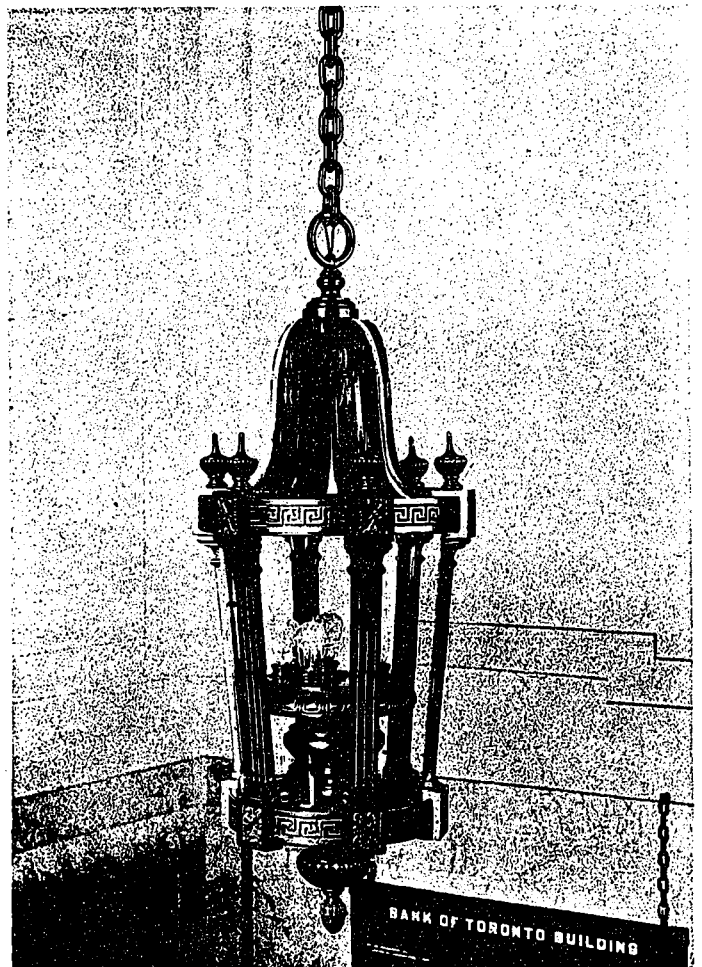
INSIDE VIEW OF ENTRANCE TO BANKING ROOM.
HOGLE & DAVIS, ARCHITECTS.



STEEL GRILLE WORK AROUND ENTRANCE TO SAFETY DEPOSIT VAULTS.



DETAIL VIEW OF MAIN ENTRANCE.



LANTERN IN HALLWAY.

were placed in the basement immediately below the banking room. A marble stair enclosed in a steel grille leads down from beside the manager's room to the safety deposits, and an electric lift takes the books from the between the safety deposit vault and also serves the adjacent money vault.

There are means of communication between the safety deposit vault and these last two through large steel grilles. The cash and safety deposit vaults are lined throughout in three layers of steel, and are fitted with the most modern type of vault doors. The outer doors are five inches thick, made up of five layers of steel. The inner doors are of three layers. These vaults are protected with the most modern burglar alarm system.

The book vault is exceptionally large, with a balcony carried around three sides, giving an extra amount of space. A similar balcony is provided in the cash vault. There is a small storage vault which provides for silver chests, etc., that may be deposited at the bank. The safety deposit vault is provided with booths for cutting coupons, examining documents, etc.

Coat rooms, lavatories, etc., for the men and women clerks are provided immediately beneath the banking room, and are reached by a separate stair. By this arrangement of vaults, coats, and lavatories, etc., while the whole of the ground floor is kept for banking purposes, the staff has no need to go to any other part of the building.

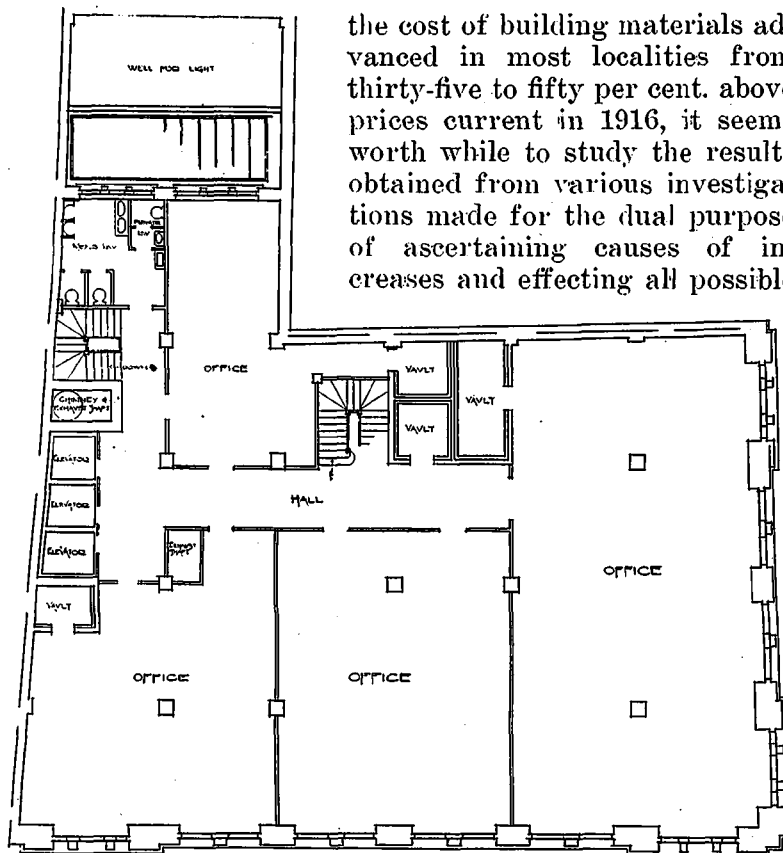
The floor in the banking room behind the counter is of cork tile, and in the "public," halls, etc., of white Italian marble with green border.

The upper floors are reached by three elevators with bronze cages and bronze and glass screens. The corridors are lined to a height of about four feet with Botticino marble, and have white Italian marble floors. The offices are divided to suit the tenant's requirements.

On the ninth floor there is a large lunch room, which will be used for the bank, well supplied with a large kitchen, larder, etc., and there is also an apartment for the bank's messenger.

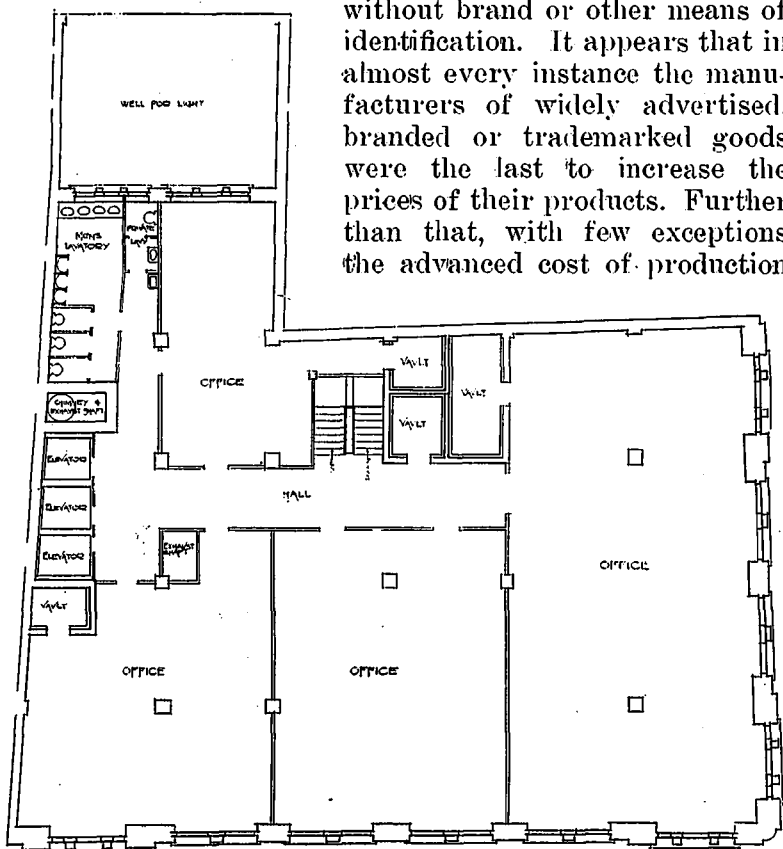
The building is heated throughout by steam.

the cost of building materials advanced in most localities from thirty-five to fifty per cent. above prices current in 1916, it seems worth while to study the results obtained from various investigations made for the dual purpose of ascertaining causes of increases and effecting all possible



FIRST FLOOR PLAN, BANK OF TORONTO, MONTREAL.

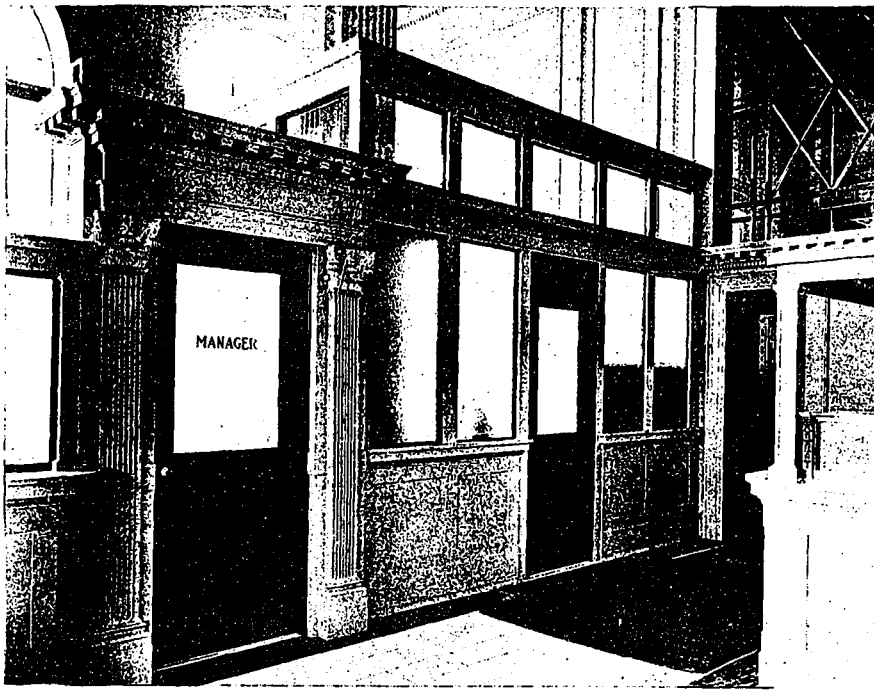
economies. Of particular interest to both architects and owners engaged in such study are the reports of an inquiry recently conducted to determine the relative increases in cost of trademarked materials, compared with those sold without brand or other means of identification. It appears that in almost every instance the manufacturers of widely advertised, branded or trademarked goods were the last to increase the prices of their products. Further than that, with few exceptions the advanced cost of production



SECOND TO EIGHTH FLOOR PLAN, BANK OF TORONTO, MONTREAL.

Trademarked Materials

Under the present conditions with



SHOWING DETAIL OF DOORWAY AND PARTITION AROUND MANAGER'S OFFICE IN MARBLE.

had been assumed in part by the manufacturers in the case of trademarked goods, whereas in others it was passed along to the consumer entirely, if in fact it was not increased.

The result of the inquiry might have been foretold, as it simply demonstrates again the responsibility which the manufacturer of a trademarked article feels, and which is not shared by the maker of a non-branded material. Not only must a manufacturer of the trademarked goods stand behind them, but he must avoid dissatisfaction, even with the price, to the limit of his ability, and a majority of them would rather assume a temporary loss of profits than to disturb relations with their customers by increasing prices. Where, as in the present instance, it is no longer possible to market their goods at the old price, it has been found that they have increased their prices as little as is consistent with the maintenance of the quality and continuation in business.

Viewed from any angle, it would seem that an architect is always protecting both his client's interests and his own reputation by selecting for use only those goods whose manufacturers are responsible, and who proclaim and make real that responsibility by marking their products so that they can be identified at all times, or at least until they have finally reached their respective places in the work for which they were intended.

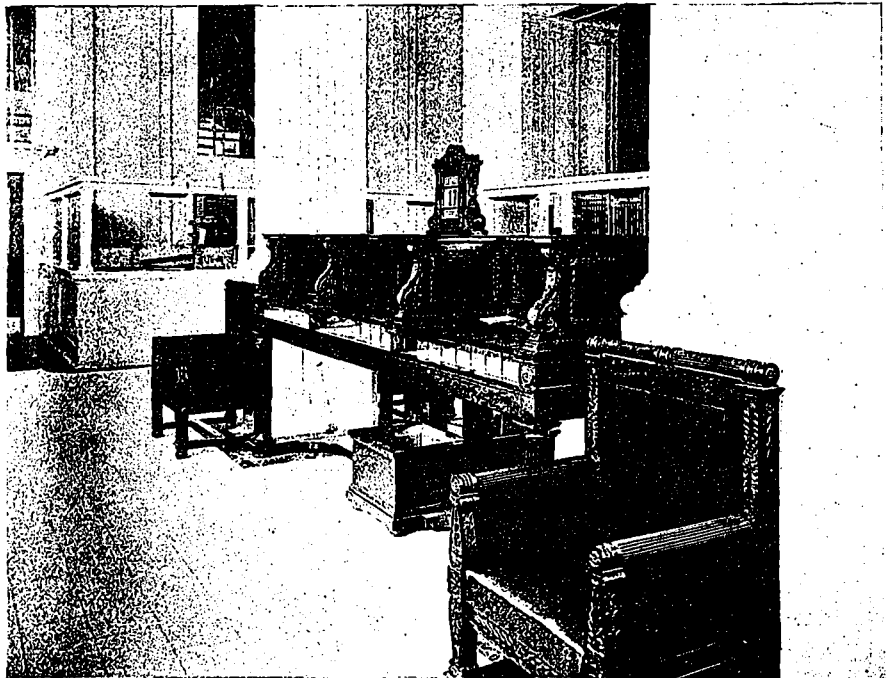
Governmental Endowment of a Chair of Architecture

An endowment of £2,000 a year has been granted by the New South Wales Government for a Chair of Architecture at Sydney University; and it is claimed that this is the first occasion of a Government of the British Empire recognizing the national importance of architecture. A certain twinge of envy must therefore accompany our nevertheless sincere congratulations to the Government and to the architects of New South Wales. But the example is not merely for Governments, but for those universities upon whom it has not yet dawned that architecture, broadly considered, has in it all the essentials of a liberal education. This news from New South Wales brings us much

nearer to the time when any university from which a well-endowed Chair of Architecture is excluded will be regarded as being hopelessly behind the times. Particulars of the Sydney Chair are not yet available, and it will be interesting to learn whether the conditions provide for the complete absorption of the professor in scholastic work, or whether the authorities adopt the more modern view that he shall be at liberty to keep in touch with actual practice.—*Architect and Contract Reporter.*

Durability of Stucco and Plaster

Exhibitions have made the public familiar with stucco buildings, and the stucco villa en-

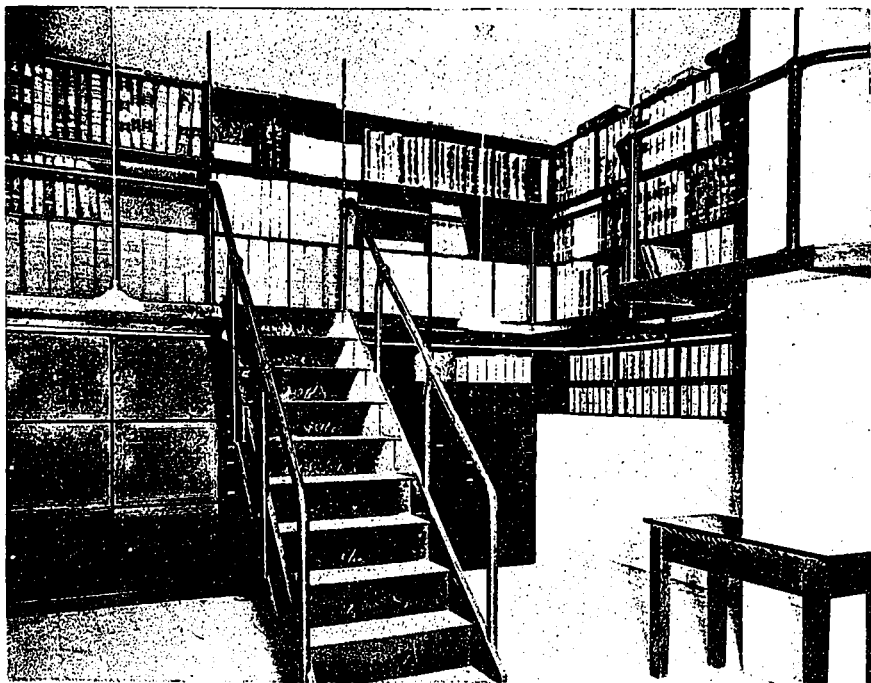


SHOWING CUSTOMERS' DESK IN BANKING ROOM.

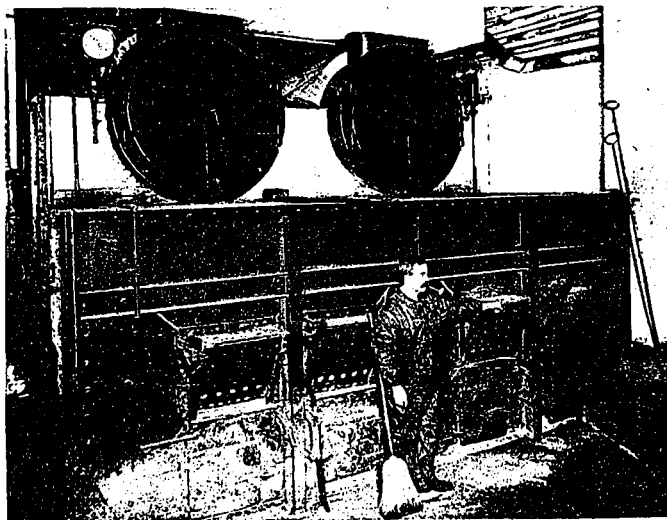
HOGLE & DAVIS, ARCHITECTS.

joys a certain popularity in the suburban districts of many cities. That is so in America as well as in Europe, and the development has been so rapid that little opportunity has so far been found or been taken to observe and test the suitability of methods and materials, though the experience of stucco has not by any means always been satisfactory. In conjunction with the Associated Metal Lath Manufacturers the United States Bureau of Standards undertook, in 1911, exposure tests of metal laths plastered with various materials, mainly for the purpose of determining the best methods of construction to insure the protection of the metal from corrosion. These tests, which are still in progress,

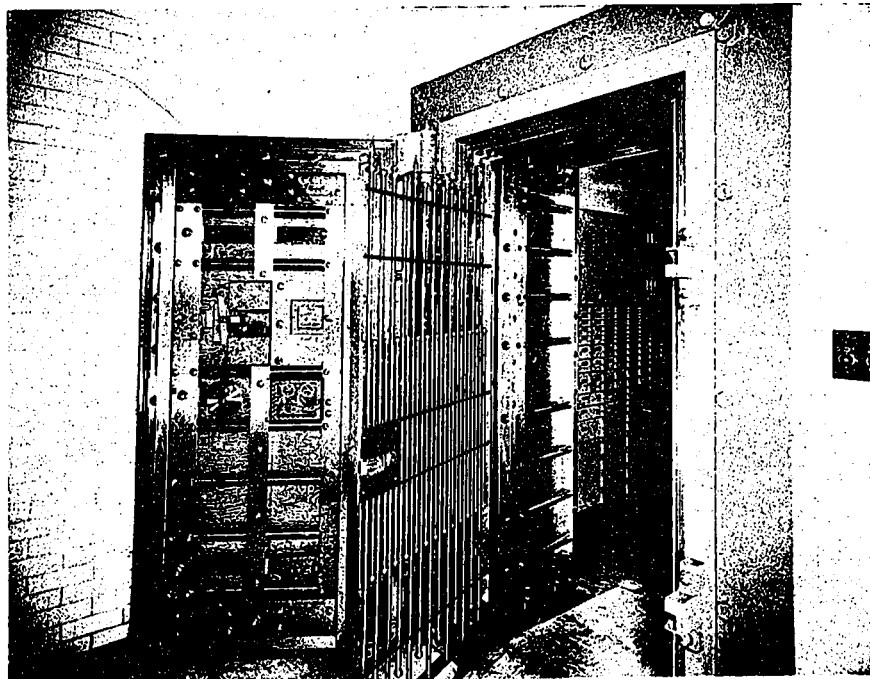
proved that painted or preferably galvanized lath, embedded in dense, water-resisting plastering material, would not corrode. At the same time, some plastering materials were in themselves found defective, of course, and the manufacturers of lime, cement, gypsum, hollow tiles, metal laths, etc., suggested a conference of interested parties. As a result



VIEW OF INTERIOR OF VAULTS.



VIEW OF BOILERS.



VIEW OF SAFETY DEPOSIT VAULTS.

a committee was appointed in 1914, consisting of members of the Bureau, of representatives of the Supervising Architect's Office of the Treasury, of the American Concrete Institute, of the industries, and, further, of three experienced contracting plasterers of good repute. A test structure, two hundred feet long, twenty-six feet wide and twenty-four feet

high, was erected in the Bureau grounds, and fifty-six stucco panels, each about fifteen by ten feet, were prepared, the building serving for the exposure of the panels and for the erection of plaster walls and partitions. When the panels were examined, in April, 1916, after six months' exposure, only two panels were found entirely free of cracks; forty per cent. of the panels were considered satisfactory, but the majority were more or less deteriorated. The tests were rather discouraging; but it must be stated that in the panels a smooth type of finish, known as "sand float finish," had been employed, which is more likely than the rough type of finish adopted by builders to bring out defects.

Engineers Plan National Industrial Preparedness

A Permanent Consulting Board Suggested, and a National Industrial Development Plan Outlined.

THE necessity for a proper plan of national industrial development, and the procedure to obtain the necessary information for the establishment of such a policy, led to the presentation of a memorandum along this line by five members of the Council of the Canadian Society of Civil Engineers. Sir Charles Ross, M.Am.-Soc.Mech.E., and head of the Ross Rifle Co.; Prof. C. H. McLeod, R. A. Ross, Walter J. Francis, and H. R. Safford. This was forwarded to the Government at Ottawa last April, but no action was taken upon it until a few weeks ago, when Sir Wilfrid Laurier asked that it be tabled in the House. The scheme outlined is worthy of serious consideration, and it is to be hoped that it will arouse a wide discussion on this subject throughout Canada.

"Acting on the suggestions of Sir Charles Ross and subsequent discussions, the undersigned engineers have the honor to transmit for your consideration a memorandum of their views regarding a National Industrial Development Plan for the Dominion. While we appreciate that this highly important matter has, no doubt, already received much careful consideration by the Government, nevertheless we sincerely trust that this memorandum may prove of service to you, and that you may find our suggestions acceptable. We submit them from a sense of patriotic duty and because we believe that Canada may well follow the example of the United States and other countries in calling upon engineers and scientists to render assistance, not only in these critical times, but in those which will succeed the war."

The accompanying memorandum was as follows:

The Necessity for a National Industrial Development Plan.—The history of any community or country is a record of the cycles of dynastic, economic or industrial change, the period of change in each instance being marked by a pause in the established order of progress.

The Dominion of Canada in common with the rest of the civilized world is at this time experiencing an interruption in its course of rapid development. Her position to-day may be likened to that of an industrial enterprise which has been financed and made ready to operate, and which has reached the time when dividends must be earned upon the expended capital before further capital is obtainable for increasing the equipment. In such a case prudent foresight dictates the taking of stock and the organizing of the enterprises along lines which will ensure co-operation among the different departments

with a view to the largest possible production.

In this country the Government, through its various activities, has taken stock to some extent of our land, forest and mineral resources, and has in a degree also interested itself in investigations of the manufacture of certain products, such as steel and paper.

The curtailment of imports and the increasing demands, resulting from the present war, have compelled Canada to depend upon and to develop a number of her own resources. Zinc, for example, heretofore largely produced abroad, is now being smelted in this country, and magnesite, formerly imported, is now being mined, utilized and exported in considerable quantities. Phosphates, recently discovered, may later be added to our productions.

It would therefore appear that if a concerted effort were made to determine our requirements for domestic and foreign trade and to investigate the results from an economic standpoint, the country as a whole and our industrial enterprises individually would be placed in a position to develop and increase their activities along logical lines within the limits of known resources.

A knowledge of the mere existence of raw materials is insufficient. It is essential that their character, best uses and final fabrication into marketable products should be studied. Teamwork by the business interests, led, directed and assisted by the Government, would appear to be the proper method of systematizing all our forces in order that the greatest good to the greatest number may result.

The beginning of a cycle of industrial production has arrived, and if Canada is to increase her industrial weight in the world or even maintain her relative importance and her normal rate of increase, it is imperative that concerted action be taken towards co-ordinating her efforts as other countries are doing.

The Results Desired Through a National Industrial Development Plan.—A community is an economic unit, and the mechanisms of that unit should be so co-ordinated as to produce the largest and most far-reaching results. A primitive community, fed, clothed and housed, having no further necessities is an agricultural State only. Rapid increase of population and urban concentration demand the creation and development of new mechanisms to provide food, clothing and habitations. Industrial enterprises must be created to support the population. Means of communication and transportation must also be established for the handling of

either raw or manufactured products among the various groups and between the point of production and the transportation outlets of the country. There will, therefore, immediately spring up a demand for products other than bare necessities. As everything is derived from the earth, two questions arise, the first being whether or not the additional products can be obtained economically from the resources of the country, and the second whether or not these additional products may be economically turned into finished products within the country. The correct answers to these questions demand close study on the part of the most scientifically trained minds.

At the present time the industrial enterprises of the country are working individually, each towards its own end, without being mobilized for efficient production from a national standpoint. It is obvious that systematic co-operation of the various enterprises will result in benefit to the country as a whole.

We are of the opinion that information regarding the resources of the country and the results of the study of the economics of the industrial situation should be made and rendered available to the public. If this were done, present undertakings would benefit and many new enterprises would spring up with a reasonable prospect of success. The Government is the only organization which can properly co-ordinate, instruct and give direction to the activities of the country. If furnished with properly ascertained facts and with co-ordinated Government guidance, no industry, whether established or newly formed, can fail to benefit itself and the whole community.

To be more specific, we mention a number of points which will doubtless arise for consideration in the working out of a national development plan:

(a) The gathering of statistics of the products of the country as regards both quality and quantity, the conditions of production or growth, the cost of production and the cost of marketing.

(b) An investigation as to the possibility of the economic production of any article of commercial importance not now manufactured, mined or grown in Canada.

(c) The most profitable methods of manufacture or growth of present or future products, and the increase of output. This involves provision for research, trade schools, and the intimate personal training of the farming community by means of model farms and otherwise.

(d) Complete information regarding the most advantageous markets, a point which involves full study of the problems of transportation.

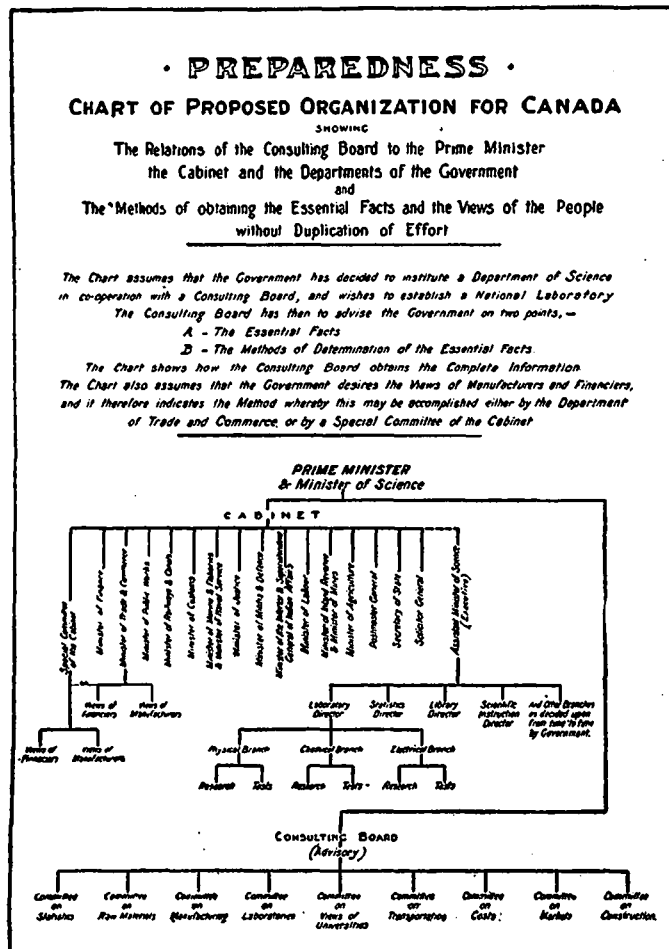
The results which should flow from this work are:

- (1) More complete utilization of the national resources of the country,
- (2) The general introduction of more scientific and commercially profitable methods of production,
- (3) An increase in production by reason of the improved methods and widened fields of operation, and
- (4) A reduction in cost to the consumer through the elimination of unnecessary handling and improvement in transportation.

A Suggested Method of Procedure to Obtain the Necessary Information for the Establishment of a Policy.—It is a well-established fact that the material development of modern civilization is in the hands of the engineer and the chemist.

The necessity for a national industrial development plan and the results desired therefrom have been fully recognized by other nations. It is needless at the present time to refer to the fact that Germany recognized the need very early, and had long since begun to reap the results the German Government desired. The economic and military preparedness of Germany has indicated to the rest of the world not only the advisability but the absolute necessity of scientific handling of the economic resources and forces of the community.

Spurred on by recent events, Great Britain, France and the United States of America have



each in its own way seriously taken up the subject—one of the most important of the present day. The war over, competition will be unprecedented. With Europe impoverished as a result of the struggle her immediate need will be employment for the industrial population in order not only to prevent starvation in the industrial ranks, but as far as possible to regain the lost wealth and to recover the lost trade.

Although affected favorably rather than otherwise by the present situation, the United States recognizes the above facts and realizes that future competition is something which may only be met by the most thorough preparation. The Americans have, therefore, taken up the question of national preparedness and have appointed what is known as the Naval Consulting Board, consisting of representatives nominated by the great engineering and scientific bodies of the United States, namely: American Society of Civil Engineers, American Institute of Electrical Engineers, the American Society of Mechanical Engineers, American Institute of Mining Engineers, American Chemical Society, American Electro-chemical Society, American Mathematical Society, American Aeronautical Society, the Investors' Guild, the American Society of Automobile Engineers, and American Society of Aeronautic Engineers.

Originally the Naval Consulting Board was intended to act in an advisory capacity with regard to naval affairs only, but its activities have since its organization been extended to include the investigation of the industrial resources of the country with a view to advising on a national policy therefor. It is interesting to note that practically the first recommendation made by this body was for the establishing of a national laboratory devoted to the solving of problems in chemistry, metallurgy, aeronautics, electricity and kindred subjects, and the placing of the information so obtained at the disposal of the community.

The recommendation for a national laboratory was made, notwithstanding the fact that the Bureau of Standards of the United States, already established about fifteen years and quite broad in its field of action, has been doing excellent work and rendering valuable service to all classes of the community. In making the recommendation the Naval Consulting Board doubtless had in mind the development of equipment especially suited to the requirements of the army and the navy on such a scale as would demonstrate results before attempting commercial manufacture. By this course all new developments in guns, aeroplane engines and the like may be thoroughly tried out before the placing of large contracts by the Government.

The organization of the Naval Consulting Board has placed the scientific and technical talent of the country at the disposal of the

United States without cost for professional service.

The French Republic has organized a civilian board similar to the United States Naval Consulting Board and has raised it to the dignity of a ministry (Le Ministère des Inventions). Great Britain has also enlisted the services of a board of civilian scientists and technologists with a view to the utmost development of the nation's industries for the prosecution of the war.

In view of the action of the United States, France and Great Britain, we are not suggesting a new or untried principle. This is further confirmed by the bibliography attached hereto. If engineering may be turned to the advantage of the country, we conceive it to be our duty to respectfully suggest that an invitation to cooperate be extended to the engineering and scientific societies in order that they may be in a position to render an official service to the Dominion.

The Government of the United States in appointing the Naval Consulting Board, selected engineers who have wide knowledge of engineering economics, thereby admitting that many of the problems of the industrial community are both scientific and economic in their nature. It was recognized also that the Government of the United States itself could not meet a situation of this kind through its own bureaux, since they are lacking in that contact with commercial conditions which is the essence of the case. Further, no mobilization of industrial organizations could be expected from the interested business enterprises acting apart from the Government. In other words, it was recognized that between the Government and industry there was required a body commanding the respect of both and recognized as authoritative by reason not only of its scientific attainments, but also by reason of its disinterestedness. Under these conditions the Government of the United States naturally turned to the engineering and scientific societies as being the only group from which could be expected the necessary technical and economic knowledge coupled with freedom from the rivalries of the commercial world.

We are, therefore encouraged to express the opinion that the Canadian Government cannot do better than address the engineering and scientific societies of Canada, inviting them to appoint from their number representatives whose advice would be at all times available to the Government. We feel sure that the engineers and scientists in Canada have as much public spirit as their professional brethren in the United States, and that a properly authorized consulting board of engineers would draw to itself the best talent in the country, and that without remuneration.

Following this idea, we venture to express

the view that the necessities of the immediate present at least might be met by selecting representatives of the civil, mechanical, electrical, mining and chemical engineers.

There is in Canada one engineering organization, namely, the Canadian Society of Civil Engineers, which embraces all branches of engineering and may be taken to correspond largely to the five great scientific bodies from which the Government of the United States selected the great part of its Naval Consulting Board. There are in addition two other organizations of less magnitude, and which include in their membership a number who are also members of the Canadian Society of Civil Engineers. These two are the Canadian Mining Institute and the Society of Chemical Industry. The Royal Society of Canada may also be considered a scientific society, but the great majority of its members are devoted to philosophy and literature. The accompanying chart indicates the number of fully qualified technical men in each of the organizations named.

In order that our view may be either confirmed or modified, we beg to suggest that the Government call prominent members of the industrial, engineering and scientific communities into its counsel and question them as to the necessities of the case and the best methods of procedure.

The Formation of a Permanent Consulting Board.—Assuming that the results of the investigation made along the suggested lines have been favorably considered by the Government and found acceptable in a broad way to all parties, it becomes pertinent to indicate the possible organization and power of such a body.

The introduction of a Consulting Board into the mechanism of government should not result in any upsetting or changing of the present Government organizations. On the contrary, the Consulting Board should be supplementary to and independent of the executive and be free to act either in the interest of any individual department of the Government or in the interest of the Government as regards its general policy in relation to industrial development.

Possibly the Government may later consider it advisable to establish a "Ministry of Industrial Development" or a "Ministry of Science," but if so, this does not in any way affect the principle of the present suggestion. We have attached hereto a diagram indicating our ideas of the function of the permanent Consulting Board and its relation to the Prime Minister.

We trust we may be pardoned for suggesting that the personnel of the Permanent Consulting Board should be free from political, individual or trade bias. The members should be in a position to deal with the technical matters presented to it in the same disinterested spirit as that with which the Bench acts, and in the sug-

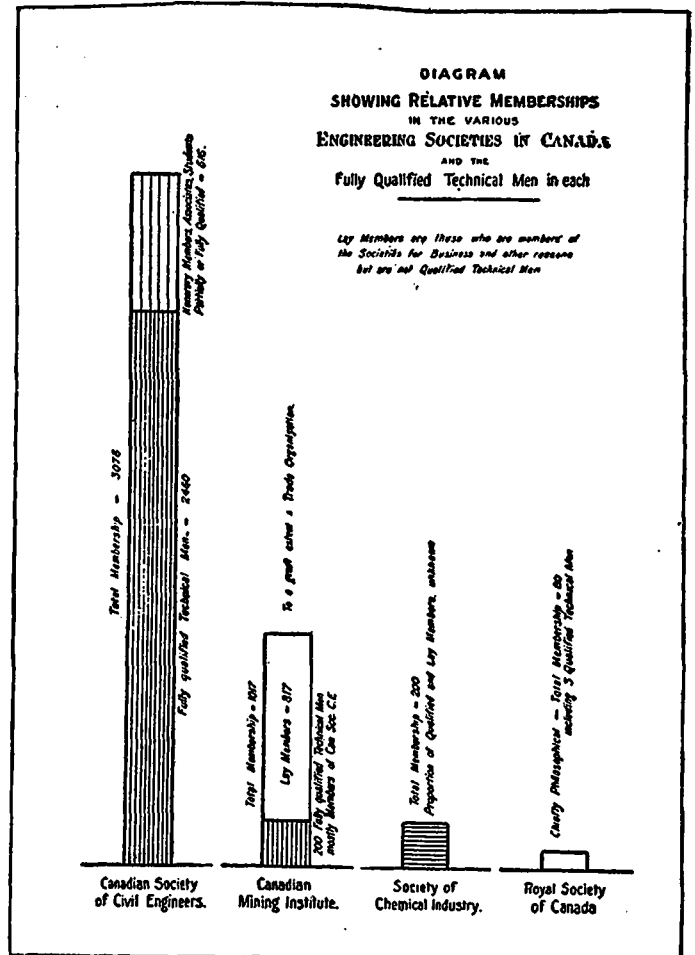
gestion referred to above this feature has been carefully kept in mind.

Assuming, then, the concurrence of the engineering and the scientific bodies above referred to, we would suggest that the Consulting Board be composed of two representatives in civil engineering, two representatives in mechanical and electrical engineering, two representatives in mining and metallurgical engineering, and two representatives in chemical engineering, all nominated by their respective societies to act each during the pleasure of the Government or of the nominating bodies. Further, we would suggest that the recall of any member be at the option of either the Government or the society, replacement, however, to be always at the discretion of the society.

The official headquarters would presumably be at Ottawa in an office provided by the Government, together with a well-paid and highly competent engineering secretary.

The operations of the board will require a certain amount of detail work, usually performed by subordinates. We believe that the Consulting Board should be authorized to appoint the necessary subordinates to carry out details.

If it be found desirable to make a census or investigation of the industries of the country the board might call upon non-paid technical assistants from the branches of the societies in the different Provinces, following the course pur-



sued by the Naval Consulting Board of the United States in investigating the industrial resources of each State.

Function of the Consulting Board.—The function of the Consulting Board is outlined in the diagram already referred to. Briefly, it should act as consulting engineers to the Dominion Government represented by the Prime Minister, independent of any department of the Government yet available through the Prime Minister to all, in precisely the same way that the general manager of a large corporation has consulting engineers at his call, not on his staff, but available to take up, independently of the working organization, all such technical or economic

problems as he may desire to have solved.

The Creation and Maintenance of a Department of Investigation, Research or Reference. If the Consulting Board be constituted along the lines we have suggested it will probably recommend that the Government establish a national testing and investigating laboratory for technical tests, investigation, research, reference or experiment. Such a laboratory would do for the Government precisely what any laboratory department does for a large manufacturing company, namely, investigate the materials, supplies, the processes employed in producing finished products and the economics of the production as related to technical matters.

The Management of an Architect's Office

Some Reflections of a Draughtsman of Experience in a Large New York Office.

WE give copious extracts from an article which recently appeared in the *Brick-builder*, since many of the reflections would apply equally here, and the article is written in a clear and effective style, and shows signs of a humorous appreciation of some of the difficulties of an architectural practice:—

On the fourth floor of a rather old-fashioned building in the city of New York is a suite of offices, the entrance door to which bears on its plate-glass panel the name of one of the best-known architects in the country. Inside is the usual arrangement of rooms—a public office where sit four or five stenographers, a finely equipped library, a private office haphazardly decorated with sketches, renderings, photographs and models, fragments of ornaments, casts, books and magazines, bronzes and marbles, Persian rugs and ancient altar cloths and the thousand and one bits of detail that an architect picks up in the course of a long career. There is a file room where are hung the drawings of several hundred buildings, and finally the big drafting room which at times accommodates a score or more of men.

Here I have spent five years in service, five years in working over all the problems that come the way of a general draughtsman in a fair-sized office. . . .

I have seen the things that have made the office famous, and I have seen the things that have retarded its progress, hampered its success, and, from a purely business standpoint, lessened the profits. . . .

It is difficult to discuss men without using names; therefore, for the sake of convenience, we will call the architect himself Smith, and his three lieutenants Black, White and Gray. Mr. Smith—we sometimes call him the Governor—

rarely used a drawing pencil except in the making of thumbnail sketches now and then, at which he was an amazingly rapid worker. His work was largely confined to the entertaining—the word is used advisedly—of clients, and parleying with contractors when the problem seemed too difficult for his subordinates to handle. Mr. Black might have been termed financial manager and general overseer of outside work; White was the designer, a Beaux Arts man, interested solely in the artistic side of his profession. Gray was head draughtsman.

In the early days of my service I wondered at the amount of work that came into the office and the apparent ease with which it was secured, and I soon attributed it in a large degree to the personality of the Governor. He was a thorough diplomat. An excellent conversationalist, educated, well read, he had that rare ability to talk intelligently and entertainingly with any man. I have frequently heard him say that to be successful an architect must be well versed in all branches of the fine arts; that a man who cannot appreciate good music cannot fully appreciate good architecture. He made friends easily, and frequented clubs and societies where desirable acquaintances might be cultivated. . . .

In the matter of getting out preliminary sketches he used a discretion that is sometimes lacking. For the real estate promoter who looked at all things from a cold business standpoint, plain business-like sketches were furnished, sometimes no more than rough plans colored in with a red pencil; but if the client seemed likely to be attracted by highly decorative drawings, White was permitted to amuse himself for a day or two with water colors and gold tape.

Withal there were many things that a draughtsman might have learned to his profit,

but there were flaws, costly flaws, in the running of the office, and it is with them that I shall henceforth concern myself. Perhaps it is safe to say that we learn more from the errors that we note than from the successes that we observe without comment. . . .

The greatest fault may be described as lack of team-work among the powers that governed. A dozen times I have heard a new draughtsman exclaim, "Who is the head of this drafting room?"

A man would be assigned to a new job. White would give him a few instructions, and he would prepare his drawings under the occasional supervision of Gray. Then, when his work was well along, Black would look at it and straightway announce, "That's not the idea at all." Gray would be summoned, and forgetting the fact that it had been his job to keep his eye on the draughtsman, would join Black in criticism. The draughtsman, nettled, would start again on a clean sheet, or, "to save time," would spend half a day in erasing his innocent errors. Then, when he had finally satisfied the two lieutenants, Mr. Smith himself would saunter in, study the drawing, and remark, "That's very pretty, but it's not right." . . .

How different from another office in which the head draughtsman, now a member of the firm, made it his practice to devote an hour each day, outside of office hours, if necessary, in studying the requirements of the problems in hand, and then, the first thing in the morning, assuring himself that every draughtsman understood exactly what his day's work was to be. . . .

The second flaw in our office management is illustrated by an incident which occurred when a number of new men were hired at a particularly busy time. We were hard at work just then on a large bank building. At the same time we were preparing sketches for a Gothic church. Now it happened that several of us had had considerable experience in church designing, while one of the new men had come to us from an office noted for its banks. The logical thing would have been to put the new man into the bank work and to permit one of us to make the sketches, which we could have done in a few days. What did happen was just the reverse. The new man was assigned to the church, and finding himself up against an unfamiliar problem, was obliged to take two or three times as long as one of the rest of us would have required, besides calling us in occasionally to help him. . . .

It was not long after this that it became necessary to rush through a set of drawings—"every drawing done by May 1." When a week or more had gone by it became evident that the force of men then employed could not do the task in the allotted time. It could have been done if each man had put in two or three evenings a week,

but we were not supposed to put in overtime except by request, and we were not then requested. The firm decided to hire new men. Obviously a new draughtsman, unfamiliar with his problem, will accomplish less in a given time than one who has worked on the drawings from the start. On May 1 the work was not completed, and it was decided to ask the men to work nights. Here again the policy of the office interfered with its work. Almost any draughtsman is willing to do extra work occasionally, but when he is required to work nights he has a right to expect pay for it; if not "time-and-a-half," at least at his regular rate. In our office, however, we were seldom paid directly for overtime. Instead, we kept an account of our time, and later, when the rush was over, we were allowed a vacation equivalent to the time we had worked. Fair enough sometimes, but there are times when a man needs money more than he does the vacation. . . .

Mr. Smith's men might have been divided into two general classes—the older men, men of eight or ten years' experience or more, and the younger fellows, boys of eighteen or twenty, still in their student days. That these younger draughtsmen should be given every opportunity to develop their talents was perfectly fair, and the more experienced men were always ready to help them with advice and criticism; but sometimes we thought that the thing was being carried to extremes. The crisis came when one of the best men we had gave notice that he intended to leave. The Governor asked the reason for his sudden departure, and the reply was, "I have spent fifteen years learning to be a designer and I'll be hanged before I'll waste my time tracing foundation plans while the office boy does the designing." It may sound like a case of injured pride, but we all felt that the man was justified; even the office boy designer agreed with us. He had been given a task beyond his ability, and he knew it. It was simply an example of the tactless method we had of assigning work, and it resulted in the loss of a valuable man.

Every office suffers from the failure of some of its draughtsmen to appreciate the true value of their work. There is always the draughtsman who omits structural details whenever possible, on the supposition that the builder will know better than he does how to build them. Then there is the fellow whose ambition to produce a beautiful drawing so absorbs his attention that he loses sight of the fact that he is doing a detail for the sole use of a few workmen, and not for exhibition purposes.

I recently saw a drawing made by just this sort of draughtsman. It was a 3/4-in. scale detail of an entrance to a public building. The man had actually drawn more than 8,000 individual bricks! . . .

From my experience in trying to analyze the leakage of time and energy in Mr. Smith's office, I am inclined to believe that more time is wasted in the making of details than in any other way. The Governor frequently criticized us for our methods of making scale details. "Remember," he would warn us, "you are making that drawing for the metal worker; don't waste time showing wood, and plaster, and marble trim." We listened and obeyed, but we sometimes felt that his criticism was not well founded. One carefully drawn sheet showing all materials in their correct relations to each other would have been of more value to the contractor than half a dozen separate drawings, and would have saved much of our time. What we were making was really a series of shop drawings which the sub-contractors, sooner or later, made over in their own way. It is not the student whose outside work enters into my criticism, it is the draughtsman who tries to build up a practice for himself while still an employee. In Smith's office we seldom accepted a job amounting to less than \$15,000 or \$20,000, unless the Governor felt obliged to do so for diplomatic reasons. Consequently, when one of the draughtsmen had a chance to do a small house or garage he didn't turn it over to the office, but made the drawings himself in his spare time—a practice that the office not only countenanced, but, to some extent, encouraged. The men benefited by it not only financially, but they were getting excellent experience.

The danger of the practice, however, lies in the abuse of it, and, in Mr. Smith's office, it must be confessed, certain of the men abused the privilege to a great extent. One man in particular had built up such a practice of his own that he was actually robbing the firm of work—schools, small theatres, and commercial buildings that ought to have been regular office jobs he captured under the very eyes of the Governor.

I would not discourage the draughtsman who can add to his income as well as to his experience and knowledge of the practical things in architecture by an occasional bit of work of his own, but to the architect who encourages the practice in his employees I would respectfully suggest that he watch out for the sort of man I have described—his genius is not rare—and if he finds him, either take him into the firm in self-defence, or else part company with him.

I might go into numerous other topics—the way in which the head draughtsman and the specification writer worked in utter independence of each other, a state of affairs which resulted in numerous discrepancies in plans, necessitating erasures and corrections; the Governor's habit of demanding the drawings on a given date, and then ignoring them for a week or more, until we learned to discount his de-

mands, so that when he really wanted a drawing on time he had difficulty in getting it; and White's custom of permitting a draughtsman to do sheet after sheet of ornamental detail as he pleased, and then blue pencilling the entire lot, changing mouldings in their entirety, until the draughtsman, in disgust, was prone to tear up his work and start anew.

I have wondered sometimes to what extent these unfortunate conditions exist in other offices. Smith's is not the only office that is losing money by mismanagement. A well-known architect has said that the ideal office is that in which there are no draughtsmen. He may be right. But, granting that draughtsmen are sometimes necessary evils, the greatest possible efficiency can be attained only when the drafting-room is under the supervision of one capable head man, and, if I may add one more condition, when the architect himself is in sufficiently intimate touch with his office to know whether or not his ideas are being properly carried out; whether, in short, his lieutenants are efficient directors.

Forest Resources of Bulgaria

When Bulgaria was separated from Turkey, the dense forests that formerly covered the country had nearly disappeared, and no steps had ever been taken to conserve them. In December, 1878, soon after the establishment of the Principality of Bulgaria, one of the reforms instituted by the new Government was the issuance of conservation regulations and the appointment of overseers and keepers charged with the duty of protecting the forests. Other regulations followed, prohibiting the export of wood, declaring all forest lands taxable, and providing for reforestation. Still later the sections to be felled were prescribed, monopolies and destructive exploitation were forbidden, and instructions published as to the best methods of preventing and combating forest fires. In the year 1908, the latest year for which statistics are available, the forest area of Bulgaria comprised 7,086,232 acres, of which 3,333,596 belonged to the various parishes, 1,611,423 to the State, 1,096,785 to private owners, and the remainder, 1,044,428 acres, to churches, monasteries, mosques, schools, the Bulgarian National Bank, and the Bulgarian Agricultural Bank. The forests then comprised about thirty per cent. of the total area of the country, were valued at \$125,000,000, and it was claimed that Bulgaria had two and one-half acres of forest to every inhabitant. Bulgaria, therefore, was at that time richer in forests than Germany, Italy, Roumania, Switzerland, France, Spain, Portugal, or Greece, and vastly better off than Hungary, while it had but three per cent. less forests than Austria, Sweden, or Norway.

CONSTRUCTION

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ENGINEERING AND CONTRACTING
INTERESTS OF CANADA



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CONTRIBUTIONS.—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and returned.

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FRASER S. KEITH - - - EDITOR AND MANAGER

Vol. X Toronto, March, 1917 No. 3

The Building Outlook

According to figures just received from the City Architect and Superintendent of Buildings, Mr. Alcide Chausse, Montreal, the building permits up to the 28th of February this year show a marked increase over those of last year. For February, 1917, fifty-five permits, the value of buildings was \$402,565, while for the same number of permits a year ago the value was \$65,915, or less than one-sixth. During the first two months of this year a total of eighty-eight permits were issued, showing a value of \$652,460. During the same period last year, there were ninety-nine permits issued, totalling \$240,000.

Montreal has generally reflected the building situation in a stable, conservative manner, so that the foregoing figures would indicate that the outlook for this year in the building field was fairly good. Whether the total number of buildings, planned for the coming year, will be built is questionable. The high cost and scarcity of both materials and labor are two factors that will undoubtedly have a deterrent effect. Another and very important factor is the transportation problem, which to-day is giving the lumber manufacturers and contractors considerable concern, and is also playing an important role in respect to the price of this commodity.

The Late Lt.-Col. S. G. Beckett

It is with sincere regret that we are called

upon to chronicle the death of Lieut.-Col. Beckett, who left Toronto last year in command of the 75th Battalion. A private cable was received in Toronto on Sunday, March 4th, giving the meagre report that he had been killed in action. The late Col. Beckett was a partner of Col. Vaux Chadwick, who is also on active service, having left Canada with the Canadian Mounted Rifles. In the passing of Col. Beckett, Canada loses a gallant soldier, who had already received high commendation in the performance of his duties at the front. His loss will be felt in architectural circles, where he occupied an established position, full of promise for future accomplishment.

The Metric System

In the last issue we published an article by Emile E. Deley on the metric system. This is a subject that has been under discussion more or less intermittently in Canada and the United States during the past fifteen years. Volumes have been written for and against the adoption of the metric system as a standard of weighing and measuring for this country. The fact that the British units adopted by us were remaining unchanged in England, made it somewhat inexpedient to consider the change in this country.

Its adoption means a complete revolution in the existing machinery gauges and standards used in all lines of manufacturing, and would entail an outlay somewhat staggering. We must, however, look at the situation in its broadest light, and peer somewhat into the future to get the proper perspective. The present epoch has seen the end of the old order of things in many instances. Even more revolutionary than the adoption of a new standard, a standard already tried and tested, the simplicity and logicalness of which is unquestioned. So it would seem that the present would be an opportune time at least for a frank declaration by the manufacturers, engineers, and scientific bodies of Canada as to their feelings in this connection.

Having two standards, the British, which is the standard both in United States and Canada, and the metric adopted by most European countries, brings about endless dissatisfaction in dealing with foreign business when the two standards come mostly into conflict.

If the organizations chiefly concerned in this question in Canada would place themselves on record, if they have not already done so, as to their ideas regarding the adoption of the metric system, they could then be presented at the postponed Economic Conference which has been announced by the Minister of Trade and Commerce, but not yet convened. This is one of the questions that should be decided at this Conference, and its importance warrants that attention be given to the subject without further delay.

Architectural Digest

Articles of More Than Passing Interest From Our Contemporaries

A CHAPTER IN THE HISTORY OF POTTERY.

The potter was the first artist. He was also the pioneer of the world's great industries. His creative instinct found its earliest expression in clay. His earthenware is contemporary with the Pyramids. Two thousand years before the Christian era he made bricks, and stamped them with the names and titles of the monarchs for whom they were manufactured. The antiquity of the art is emphasized by Homer. It contributes to the household service of the humblest cottage, and adorns the palace of the king. Pottery has provided the only existing record of the past. The pioneers of modern sanitary science have found in the potter their most useful ally, frequently anticipating the best inventions for improving the health of towns, and meeting every claim upon his ingenuity and skill.

In the last quarter of the seventeenth century two potters of Amsterdam became acquainted with the fact that at Bradwell, in the vicinity of Burslem, there was a bed of beautiful red clay, peculiarly fine in grain and color. It is thought that John Dwight, of Fulham, one of the foremost artists in clay at that time in England, supplied his two friends, or correspondents, with this valuable information. These two potters, on the strength of the English red clay, emigrated to Staffordshire and established a pottery at Bradwell in 1690, where they endeavored to imitate one at least of the foreign kind of ware. With a mixture of red clay and a little ochreous clay they made red porcelain glazed teapots; and, by adding manganese, they produced red porcelain, or Egyptian ware. These novelties were stored at Dimsdale, about a mile distant from the work, and the buildings were said to be connected by a speaking tube. They were very jealous of their manufacturing secrets, and looked rather to strategy than to patents for their protection. One can well imagine how the foreigners would pique local curiosity. Moreover, it is easy to understand that they would not be likely to make many friends in the neighborhood, seeing that their manners were said to be somewhat supercilious; the fact being that, considering their origin and bringing up, they would not be likely to find among the local potters of the Staffordshire district of that time many cultured acquaintances. The Dutchmen kept themselves to themselves, affected, no doubt, a superior tone in their limited associations with their neighbors, and in presence of this foreign hauteur of the invaders and their great success in pottery with local clays, it is not surprising that their stratagem of secrecy was met with opposing artifice. Their very precautions must have been regarded as more or less of a challenge. John Astbury and Josiah Twyford evidently acted upon this view, as well as with a desire to advance their own practical knowledge. The Dutchmen kept a careful guard over their works against strangers. Between their establishments at Burslem and Bradwell they had a code of signals to warn each other of the approach of strangers. They selected their servants and laborers from the dullest and most stupid people they could find. They looked for hands, not heads. An idiot was employed to turn the thrower wheel. Each person was locked in the place where he was employed. Previously to the few work people retiring at night, each was subject to a strict examination. In this state the processes were pursued, when the two local potters, Twyford and Astbury, applied for employment at the works. Twyford seems to have been the first to succeed. He relied upon a carelessness and indifference of manner that went without challenge. It was not a question of assuming a virtue, though he might have it not, but of sustaining the disguise of a shrewd intelligence under the aspect of a doltish stupidity. They took him on, and he successfully played his part of an indifferent toiler who was content with his humble wage and position. Astbury appears to have found it necessary to adopt more severe shifts than Twyford, or was more resolute in his determination to master the secrets at all hazards.

After two years of this strange employment, Astbury came to the conclusion that he had no more to learn in this factory, and he availed himself of a real or feigned sickness to remain at home, and the Dutchmen had the mortification to discover that they were no longer the only persons who could make the pottery they had introduced in the district.

Disturbed, if not disgusted, with the inquisitiveness of Burslem potters, and believing in the desirability of being near the principal market for their wares, they removed to a manufactory near London, where a branch of the family is still resident.

Josiah Twyford of this incident established his works near Shelton Church and the residence of Elijah Fenton. Parts of the buildings in connection with these works, the cottages for the work people, and "Twyford Square" are still in existence; also pieces of pottery made by him are still to be found when the ground is disturbed. He died in 1799, and was buried in Stoke Church. Prior to fifty years ago operations at these works were confined to general pottery. Sanitation was in its infancy. Mr. T. W. Twyford saw that there were possibilities of great development in the art and business of the sanitary potter, who at that time was content (with few exceptions) to receive, for his share of a miscalled "Sanitary Appliance," 2s. for the earthenware, the brass and iron-founder getting from 20s. to 50s. He thought this was hardly equitable in principle, and so conceived the idea of the "National" basin, made all in earthenware, to displace the old "pan" closet and similar unsanitary systems. At first this innovation met with scant success owing to the difficulty with which old-fashioned notions and customs are superseded. During the first year of its introduction, not more than fifty were sold; the next year about two hundred; a year or two later, when its advantages, from a sanitary point of view, were generally discovered and acknowledged, the sales reached about ten thousand a year.

In the summer of 1835, when an inquiry was received through the Paris agent from a French architect of advanced views in sanitary engineering, who desired to know if he could be supplied with a basin to be fixed open and exposed, without any wood enclosure, Mr. Twyford replied in the affirmative, and at once had a design prepared and submitted to the architect, who was so well pleased with it that seven hundred were at once ordered, to be fixed in some large residential flats which were then being built under his supervision in Paris.

This basin, which was of a large type known as the "Wash-out," under the name of the "Unitas," was the pioneer of "Pedestal" closets, and was really the commencement of the present fixing basins open and exposed, so that all joints and connections can be examined, abolishing corners or concealed places in which dirt can accumulate unperceived.

The "Unitas" was exhibited at the Health Exhibition, 1886, and excited many comments. While on sanitary grounds the principle was commended, yet it was generally remarked that the innovation would never be popular. Indeed, had it not been for the loyal support of the medical profession, who unceasingly, in their own journals and also by their own example, advocated this new principle in sanitation, it is questionable whether it would not have been sacrificed to the conservation of old prejudices and false ideas of propriety; happily, however, science triumphed over sentiment.

The same progress and advance has been made in other branches of sanitary pottery. Lavatory basins of large size and improved construction have to a great extent taken the place of the unsatisfactory and often unsanitary wood top, marble or slate, with plug basin underneath. Indeed, it is now quite common to see fine pieces of lavatory earthenware that a few years ago it would have been deemed impossible to produce. Then, again, it is now possible to produce lavatory ranges of any length, fitted together with joints so perfect and complete that they can scarcely be detected, and forming, when complete with their stands, fittings, and pipes, real marvels of constructive sanitary art.

Architects, builders, and sanitary engineers were quick to take advantage of the practical advance in providing for the better health of towns, and Twyford's followed the agitation with an energy and inventive capacity that soon covered the country with their new sanitary appliances, which they first made chiefly for private firms, and after a time with their own name and guarantees of perfection.

Prior to this new departure at Twyford, enamelled fireclay had been made principally in Yorkshire, at Stourbridge in Worcestershire, and in various parts of Scotland, the porcelain enamelled baths of Stourbridge being especially celebrated. From Mr. Twyford's experience in the manufacture of large pieces of earthenware in connection with his sanitary pottery, he recognized the possibility of utilizing the fireclay of the district in the production and manufacture of specialties in the shape of sanitary and culinary vessels, sinks, cisterns and baths of a size and strength which had hitherto not been projected. A considerable time was spent in experimenting and testing the various clays, some of which, having an undue proportion of alkalis or alkali earths, would not stand the fire; others, having too great a percentage of silica, would not take the enamel; others, being too much impregnated with oxides of iron, discolored the enamel; whilst many contained other impurities which rendered them impossible for the purpose.



THE LATE LT.-COL. S. G. BECKETT

Commander of the 75th Battalion, C.E.F., who was killed on the Somme recently, particulars being still lacking. The late Lt.-Col. Beckett was a very fine officer and prior to the war practised in Toronto as an architect. He and his partner, Col. Vaux Chadwick, gave up their business to serve the Empire.

CONSTRUCTION NEWS

Information of Special Interest to Architects, Contractors, and Manufacturers.
Construction Building Reports will Give You Up-to-date Information Every
Day on all New Buildings About to be Erected or in Course of Erection.

BUILDING PERMITS.

Quebec, Que.—Permits issued at Quebec, Que., for the month of February totalled \$147,000.

Stratford, Ont.—Permits issued at Stratford, Ont., for the month of February totalled \$11,305.

BUSINESS BUILDINGS.

Galt, Ont.—The Gore Mutual Fire Insurance Company, Galt, have prepared plans for office alterations.

Hamilton, Ont.—Geo. Mills, 614 King street east, has been awarded the mason contract in an addition to a bank for the Bank of Montreal, to cost \$6,000; G. Kenneth Rea, 59 Beaver Hill Hill, Montreal, Que., is the architect.

Quebec, Que.—Architect P. Levesque, 115 St. John street, Quebec, has prepared plans for a bank branch for La Banque Nationale, Quebec City, to cost \$3,000.

Niagara Falls, Ont.—Wm. Mullen, Victoria avenue, has been awarded the painting and glazing contracts in a bank for the Royal Bank of Canada; May Electric Company, Niagara Falls South, have been awarded the electric wiring contract; Ireland & Dinham, Glenholme avenue, are the general contractors; C. M. Borter, Main street, is the architect.

Windsor, Ont.—J. Rutherford, 1000 Wellington street, London, has commenced work on an office building for the Huron and Erie Mortgage Corporation, London, to cost \$65,000; Watt & Blackwell, Bank of Toronto Building, London, are the architects.

CIVIL ENGINEERING.

Fredericton, N.B.—B. F. Smith, Minister of Public Works, has received tenders for the erection of a bridge over the Kennebecasis River.

Ottawa, Ont.—The city of Ottawa contemplates the erection of a bridge at the foot of St. Patrick street and Rideau River, to cost \$150,000.

Peterboro, Ont.—The town of Peterboro contemplates the erection of a bridge across Hunter street.

Toronto, Ont.—The Wm. Davies Company, 521 Front street east, has prepared plans for a bridge to be erected on Front street east, to cost \$2,500; Wells Bros. Co. of Canada, Ltd., Church street, have been awarded the general contract.

CLUBS, HOSPITALS, THEATRES AND HOTELS.

Gravenhurst, Ont.—The National Sanitarium Association, 238 College street, Toronto, contemplates the erection of hospital buildings.

Hamilton, Ont.—H. Guest contemplates remodelling the Strand Theatre, to cost \$10,000.

Hamilton, Ont.—E. R. Gray, City Engineer, City Hall, has prepared plans for moving and repairing of the club house for the Victoria Yacht Club, to cost \$7,000.

Hamilton, Ont.—J. M. Peregrine, 74 Queen street south, contemplates the erection of a theatre, to cost \$75,000. H. Guest, 755 King street east, contemplates an addition to his theatre, to cost \$15,000.

Hamilton, Ont.—Samuel Howard, 231 Mary street, has been awarded the mason contract in altering a hotel into apartments for Miss Edwards, to cost \$10,000; Murry & Connor, 158 Victoria avenue, have been awarded the carpenter contract; Adam Clark, 7 Main street west, has been awarded the plumbing contract; Stewart & Witton, Hamilton, Provincial and Loan Building, are the architects.

Kitchener, Ont.—Work on the hospital for the Sisters of Charity will commence in the spring.

Montreal, Que.—Messrs. C. E. Deakin Construction Company have commenced work on the new wing to the Algonquin Hotel for the Canadian Pacific Railway Company.

Nelson, B.C.—The directors of the Kootenay Lake General Hospital Board estimated that it will cost about \$85,000 to finish their hospital, which is now under construction.

Renfrew, Ont.—The Renfrew Hotel Company will erect an addition of forty rooms to their hotel.

Renfrew, Ont.—Architect W. E. Noffke, 45 Rideau street, Ottawa, is preparing plans for an hotel addition for the Renfrew Hotel Company.

South Porcupine, Ont.—The Township of Tisdale, South Porcupine, contemplates the erection of a hospital.

Windsor, N.S.—The trustees of King's Hospital, Windsor, N.S., contemplates the erection of an addition to their hospital, to cost \$1,000,000.

FIRE LOSSES.

Arborg, Man.—The Arborg Hotel was destroyed by fire; loss \$30,000.

Amherst, N.S.—The Empress Theatre was destroyed by fire; loss \$25,000.

Battleford, Sask.—The store of White & Joliffe and other buildings at Battleford were destroyed by fire.

Brockville, Ont.—The Isolation Hospital of the town of Brockville was destroyed by fire.

Calgary, Alberta.—Three stores in the town of Okotoks were destroyed by fire; loss \$30,000.

Elstow, Sask.—The hotel at Elstow was destroyed by fire.

Ellice Township, Ont.—St. Paul's Lutheran Church was destroyed by fire; loss \$20,000.

Fort William, Ont.—Chapples, Limited, departmental store was destroyed by fire; loss \$125,000.

Galt, Ont.—Ross D. Bailey's hungalow was destroyed by fire; loss \$6,000.

Gravenhurst, Ont.—E. Long Manufacturing Company's foundry and machine shop was destroyed by fire; loss \$20,000.

Halifax, N.S.—The business premises on Gottingen street were destroyed by fire; loss \$40,000. The smoke house of the North Atlantic Fisheries was destroyed by fire.

Hamilton, Ont.—Grafton & Co.'s store building was destroyed by fire; loss \$150,000.

Kenora, Ont.—The Vereker Block was destroyed by fire; loss \$10,000. The Zion Methodist Church was destroyed by fire; loss \$20,000.

Kenora, Ont.—The Fullerton business block was destroyed by fire; loss \$15,000. The King Edward Hotel was destroyed by fire; loss \$40,000.

Moncton, N.B.—The Minto Hotel Building was destroyed by fire; loss about \$40,000.

Oshawa, Ont.—W. J. Trick & Co.'s factory was destroyed by fire.

Peterboro, Ont.—The Canadian General Electric Company's building and machinery were destroyed by fire; loss \$25,000.

Phoenix, B.C.—The Dominion Hotel was destroyed by fire; loss \$1,000.

Port Hope, Ont.—John Walker's store was destroyed by fire; loss \$7,000.

Quebec, Que.—The dry goods store of Simard & Carmichaels, on St. Joseph street, was destroyed by fire.

Quebec, Que.—Three buildings were destroyed in the business section of St. Roch's Ward; loss \$150,000.

Quebec, Que.—The biscuit factory of W. Charest and the sausage factory of G. Gouillard were destroyed by fire; loss \$25,000.

Sarnia, Ont.—Mrs. T. K. Crinnian's hotel was destroyed by fire; loss \$20,000.

Sherbrooke, Que.—The plant of MacKinnon-Holmes Company was destroyed by fire; loss \$30,000.

Simcoe, Ont.—The Simcoe Lithographing Company's plant was destroyed by fire; loss on the plant was \$150,000, and on the equipment about \$200,000.

Sudbury, Ont.—The freight sheds of the Canadian Northern Railway at Sudbury were destroyed by fire.

St. Hyacinthe, Que.—Emile Bouchard's business building was destroyed by fire; loss \$20,000.

St. John N.B.—The Kennedy Building was destroyed by fire; loss about \$20,000.

St. Thomas, Ont.—Norsworthy & Co.'s foundry was destroyed by fire; loss \$20,000.

Toronto, Ont.—Bingham's, Limited, palm garden and tea room were destroyed by fire; loss \$15,000.

Toronto, Ont.—The foundry of the Queen City Foundry Company was destroyed by fire; loss \$30,000. The Stanley Piano Co.'s (241 Yonge street) warehouse on Temperance street was destroyed by fire; loss \$10,000.

Winnipeg, Man.—The Parkview Annex on Carlton street was destroyed by fire; loss \$25,000.

Winnipeg, Man.—The warehouse of the James Stewart Stove Company was destroyed by fire; loss \$250,000.

Winnipeg, Man.—The Great West Saddlery Company building at Winnipeg was destroyed by fire; loss \$40,000.

Winnipeg, Man.—The warehouse of Jobin-Marrin Company was destroyed by fire; loss \$150,000. The business building of Scott, Bathgate Company, Limited, was destroyed by fire; loss \$200,000.

MISCELLANEOUS.

Brantford, Ont.—Architect W. C. Tilley, Dalhousie street, is preparing plans for a boiler house addition for the Water Commissioners, City Hall. The Waterous Engine Co., Brantford, Ont., have been awarded a contract for the erection of a smoke stack for the city of Brantford.

Chatham Township, Ont.—Arphax Hin, 100 Murray street, Chatham, has been awarded the general contract for the erection of a stock barn for John Johnson.

Collingwood, Ont.—Architect John Wilson, Hourontario street, has prepared plans for a garage for Smalley & Toms, Collingwood.

Cornwall, Ont.—The Cedar Rapids Transmission Company are preparing plans for a power and transformer station.

Fairbanks, Ont.—Walter Freeland contemplates the erection of an abattoir.

Guelph, Ont.—The Board of Parks Management contemplates the erection of a public lavatory at the Exhibition Park. The Board of Parks Management contemplates the erection of a band stand at St. George's Park.

Halifax, N.S.—J. Downey, a wealthy New Yorker, contemplates the erection of a four-million-dollar ship building yard at Halifax, N.S.

Hamilton, Ont.—Thomas Myles & Son, 8 James street north, contemplates the erection of coal sheds on Ferguson avenue

north, to cost \$9,000. The city of Hamilton contemplates the erection of a grand stand and exhibit buildings on Tuckett's farm.

Hamilton, Ont.—The International Harvester Company contemplates the erection of a dock and warehouse extensions, to cost \$43,000.

Hamilton, Ont.—Isbister Bros., 65 Hughson street, have been awarded the general contract for the erection of a garage on Charles street, to cost \$20,000; McPhie & Kelly, Bank of Hamilton Building, are the architects. Architect W. G. Brown, Clyde Block, is preparing plans for a parish hall for the Diocese of Niagara (Bishop Clark, Hamilton), to cost \$10,000. Jas. Jolley & Son, 51 John street south, contemplate the erection of a garage, to cost \$25,000. Architect E. R. Gray, City Engineer, is preparing plans for coal sheds for the city of Hamilton.

Hamilton, Ont.—The Ottawa Contractors, Limited, Catherine street north, have commenced work on a dock extension and repairs for the Park Board, to cost \$6,000. Henry Walsh, 159 Sanford street, Hamilton, will build a garage on Charles street, to cost \$20,000; McPhie & Kelly, Bank of Hamilton Building, are the architects; Isbister Bros., 65 Hughson street, are the general contractors. Architect W. A. Edwards, Hamilton Provincial and Loan Building, is preparing plans for a garage for Jolley & Sons, 51 John street south, to cost \$50,000. Williamson & Torrance, 469 King street east, contemplates the erection of a garage on Main and Walnut streets, to cost \$50,000.

Lindsay, Ont.—The town of Lindsay contemplates improvements to the town hall and market building, to cost \$5,000.

Montreal, Que.—The Riordan Pulp and Paper Company contemplates the erection of a new sulphite plant.

New Toronto, Ont.—The West Point Lodge, 425, I.O.O.F., contemplates the erection of a lodge building.

New Westminster, B.C.—Sloan & Harrison, New Westminster, have been awarded the general contract for the erection of freight sheds.

Niagara Falls, Ont.—The project for the erection of a Y.W.C.A. building has been dropped until a later date.

Ottawa, Ont.—The highest dam in the world will be built over the Pend Oreille River.

Ottawa, Ont.—The city of Ottawa contemplates the erection of industrial farm buildings, to cost \$50,000.

Paris, Ont.—Hewson & Potter, 127 Erie avenue, Brantford, Ont., have been awarded the plastering contract in a Y.W.C.A. for Penmans, Limited; Schuttz Bros. Co., Ltd., Brantford, are the general contractors; Frank Nichol, Temple Building, Brantford, is the architect.

Paris, Ont.—Schultz Bros. Company, Limited, Brantford, have been awarded the general contract for the erection of a Y.W.C.A. for Penmans, Limited, to cost \$15,000; the Brantford Roofing Company have been awarded the roofing contract; R. C. Chave, 17 Pearl street, Brantford, has been awarded the painting and glazing contract; Webster Electric Company, 211 Colborne street, have been awarded the electric wiring contract; Anguish & Whitfield, 40 Colborne street, have been awarded the heating and plumbing contract.

Port Arthur, Ont.—Barnett-McQueen Company, Fort William, Ont., have been awarded the general contract for the erection of grain elevators for the Eastern Terminals Company.

Regina, Sask.—Mr. George Cook, of Regina, contemplates the erection of a flour mill at Regina.

Smith's Falls, Ont.—James McDonald, Smith's Falls, has been awarded the general contract for building twelve miles of road at St. Clet, near St. Polycarpe, to cost \$90,000.

Toronto, Ont.—Plans have been drawn for a garage for Moore & Harrison, 2032 Queen street east, to cost \$11,000.

Toronto, Ont.—Jackson-Lewis Company, Bell Telephone Building, have been awarded the general contract for the erection of a shed and garage for the Canadian Aeroplanes, Ltd., to cost \$9,000; J. M. Lyle, 19 Avondale road, is the architect.

Toronto, Ont.—L. E. Dowling, 167 Yonge street, has been awarded the general contract for the erection of a concrete tank for the American La Fracne Fire Engine Co., 195 Weston road. Architect P. H. Finney, 79 Adelaide street east, has prepared plans for a public garage and residence for the Mutual Motors Co., 64 Woodcrest avenue, to cost \$10,000.

Trenton, Ont.—The Imperial Munitions Board, Ottawa, has prepared plans for a Y.M.C.A. to be erected at Trenton, Ont., to cost \$12,000.

PLANTS, FACTORIES AND WAREHOUSES.

Bridgeburg, Ont.—The Genessee Pure Food Company, Leroy, N.Y., contemplates the erection of a factory at Bridgeburg.

Gravenhurst, Ont.—E. Long Manufacturing Company, Orillia, will rebuild their factory, which was destroyed by fire.

Haileybury, Ont.—The Riordan Pulp and Paper Company contemplates the erection of a sulphite mill.

Hamilton, Ont.—T. R. Sloan, Federal Life Building, contemplates the erection of a storage plant, to cost \$50,000.

Hamilton, Ont.—Architects McPhie & Kelly, Bank of Hamilton Building, are preparing plans for a newspaper plant for the Spector Printing Co., James street south.

Hamilton, Ont.—W. T. Rawleigh Medicine Company, Duchess street, will erect a factory to cost \$100,000; McPhie & Kelly, Bank of Hamilton Building, are the architects.

Hamilton, Ont.—Architect W. H. Yates, 24 Leeming street, has prepared plans for a factory addition for the National Paper Goods Company, 144 Queen street north, to cost \$10,000.

Hamilton, Ont.—H. C. Gummo, 15 Tuckett street, has been awarded the general contract for the erection of a warehouse for C. Miles, 95 King street east, to cost \$5,000; J. Mercer, 72 Barton street east, has been awarded the carpenter contract.

Hamilton, Ont.—Geo. E. Mills, 614 King street east, has been awarded the general contract for the erection of an addition to the factory of Chipman-Holton Knitting Company, 122 Mary street, to cost \$50,000; McPhie & Kelly, Bank of Hamilton Building, are the architects.

Hamilton, Ont.—Architect G. J. Hutton, Bank of Hamilton Building, is preparing plans for a departmental store for Graf-ton & Co., James street north, to cost \$100,000. The city of

Hamilton contemplates the erection of a coke oven and gas plant, to cost \$2,000,000.

Hamilton, Ont.—Architects Prack & Ferrine, Lumsden Building, Toronto, have prepared plans for a factory for the Carbon and Alloy Steels, Limited, to cost \$100,000. Adam Clark, 7 Main street west, has been awarded the heating and plumbing contract in a factory for the Tallman Brass and Metal Company, to cost \$50,000; Stewart & Witton, 7 Hughson street, are the architects.

Lindsay, Ont.—The Boving Hydraulic and Engineering Company contemplates the erection of a factory addition.

St. Catharines, Ont.—The Steel and Radiation, Limited, Toronto, will extend their plant at St. Catharines.

Toronto, Ont.—The Ajax Rubber Company, Trenton, N.J., contemplates the erection of a factory.

Toronto, Ont.—B. F. Johnson Soap Company, Ltd., 155 George street, contemplates the erection of a factory.

Toronto, Ont.—Frank Stanley, 241 Yonge street, will repair their warehouse on Temperance street, which was destroyed by fire.

Toronto, Ont.—Engineers Harkness & Oxley, Confederation Life Building, are preparing plans for a factory for the Willards Chocolates, Ltd., 250 Spadina avenue.

Toronto, Ont.—The Dominion Bridge Company, Imperial Life Building, have been awarded the steel work contract on a warehouse for Baines & Peckover, to cost \$25,000, at the foot of Cherry street. Geo. Nicholson, 61 Clinton street, has commenced work on factory repairs for Robert Watson, 363 Sorauren avenue, to cost \$5,000.

Toronto, Ont.—John V. Gray Construction Company, Confederation Life Building, have been awarded the general contract for the erection of a warehouse and garage for Clarkson-Jones estate, Home Life Building, to cost \$18,000; Port Credit Brick Company, McKinnon Building, have been awarded the facing brick contract; the Don Valley Brick Company, Dominion Bank Building, have been awarded the hack brick contract; Seaman-Kent Company, 263 Wallace avenue, have been awarded the maple floor contract.

Toronto, Ont.—W. Williamson, 137 Woodbine avenue, has been awarded the general contract for the erection of an addition to the warehouse of E. Leadley & Co., 87 Front street east, to cost \$25,000; G. H. Weale & Son, 18 Applegrove avenue, has been awarded the mason contract; W. T. Stewart, 110 Church street, has been awarded the roofing contract; Feather & Roadhouse, 11 Foster place, have been awarded the sheet metal contract; Geo. S. Egles, 380 Queen street, has been awarded the electrical wiring contract; Otis-Fensom Company, 50 Bay street, have been awarded the elevator contract.

Windsor, Ont.—Architect A. H. McPhail, Board of Trade Building, Windsor, is preparing plans for a cigar factory for Brener Bros., 184 Horton street, London, Ont., to cost \$100,000.

Woodstock, Ont.—W. J. Taylor, Woodstock, has been awarded the general contract for the erection of an addition to the factory of the Harvey Knitting Company.

PUBLIC BUILDINGS AND STATIONS.

Hamilton, Ont.—The city of Hamilton contemplates the erection of a sub-station on Gage avenue, to cost \$20,000.

Hamilton, Ont.—The Canadian Northern Railway Company, Toronto, contemplates the erection of a station on James and Murray street, to cost \$250,000.

RESIDENCES, STORES AND FLATS.

Brockville, Ont.—Architect A. Stuart Allaster, Brockville, Ont., is preparing plans for a residence for W. Gilbert, Cincinnati, Ohio, to cost \$50,000.

Guelph, Ont.—Johnson & Williams, Central street, have been awarded the mason, cut stone and concrete contracts in a residence for Alvar H. Simpson, to cost \$6,500; G. C. Walker, Tiffany street, has been awarded the carpenter contract; Fred Smith, Quebec street, has been awarded the plumbing and heating contract; Albert Smith Company, Ltd., Cork street, has been awarded the sheet metal contract; W. A. Cowan, 149 London road, is the architect.

Hamilton, Ont.—George F. Webb, Mountain Top, contemplates the erection of apartments and stores, to cost \$75,000.

Hamilton, Ont.—H. Crosthwaite, 160 Alanson street, contemplates the erection of a residence on Sherman avenue south, to cost \$7,000.

Hamilton, Ont.—The Stanley Mills, Limited, James street north, will rebuild their departmental store, which was destroyed by fire. W. O. Seeley, 61 Hunter street west, contemplates the erection of an apartment house to cost from \$20,000 to \$25,000.

Lindsay, Ont.—I. E. Weldon, Kent street, contemplates the erection of a residence.

Oshawa, Ont.—The Oshawa Development Company, 33 Richmond street west, Toronto, contemplates the erection of residences.

Ottawa, Ont.—McFarlane-Douglas Co., Slater street, Ottawa, have been awarded the roofing contract on an alteration to a teachers' residence for Grey Nuns, to cost \$45,200; J. Bourque, 137 Notre Dame street, Hull, Que., has been awarded the carpenter contract; L. Lémieux, 140 Laurier avenue, and Hector Iebanc, Kent street, Hull, are the general contractors; J. Chene, 163 Notre Dame street, Hull, Que., is the architect.

Ottawa, Ont.—Wm. Campbell, 70 Spruce street, has been awarded the mason contract in a shop and residence for P. W. Burn, 673 Somerset street, to cost \$10,000; Ed. Wentzloff, 249 MacKay street, has been awarded the carpenter contract; R. J. Cameron, 488 Lewis street, has been awarded the sheet metal contract; Murphy & Morrow, Ottawa, have been awarded the plastering contract; Duford, Limited, 70 Rideau street, has been awarded the painting and glazing contract; J. A. Ellacott, 226 Bank street, has been awarded the electric wiring contract; J. A. Blyth, Front street, has been awarded the heating and plumbing contract; W. E. Noffke, Plaza Building, is the architect.

Toronto, Ont.—Plans have been prepared for a residence for

R. J. MacLennan, 30 Murray street, on Oriole Parkway, to cost \$7,000.

Toronto, Ont.—The Dominion Bridge Co., Imperial Life Building, have been awarded the steel work contract; also the Bethlehem Steel Company have an order for 10,000 tons of steel for the departmental store for the T. Eaton Co., Ltd., Yonge street, to cost \$5,090,000; Graham, Burnham & Co., Chicago, Ill., are the architects; Sproatt & Rolph, 36 North street, are the associate architects.

SCHOOLS, COLLEGES AND CHURCHES.

Belleville, Ont.—The Board of Education contemplates the erection of a collegiate at Belleville.

Charlottetown, P.E.I.—Architects C. B. Chappell & Hunter, Charlottetown, have prepared plans for a new Catholic church, to cost \$60,000.

Creemore, Ont.—Joseph Akitt, Creemore, Ont., has been awarded the general contract for the erection of a school for the town of Creemore, to cost \$17,940; T. C. Pann, Collingwood, is the architect.

Elmvale, Ont.—Dillon Bros. & Reckie, Collingwood, Ont., have been awarded the general contract for the erection of a school for the trustees of the Separate School No. 5, Flos, Elmvale, to cost \$21,000; John Wilson, Collingwood, is the architect.

Hamilton, Ont.—The Board of Education, City Hall, Hamilton, contemplates the erection of a school, eight rooms, to cost \$50,000.

Hamilton, Ont.—The Board of Education, City Hall, contemplates the erection of a technical school, to cost \$2,000,000, on Wentworth street north.

Hamilton, Ont.—W. H. Yates, Jr., 15 Leeming street, has been awarded the mason contract in a school addition for the Board of Education, G. J. Hutton, Bank of Hamilton Building, is the architect.

Kitchener, Ont.—The Public School Board of Kitchener contemplates the erection of alterations to the Sunday school.

Lindsay, Ont.—The Monsignor Casey Roman Catholic Church have purchased a site for the erection of a church.

New Liskeard, Ont.—The Provincial Architect has prepared plans for an agricultural high school for the Department of Lands, Forests and Mines, Toronto.

McGregor, Ont.—K. L. Dufour, Avlmer avenue, Windsor, Ont., has been awarded the general contract for the erection of a school to cost \$7,000 for the Board of School Trustees; G. Jacques & Co., Peninsular Security Building, Windsor, are the architects.

Oakville, Ont.—The Board of Education contemplates the erection of a school at Oakville to cost \$35,000.

Parry Sound, Ont.—George P. White, Parry Sound, Ont., has been awarded the general contract for the erection of a school, six rooms, for the Public School Board, to cost \$30,000; Angus & Angus, North Bay, Ont., are the architects.

Steeltown, Ont.—The Methodist congregation, Steeltown, contemplates the erection of an addition to a Sunday school; Rev. E. Peacock, pastor.

Sandwich West, Ont.—Alexander Tourangeau, 14 Bridge avenue, Sandwich, has been awarded the general contract for the erection of a school for the Trustees of the Separate School No. 1, Sandwich West, to cost \$8,890; G. Jacques & Company, Peninsular Security Building, Windsor, are the architects.

CATALOGUES and BOOKLETS

Hollow Metal Construction.—The Dahlstrom Metallic Door Company has recently compiled a portfolio containing thirty plates, illustrating and showing details of construction and installation of metal doors and trim. The drawings referred to are made to large scale, and include every type of door and trim produced. No expense has been spared in producing this portfolio, and it should prove of immense value to architects. Other literature is also offered by this company, in which information relative to fireproofing the modern building is presented. Copies of these books will be sent by addressing the Dahlstrom Metallic Door Company, Jamestown, N.Y.

Canadian Firm's Activities in Latin America—Jenkins Bros., Limited, Montreal, Canada, manufacturers of brass and iron body valves of every description, have more securely entrenched themselves in the leading markets of South America, having lately sent a special representative to look over the situation with a view to extending trade relations there. The territory having been traversed successfully, a follow-up system has been inaugurated whereby their products will be given all publicity possible. In this connection they have issued new catalogues one No. 8-S, printed in the Spanish language, and another, No. 8-P, in Portuguese, both of which fully describe and illustrate valves and mechanical rubber goods suitable for the requirements of up-to-date power and industrial plants, mines and office buildings. Valves with screwed ends are supplied tapped with either American or British standard threads to meet the demands of customers in other lands.

"Water Powers of Manitoba, Saskatchewan and Alberta," a well-bound and attractively illustrated volume just issued by the Commission of Conservation, forms a valuable contribution to the authentic literature respecting the natural resources of Western Canada. This report, by Leo G. Denis and J. B. Challice, comprises the results of special surveys by the Commission of Conservation and a compilation of records from other reliable sources. As a compendium of all available data on the subject, it is particularly valuable for reference purposes. While the Prairie Provinces, as a whole, are not lavishly endowed with water-powers, the report demonstrates that the utility of their rivers for power development can be vastly enhanced through proper storage of flood waters. At present, in the absence of conservation dams, and of adequate natural regulation, the great volume of flow is lost during high water seasons. Methods of development to ensure the maximum utilization are now being carefully worked out on the Winnipeg, Bow and other large rivers. The more northerly regions possess numerous sites of great potential value for pulp, electro-chemical and other special

industries. The report just issued is the second in the series on water-powers in Canada to be published by the Commission of Conservation. The third volume, "Water Powers of British Columbia," which is now in press, will complete the Commission's general inventory of this item of the Dominion's natural wealth.

A Booklet on the Stained Glass of Mr. Horace Wilkinson.—Attention is called to the fact that the illustrations in this booklet are reproductions from water-color designs and not from the actual windows. As his larger sketches would have to be so greatly reduced in size, the details not being easily seen, he has reproduced the drawings solely to prove that he is conversant with the chief styles adopted for modern windows. Wherever possible, it is always best for donors of windows to see examples of work, in situ, before placing an order with any artist whose work is not known to them, for so much depends upon the coloring and the method of glass painting, and these points are better seen in a window than in any colored copy, however skillful the lithographer, and a highly finished sketch is no proof at all that the glass shall be of the same excellence. He gives, therefore, a list of his windows, and, as in some cases, the churches mentioned possess windows previously obtained from other studios, an opportunity of comparison is afforded.

Mr. Horace Wilkinson has had twenty-nine years' practical experience, seven years of which were spent in London studios each under Royal patronage. Three years were spent abroad, after which he started his own studio and workshops. He is conversant with all styles and periods of Gothic glass, and has his own studies of the old glass at York Minster, All Saints', St. Martin's, and other churches in York; Malvern Abbey, Gloucester Cathedral, Canterbury Cathedral, Fairford, New College, Oxford; S. Ouen, Rouen, Cologne Cathedral, and other English and French centres of mediæval glass painting.

He had the honor of being selected by Mr. W. D. Caroe, M.A., F.S.A., etc., Architect to the Ecclesiastical Commissioners, Canterbury Cathedral, Great Malvern Priory Church, Southwell Minster, etc., etc., to execute the first of the proposed new series of windows for Winchester College Chapel. The first panel (St. Jude) is now fixed (north side, window nearest east), but at present it has a temporary coat of pigment over the whole, to keep it in harmony with the surrounding Georgian glass, which, being of a decadent period of glass painting, has none of the brilliancy and sparkle of the glass of William of Wykeham's time, when the original windows were made.

Mr. Caroe's subsequent orders form quite one-third of list on page seven.

Among the many unsolicited testimonials which he has had the pleasure of receiving (nearly all of which mention the beauty of the color scheme), only one is reproduced here. This was received from Mr. C. E. Ponting, F.S.A., Consulting Architect to Salisbury Cathedral, also Diocesan Surveyor to Bristol, and refers to the first window that he placed with Mr. Wilkinson. It is chosen because of the architect's previous acquaintance with the work of other London studios.

Several of the churches on the list are other orders from Mr. Ponting.

Copies of this booklet may be had by addressing Mr. Horace Wilkinson, Artist in Stained Glass, 68 Great Russell Street, London, W.C.

NEW TECHNICAL SCHOOL, HAMILTON, ONT.

A committee of the Board of Education of Hamilton, Ont., has recommended that architects be invited to submit competitive plans for the Technical School and the carrying out of the project at once. The estimated cost of this school is \$500,000 or over.

BRITISH COLUMBIA'S NEW CHIEF FORESTER.

Mr. M. A. Grainger, who has been acting chief forester for British Columbia since Mr. H. R. MacMillan's appointment as lumber commissioner to study foreign markets, has been appointed chief forester. Mr. Grainger is a graduate of King's College, Cambridge, where he took a high standing in mathematics. He came to Canada in 1897, served during the South African War, gaining the South African medal with six clasps, and returned to British Columbia, where he engaged in logging. He joined the Forestry Branch upon its inauguration, and has occupied an important post in it ever since.

FEDERAL CONSTRUCTION ESTIMATES.

In the estimates submitted by the Finance Minister, \$1,000,000 was voted to Victoria for the purpose of completing harbor works by the special harbor and river committee. Toronto, St. John, and Quebec secured equal amounts of \$1,000,000. Port Arthur and Fort William secured \$750,000 each.

General harbor and river votes for British Columbia include the following: Fraser River (lower), improvements, \$20,000; harbor and rivers, generally, repairs and improvements, \$75,000; Holberg, repairs to wharf, \$3,300; James Island, repairs to wharf, \$750; Metchosin, repairs to wharf, \$1,700; Prince Rupert, Quarantine Station, repairs to wharf, \$1,500; Quatsino, repairs to wharf, \$4,300; Sidney Island, repairs to wharf, \$2,200; Stikine River, improvements, \$5,400; to purchase supply of creosoted timber for use in repairing wharves, \$10,000; Union Bay, repairs to wharf, \$6,500; Vargus Island, repairs to wharf, \$2,100; William Head Quarantine Station, improvements and repairs, \$3,500.

The main estimates provide for an expenditure of \$203,472,765, as compared with \$271,015,545 voted last year.

SOUND TRANSMISSION, REFLECTION AND ABSORPTION.

Acoustically architectural and engineering structures cannot be said to excel, and the builder may justly complain that scientists do not give him much guidance as to the acoustical behavior of his materials and structures. In his experiments on the transmission, reflection and absorption of sound, Professor F. R. Watson, of the University of Illinois (Physical Review, vol. vii, pages 125 to 132), made use of the following arrangement. He placed the source of sound in one room, and the receiver in another, the two rooms communicating by a door. The source was an adjustable whistle blown by air at constant pressure and mounted in the focus of a parabolic reflector. The receiver was a Rayleigh resonator in which a mica plate, suspended by a quartz fibre at 45 deg. to the direction of the sound,

was turned more or less about its vertical axis by the arriving sound waves. The waves travelled through the door, which was either open, or closed by one or more superposed panels of the respective material. The deflections observed were not steady, and some peculiar observations were made. With the door open the deflections amounted to about forty divisions, measured by a cathetometer. When the door was closed by the panels the deflections were, of course, smaller; but several layers of the same material had not always the effect to be expected from measurements made on one layer. Thus the deflection with one layer of different materials, $\frac{1}{2}$ -in. hair felt, $\frac{1}{4}$ -in. cork board, $\frac{3}{4}$ -in. cork board, $\frac{1}{4}$ -in. paper-lined hair felt, $\frac{3}{4}$ -in. of same, $\frac{3}{4}$ -in. flax board, $\frac{1}{4}$ -in. pressed fibre, $\frac{3}{4}$ -in. of same, were, respectively, 22.6, 7.9, 1.15, 5.0, 6.5, 2.25, 0.32, 0.2, so that one layer of hair felt stopped least of the sound (only 43 per cent.), whilst the cork board stopped 80 and 90.5 per cent., and the pressed fibre barred practically all the sound. But the figures for one, two and three layers of hair felt were 22.6, 15.4, 10.4; for $\frac{3}{4}$ -in. cork board, 1.15, 2.05, 0.85; for $\frac{1}{4}$ -in. lined hair felt, 5.0, 21.7, 3.8; and for $\frac{3}{4}$ -in. lined hair felt, 2.25, 0.55, 0.1. Thus two layers of cork stopped less sound than either one layer or three layers, and two layers of the $\frac{1}{4}$ -in. paper-lined hair felt behaved still more abnormally compared with one and three layers of the same material. The further investigation showed that reflection, absorption, resonance, and other effects come in. To study these the sound was sent obliquely towards the door: the reflected sound was measured, and the absorbed calculated by difference, assuming that the sound can only be transmitted, reflected or absorbed, and that the three fractions together ought to make up the unit value of the whole incident sound. Arranging the materials as before, the following reflections were observed, again for one, two and three layers: hair felt, 19, 25, 40; $\frac{1}{4}$ -in. cork, 61, 55, 87; $\frac{3}{4}$ -in. cork, 100, 82, 85; $\frac{1}{4}$ -in. paper-lined hair felt, 30, 23, 39; $\frac{3}{4}$ -in. same, 40, 25, 36; $\frac{3}{4}$ -in. flax board, 87, 77, 77. The amount of sound reflected and absorbed increased in most cases with the thickness, while the transmission decreased. But in the $\frac{3}{4}$ -in. paper-lined hair felt reflection and transmission followed each other closely (as Professor Watson's curves clearly indicate), both being anomalous, and that is probably accounted for by resonance; certain thicknesses of the materials vibrate vigorously under the action of the sound, setting up new waves. This explanation was suggested in similar researches made by a different method in 1910 by Weisbach; porosity, density and elasticity of the material have to be considered. Porous bodies like hair felt probably transmit sound like air, and a denser material stops more sound than the same thickness of a less dense material. Thus pressed fibre cuts off the sound better than the same thickness of oak. Elastic materials vibrate in resonance to the source, creating sound waves of the same character on the further side. Hence they act as if there were no partition wall. The two thicknesses of paper-lined hair felt probably approximated such a vibration.

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CONTRACTORS and SUB-CONTRACTORS

As Supplied by The Architects of Buildings

Featured in This Issue

- Building, Imperial Oil Building, Toronto, Ont.
 Air Conditioning Apparatus, Carrier Air Conditioning Co., New York.
 Boilers, Heine Safety Boiler Co., St. Louis, Mo.
 Bronze Work, Architectural Bronze and Iron Works, Ltd., Toronto, Ont.
 Casements and Window Construction, also Doors and Window Trim, A. B. Ormsby & Co., Ltd., Toronto.
 Copper Work, A. B. Ormsby & Co., Ltd., Toronto, Ont.
 Electric Fixtures, F. C. Henderson, Toronto, Ont.
 Electric Wiring and Apparatus, L. K. Comstock & Co., New York.
 Elevators, Otis Fensom Co., Ltd., Toronto, Ont.
 Fire Doors, A. B. Ormsby & Co., Ltd., Toronto, Ont.
 Flooring (wood), Georgian Bay Shook Mills, Ltd., Midland, Ont.
 Flooring (terrazzo), Missisquoi Marbles, Ltd., Montreal, Que.
 Fire Hose, Gutta Percha and Rubber Co., Ltd., Toronto, Ont.
 Furniture, Canadian Office and School Furniture Co., Ltd.
 Hardware, P. & F. Corbin, New York.
 Heating, W. J. McGuire, Ltd., Toronto, Ont.
 Heat Regulating System, Canadian Powers Regulator Co., Ltd., Toronto, Ont.
 Insulation, Philip Carey, Ltd., Toronto, Ont.
 Metal Lockers, Geo. B. Meadows & Co., Ltd., Toronto, Ont.
 Marble, Missisquoi Marbles, Ltd., Montreal, Que.
 Mail Chute, Canadian Cutler Mail Chute Co., Ltd., Montreal.
 Ornamental Iron, Architectural Bronze and Iron Works, Ltd., Toronto, Ont.
 Painting, Barker Painting Co., New York.
 Plumbing, W. J. McGuire, Ltd., Toronto, Ont.
 Sanitary Fixtures, Imperial Products, Ltd., Toronto, Ont.; Standard Sanitary Mfg. Co., Ltd., Toronto, Ont.
 Plaster Work, Andrew Petrie & Co., Toronto, Ont.
 Pumps, Storey Pump and Equipment Co., Toronto.
 Refrigeration Equipment, Canadian Ice Machine Co., Ltd., Toronto.
 Radiators, Steel and Radiation, Ltd., Toronto, Ont.
 Roofing, Premier Roofing Tile, Premier Quarries, Toronto, Ont.
 Skylight, A. B. Ormsby & Co., Ltd., Toronto, Ont.
 Stone, Indiana Limestone, A. Witchall & Son, Toronto.
 Structural Iron and Steel, Dominion Bridge Co., Ltd., Montreal.
 Tile, Premier Quarries, Toronto.
 Turntable, Canada Foundry Co., Ltd., Toronto.
 Vacuum Traps, C. A. Dunham Co., Ltd., Toronto.
 Valves, Jenkins Bros., Ltd., Montreal.
 Vaults, J. & J. Taylor, Ltd., Toronto.
 Ventilating System, Canadian Blower and Forge Co., Ltd., Kitchener, Ont.
 Mason Contractor, A. Witchall & Son.
 Contractors, General, Thompson-Starrett Co., New York.
 Architects, Clinton & Russell, New York; J. L. Havill, resident architect, Toronto.
- Building, Bank of Toronto, Montreal, Que.
 Boilers, Waterous Engine Works Co., Ltd., Brantford, Ont.
 Casements and Window Construction, also Doors and Window Trim, A. B. Ormsby & Co., Ltd., Toronto, Ont.
 Concrete Work, Atlas Construction Co., Montreal, Que.
 Electric Fixtures, McDonald & Willson, Ltd., Montreal; Canadian H. W. Johns-Manville Co., Ltd., Toronto, Ont.
 Electric Wiring, Philip Lahee, Montreal, Que.
 Elevators and Hoists, A. B. See Electric Elevator Co., Montreal.
 Enamel, R. C. Jamieson & Co., Ltd., Montreal.
 Expanded Metal, McNulty Bros., Montreal, Que.
 Fire Alarm System, Dominion Gresham and Casualty Co., Ltd., Montreal.
 Fire Doors, A. B. Ormsby Co., Ltd., Toronto, Ont.
 Fire Escapes, Montreal Architectural Iron Works, Ltd., Montreal.
 Fittings, Jenkins Bros., Ltd., Montreal, Que.
 Flooring, Smith Marble Co., Ltd., Montreal, Que.
 Glass, Hobbs Mfg. Co., Ltd., Montreal, Que.
 Hardware, Canadian Yale & Towne, Ltd., St. Catharines, Ont.
 Heating System, C. A. Dunham & Co., Ltd., Toronto, Ont.
 Heat Regulating System, Johnston Temperature Control Co., Toronto.
 Marble, Smith Marble Co., Ltd., Montreal.
 Ornamental Iron, Montreal Architectural Iron Works, Ltd., Montreal.
 Plumbing and Fixtures, Jas. Robertson & Co., Ltd., Montreal.
 Plaster Work, McNulty Bros., Montreal.
 Pumps (air), Connersville Blower Co., Connersville, Ind.
 Reinforcements, Pedlar People, Ltd., Oshawa.
 Radiators, Dominion Radiator Co., Ltd., Toronto.
 Stone, Stanstead Granite Quarries, Ltd., Stanstead, Que.
 Tile, Smith Marble Co., Montreal.
 Terra Cotta, Atlantic Terra Cotta Co., New York.
 Vaults, Goldie & McCullough, Ltd., Gait, Ont.; J. & J. Taylor, Ltd., Toronto, Ont.
 Valves, Jenkins Bros., Ltd., Montreal, Que.
 Ventilating System, Canadian Sirocco Co., Walkerville, Ont.
 Wall Enamel, R. C. Jamieson & Co., Ltd., Montreal.
 General Contractors, Atlas Construction Co., Ltd., Montreal, Que.

Architects, engineers and contractors are invited to contribute information on construction work, whether it be proposed or in progress, and such information will be published in these columns.

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YOU can select at random any large, important commercial or public building that has been built within the past ten years and find, almost invariably, that it has a Barrett Specification Roof.

Such large and first-class buildings attract first-class architects and engineers, and the preference of such men is almost always for Barrett Specification Roofs. Their popularity is not to be wondered at, for such

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It requires no care or maintenance expense and is good for upwards of twenty years without repairs.

The Barrett Specification in your building plan furnishes a fair basis for competitive bids. It insures the best materials being used. It specifies the most approved method of construction.

A copy of The Barrett 20-Year Specification, with roofing diagrams, free on request. Address our nearest office.

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 Winnipeg, Manitoba,
 Architects: Brown &
 Vallance, Winnipeg.
 Roofing Contractors:
 Winnipeg Ceiling and
 Roofing Co.,
 Winnipeg.

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 BUILDING ENGINEERS

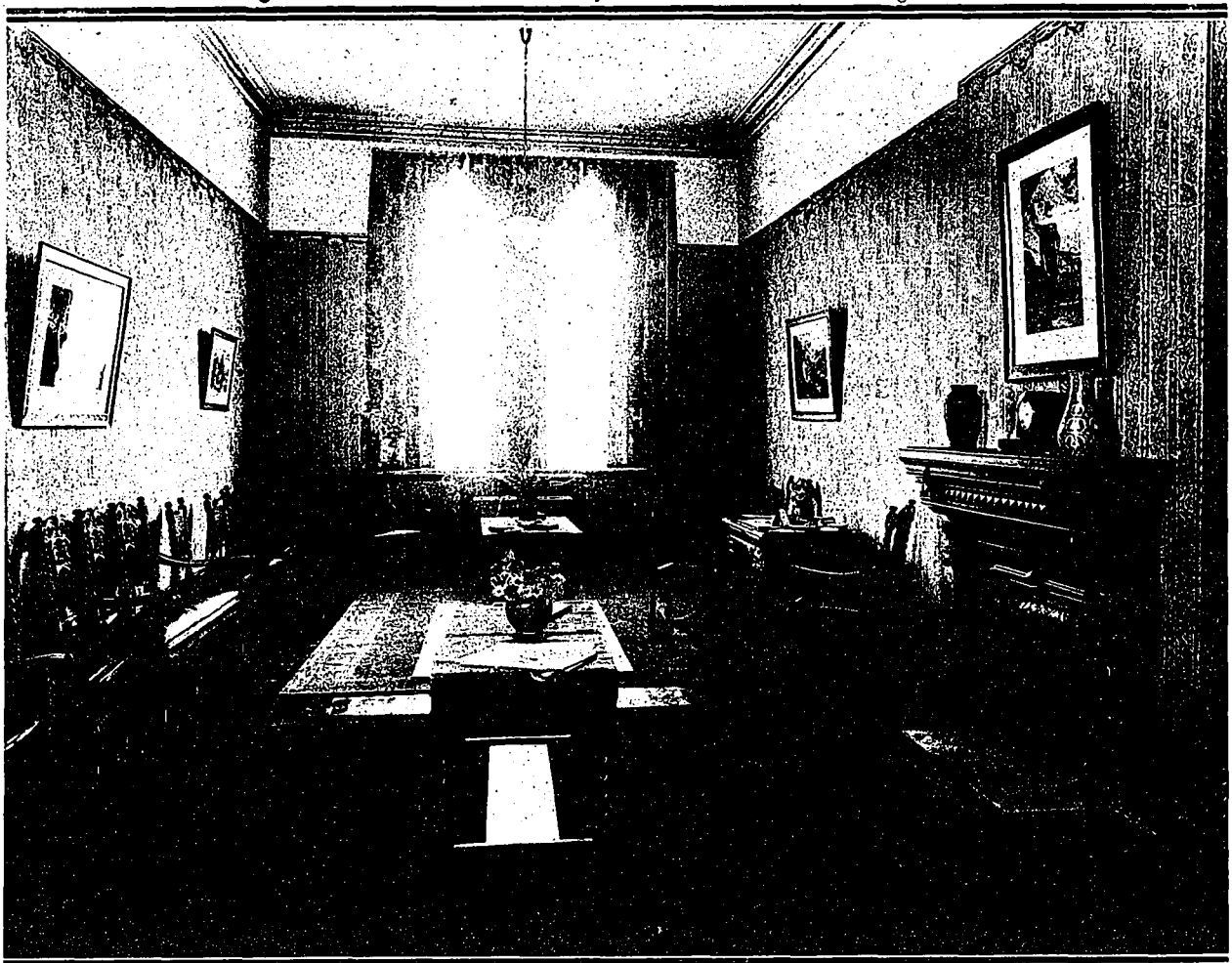


Our 20-Year Guaranty Bond

We are now prepared to give a twenty-year Surety Bond Guaranty on every Barrett Specification Roof of fifty squares and over in all towns of 25,000 population and more, and in smaller places where our Inspection Service is available.

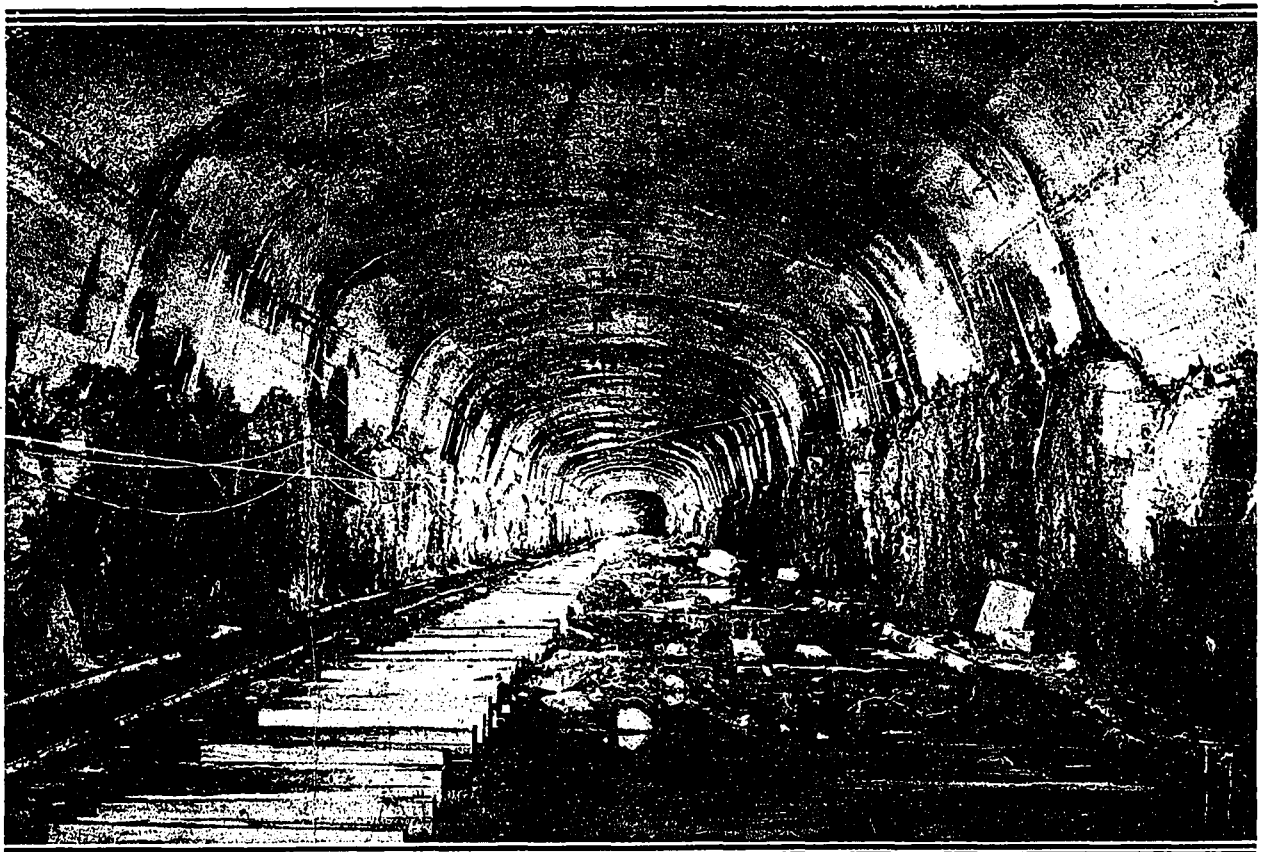
This Surety Bond will be issued by the United States Fidelity and Guaranty Company and will be furnished by us without charge.

Our only requirements are that the roofing contractor shall be approved by us, and that The Barrett Specification, dated May 1, 1916, shall be strictly followed.



IN THE SOLDIERS' HOSPITAL.

This waiting-room was furnished by the A. F. and A. M. for the Military Hospital, Toronto (Old Knox College), and is one of the pleasantest rooms in the institution.



THE C.N.R. TUNNEL AT MONTREAL.