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CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA



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**Makes Concrete Impervious to Water
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It is a dry powder, to be thoroughly mixed with dry cement before sand and water are added, thus becoming an inseparable part of the concrete.

**“MEDUSA” GIVES ABSOLUTELY
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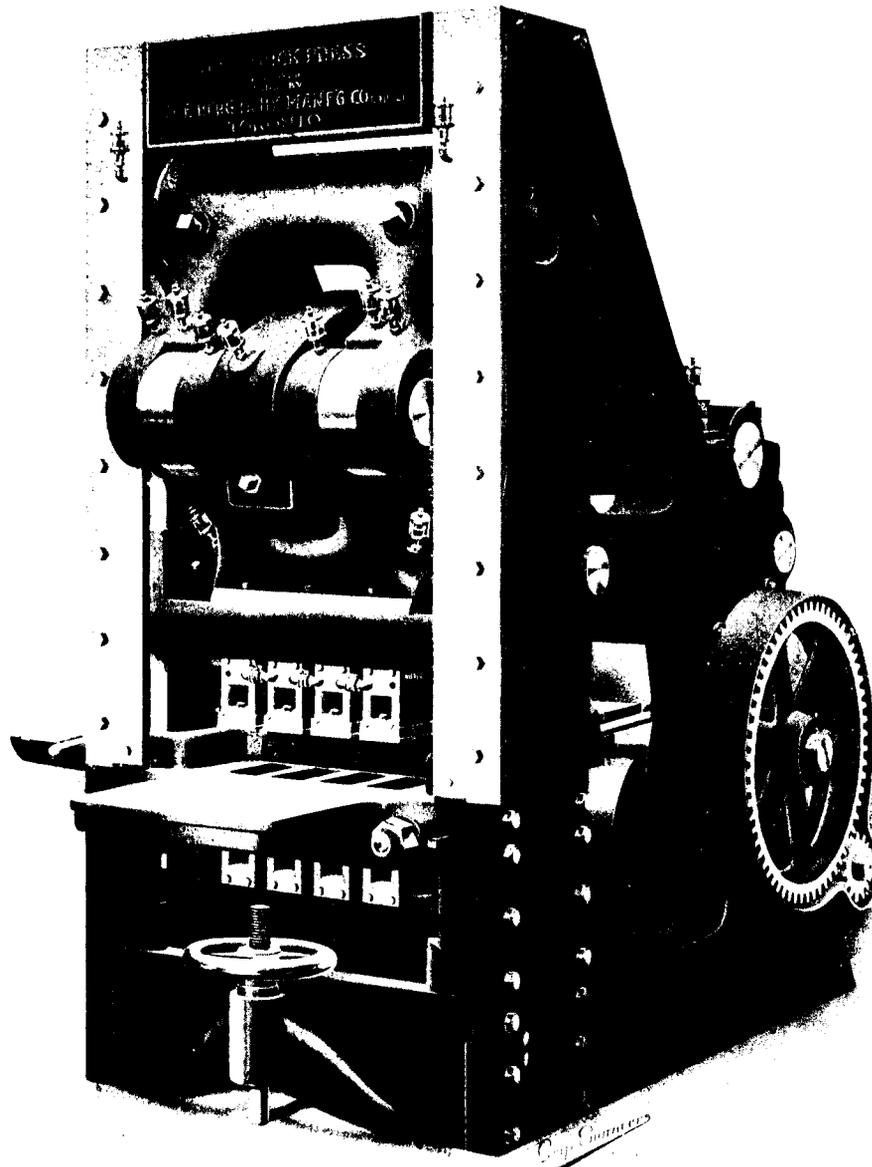
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with the

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"The Most Profitable Machine in a Most Profitable Business"

This home is owned by A. H. Brown, Leesburg, Ind. It covers 38 x 32 feet, is built entirely of Ideal Concrete Blocks 8x8x16 inches, includes nine rooms on the first floor; four bedrooms, bathroom and sewing room on the second; den and attic on third. Floors are laid in quarter-sawed oak, plastic cornices throughout, dining room and hall wainscoted, interior finish of yellow pine stained to represent various woods, private water, lighting, hot water heating plant—total cost \$6,800.

CAUTION

Our patents covering the Face Down Horizontally Movable Core type of Concrete Block Machine were upheld by the High Court of Justice for Canada, at London, before His Lordship, the Honorable Mr. Justice Clute, on Nov. 21, 1906. The infringing manufacturers were enjoined from making, selling or using such machines.

We regard machines of this type as infringements of our patent rights. We caution buyers to make careful investigation before purchasing such machines. This same type of Concrete Block Machine is protected also by our numerous foreign patents.

Material Was Saved for 462 blocks, equivalent to ten barrels of cement, because the Ideal is so carefully constructed, the parts so perfectly fitted and adjusted, the opportunity for thorough tamping against the face and the horizontally movable cores made so absolute by the mechanical arrangement that the *most economical mixture* possible to a satisfactory block can be used.

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Beauty Was Produced in every feature because through the "face down" principle of the Ideal it was possible to secure clean, clear cut lines, numerous rich, effective, original designs in the facing, absolute precision and accuracy in every block and general artistic completeness.

Moreover the Ideal Blocks made are durable, substantial, fire proof, vermin proof, frost and damp proof, need no paint or decoration.

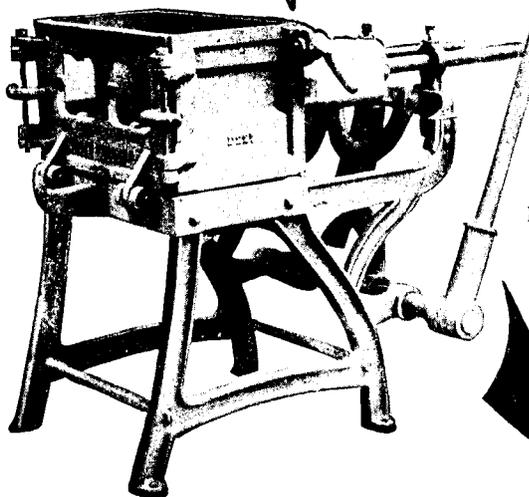
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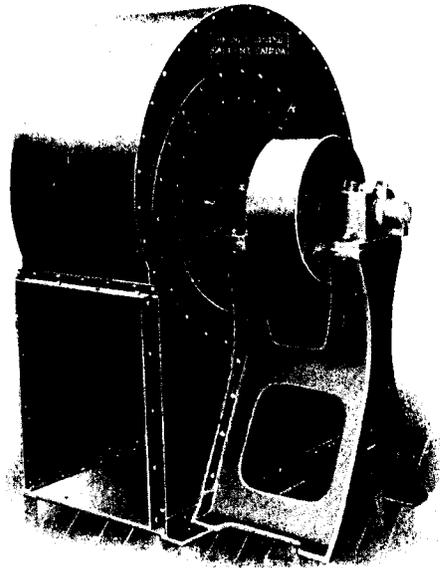
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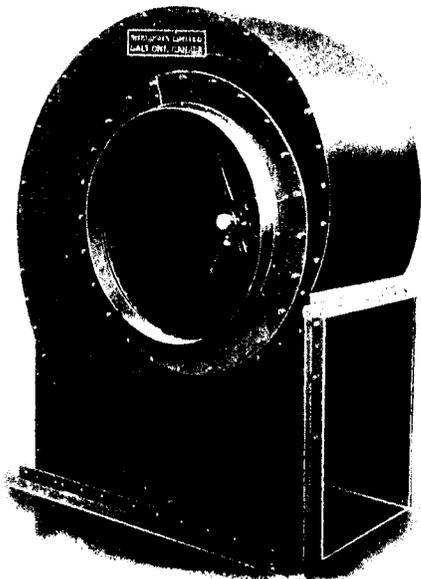
— THE —
ÆOLOS FAN

(Pronounced E-O-LOS)

The
 King
 of
 The
 Winds



ÆOLOS FAN, pulley side, bottom discharge.



ÆOLOS FAN, inlet side, bottom discharge.

Canadian
 Patent
 No. 122822

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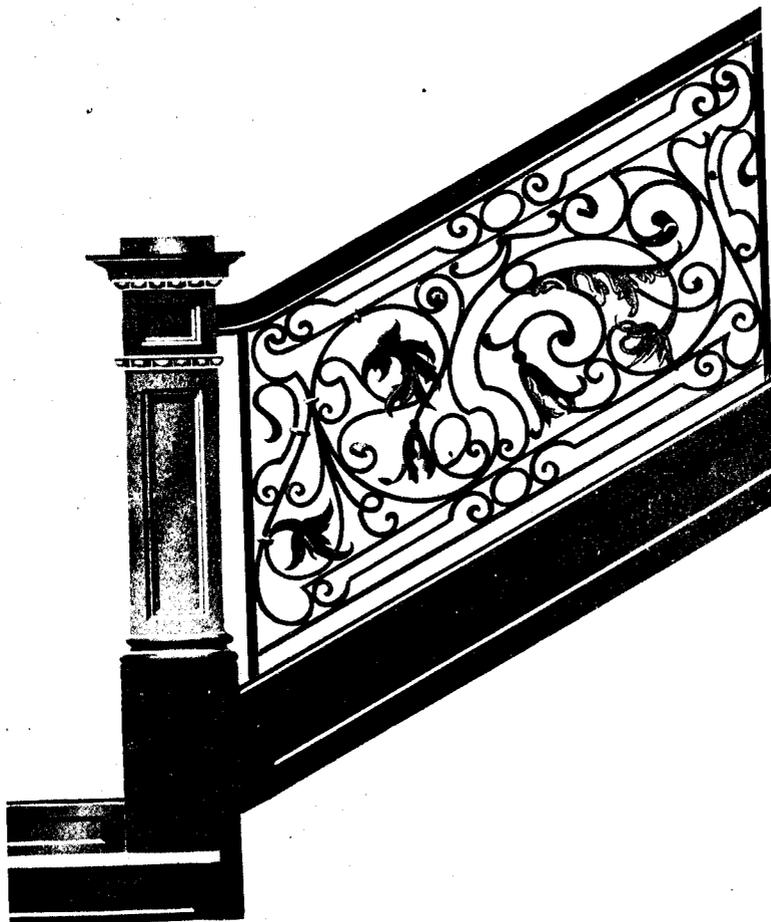
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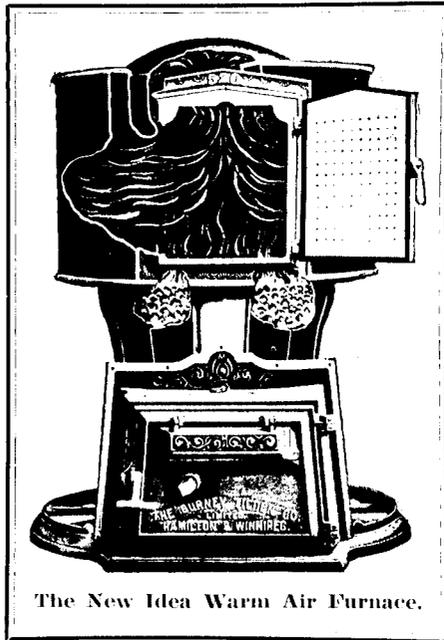
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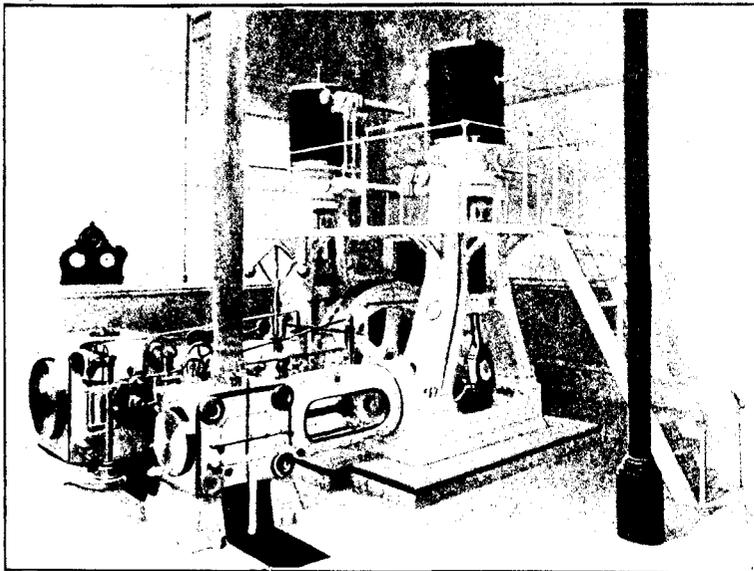
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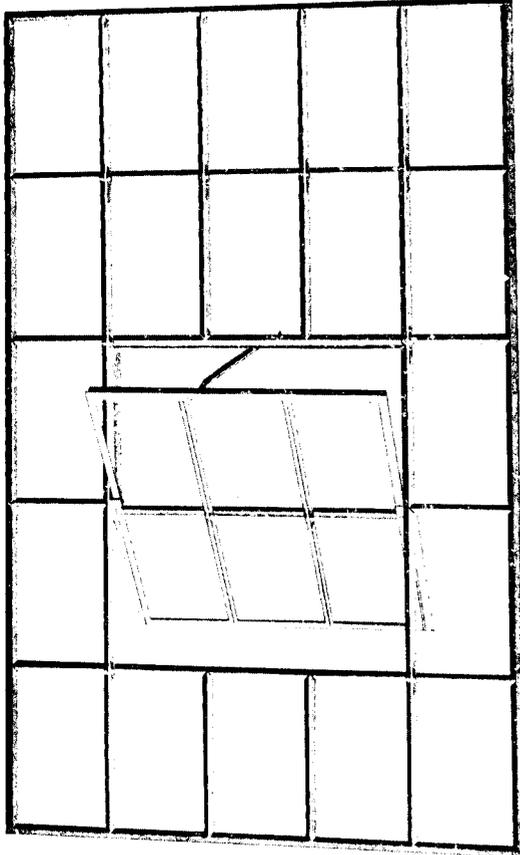
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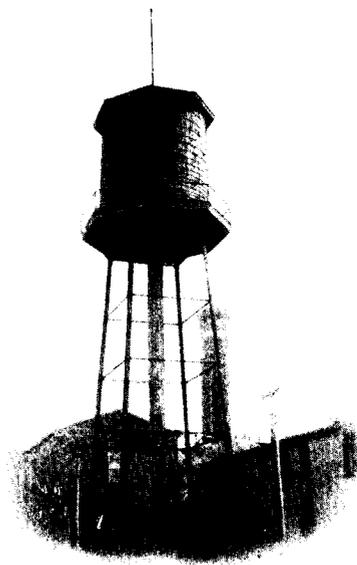
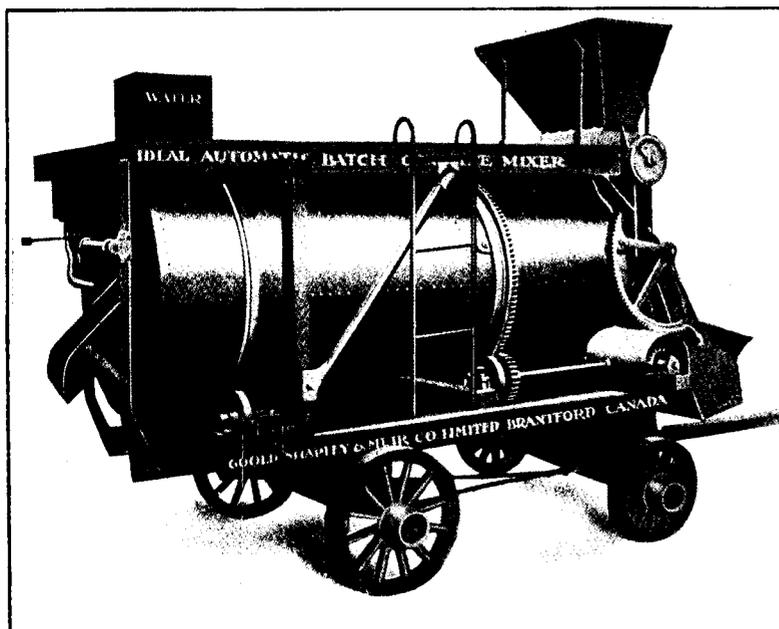
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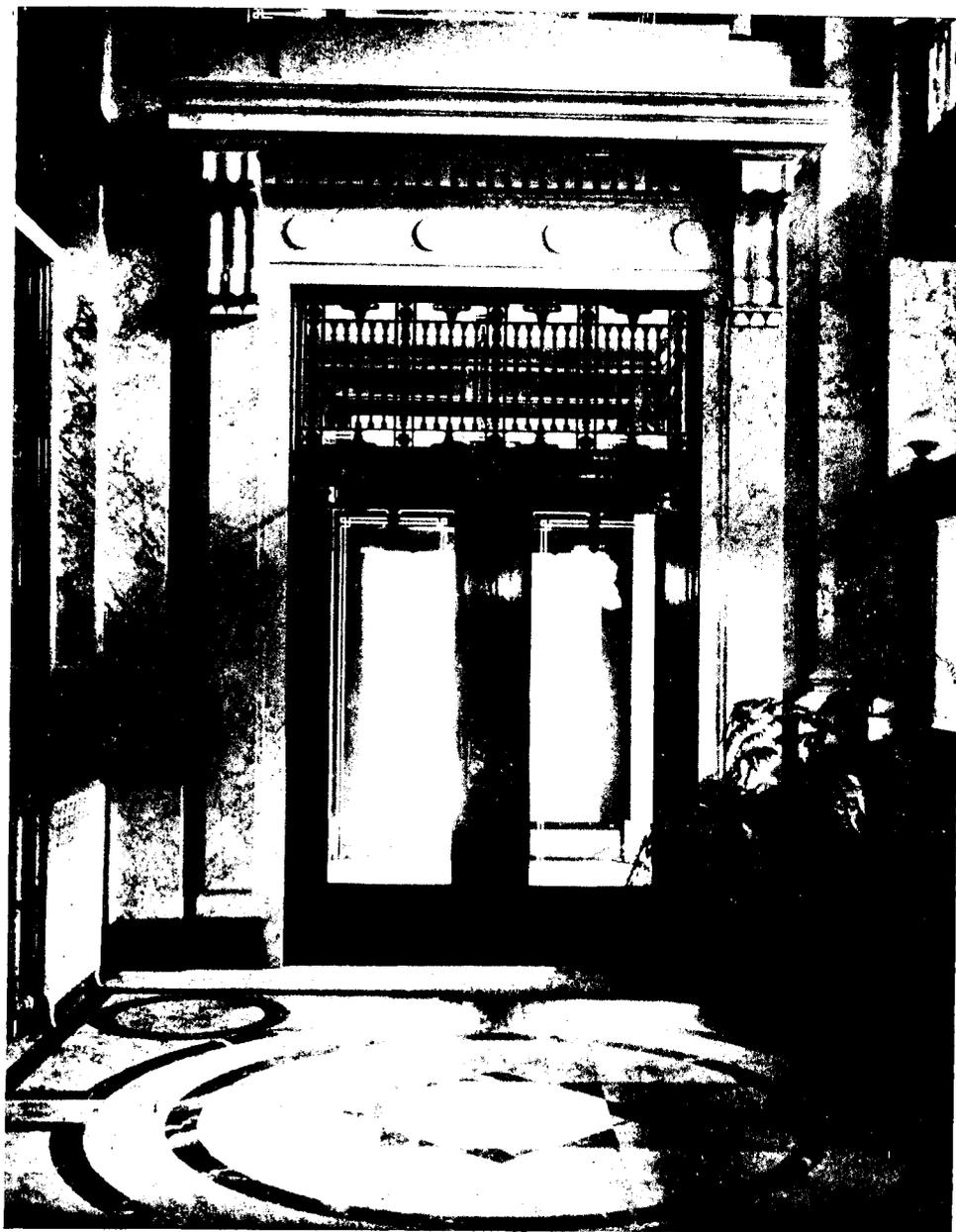
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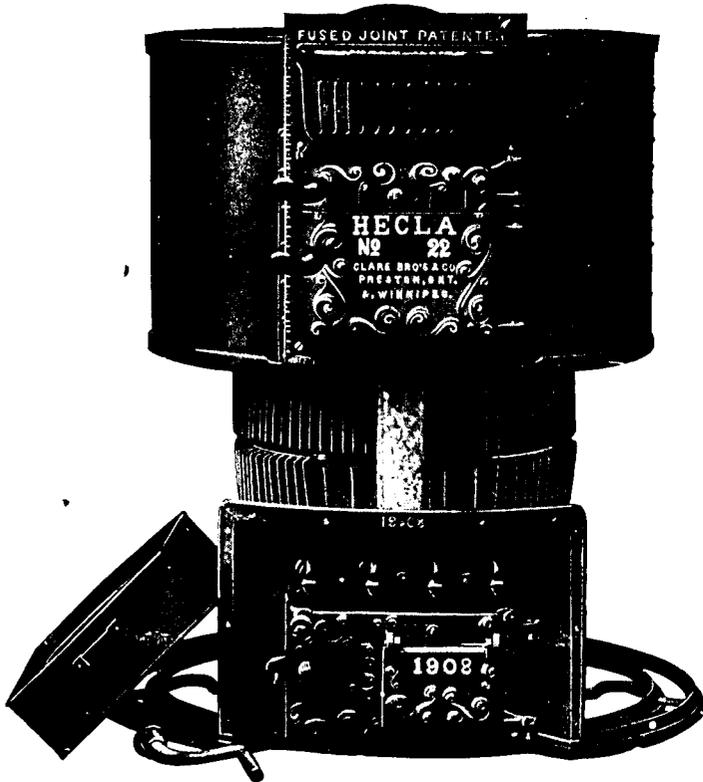
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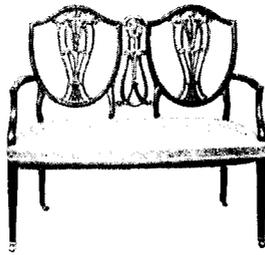
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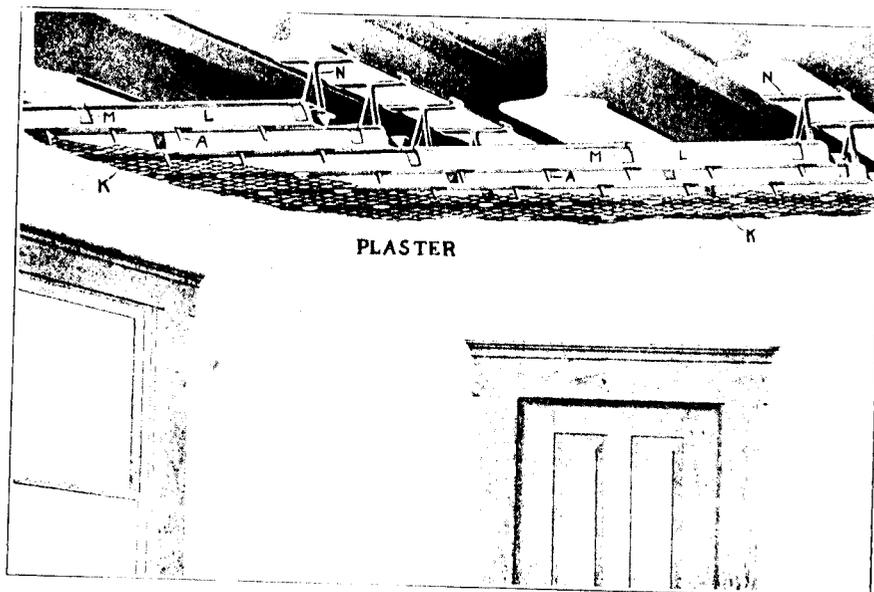
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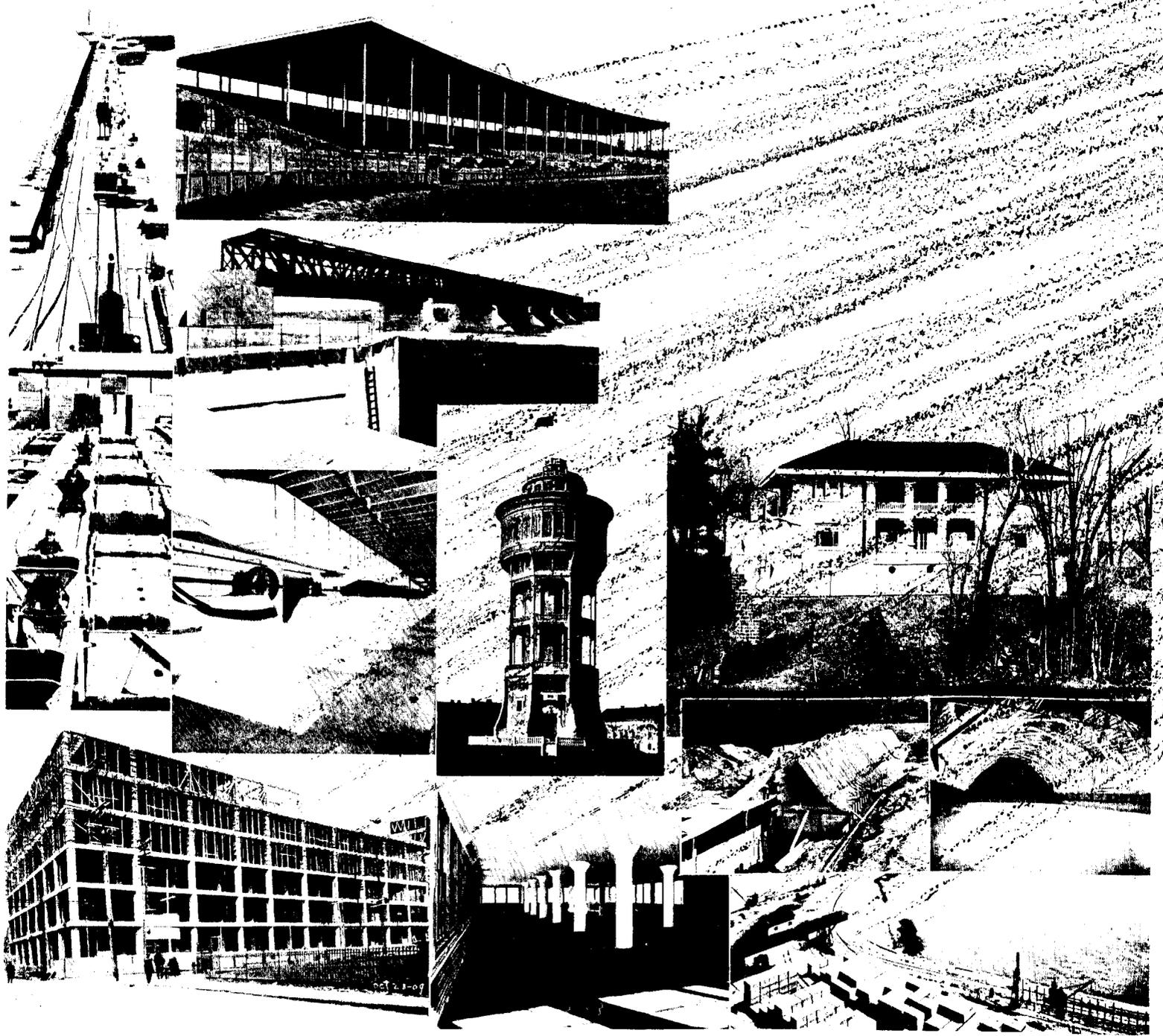
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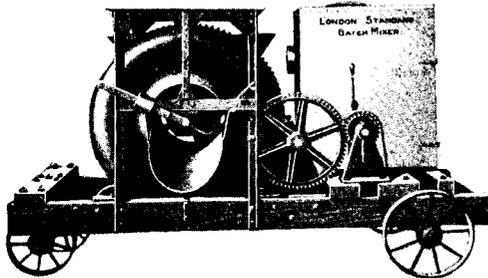
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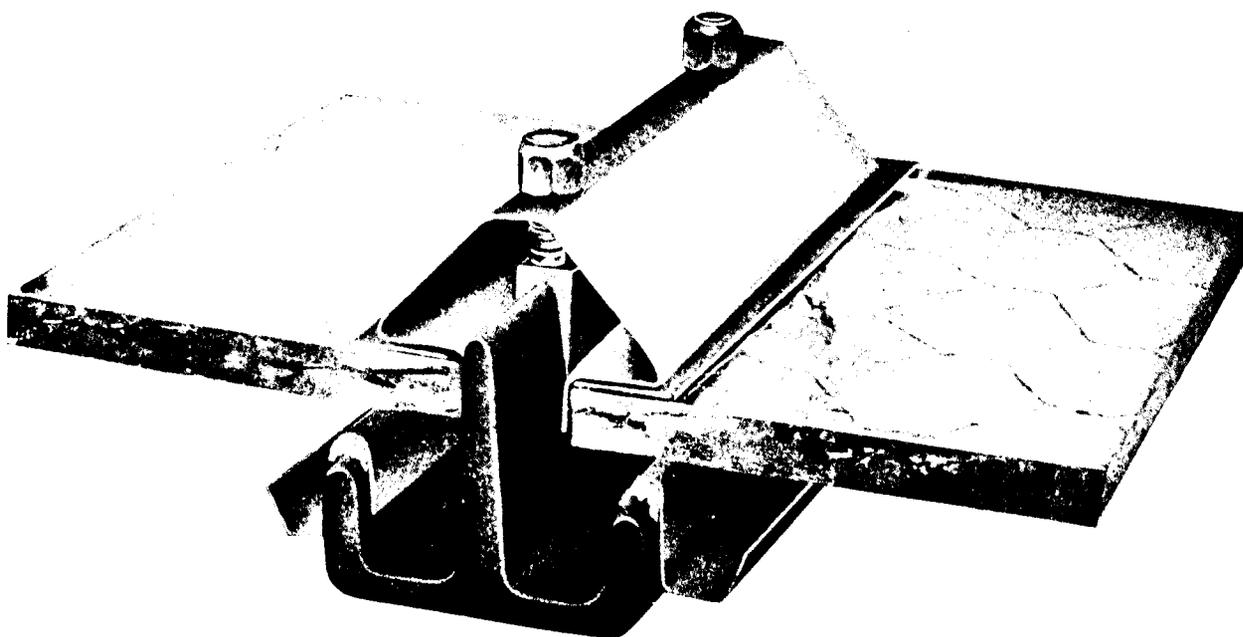
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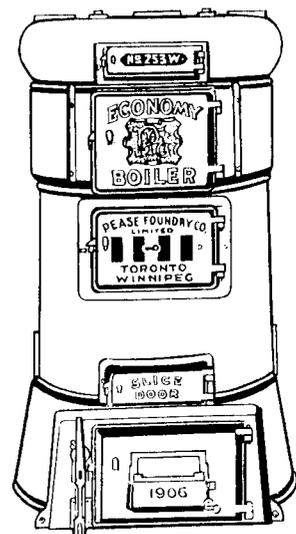
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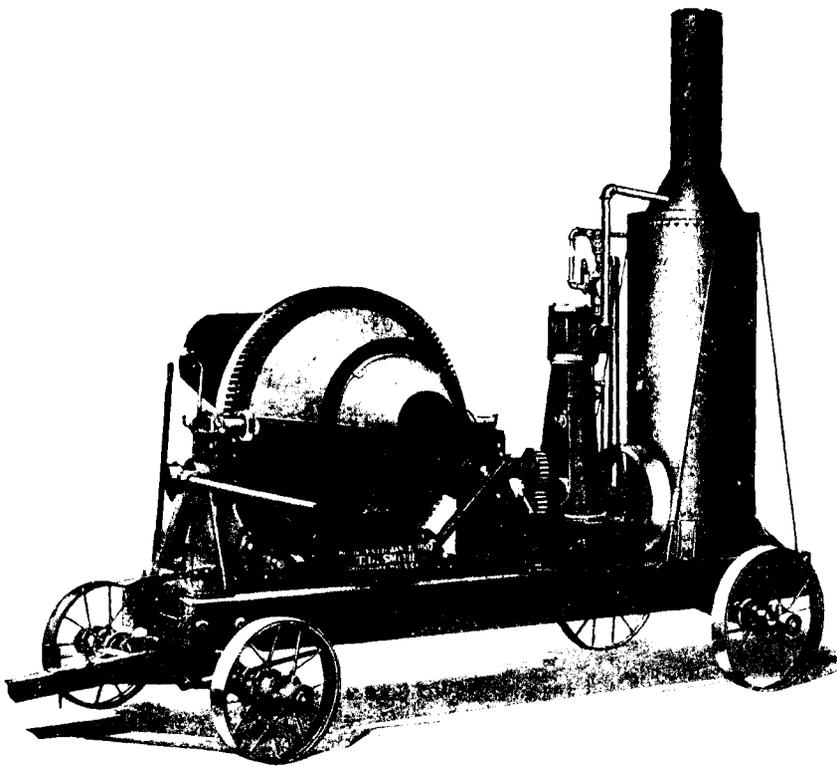


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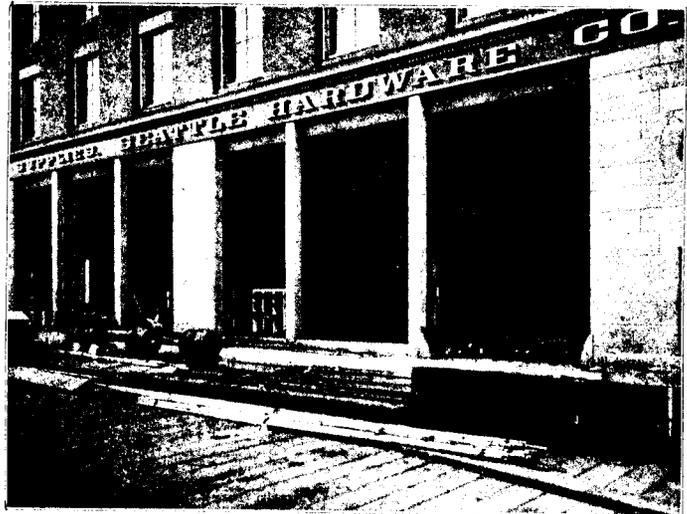
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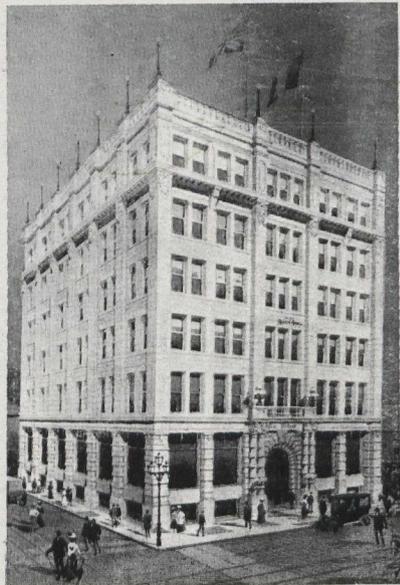
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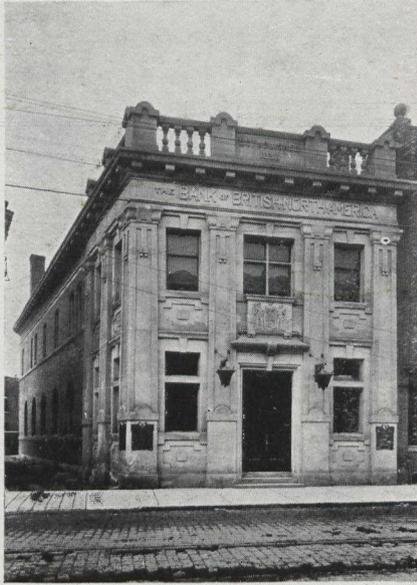
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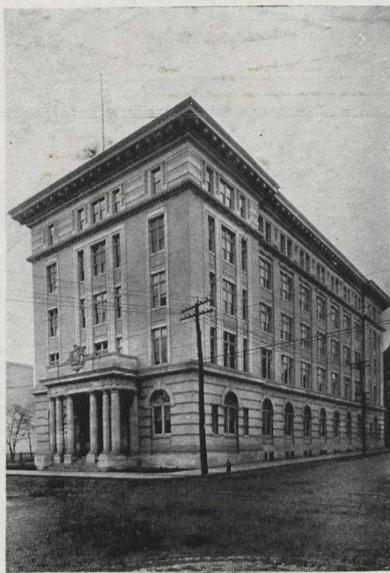
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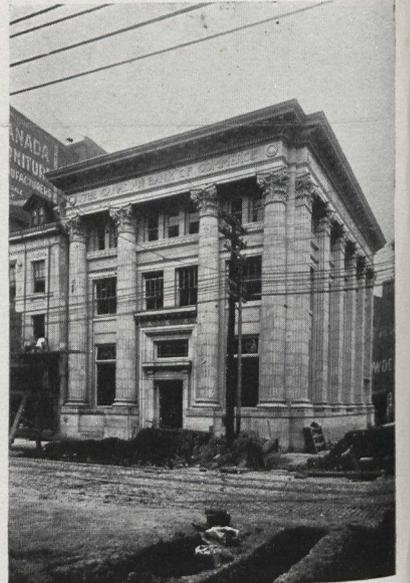
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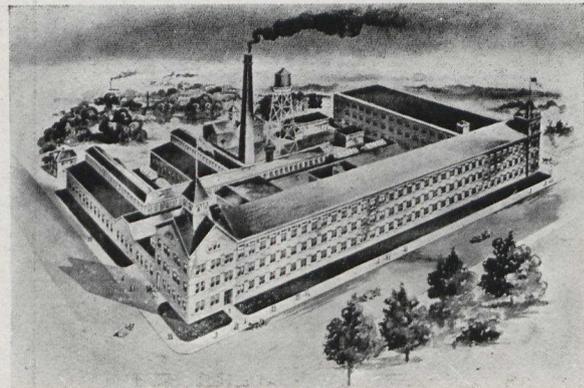
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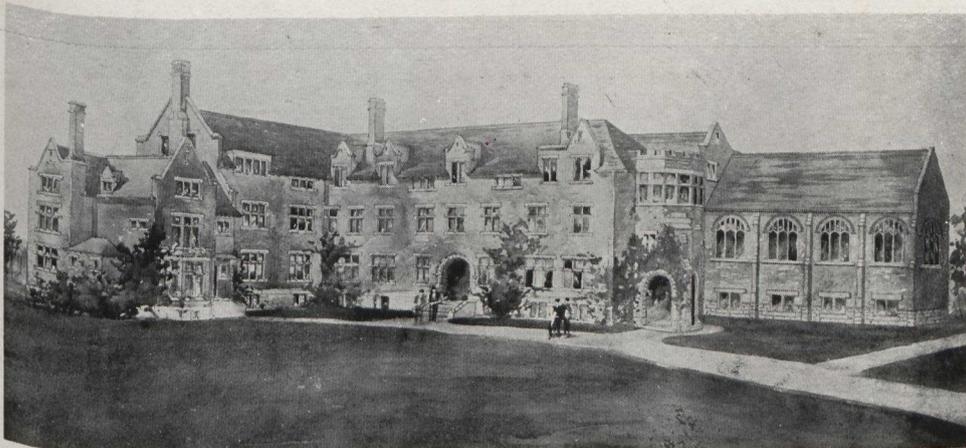
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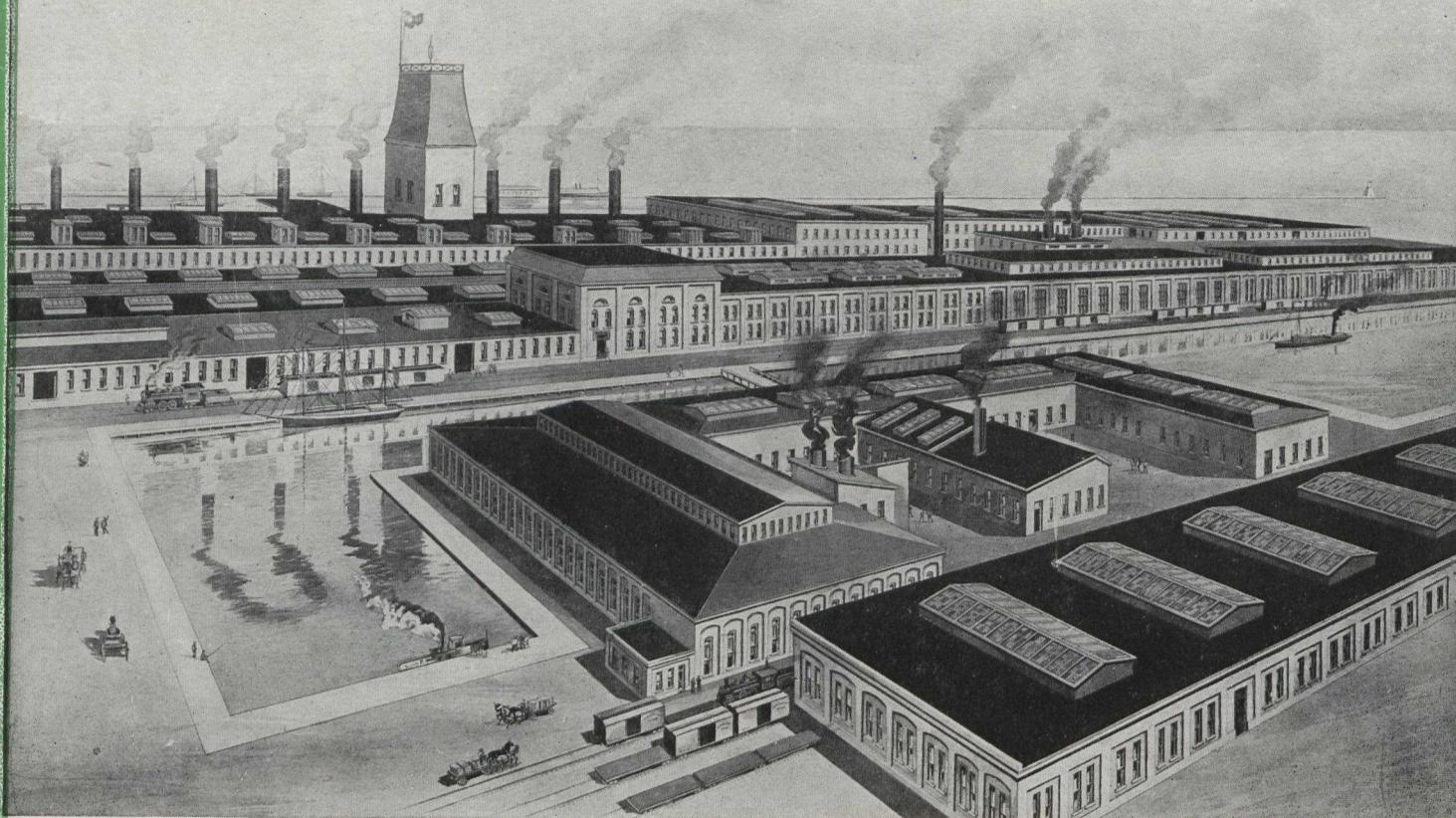


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Vol. 3

TORONTO, JUNE, 1910.

No. 7

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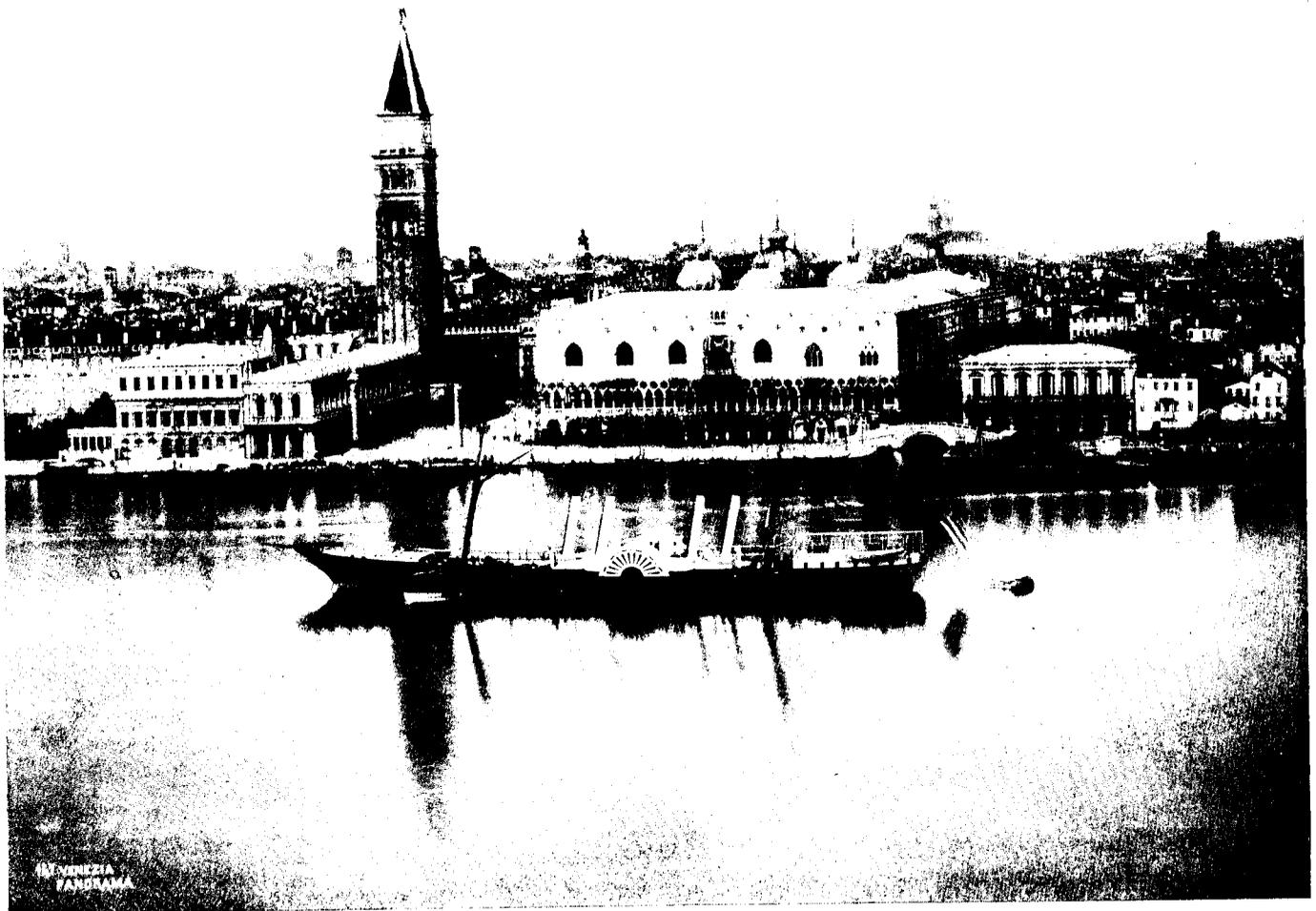
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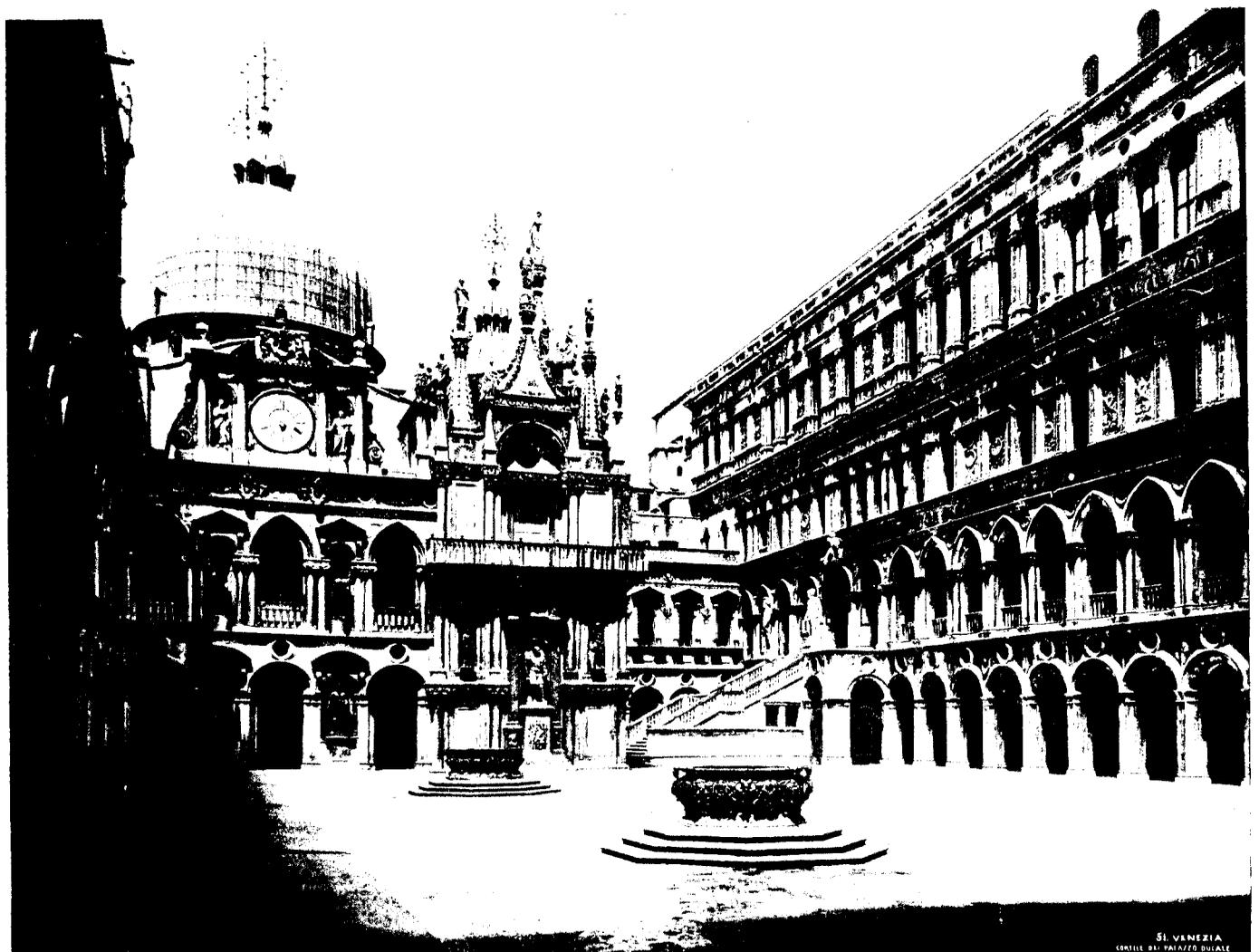
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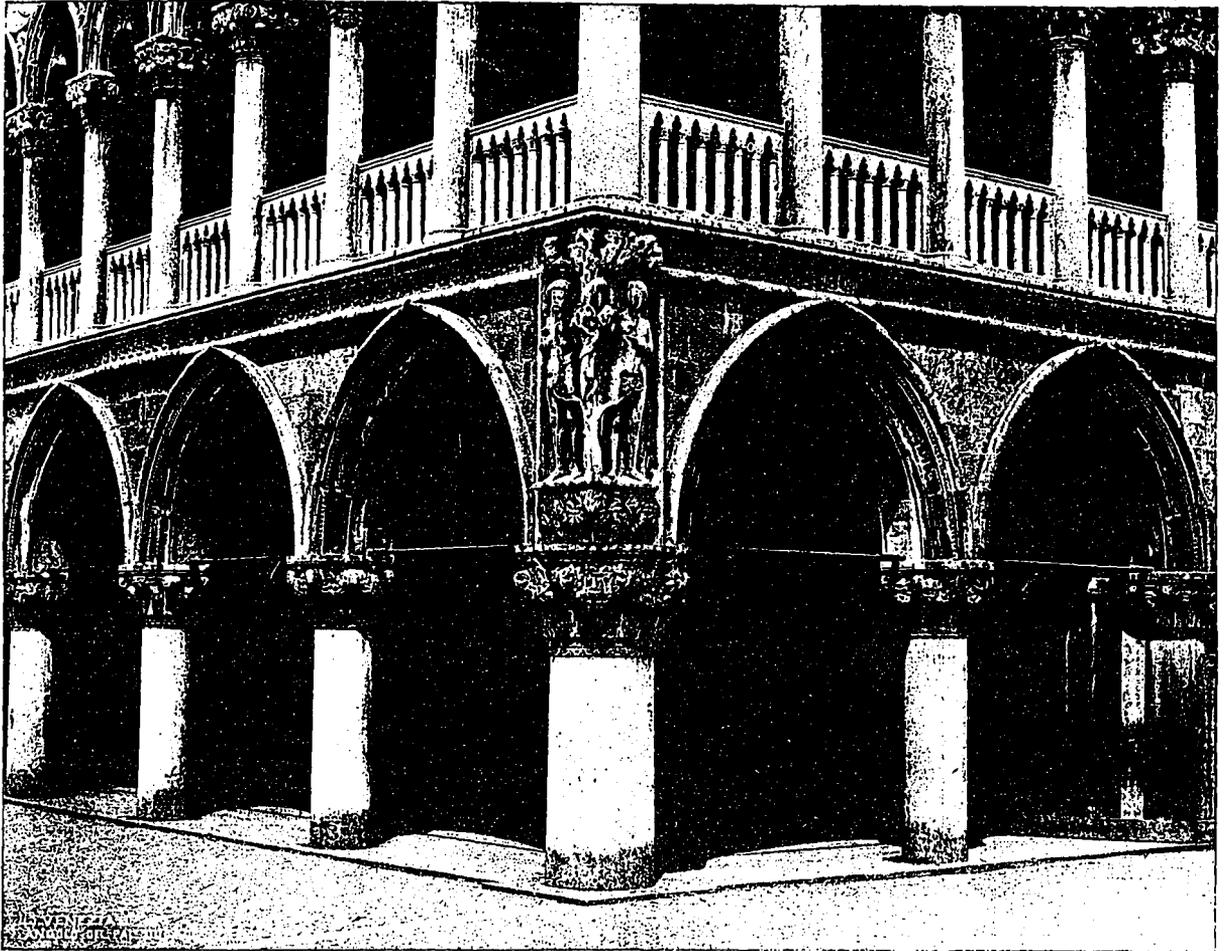
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Panoramic View of Venice, showing the Ducal Palace with its Open Colonnades, together with the Campanile towering on the Left, and the Domes of St. Mark which appear above the Palace in the Background.



Ducal Palace, Venice. View showing Inner Colonnade and General Architectural Treatment of Court-yard Elevations.



Detail of Colonnade, Ducal Palace, Venice, showing the Sculpture Work at the Angle of the Walls and the Varied Treatment of the Capitals. The Lower Columns have a More Stumpy Appearance than was Intended owing to the Raising of the Pavement in the Piazza. They have no Bases, but are Supported by a Continuous Stylobate.

DUCAL PALACE, VENICE.—Notable Structure of Fifteenth Century Italian Gothic Which Has For Years Been a Subject of Interest to Students of Design.—Comments on Its History and Architectural Features.

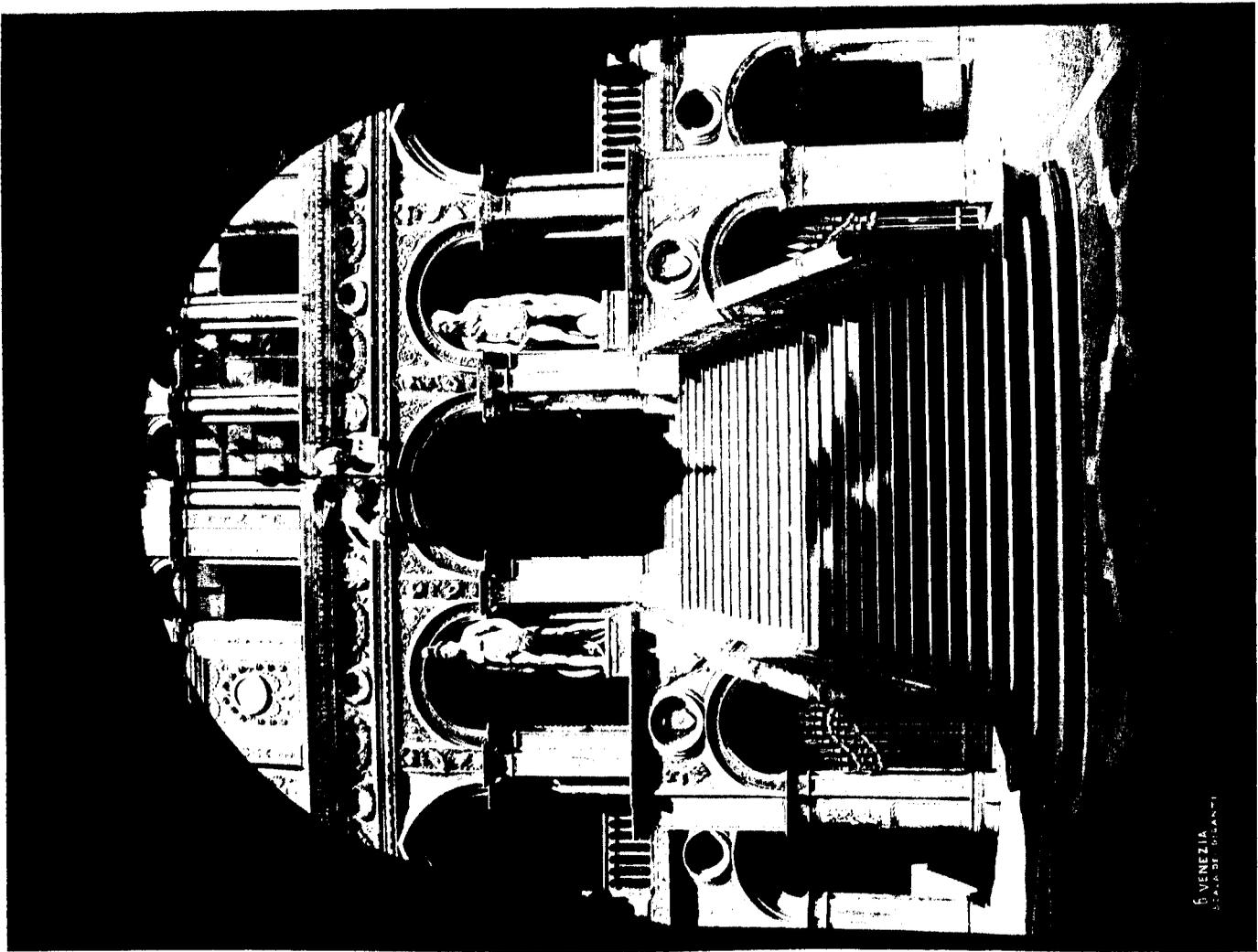
WHEN CONSIDERING Venetian Gothic architecture, it is impossible to overlook the Doge's Palace. For centuries this building has been visited by the world's greatest architectural critics, and although on some few occasions the criticism has been rather of an adverse nature in some few details, it nevertheless has, more than any other building of its type in Venice, risen triumphantly over centuries of critical inspection.

The first Ducal palace was built in 829 by Doge Angelo, a Byzantine palace, and we know that from contemporary writers, it was of great magnificence, but it received great additions during the twelfth century, especially from the Doge Sebastiano Ziani, who enlarged it in every direction. In the fourteenth century the great Saloon was built with many other important additions, but the palace of Ziani still remains, contrasting with the splendours of the later buildings. So strong was the feeling that it ought to be re-built that to save the vast expense and fearing their own weakness, the Senate passed a decree forbidding anyone speaking of rebuilding the old palace, under a penalty of one thousand ducats, but in 1419 a fire occurred, which destroyed part of the old building. A decree for rebuilding the old palace was issued

under Doge Moncenigo in 1422 and the work was carried out under his successor, Doge Foscari. In 1684 another fire destroyed the upper rooms of the east facade and almost all of the whole of the interior of the palace, and the completion of the repairs necessitated at this time brought the edifice into its present form. The architects employed were members of the family of Bon or Buoni, and to two of them the two principal colonades are due.

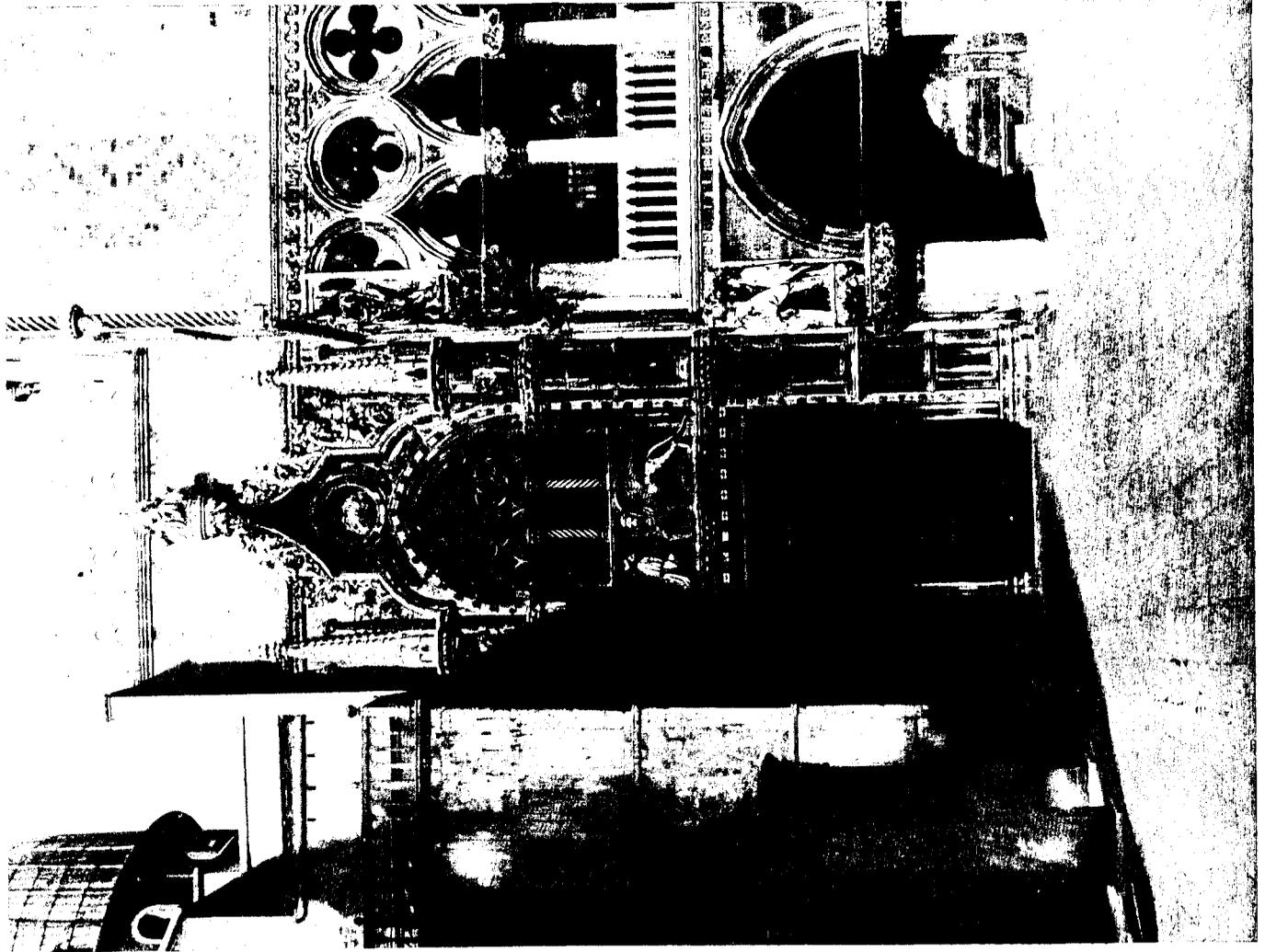
In this description of the Ducal palace we have drawn upon the best known authorities in existence, and a large amount of the comment and criticism has been extracted from Street's description of this old palace in "The Brick and Marble Architecture of the Middle Ages in Northern Italy." This is considered one of the best treatises on this especial phase of Italian architecture, and is now out of print. We believe that with the illustrations and descriptions herewith given the student of architecture may be enabled to get a pretty fair idea of the beauties of this old Ducal palace.

The whole building forms three sides of a hollow square; one side rises out of the deep recesses of the Rio del Palazzo, spanned near its outlet by the famous Bridge of Sighs and is entirely of Renaissance work, the next side rising from the River dei Schiavouli, faces the Guid-

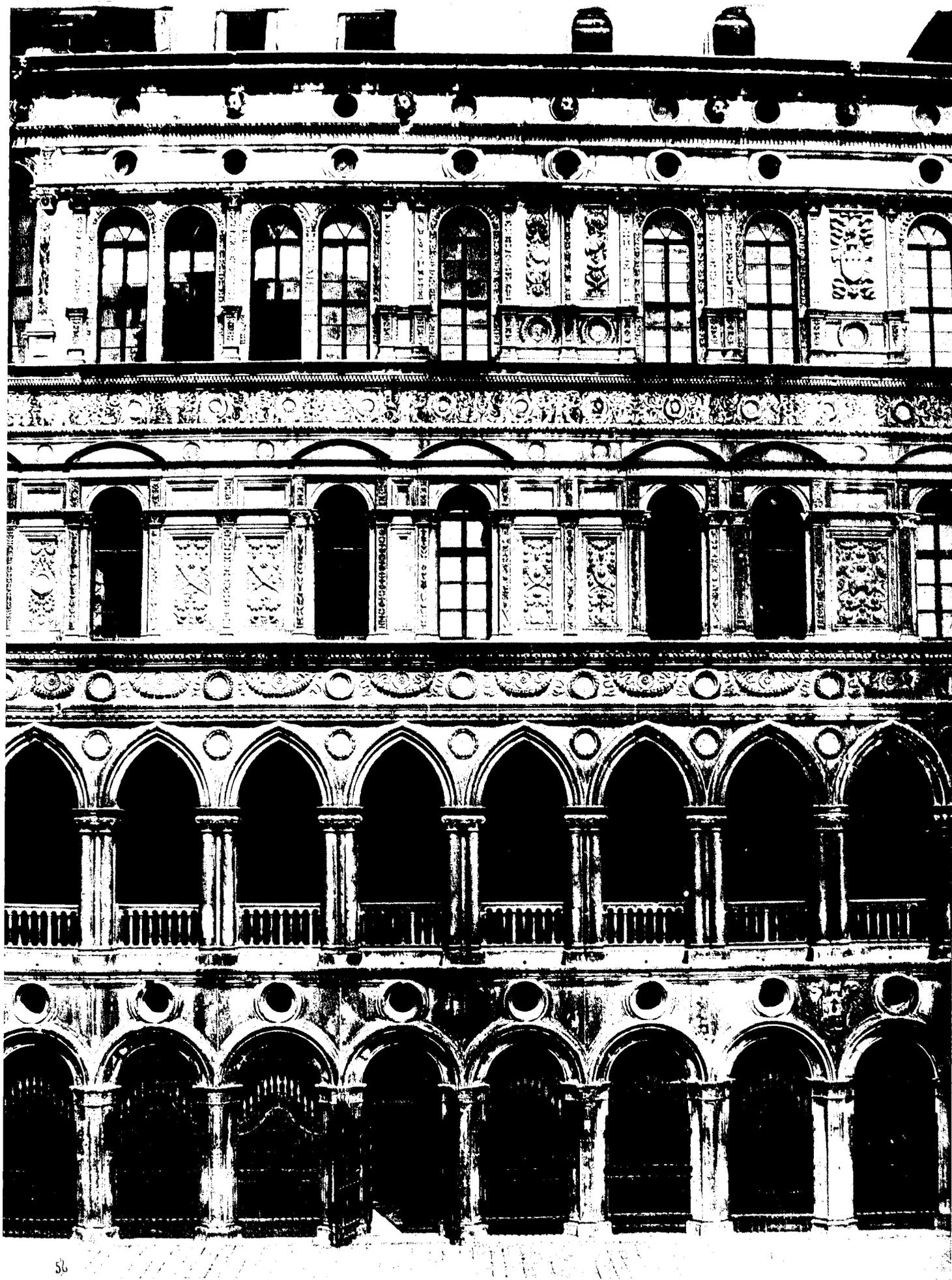


Scala dei Giganti (Giant's Staircase). Ducal Palace, Venice, built by Antonia Rizzi. It derives its name from the Colossal Statues of Mars and Neptune, wrought by Jacopo Sansovino in 1554, which Stand at Either Side of the Entrance.

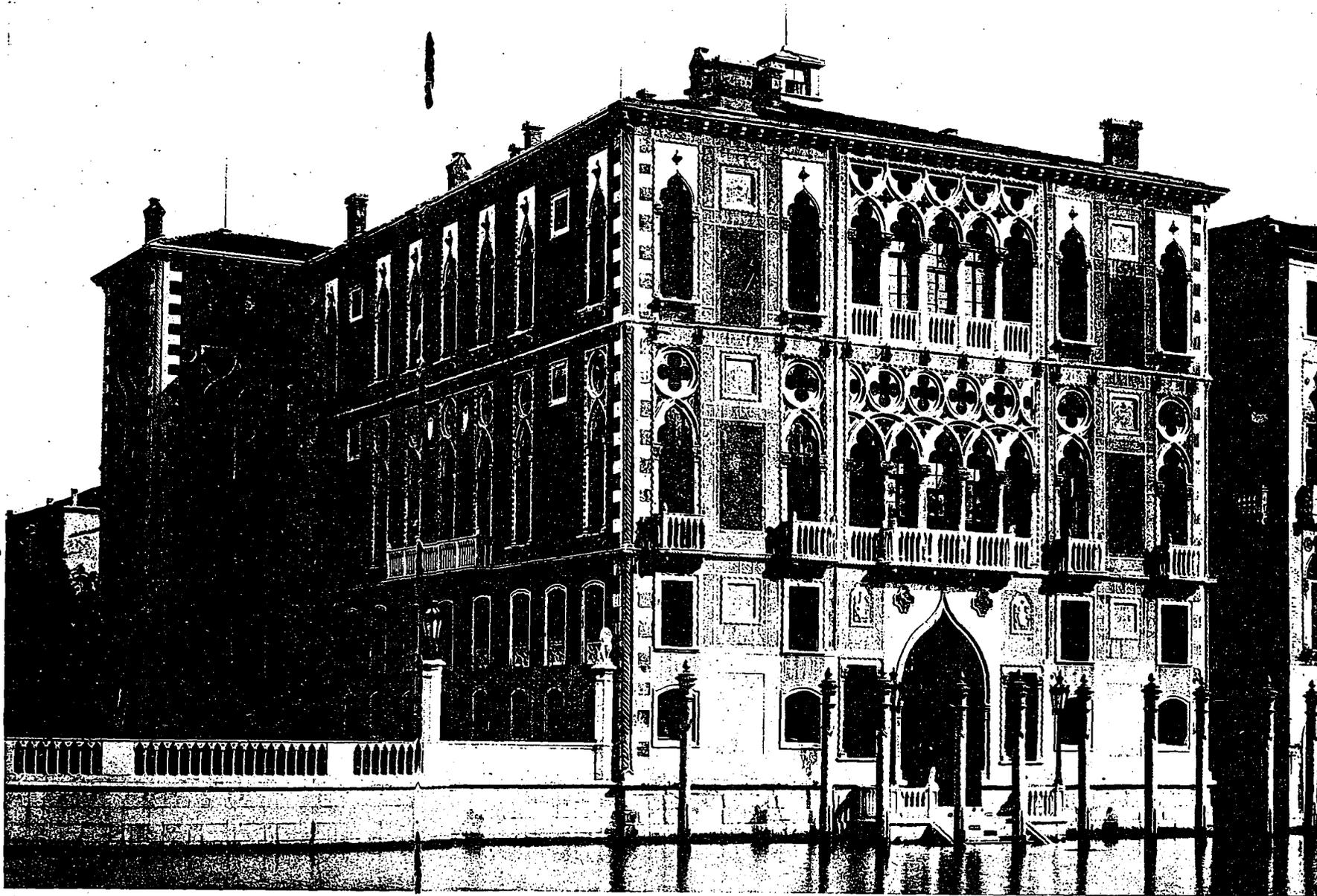
CONSTRUCTION, JUNE, 1910.



Porta della Carta, Ducal Palace, Venice. The Beautiful Entrance-way, giving Access to the Court from the Piazzetto, which is inscribed with the name of its Architect, Bartolomeo Bon (1440-1443).



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Section of Elevation in Court, Ducal Palace, Venice, showing the Decorative Enrichment of the Walls, and the General Arrangement of the Windows in the Upper Stages.



Palazzo Cavalli, Erected in the 15th Century. One of the Striking Examples of Venetian Gothic along the Grand Canal.

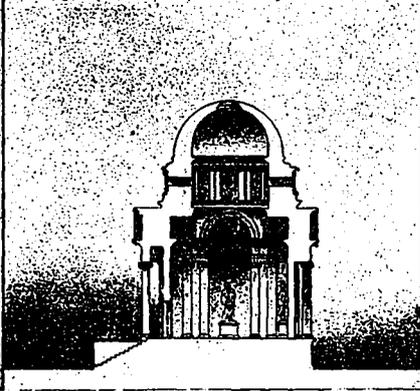
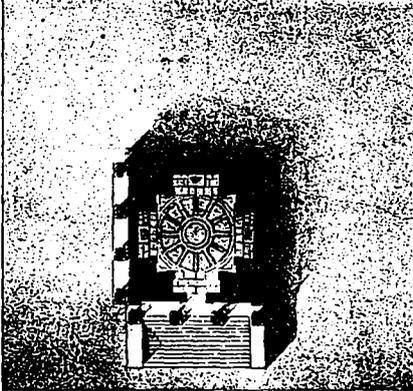
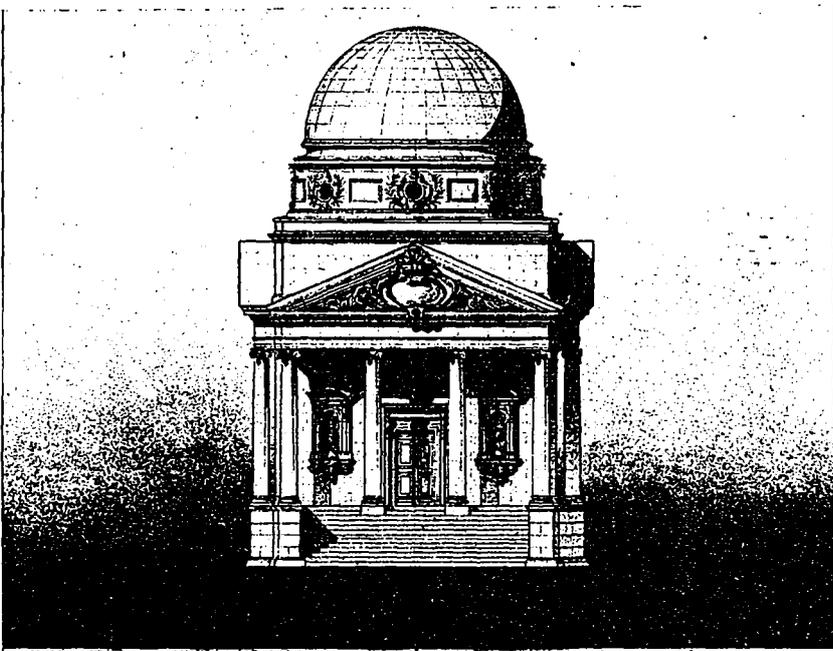
ecca, and is of the purest Gothic, and the third, facing the Piazzetta de San Marco—the small square which opens St. Marks to the water—is also Gothic, and of the same type. In height the whole design is divided into three stages, the upper nearly equal to the united height of the two lower stages, and faced entirely with a delicate diaper of marble cut in small oblong pieces, and looking, save in their texture and color much like bricks. In this marble faced wall are pierced a number of windows with pointed arches, the tracery of which has been taken out, and in or near the centre of each facade a much larger window and balcony which looks rather as though it had been subsequently inserted. The lowest stage consists of a long and uniform arcade of very simple and noble pointed arches resting upon circular columns with elaborately carved caps. The intermediate stage is a magnificent arcade supporting very glorious tracery too well-known to everybody to require much description, and divided from the stages above and below it by large and pronounced lines of carved and moulded string-courses. It is important to observe that up to the top of the second string-course, the whole of the architecture is of the noblest type of Venetian pointed, the arches of the lowest stage are well proportioned, and though very simple, still well moulded, and the detail of the work of the second stage is, to say the least, not at all inferior. They form altogether, many writers maintain, without exception the very noblest and truest specimen of Christian architecture south of the Alps. Above this noble work the third stage comes with patent marks in every stone of which it is composed, and it was designed by some other hand than that which had been so successful below. There is something chilling in the waste of plain unbroken wall coming above the wonderful richness of the arcades which support it. Moreover, this placing of the richer work below and the plainer above is so contrary, not only to all ordinary canons of architecture, but just as much to the ordinary practice of the Venetians, that it creates an impression that is substantially correct, viz., that the line at which alterations and additions have been made is to be looked for in a horizontal and not in a vertical direction; that in all probability, consequently the builders of A.D. 1301 commenced with some portion of the sea facade and gradually carried on the building to (at any rate) the height of the two stages as we now see them and that then, when in A.D. 1341 the Council Chamber was found to be too small and larger rooms were required, another architect suggested the advantage of obtaining this by raising an immense storey above the others, and without destroying much of his predecessors work, providing rooms on the most magnificent scale for the Doge and his Council. There is no mark of diversity of style between the two fronts beyond some slight differences in the treatment of the sculptors, but it is quite impossible to argue with any certainty from this, because it is plain that this difference might arise from the employment of two sculptors at the same time, whose minds were as different in tone as their hands were in power, or from the completion of a portion only of the carving at first and the delay for some reason which might easily arise to that in the Piazzetta front until a later period. The shafts at the angles of the building, which in the earliest Venetian work were simply the rounding off of the sharp angles, afterwards three-quarter shafts formed by rounding the angle and then sinking a line on each side a few inches from it, becoming in time detached shafts projecting from the face of the wall, and apparently independent of it, and held in their places by occasional bands bedded into the wall. In short these latter expedients were just as unreal, unnatural and ugly expedients for marking the angle of the wall as the others were lovely and simple modes of delicately softening its contour. The shafts at the upper angles of the upper stage of the Ducal palace are of the late type, both ugly and weak and never devised by the original architect of the work below. Besides these, the windows which are

indeed arched, are poor in their detail, small, and entirely wanting in a bold spirit, and where tracery remains, as it still does in two windows at the extreme end of the sea front, it is of much later and poorer character than the traceries below. Finally, the parapet is not at all equal in its conception to any of the lower work, and crowns with an insignificant grotesqueness the noble symmetry of the two lower arcades.

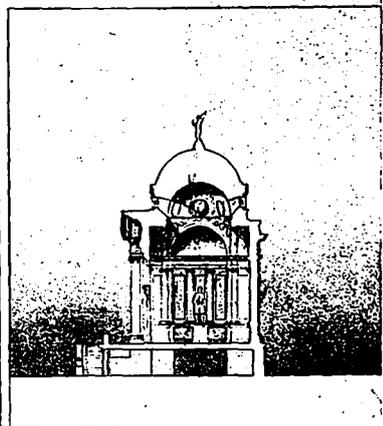
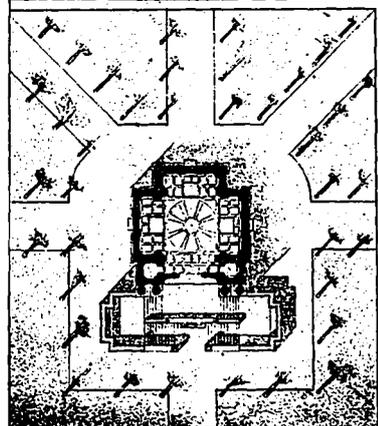
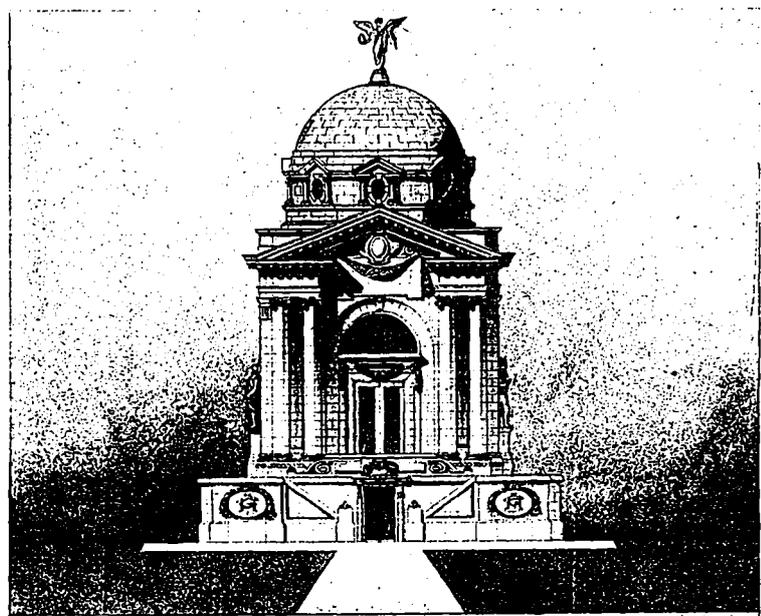
The new Council Chamber was not completed entirely until A.D. 1423, and in A.D. 1429 the Doge Foscari built a gate called the Porta della Cartè at the S. Mark's end of the Piazzetta facade. In constructive art the palace appears to be very much of the Byzantine type in its early stage. The weight is supported by a succession of shafts placed at very short intervals from each other, and in neither is there any approach to the system of pier, and arch and buttress, so distinct of pointed art in the north. The pointed arch is used, it is true, in the palace, but after all the mere use of the pointed arch does not make thorough pointed architecture, and therefore all glorious as it is as a variety of pointed architecture, the Ducal palace is scarcely to be placed in the first class of pointed buildings. Indeed, the second stage, whose exquisite beauty is the charm of the whole building, does not exhibit the pointed arch at all in a properly developed form, but is strong enough to support the great weight of wall above, only by reason of the massy character of its tracery, and not by the proper application of constructional arches. There is no approach to buttressing; but the angles required some help; and this is given partly by iron ties at the springing of the arches running for some distance in each direction. All the mouldings are very simple, generally composed of three-quarter beads, small fillets and large flat hollows, and constantly arranged in the same order. The label of the main arcade is a plain bead. In the spring-course boldly carved figures are repeated with a slight interval between each, and the upper string-course has a row of nail-heads in one of its members. The cusping of the tracery is quite square in this section, and the cusps finished with a square end, to which is attached—with good effect—a small circular ball of red marble. The parapet is of the somewhat peculiar kind, and one cannot but admire its extreme peculiarity of both outline and design.

Such then is the Ducal palace; a building certainly in some respects of almost unequalled beauty, and at the same time of unequalled merit. Its first and second stages, quite perfect in their bold, nervous character, and in the almost everlasting-looking succession of the same beautiful features in shaft, and arch and tracery, form perhaps one of the very grandest proofs in the world of the existing beauty of perfect regularity in architecture, which it is possible to obtain it a very large scale. It is, however, in spite of, not in conjunction with the treatment of the upper stage, that this facade is so eminently beautiful, and without it the remainder of the palace would find at least as many admirers as it does now, whilst by itself the world with one consent would pass by this upper stage as a very worthless and inferior piece of architecture.

CONCRETE FLOOR TILES are quite extensively used in Palestine where concrete was first introduced twenty years ago. Other products of this particular material also in evidence are railings, cornices, steps and sewer and water pipes. Reinforced concrete construction, however, is still something new and it is only recently that the first building of this kind—a sanitarium—was built near Jerusalem. It is extremely doubtful though, whether this form of construction in Jerusalem, will be adopted to any great extent owing to the large supply of building stone available, and the low cost of labor in quarrying and dressing it. In Jaffa, however, where the reverse condition exists, both reinforced concrete and concrete block construction should become popular.



Design for Memorial, to be placed at a Focal Point in a Public Park and to contain the Statues of Three Great Artists—T. L. Rowe, Second Year Student, Department of Architecture, Toronto University.



Design for Memorial, to be placed at a Focal Point in a Public Park and contain the Statues of Three Great Artists—H. H. Madill, Second Year Student, Department of Architecture, Toronto University.

STUDENT'S WORK IN ARCHITECTURAL DESIGN.—Productions of Second and Third Year Men at Toronto University.—The Course of Study and Facilities and Equipment Provided.—Department Should be Encouraged by Co-operation of the Profession. . . .

THERE HAS BEEN much discussion in architectural circles with regard to the efficiency of the Architectural Department of the Toronto University conducted under the direction of Professor Wright, and we are under the impression that much of the adverse comment was prompted by the fact that the architectural profession generally is not conversant with just what Professor Wright is really accomplishing in his department. It is true that the Toronto University does not offer as good facilities in its architectural department for the education of the student in the matter of design, as do some of the larger universities in the United States, but it is also true that the university authorities must have the co-operation of the architectural profession to enable them to give more to the architectural student.

The curriculum adopted by the University for architectural education, consists mainly of course in mathematics and the science of construction, although in the past few years considerable attention has been given to the study of design and the aesthetic side of architecture. At the present time, two studios of ample size, which are well lighted from the East and North, are devoted to this particular branch of the work and the efforts of the students, under the direction of Mr. A. W. McConnell, who has charge of the classes in design, shows considerable proficiency and promise. Mr. McConnell, who is himself a graduate of the Department of Architecture at the University, is well qualified for the duties of his position, having had, in addition to his university course, the benefit of a summer course at Harvard, and a year's study in Paris, where he has just returned to do further supplemental work during the summer months. Furthermore, he has had considerable good office experience both in Toronto and the West, and is, therefore, in a position to instruct the students as to what is required of them in this respect.

The Department at the present time provides for a three year's course of which the first year is chiefly devoted to studying the various Orders and Architectural History. Practical work in design is taken up in the subsequent terms, when the students are given a wide diversity of subject matter on which to work. The full programme of study, showing the nature and variety of problems set for second and third year men during the past session, appended hereto, gives a good idea of just what the University is doing in this respect.

Second Year Students

A Porch for a City House.—The building is situated on a residential street in a large city. The porch is to be a small, open vestibule placed over the main entrance, which leads through an interior vestibule into a large reception hall. Drawing required: Elevation, $\frac{1}{4}$ in. scale. Plan and section, $\frac{1}{8}$ in. scale.

A Memorial to Three Great Artists.—This monument is to be placed at a focal point in a public park and is to hold the statues of three great artists. The base shall not exceed 40 feet over all. Drawings required: Plan, 1-16 in. scale; section, 1-16 in. scale; front elevation, $\frac{1}{8}$ in. scale.

Suburban Residence.—To be situated on a northeast corner lot 120 feet by 120 feet. The ground floor is to contain a vestibule, reception hall, drawing-room, library, dining-room and kitchen; the first floor, sitting-room, bathroom and bedrooms; and the second floor, bathroom and bedrooms. Drawings required: Plan, front elevation, cross section. Scale, 1-16 in. to 1 ft.

Row of Six Workingmen's Cottages.—Ground floor to

contain living room and kitchen; and first floor two bedrooms and bathroom. Total area of ground floor, 360 square feet. Drawings required: Plans of one of the cottages; front elevation of row, and a cross-section. Scale, 1-16 in. to 1 ft.

Garage.—Ground floor to contain room 16 feet by 20 feet (space for two cars), workroom, and stall for a team of horses. First floor to be occupied by caretaker's apartments. Drawings required: Plan, front elevation, and cross-section. Scale, 1-16 in. to 1 ft.

Colonial House.—A business man having purchased a lot sufficiently large to give him space on all sides, wishes to build a nine-roomed Colonial house. First floor to have a central hall, 15 feet wide, with vestibule and porch in front and doorway in rear; a large living-room about 14 feet by 25 feet, and a parlor and dining-room about 12 feet by 14 feet each. The kitchen, pantry, china closet are to be located in a separate wing. The second floor to be occupied by five bedrooms, bath, closets, and an alcove if possible; and the attic to be arranged for sleeping rooms.

A Summer Residence.—To be erected for a well-to-do city family who spend six months of the year in the country. This house is to have a spacious verandah and a large living-room (24 feet by 36 feet, about), with fireplaces, seats, etc., to occupy the whole of ground floor of main portion of house. The dining-room is to be 13 feet by 16 feet, with kitchen. The client wishes to have dining-room and kitchen in a wing. The first floor is to contain a bath and bedrooms of medium size.

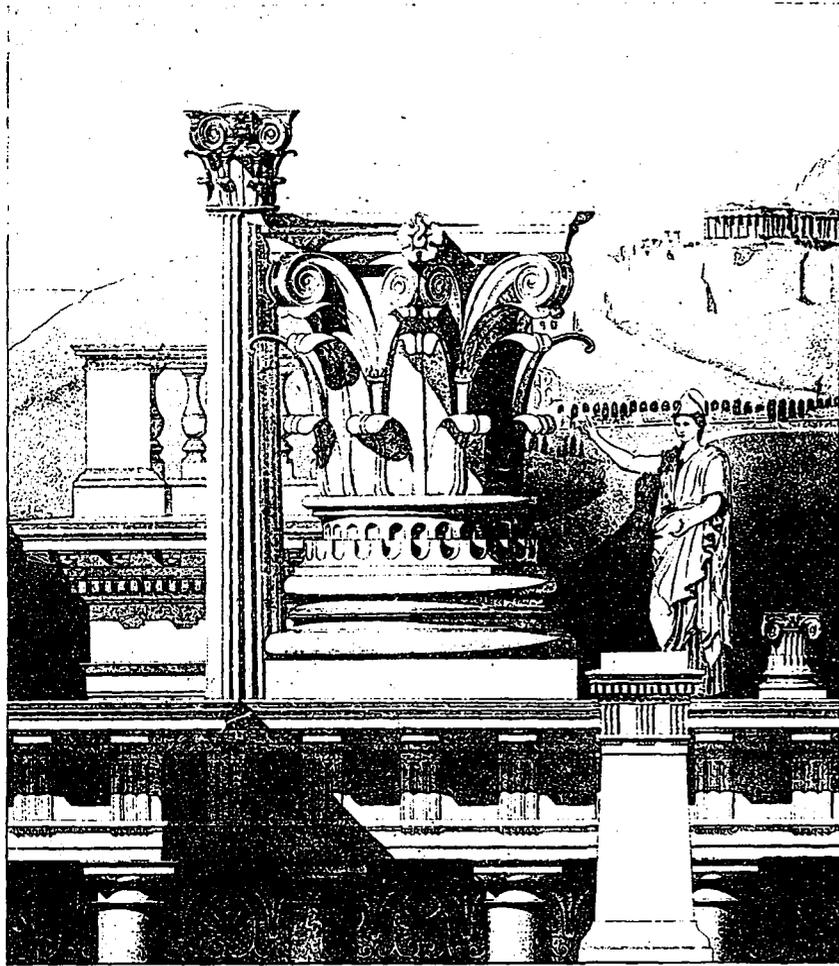
Third Year Students

Loggia.—The drawing will show the loggia before the elevation of a museum. The loggia will be itself the principal entrance to the building, which will include a large hall (a) lighted from the roof, and side galleries (b and c) lighted by windows and disposed for the exhibition of small works of art, metals, etc. In the hall will be exposed the sculptures, ancient and modern. The loggia will be of the nature of an open vestibule, in the spirit, perhaps, of the Loggia del Lanza at Florence. A number of groups of vases, statues, etc., will be placed under its vaults. The elevation will not exceed 80 feet. Plan with part of building, scale 1-16 in. Elevation and section, $\frac{1}{8}$ in.

Chapel.—Situated on the northern coast of a large lake and visited by a great number of travellers, a small chapel is to be erected to take the place of one well known as the centre of local pilgrimage. The mountain falls here almost directly into the lake. It is supposed, however, that the road for carriages passes between the chapel and the lake and that an open space of 100 feet is here left behind the road, which is 17 feet higher than the lake. A disposition of steps and landings will give access to the visitors arriving by boats. The width of the chapel shall not exceed 40 feet. It will include a small sacristy and will be decorated as richly as possible. Plan, 1-16 in. to 1 foot. Section and elevation, $\frac{1}{8}$ in. to 1 foot.

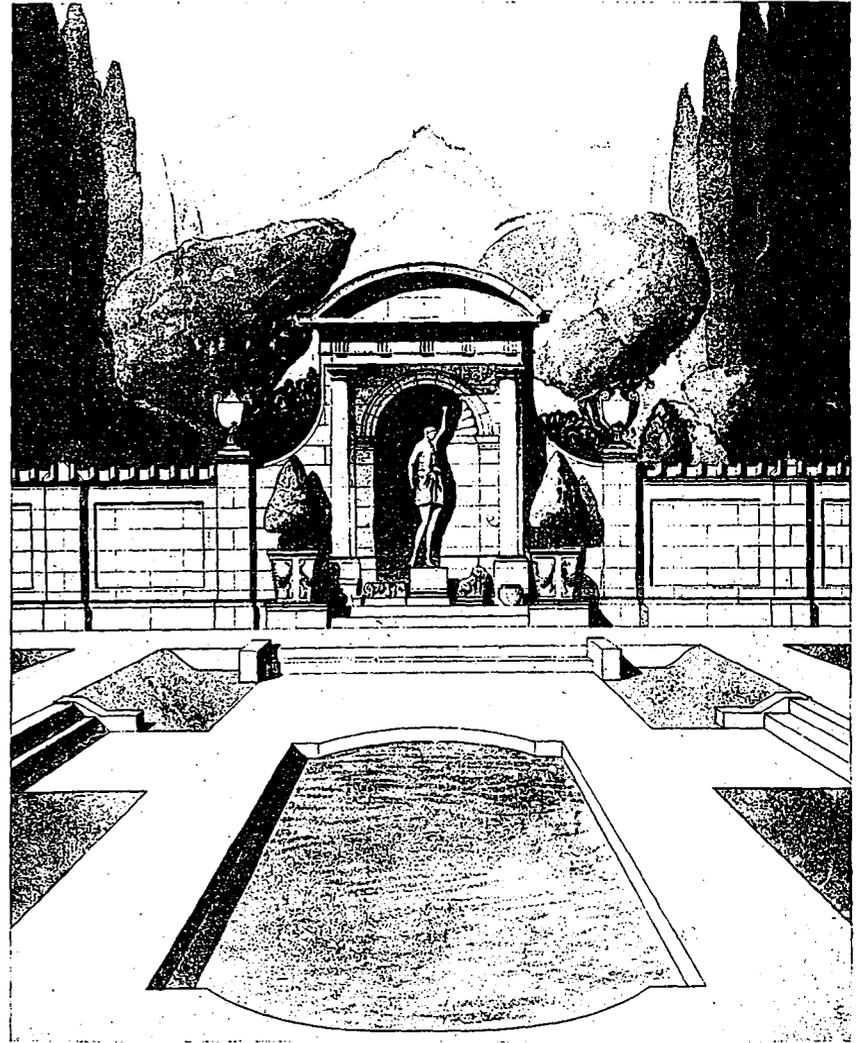
A Tomb.—To be built in a private cemetery by a rich gentleman to hold the remains of himself and family. A composition showing the surrounding walks and grounds, is to be suggested. The greatest dimension shall not exceed 30 feet. Drawings required: Front elevation, $\frac{1}{4}$ in. scale. Plan and section, $\frac{1}{8}$ in. scale. Time, 10 hours.

A Billiard Room.—To be situated at the end of a large villa. The billiard room will be placed, as in the sketch, at the end of an open gallery. The width of this gallery is 35 feet over all. In elevation, the billiard room will not

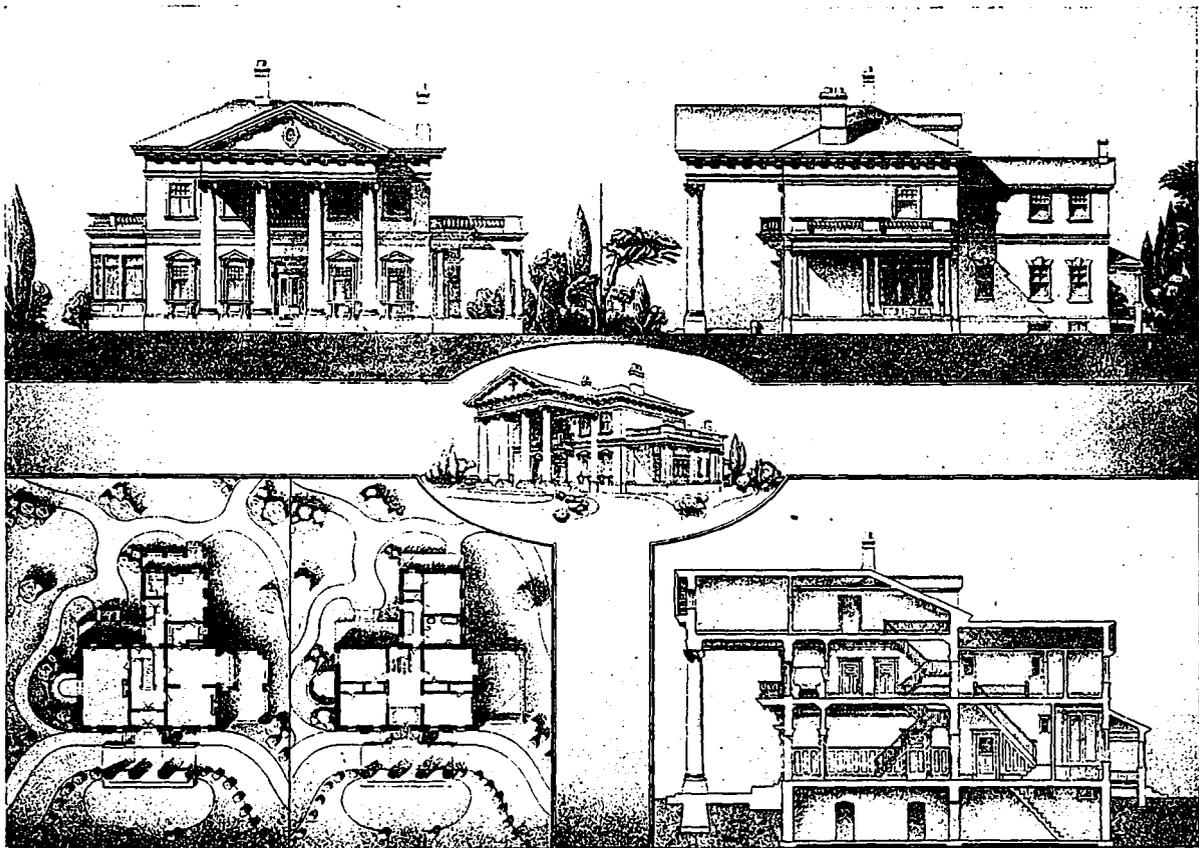


FRAGMENTS

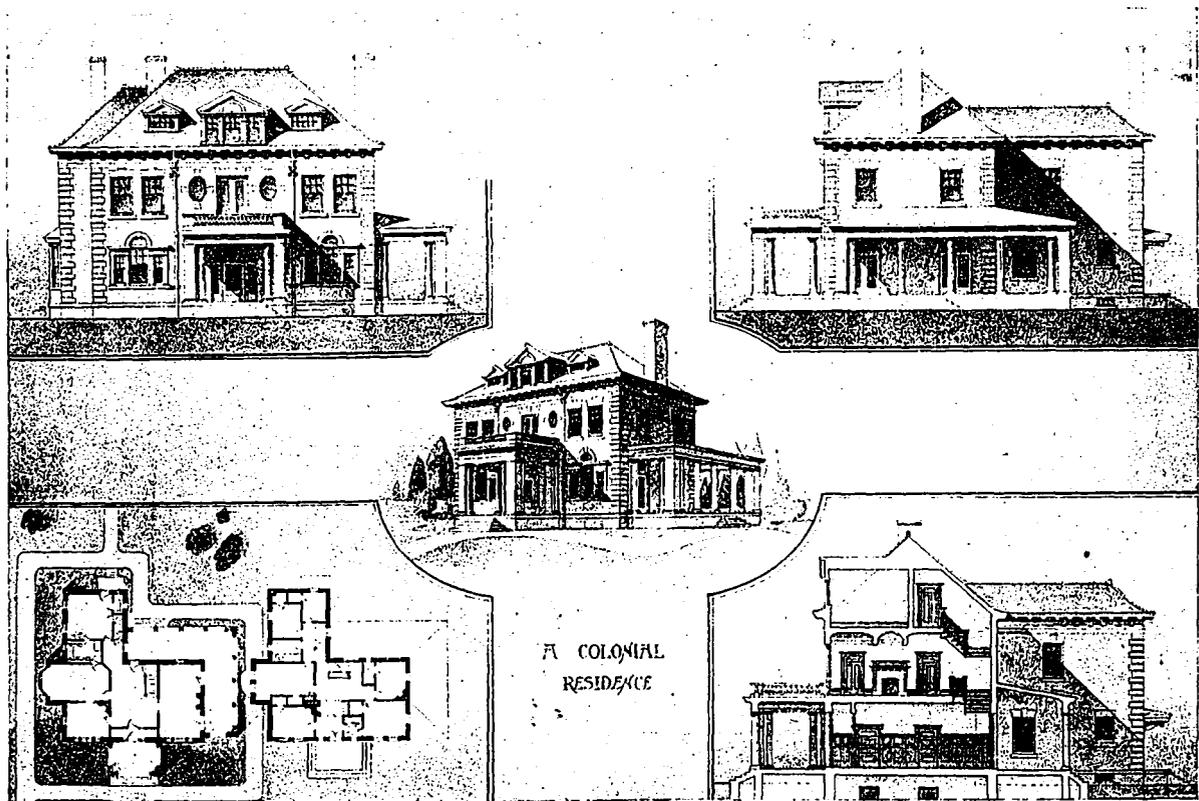
"Fragments," a Study in Detail and Perspective—H. H. Madill, Second Year Student, Department of Architecture, Toronto University.



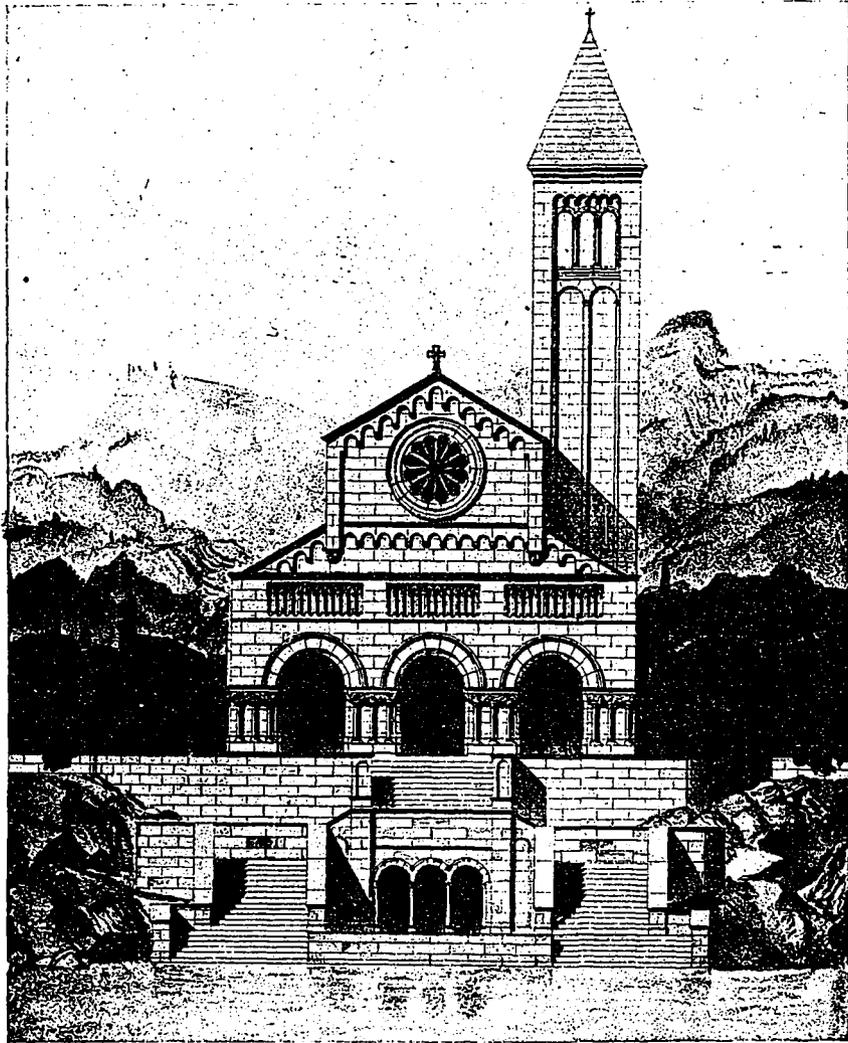
Design for "Niche for Antiques," to be Situated at the End of an Alley on a Large Private Estate—J. B. Fiskin, Third Year Student, Department of Architecture, Toronto University.



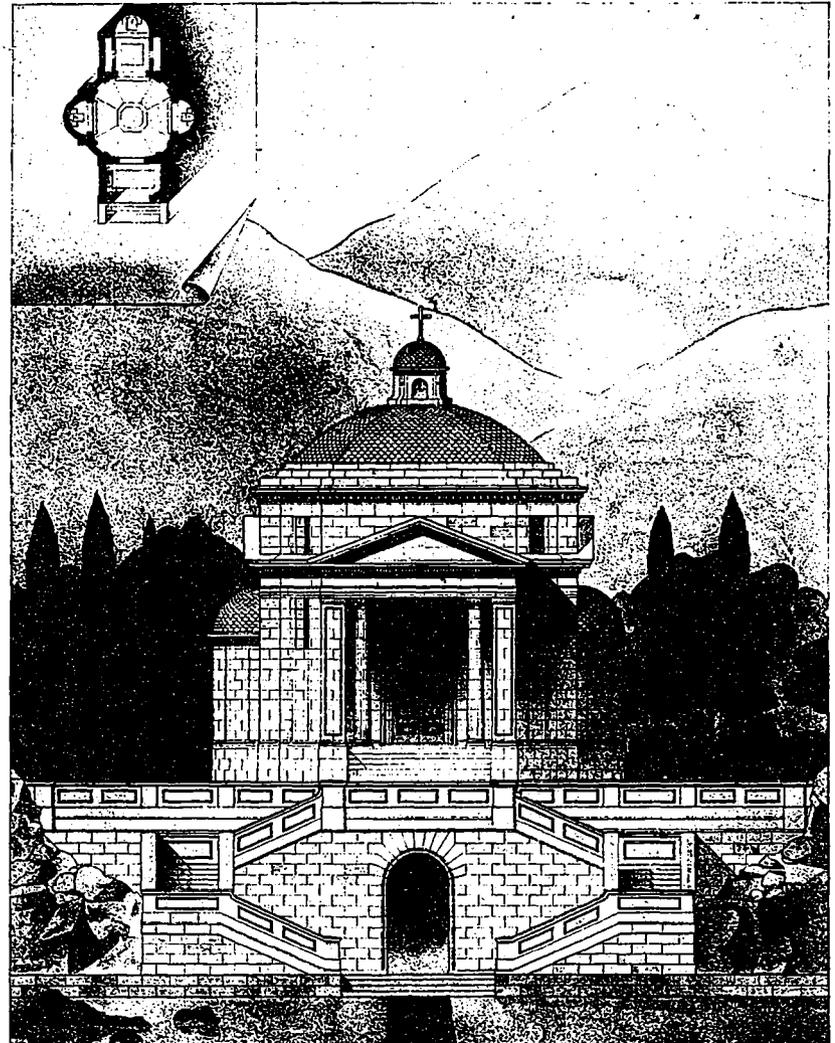
Design for Colonial Residence—T. L. Rowe, Second Year Student, Department of Architecture, Toronto University.



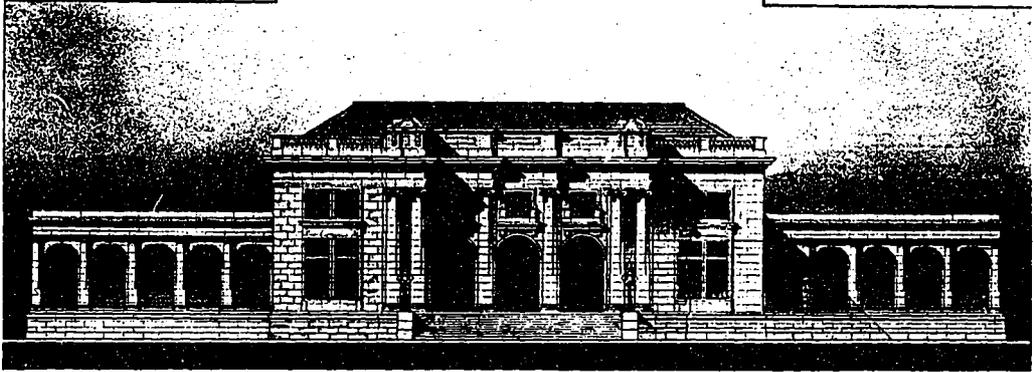
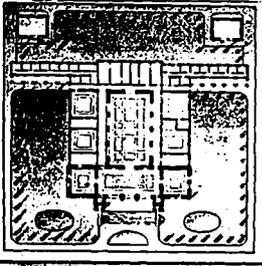
Design for Colonial Residence—H. H. Madill, Second Year Student, Department of Architecture, Toronto University.



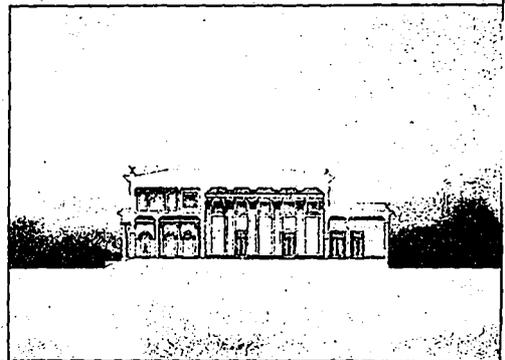
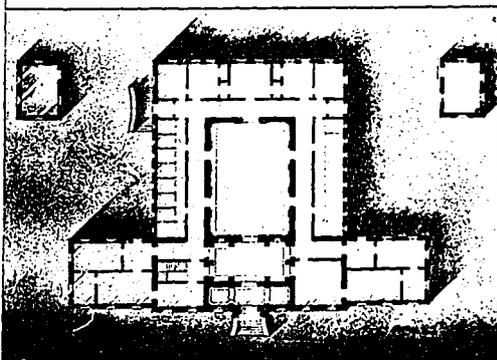
Design for Chapel to be Situated on the Southern Coast of a Large Lake—J. B. K. Fisken, Third Year Student, Department of Architecture, Toronto University.



Design for Chapel to be Situated on the Southern Coast of a Large Lake—J. H. Craig, Third Year Student, Department of Architecture, Toronto University.



Dispensary for Children—T. C. McBride, Third Year Student, Department of Architecture, Toronto University.



Dispensary for Children—J. H. Craig, Third Year Student, Department of Architecture, Toronto University.

exceed 33 feet. The end of the composition will be accentuated by an exedra (b) covered by a roof or half cupola. The exedra can be part of billiard room or can be considered like an ordinary balcony. Plan with end of gallery, 1-16 in. Elevation and section, $\frac{1}{8}$ in.

A Band Stand.—To be erected in a public park in a place where it is possible to have the audience on only one side. Over all dimension must not exceed 45 feet. Elevation, plan and section.

Niche for Antiques.—To be situated at the end of an alley in the private grounds of a rich man's estate, which is walled. This is built for the purpose of holding an antique statue and to form a background for certain antique figures which will be on the ground, wall, etc.

THE COMMERCIAL ASPECT OF CONCRETE IN CANADA.*—By Gustave Kahn.

THAT CONCRETE as a building material has passed the experimental stage in modern construction is evidenced by the rapidly increasing number of structures to be found in the civilized world. Writers of history tell us that concrete, either plain or reinforced, is not a new material, and in support of this statement point to structures of ancient as well as medieval days. Be that as it may, our own immediate knowledge of the material is comparatively new, but new or old, the data to be had relative to the material and its value as a structural material, is to-day just as complete and just as reliable as the data to be had on any other material.

The history of mankind divides all epochs pertaining to civilization into different ages, and so we may safely conclude that the history of construction should be divided into ages. We have had the age in which stone was used; we have had the age in which wood was used, and we have had the steel age, and we are now passing through what in time will come to be known as the concrete age. That the concrete age will occupy just as prominent a place in future building history as any other is only reasonable to expect, even though the conditions making this possible have changed.

As Victor Hugo said in his writings: In early history structures of all classes were intended to record the happenings of the day; in other words, to record history. Therefore in order for a material to be adopted for structural purposes its main requisite was quality to withstand the ravages of time. To-day, however, we look for more. In order that a structural material satisfy the required demands, it must have the enduring qualities required in earlier days, and also must have the virtue of being easily handled in order that it may be commercially economical in its application. This then is the primary reason why concrete will naturally come to be known as the building material of the age. There is no known material that will better withstand the ravages of time, and, furthermore, there is no known material that can be handled more economically.

That Canada is keeping pace with other countries in concrete construction is evidenced by the growth of the entire industry in Canada. Unquestionably the best indication of the industry's growth is recorded by the cement manufactured in, and imported into Canada. Looking into this record, we find that during the year 1900 there were manufactured here 292,124 barrels of cement. During the same year there was imported 374,966 barrels of cement. This shows that the total consumption for the year in Canada was 667,090 barrels, of which only 44 per cent. was manufactured here.

During 1909 there was manufactured in Canada 4,089,191 barrels; there was imported 156,456 barrels; the total consumption for the year being 4,245,647 barrels.

*Paper read before the Second Annual Convention of the Canadian Cement and Concrete Association, at London, Ont.

with the splendid showing that a total of over 95 per cent. was of home manufacture.

The fact that concrete work in Canada compares favorably with concrete work done in other countries indicates that the cement manufactured here compares favorably with that manufactured in other countries. Assuming that on an average there is used one and a quarter barrels of cement to each cubic yard of concrete, we have for the year's work, 3,396,500 cubic yards, representing an approximate expenditure of \$30,500,000.

There is cause for congratulation among Canadians that more than eighty per cent. of all the materials entering into this work were produced in Canada. And I believe that the growth of the industry is such that we are justified in demanding Government recognition of the industry. I believe that it will be of special interest to this convention to hear that practically all of the important structural work in Canada during the last year was either entirely or partially carried out in concrete, plain or reinforced. This statement may be rather broad, but it can be easily proven.

A hasty review of the situation may not be out of place at this time. To make the review systematic, we would begin at the Pacific Coast. The largest building in Victoria for the year, known as the Pemberton Building, is reinforced concrete throughout, and all of the larger buildings in Vancouver for the year are either entirely reinforced concrete or are steel skeletons with concrete floors.

Coming on to Calgary, there were erected last year in this city two large reinforced concrete buildings, in addition to steel frame buildings with concrete floors. Edmonton, however, has been somewhat backward in this respect, the use of concrete there having been limited to pavements, foundations and concrete floors.

Regina showed most excellent progress indeed, and was one of the leaders in this class of construction. The most notable examples there are the Saskatchewan Parliament Buildings, which are built almost entirely of reinforced concrete.

Winnipeg witnessed a great development in the use of concrete, as is instanced in such buildings as the Transcontinental Railway shops, the Fort Garry Terminal station, the Maltese Cross Rubber Company's warehouse, the Government Examining Warehouse, and other important structures. We learn that Winnipeg alone was responsible last year for about thirty large concrete buildings, not counting the smaller work to be found everywhere, or the large Power Plant for the City of Winnipeg, at Lac Du Bonnet, built almost entirely of concrete. Again, Port Arthur and Fort William have made big advances in this direction as is seen in the large reinforced concrete grain elevators which were erected in these towns during the last year.

Coming still further East, for the year right here, in and around London, may be found any number of good examples of concrete buildings and bridges. Among these may be noted a building finished for the Murray Shoe Company, also the Water Works and Power Plant, now in course of construction. In Hamilton nearly every building of importance erected during the past year is either entirely or partially of reinforced concrete. Toronto, while a little behind the others, also shows its quota of good work for the year. The fight in Toronto last year in connection with the large trunk sewer there, now in course of construction, should be of especial interest to this convention. The engineers for the work designed it originally in concrete. The brick industry made a very strenuous fight, and succeeded in delaying the awarding of the contract. Through them the City Engineering Department was compelled to investigate concrete for sewer construction in general, and only after a very thorough investigation were they permitted to adopt concrete.

Peterborough shows the use of this material in the erection of a large Water Works Dam and Power House.

and also in the most important concrete arch bridge yet attempted in Canada, which was started last fall. Belleville and Kingston, too, were well represented in this year's work, while Ottawa shows five new reinforced concrete buildings as well as a large concrete grand stand built on the fair grounds.

Note here, that in giving the number of reinforced concrete buildings, the numerous smaller buildings, such as concrete block houses, erected in this material have not been included.

In Montreal was erected the largest reinforced concrete building in Canada during 1909. The structure to which I refer is known as Jacobs Building. It has a frontage of 237 feet; a depth of 133 ft.; at present it is seven stories high, and is planned to eventually be increased to ten stories. Another example is the Wilder Building, a ten-storey warehouse. Another, the Ogilvie Building, a large steel skeleton frame with concrete floors. In addition to these, Montreal has a number of smaller buildings erected in concrete during the past year.

And so we may pass on to the Atlantic Coast, and find evidence to substantiate the claims made earlier in this paper.

The commercial success or failure of the contractor in concrete work is entirely a matter of ability in handling the work efficiently. No greater mistake can be made by the contractor than to attempt to make money on concrete work by slighting or skipping the job. Only the best materials obtainable should be used. It is true you may place a certain amount of stone, sand and cement into a mixer, mix it and place it in position to harden or solidify, and a satisfactory piece of concrete may be the result; but if it is, it is merely a matter of chance. On the other hand, if proper precautions are taken, if the stone is clean and of proper quality and size, the sand clean and of consistent quality, the cement sound and of recognized quality, the proper proportions of materials carefully mixed together, the total just as carefully placed in position, there can be no question as to the result. It is a foregone conclusion, not a matter of chance. The contractor undertaking reinforced concrete work will find it greatly to his advantage and the advantage of the industry to exercise every precaution, in fact, it is absolutely necessary. It is not sufficient to place steel into a bed of concrete and then run chances of the amount, the quality or shape of the steel being right. There is only one proper way, and that is to analyze or diagnose the case. Be sure that all possible conditions have been considered, such as the known load that the structure is to sustain, the greatest possible load that it may be called upon to sustain. Analyze the stresses these loads will produce on the concrete as well as on the steel, make sure that the quality and quantity of the concrete as well as the steel is sufficient to take care of this load. Make sure that the concrete will be called upon to take care of only the stress it is known it can resist. (Compression). Be sure that the distribution of the steel throughout the mass is in accordance with the stresses distributed throughout the mass. In other words, be sure that all compression, all tensile, as well as all shearing stress are provided for. Then exercise the proper precautions in combining the proper materials, and the final result is again a foregone conclusion; not chance; it spells success.

No contractor can become a permanently successful business man unless he does good work, and at the same time make money. It therefore only follows that a successful concrete contractor must do good concrete work, and must make money.

According to my former statements, if all necessary precautions are taken in designing, planning, inspecting and performing the work, the final result, regarding quality of work, cannot be questioned. The only thing that remains to be considered from a business point of view, is how to make money. To this there is only one answer. Learn to figure costs. Do not undertake a contract, un-

less you can see that the price to be obtained will provide a profit. It may seem strange, but it is true that the difference of opinions among contractors regarding cost are just as great as the differences of opinions among lawyers, regarding matters of law, or doctors pertaining to matters of medicine. Only careful study and long experience will perfect the contractor's judgment in this regard. There always are, however, or should be, certain positively known facts. These are, the cost of the required material, the cost of transporting these materials to the site, and overhead charges, or cost of looking after the routine business in connection with any contract. Then comes the cost, or probable cost, of equipment required, and last, but by no means least—(rather the greatest) is the cost, or probable cost of the required labor. If the plans are properly prepared, the cost of the materials is usually only a matter of plain addition and multiplication. Right here, I would ask you to observe that this statement is modified. The plans must be properly prepared, and that means a lot; for plans that are properly prepared must show the most economical way known to accomplish certain results. By this it means that every particle of material shown on the plan must when incorporated in the work, perform a certain needed function in such a manner that the full strength of the material used is developed; and further, that only materials especially suited for certain functions be employed for said duties. The statement has often and truly been made that every dollar judiciously spent in planning work will save two dollars in performing same. This principle also holds true in the careful selection of materials to be used. As a rule, the low unit cost of raw material is not a criterion for careful planning, for, should all materials required in the structure cost the contractor \$10.00 and the labor required to place this material cost an additional \$10.00, the resultant total cost thus being \$20.00; then differently prepared materials which cost \$12.00 and the labor required in placing same \$6.00, are unquestionably more economical. The overhead charges in any business are usually controlled by business system; the better the system employed, the lower the overhead cost. The cost of labor is usually reduced in direct ratio to the care exercised in planning the work, selecting the materials and the equipment for handling same.

To sum up, to be successful as a contractor in concrete work, plan the work in a careful manner, select carefully the materials to be employed in the work, (employing not the materials whose first cost is lowest, but materials that are most economical "in place," and which when properly prepared reduce the chance of error to a minimum). Simplify as much as possible field labor and above all things, refrain from taking contracts so low, that when the work is finished and the bills are paid, nothing remains to recompense you for the energies expended in carrying the work to completion.

We are all working, or should be working, for a common cause, the success of the cement and concrete industry. Remember that every bad piece of concrete work done injures not only the contractor who performed this work, but the entire industry, so for his selfish reason, if for no other, it is up to us to assist one another in successfully handling all our contracts. In our own interests we can not afford to knock; we must boost our fellow concrete contractor.

COFFERDAMS CONSTRUCTED BY FREEZING
have been used in Germany. The plant consists of an air compressor and suitable receivers mounted on a vessel. A shallow closed box of steel is built the shape of the cofferdam and weldless steel tubes are inserted in it at short intervals. These tubes are closed at the bottom, pointed, and of such length that when driven into the river or lake bottom the closed box is just at the surface. Compressed air is pumped into the box and tubes and on expanding freezes the surrounding water and forms a wall of ice.

ART, ARCHITECTURE AND THE ASSISTANT.*—By E. J. Dixon, A.R.I.B.A.

THE FIRST GLIMMER in the official mind of the existence of the architect's assistant, as we know him, was exhibited in the address of Mr. Walter Cave at the Architectural Association nearly two years ago, and the measures taken by that body in reference to the state of unemployment, as exhibited by their register, indicates the desire for protection so widespread in the profession at the present time, and of which the measures taken by the Royal Institute cannot be too generously praised. But, previous to Mr. Cave's address, and since, the official view of the assistant as a person of private resource apart from the salary he receives for his work, has been the predominant one. In listening to presidential addresses one after another, one wonders whether presidents live in another world, whether their productions in this direction are intended as an impertinence, a gross piece of sarcasm by tacit inference to their audiences, who principally consist of the struggling assistant who often finds it a matter of difficulty to pay his annual subscription, or, thirdly, whether the assistant is considered so unimportant as to deserve no recognition from the presidential point of view, except as a student.

From the position of the assistant as student there is much to be done, and the existence of a large class, much larger than one would suspect, wretchedly paid, quite unrepresented in any society, and having no means whereby their position may be bettered, the existence of this class, I say, is a standing menace to the profession as it concerns the assistant, for it means the lowering of salary and status of the better men and more casual employment. The existence of many offices where men of this class are employed at insignificant salaries, with a paid assistant brought in at intervals to perform any thoughtful work, tutor the pupils and backward assistants, and then politely dismissed when the term of his usefulness is past, is no uncommon experience, and one which has been politely waived aside by official opinion. As a student, the assistant has always been interested in matters of art, and especially in relationship to his profession. From the point of view of individual development, the study of art is essential; but art in relation to the assistant and to our profession as matters stand at present is besmirched with cant and hypocrisy. One cannot but regard the manner in which the cant of art has grown up in our profession as one of the most important signs of the times, whereby the selfish business man talks insincerely of art in order to dupe his sincerely artistic confreres to achieve his real aims; those aims, of course, being those of any other profession or business devoid of any factor appealing directly to the emotions, as art appeals to any architect who sincerely believes and practises the Mistress Art.

The assistant, of course, has only the full opportunity of showing his knowledge of the art of architecture when either the cunning, carelessness, laziness, or lack of ability of his principal will allow—a condition of things which often prevails, and very largely in public offices where an engineer often reaps a harvest of praise and prestige from the work of an unheard-of architectural assistant. Art itself appears to have reached a precarious stage in the profession of architecture. The disciples are busy imitating and collecting from the masters, and the masters are busy in an ostensible game of bluff—that of imitating themselves; so that the final result of the latter's work is little above the average of their disciples.

To describe the present position of the profession of architecture towards art as that of a mere superficial relationship will probably honestly astonish a few, disgust many, and be looked upon as the idle prattle of an imbecile by many more. To describe that relationship as suspiciously dishonest is probably much nearer the truth, and

to frankly describe it as dishonest is more probably the expression of outspoken sincerity. The many points of view as to the relationship of architecture to art agree in those well-known aphorisms so dear to some of us, architecture "The Mistress Art," "The Mother of all the Arts," "Architecture not a Profession but an Art." Most of us have heard these well-worn words so many times that, had we no genuine basis for our belief in them, the mere repetition would have engendered it. The purely artistic phases of the profession, Grand Manner or no Grand Manner, Decorated Construction or Constructed Decoration, are gradually being narrowed to the position the question of religion popularly occupies. If we are Methodists we buy our bread from a Methodist baker, and if we are Calvinists we feel intense remorse on purchasing goods sold by a grocer who contemns the Five Points. Likewise the Grand Manner disciples gaze with silent disgust on the followers of Mr. Baillie Scott. All this is very pleasing and amusing, but its economic aspect as affecting the assistant is scarcely worth any further reference except in a very few exceptional cases. The most noticeable feature of many of the ardent and talkative adherents of any of the schools of architecture is, that if their principles differ, their work has much in common, and usually finds an ample shelter under the title "early Victorian."

As all true camp followers of the art of architecture, the members of this Guild of Assistants duly subscribe to the common declaration of faith which we continue to recite with all due solemnity as our professional fathers have taught us. We do not desire to drag the art of architecture from the high place it occupies, or to trail even the hem of the garments of the Mistress Art in the dust. One would have thought that the position of the art of architecture was sufficiently well-established to resist the breath of scandal from any quarter, but it has ever been a commonplace that the gods should be strictly respected and protected in their implied sufficiency from blasphemous influence. We are not deeply concerned in this table talk of architecture, and as a Guild of Assistants we desire to study the profession of architecture as it really is, and to discover the sources of the evils we know and feel the effects of. Let us leave for a moment the attractive thesis of the art of architecture and examine the less attractive but more engrossing one of the profession of architecture. The principal and the assistant of fifty years ago might be described as standing on the same plane as regards rank and social position, and in a relationship somewhat of tutor and pupil, the latter being practically certain, if he persevered, of reaching the same, or perhaps a higher, position in the profession than his tutor. It is not implied that the service of architecture was entirely the object, for many of the older practitioners have left some goodly sums of money, as we all know, penuriously amassed in the service of architecture. The advent of the modern assistant, a man with little or no financial backing and depending solely on his salary to live, was gradual; but eventually he numerically swamped the older class, and often proved himself more capable. He immediately endeavored to imitate the older men—he adopted their superstitions, their habits, and their prejudices. This kind of thing is not, of course, unknown in other walks of life, it is a common social phenomenon. The difficulties of any new movement on behalf of any section have, as their initial difficulty, their first obstacle, the prejudices borrowed from the social strata immediately above, and the question of their removal. The architect's assistant of the present day quickly found himself in the same position as the wage-earners in any other business, and due to precisely the same causes. He has hitherto found his prejudices too strong to permit him to combine in his own interests, to recognize, in short, that his position as assistant is rapidly becoming a permanent one, that the possibilities of becoming a principal grow less as he grows older, that signs are not wanting that the principal means of outlet for the energies of the assistant, the opportunity that this profession possesses above all others, the open competi-

*Paper read before the Guild of Architect's Assistants, at London, Eng.

tion, is gradually becoming limited, either to districts and more often to architects in practice. I do not think that in thus rapidly sketching the latter history of the architect's assistant I have in any way overdrawn the real state of affairs in the profession as it concerns him. Once granting the truth of this account of the present position of the architect's assistant, it would appear that the only common-sense course to adopt, if no escape from the profession is available, would be to render it as congenial as possible; to recognize the probable limitations of one's genius without attempting to render null and void any ambition one may possess. The first point to be noticed in assuming this view of the architect's assistant's place in the profession is the fact that nothing definite can be achieved without organization of some kind or other, and the painful fact that the existing societies are composed of principals or those who are in full possession of the illusion that they will be principals, and, secondly, that a deplorable reception awaits the man who would take up cudgels on behalf of the assistant in such a foreign atmosphere. The question then for all assistants to decide is the kind of organization they will select, the work they propose to commit to its care, and the manner of its execution.

The Guild of Architects' Assistants proposes to unite all those who have any title whatever to its designation; it proposes to primarily unite them socially as a matter of course, and, secondly, it has proposed a programme whereby the many grievances under which the assistant struggles, and which before recognizing his position as practically that of a mere casual laborer with practically the same wage, it regarded as the necessary struggle of the architectural pilgrim on his way to achieve the crown of glory of a future practice; this programme has now been before the public in the architectural press for the past eighteen months. It proposes to endeavor to do something in the matter of (1) salaries, (2) office hours, (3) office conditions, (4) recognition of an assistant's work where possible, (5) legal assistance, (6) unemployment bureaux and insurance, (7) education. The Guild will endeavor to carry out the proposals by means of combination, necessitating strength of numbers, and conference with existing societies and principals, necessitating tact and toleration. There are many other advantages a keen, solid combination such as this will immediately suggest, such as parliamentary and municipal action, it being usually found an easier matter to effect changes in the domestic affairs of public bodies by means of correspondence and deputations than in the case of private employers.

The act of bringing forward matters which immediately affect the well-being of the assistant to the notice of existing bodies would have the effect of stimulating the interest of assistants who are members of those bodies.

The inclusion of principals who are interested in this, which the Guild trusts will become the important phase of architectural politics, will provide the necessary element of experience and breadth which such a movement as ours demands. The principal finds it necessary to take some measure of protection for his own interests against the guerilla warfare carried on against him by the unruly members of his class, by taking refuge within the folds of a Registration Bill; but the assistant feels doubtful as to whether he should combine in like manner, and for exactly similar reasons. You see "We don't intend to remain assistants—we shall one day be principals," and then "the idea of combination is so like trade unionism, which, of course, is a thing we must not dream of." There are some of us, however, an increasing number, who, after noticing the gradual removal of the elderly assistant who has failed to arrive, muttering continually, as he shakes his iron-grey head, the dear old excuses and shibboleths, and gradually sinking into that dismal limbo from which no architect's assistant returns, who, I say, desire to bring all assistants together within a bond of union of their own interests, for their own progress and betterment. Whatever is bad in combination let us exhibit enough sense to

reject, and whatever is good let us hold fast to whatever borrowed prejudices may be wrecked in the struggle.

To begin with, this Guild of Architects' Assistants welcomes the advice, help and assistance of all principals who are really interested in the welfare and fate of the assistant. They are able to see the assistant from the business point of view, to appreciate the value of a good assistant, and to condemn the incompetence of a poor one. All principals interested in the better organization of the profession generally will welcome the advent of any well-considered scheme which redounds to their benefit, which will select, classify, and secure to them the best assistant available on the market, instead of continuing the present method, if it can be so called, of trial and error in the engagement of assistants. Principals will recognize that the assistants are even more interested in any sound scheme for the protection of the profession than they are themselves, that they form a potent numerical factor in all societies, and consequently represent an interest which, if well organized, would unquestionably prove of great value in any movement in the direction of the real reform of the business organization of the profession or the improvement of the status of its units.

We make no attempt to strictly define the term "Architects' Assistant," regarding as such all who are engaged in the practice of the construction of building and who may be likely to compete with us in business life for any class of work, building or architecture. We want to make the term "Architects' Assistant" as broad as possible, leaving it to the common sense of those who desire to join us as to their reasons for inclusion.

Apart from all these reasons for the development of the Guild of Architects' Assistants, which we may term "economic," another, and perhaps more powerful one, may be brought forward to justify our existence, and that is the "social" reason. We are the only "Society of Architects' Assistants," the only architectural society having for its primary object the maintenance of the status of assistants. As all other existing societies place the principals' interests first and the assistants' last, so we fill a place in the profession by providing for and maintaining the assistants' interests, and those not without deference to the principal, whom we ask to join and assist us. We have continually reiterated that we have no desire to compete in any way with other societies, but to collaborate and work with and within them. Unfortunately the fact that we must receive subscriptions if we want to live constitutes in some way a challenge to other societies; but we have endeavored to minimize this possible source of irritation to as low a figure as possible (1) in order to allow our members to remain in existing societies and to work within them, (2) to avoid as much as possible any appearance of competition with other societies. Any similarity that may be apparent in the aims of the Guild in comparison with those of other societies demonstrates firstly, that no radical difference exists; secondly, that the proposals of other societies in relation primarily to the principal are exactly similar to ours in relation to the assistant; and thirdly, the social aspect, that of providing an assistants' society, is exactly similar to that of other societies.

In conclusion, therefore, it is our hope that the Guild of Architects' Assistants, by presenting the assistants' case in an organized fashion to existing bodies, besides carrying out that section of the work which is peculiarly its own, will form a useful cement to existing professional opinion, even if it may not eventually aspire to the position of an important feature in the professional structure itself.

THE GOVERNMENT BUILDINGS AT KHARTOUM.

THE SUDAN possesses practically no ancient architecture; true, a few remains exist of churches erected probably in the fourteenth century by Coptic Christians, but, unlike the neighboring land of Egypt—the seat of the earliest civilization—there are no wondrous temples

or tombs such as bear witness for all time to the magic skill of the Egyptians of remote antiquity.

Thus, after the conquest of the Sudan, when it became necessary to erect buildings for administrative purposes, there was no indigenous architecture to reproduce or to work upon as the basis of a style for modern buildings suited to the exacting climatic conditions.

The Governor-General's palace, built on the site of Gordon's old residence, was the first important building of the new regime. It was commenced by Lord Kitchener almost immediately after the battle of Omdurman and is designed in the Florentine manner. Situated amid a wealth of tropical foliage, the effect of the white palace on the bank of the Blue Nile is certainly pleasing, though it is perhaps chiefly interesting for the rapidity of its construction and from the fact that it was built entirely by native soldiers quite untrained in the building crafts. The Gordon College, another of Lord Kitchener's achievements, is also Gothic in treatment. This building, as its name implies, was erected in memory of the heroic General who was killed in 1885 while defending Khartoum.

When the question of the new Government buildings was mooted the first consideration was as to style. After much thought a form of Saracenic architecture was adopted, this style being, of course, the product of the Mohammedan faith, and therefore eminently suitable for a country where the English have never sought to impose their religion or customs on the natives. Further, it has a certain likeness to the style of the buildings previously mentioned, and as it has ever been a style for Eastern lands it lends itself readily to a treatment designed to obviate the discomforts of a very trying climate.

The building is being erected on the peninsula formed by the junction of the White and Blue Niles. The part to be proceeded with at present contains the entrance hall (a room of noble proportions), the economic museums, and a masonic temple, the interior of the latter being modelled on one of the ancient temples of Egypt. The whole scheme, which it is hoped to carry out eventually, will comprise a large hall in the centre of the building adjoining the entrance hall, which will be used for official receptions, levees, etc.

The frontage of the building is 352 feet, the depth 230 feet, and the tower when completed will be 150 feet high.

The walls are of hard sandstone on a plinth of granite, and will be finished externally in white plaster, the ornate details being specially executed by skilled workers.

Internally a considerable amount of marble and mosaic will be used, and a feature is to be made of the great staircase in the entrance hall.

The work is being carried out by the Sudan Public Works Department, Captain M. Ralston Kennedy, R.E., D.S.O., Director of Public Works.—THE ARCHITECT, LONDON.

CEMENT STUCCO.—Its Adaptability to Modern Residential Construction.—By W. E. Ramsay.

THE STUCCO HOUSE MARKS the completion of an evolution destined in the near future to completely revolutionize building methods in Canada. The stucco house is no longer a speculation but a definite quantity; for aside entirely from its architectural possibilities and the plastic way in which it lends itself to the building of the home beautiful, it possesses the added advantages of being proof against fire, wind, cold and dampness.

To fully appreciate the marvellous possibilities of this wonderful building material, try a simple little experiment for yourself.

Take a small piece of plank, nail a small piece of metal lath to it, then cover the lath half an inch thick with mortar composed of Portland cement and sand in about the proportions used in making sidewalks.

Keep this in a damp place for a few weeks and you will find that to cut the mortar from the plank you will have to use a cold chisel.

The cement application has become an artificial stone—but much tougher and much more durable than any stone that nature has even turned out.

Could anything be more simple? And the necessary materials in this evolution were merely cheap cement and cheap metal lath—two commodities both here and both so inexpensive that a few years will bring about a marvellous change in the appearance of town and country.

With some exceptions, the new houses will be made of wood or steel frames covered with metal lath and finished in the manner described.

While the covering will not be thick, it can be given the appearance of massiveness and stability according to the character of the house; the process lends itself to any architectural design.

Not only is the initial cost low, but the cost of frequent repainting and repairs is obliterated entirely. A stucco house properly built will be warm in winter and cool in summer—so long as a tight roof is maintained—will be indestructible by the elements as lapse of time only serves to make the cement harder and better.



An Interesting Residential Structure, Showing the Artistic Possibilities of Cement Stucco.

The greatest benefits to come from this system will be in the covering of old frame houses and outbuildings which now, in every condition of dilapidation, offend the sight.

A few days' work of the plasterer marks the disappearance of the old house, and means, in effect, the creation of a new cut structure, up-to-date in appearance, strong and durable, and in many cases readily saleable at at double the previous market value. If the work is done with a light-colored cement and a white sand, with a smooth finish which will not catch the dust and soot, the result will be most attractive. Much of the charm of European cities comes from the white stucco or cement covering so universally used. This is not a new idea in Europe; it was introduced into England in the Elizabethan period and is to-day considered the most efficacious and substantial form for the outside coating of residences. In fact, in England, as in France and Italy, stucco is commonly applied to new bricks in order to get more artistic results. Motor through the suburban districts of New York and New Jersey and you will see a continuity of handsome homes built by the wealthy, which are in many cases merely of frame constructions covered with stucco on expanded metal.

In order to get the best results it is absolutely imperative that this lath should be thoroughly painted or galvanized and, above all, the architects should select a lath that will be bedded in the stucco, as the longevity of these light fabrics depend upon this.

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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 duly returned.

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Building Operations in April.

AN AVERAGE GAIN of 43 per cent., representing a total investment of \$12,294,780, as against \$8,552,375 in the corresponding period last year, or an amount approximately \$4,000,000 in excess of that recorded in the preceding month, is the story of Canada's wonderful building progress, as briefly told by the comparative figures for April submitted to CONSTRUCTION from twenty-eight representative cities scattered broadcast throughout the Dominion. Halley's comet on its trip past the earth this time found much that it failed to observe when ~~it came this way before~~, and Canadian builders in all sections, it seems, exerted every effort by the erection of new structures, to make it difficult for this celestial wonder to whisk its tail by without, as it were, causing it to sit up and take notice. So marked has the development been, in fact, that several sections of the West are on the verge of a building material famine, such as was never experienced before. In Winnipeg and Calgary, prices are said to have steadily increased, and that despite any willingness to accept the advance, materials cannot be obtained in sufficient quantities to in any way adequately meet the unusually heavy demand.

Possibly the most pronounced feature of the month was not so much the universal activity that prevailed in general, as much as it was the heavy proportionate gains made in all parts. Four cities totaled \$1,500,000 or better, and fourteen others registered amounts ranging from \$100,000 upwards. While five more losses are noted than in the preceding month, it must be remembered that the number of cities reporting is practically one-third again

as great. Some of the declines are due to labor trouble; as in the case of Lethbridge, where the falling off (55 per cent.) can be ascribed wholly to the strike in the building trades during the first two weeks of the month.

The largest amount of the month is noted in the case of Toronto, which issued permits for improvements, amounting to \$2,522,055, although Winnipeg, with a total of \$2,305,450, was a most worthy competitor for honors in this respect. Considering the huge volume of work undertaken in the same month last year, the progress made in either instance is most gratifying indeed, and especially so, in view of the fact that both of these cities report a large number of important projects in immediate prospect.

The highest increase for the month, however, goes to Stratford, which climbed to the apex with a gain of 1741 per cent., representing an investment of over half a million, as compared with \$30,100 in the month of April, 1909. Ontario, in fact, turned to account six increases, besides the two mentioned, viz.—Brantford, 109 per cent.; Hamilton, 69; Berlin, 16; Peterboro, 48; Port Arthur, 22; and Kingston 12 per cent. The losses noted in this province occurred at Ottawa and London, which receded 5 and 40 per cent. respectively; and at Fort William and Windsor, which fell short of their corresponding figures, to the extent of 76 and 70 per cent. in order named. Windsor promises a big improvement in the near future, as a by-law has just been passed regarding the granting of sites for factories and manufacturing plants, which will in all probability bring a large number of important industrial concerns to that city and stimulate building development in all lines; while as for Fort William, it might be explained that the permits in April 1909 included the mammoth elevator erected there last year, and that omitting this one item, the city is ahead for the month on all other work, by over 50 per cent.

As regards the Eastern section of the country, Montreal crowded well to the front by netting a gain of 62 per cent., her total for the month of \$1,822,082 being the third highest amount recorded; while Sydney's tremendous uplift (602 per cent.) gives that place the second highest standing as regards percentage increase. Halifax and St. John, however, fell to the rear by a decline of 47 per cent. and 48 per cent. respectively, although the corresponding figures in the latter case are of such meagre proportions as to afford no reliable means for accurately judging the situation. Last month and the month before, this city was substantially ahead, and there is no reason to assume other than that the healthy condition which heretofore obtained will shortly reassert itself.

In the West, operations in general were veritably

	Permits for April, 1910.	Permits for April, 1909.	Increase, per cent.	Decrease, per cent.
Berlin, Ont.	\$87,881	\$75,200	16.86	
Brantford, Man.	52,750	50,875	53.94	
Brantford, Ont.	79,830	38,015	109.99	
Calgary, Alta.	603,930	174,150	246.78	
Edmonton, Alta.	252,196	210,890	19.58	
Fort William, Ont.	261,625	1,116,000		76.55
Halifax, N.S.	29,650	57,000		47.98
Hamilton, Ont.	382,175	225,380	69.56	
Kingston, Ont.	45,188	43,000	12.06	
Lethbridge, Alta.	100,425	224,440		55.25
London, Ont.	104,883	177,250		40.82
Montreal, Que.	1,822,082	1,111,891	63.87	
Moose Jaw, Sask.	153,250	161,250		4.95
Ottawa, Ont.	340,675	359,500		5.26
Peterboro', Ont.	121,201	81,721	48.31	
Port Arthur, Ont.	107,650	87,600	22.88	
Regina, Sask.	307,205	71,875	327.41	
St. John, N.B.	5,200	10,000		49.00
Saskatoon, Sask.	292,956	147,090	99.16	
Stratford, Ont.	554,300	30,100	1,741.52	
Sydney, N.S.	88,025	12,550	601.39	
Toronto, Ont.	2,522,055	2,003,398	2.58	
Vancouver, B.C.	1,460,508	783,490	86.41	
Victoria, B.C.	192,440	188,060	2.32	
Windsor, Ont.	18,250	64,350		70.70
Winnipeg, Man.	2,305,450	1,064,200	116.63	
	\$12,294,780	\$8,552,375	43.75	

rampant. Aside from Lethbridge's decrease, and a loss of 5 per cent. experienced at Moose Jaw, all places prospered to an unusual degree. Vancouver's big upturn of \$1,460,508 practically doubles the amount of work undertaken in the month of April, 1909, and is a most remarkable total, considering the phenomenal advances made by this city since the first of the year. Victoria overlapped her previous mark by a gain of 2 per cent. Calgary made a most excellent showing, registering an increase of 109 per cent., as did also Edmonton, where the total was 19 per cent. in excess of that recorded last year. Again, Regina came mightily to the fore with a striking gain of 327 per cent., while Saskatoon and Brandon with their increases of 99 per cent. and 53 per cent. respectively, give evidence of a growth which, to say the least, is both gratifying and substantial.

While these figures truthfully reflect the wholesome conditions as regards building operations which exist in all sections of the country, they fail materially to measure the full force of activity in general. There are hundreds of secondary towns and villages throughout the length and breadth of the land that are going ahead at equally as stupendous strides, and it is only necessary to glance at the daily or weekly press in almost any locality to be impressed with the truly wonderful development that is taking place. As regards the outlook immediate indications are that the present pace will be maintained indefinitely, as practically all architectural offices are well laden with work, and a large number of important projects as well as much small work will be carried out during the summer months.

City Building in Germany.

CITY BUILDING, that is, the planning and laying out of cities so that they may be beautiful and an uplifting influence, is something which is being earnestly carried out in the more progressive European countries. Germany, who has always made a keen study of her sociological and economic problems, is making splendid progress in this direction. In England one is greatly impressed with the improvements being wrought by garden-city schemes, and town-planning. Edinburgh and Paris reveal in beautiful streets and buildings what is possible of attainment by governmental and architectural co-operation. But here in Canada, the seed of progress in this respect has not begun to germinate.

How utterly behind we are in this connection is fairly demonstrated in the ineptitude of the Dominion Department of Public Works in its proposed programme as regards the Departmental Building at Ottawa, and the inanity of the Board of Education in Toronto in its procedure in connection with the designing of the proposed \$500,000 Technical School.

Germany, as a nation which has given most careful attention to sociological and economic problems, affords an object lesson that we can profitably study. In an article entitled, "City Building in Germany," appearing in Scribner's Magazine, Mr. Frederick C. Howe, says: "The paramountcy of private property does not exist. Humanity is first. The city enjoys some of the sovereignty of the Empire. It can promote the beautiful. It can destroy the ugly. It can protect its poor. It can educate as it wills. It can plan for the future. It can have city dreams. And the German city has dreams, dreams which are fast being visualized. The German burgomeisters are laying the foundations of the city of to-morrow as an architect lays the foundations of a forty-story skyscraper or the designer of a world's fair plans his play city far in advance of its excavation.

German architects saw the obvious. They saw that the city would grow as it had in the past. So they enlarged the boundaries. They annexed suburban land. The present area of Dusseldorf, with its 300,000 people, is 29,000 acres; of Cologne, with a population of 428,700,

is 28,000; of Frankfort, with a population of 335,000, is 23,203. Having enlarged its area, the city was in a position to control its development, to plan for its building. It called in its architects and its engineers or it sent to a neighboring university for an expert. A plan is made of the surrounding territory, of the topography of the land, the natural advantages, the proximity to the railways, and the probable uses to which the region will be put. The prevailing winds are studied, and factories are only permitted to locate in certain prescribed areas. In some cities they are excluded from the business and residence sections altogether. If the neighborhood is suited for manufacturing it is dedicated to industrial uses. If it is a working-class quarter, the streets and parking are adjusted to workmen's homes. If it is suited to homes of a more expensive sort, the plan is upon a more elaborate scale.

The foresight of the city does not end here. Streets, boulevards, parks, open spaces and sites for public buildings and school-houses are laid out far in advance of the city's growth."

Of course, we appreciate that there are self-centred government and school board officials in Canada, who will say: "Who cares what Germany is doing?" Aye! there's the rub. We also appreciate the fact that there are self-centered government and school officials, who say: "What do we care for the Canadian people?" Aye! ditto. "The public be damned." These gentlemen may have a multiplicity of talents as regards their respective vocations, but the designing and erecting of buildings is not one of them. It is work for the architects and them alone and just so soon as the *representatives of the people* (?) realize this old and long established fact, just so soon will architecture in Canada represent fairly the intelligence and culture of our people.

An Unheeded Lesson.

AT NEARLY THE CLOSE of last season's sports in Toronto, the sheds and shacks that had been erected for the purpose of housing schemes and apparatus for the entertainment of the people of the city of Toronto, at Hanlan's Point, were destroyed by fire. A young lady lost her life. She was *merely* a cashier in one of the tinder boxes in which people had been accustomed to be entertained; and the manner of construction adopted in the rebuilding of this well known resort, is but another evidence of how cheaply human life is held.

All Toronto watched the fire. People who have their summer homes on the Island were very anxious about how far the blaze might spread. The city of Toronto was accused of not having sufficient fire protection at the Island. The owners of the Island were accused of not having sufficient protection against fire. The former promised better fire protection, which has been provided. The latter promised a fireproof class of buildings, which has not been provided. The buildings at Hanlan's Point, across from the city of Toronto, to-day are entitled to be termed tinder boxes just as much as those which were destroyed by fire last August. The city of Toronto, which provides police to patrol it for the protection of its citizen, and firemen to protect it against fire, was promised cement buildings, concrete buildings, promised everything of a fire resisting nature, for its greatest amusement place. Instead, the Building Inspection Department, which has jurisdiction over this amusement place, has issued permits for a class of buildings that are wholly unfit in construction to safely house the people whom they are built to accommodate.

It is not our desire in this manner to give a lecture to either the authorities of the city of Toronto, or the owners of Hanlan's Point, but we do propose placing ourselves on record as being not only opposed to the action of the city authorities who granted permits for such buildings as have been erected for amusement purposes at Hanlan's Point, but we are surprised that the men who

are financially interested in this, the greatest amusement place of the second largest city of Canada, have not deemed it more expedient to erect buildings that are incombustible, rather, than ones which would serve as ever dangerous fire traps.

Yankee Control Again.

IT OCCURS THAT the regulations of our Board of Fire Underwriters in Canada are controlled from the United States. A short time ago an instance was brought to our notice, where a Canadian manufacturer of fireproof windows had to submit his invention to a board of underwriters in Chicago. It occurs to us that this procedure is very much akin to that of having our laboring men controlled from what are ostensibly termed international headquarters (in the United States).

Bearing upon this subject, we have recently a dispatch from London stating that the Birmingham Chamber of Commerce has decided to approach the Board of Trade on a matter affecting British trade relations with Canada. A local firm recently made an effort to open trade with Canada. Samples of their goods were sent to an agent, who reported that they had been submitted to the inspection of the Fire Underwriters' Association and that he had stated a test would have to be made at the underwriters' laboratories in Chicago. It goes on to state that in accordance with the rules of the National Board of Fire Underwriters, manufacturers would have to bear the cost for testing and labelling and the charges for carriage to and from the laboratories. This meant that the supply of all kinds of materials for use in buildings would be practically controlled by a corporate body established in and under the laws of the United States. It is maintained by the chamber that this is a serious state of affairs and might readily be considered a menace to the extension of British trade with Canada of a great range of articles. The effect of such conditions in relation to our trade with Great Britain is small as compared with the effect that it may have, or will have, upon our own Canadian trade. When we consider that it is necessary for a British manufacturer in Birmingham, England, to have his goods sent to the city of Chicago, in the Republic of the United States, to be tested before it can be used in Canada, a portion of the British Empire, it occurs to us that a condition exists that must be remedied.

Again, why should the Underwriters' Association demand that all tests, all decisions with regard to fireproofing qualities, and all points of criticism either of approval or disapproval, be made in Chicago, a city foreign to our country? This is just another instance in which our Canadian people have not shown their national stamina.

The Philosophy of the Scrap Heap.

IN THESE DAYS of rapid construction on all kinds of work we are sometimes struck with the rapidity with which one change follows another, as well as with the expedition with which the work is rushed to completion. The destruction of an almost modern New York building to make way for one that will be more economical for its owners in "upkeep" as well as more profitable from a standpoint of investment, has caused the SCIENTIFIC AMERICAN to deal with what it very aptly terms the "philosophy of the scrap heap." Although the building referred to is almost comparatively new, still the sound business judgment of the owners has found that their interests may be better served by its demolition. Speaking of the adverse tendency which still prevails in many countries regarding this seemingly extravagant waste, it says:

"Your old-world engineer or architect, with perhaps a stronger flavor of sentimentalism, hesitates to sweep a faithful servant so remorselessly out of the way. He will point with pride to his forty-year-old locomotive with its million-mile record of service; and he will add wing to wing and another storey or two to a building, if this be possible, rather than raze to the foundations and build from the ground up. It is a case of each to his choice; though there are not wanting many indications that British engineers are beginning to realize the value of the scrap heap, and apply the principles which it implies in the development of their industrial enterprises."

No one can in this instance lay the charge that this building was faulty, or to any extent behind the times in the construction of any of its sixteen storeys, but the fact that it is moderately satisfactory will not suffice for its salvation. The reign of "good" has given place to that of "best," and everywhere we see in our industrial operations one machine being thrown away, although it has only been in use perhaps a year, because another has been found that with the expenditure of equal labor or power will give double the manufactured product. It is a recognized fact that the pecuniary loss from inefficiency of operation is often twice as great as the increased cost of new installation. And the same law holds in the construction of our buildings. This principle is well stated in the following paragraph from the same source:

"Under modern industrial conditions, things are done in a big way with a strong dash of the spectacular. But the city dweller, albeit he is daily confronted with the unusual and the unexpected, must confess to some measure of surprise on learning that a modern skyscraper 300 feet in height, and but a dozen years old, is to be torn down to make way for a new structure which is to be several storeys higher, and—"more up-to-date," if you please. To the conservative European, the ruthless demolition of a building that must have cost over a million dollars, and is still entitled to be called new, will appear, no doubt, as another instance of our national vice of extravagance. But it is not so. The Gillender building is being razed in accordance with a certain industrial doctrine, which has been found to give most excellent economical results, namely, the doctrine of the "scrap heap," according to which, we believe, and have proven in a thousand ways, that so soon as the march of improvement or development renders it certain that there is more profit in "scrapping" an existing machine, plant, or building, and replacing it by another more efficient or of greater capacity, it is a matter of sound business policy to send that machine to the "junk heap" or turn the "wrecking gang" loose upon that building."

The United States is perhaps the greatest exemplification of this doctrine. No man in that country is a greater apostle of the same creed than Andrew Carnegie, and his different manufacturing enterprises, be they furnace or mill, are eternal monuments of his carrying into practice this very doctrine.

Condemn it as some may by saying that the policy is purely utilitarian—a mere question of *dollars and cents*, still they cannot get away from the argument so aptly stated in our contemporary that it "is a good business policy nevertheless, and, in reality, has been one of the most powerful factors in bringing about the present phenomenal industrial development of the United States."

Is there not here a lesson worth while? May not the Canadian architect and engineer learn points of value from these very instances that will be to the material advantage of himself and client. Neither of these professions need to view it with glances cast askance. It is the gospel of men who have proved its worth in practice; and in many cases is the very essence of wisdom, economy and good business judgment, and an impetus to commercial and industrial development.

Canada and Conservation.

THE SUBJECT OF CONSERVATION is now being given greater prominence by the people of Canada, due no doubt, to the great progress made during the last few years in her different industrial enterprises. The recent events in the United States, especially in the matters of forest preservation and water franchises, and the information gleaned from those in touch with the actual conditions in our own land, have done much to hasten the present movement. Of especial importance are the efforts of the Conservation Commission at Ottawa, and they cannot fail to arouse the necessary enthusiasm of the Canadian people, as well as bringing about the most thorough husbanding of our native resources.

The latest step in their propaganda is the issue of a series of bulletins which will deal with specific instances showing wherein the young nation must be awake to the proper development of her wonderful natural wealth.

If the work of this department is to be of the immense benefit that the people of Canada anticipate, the administration must be done with a fearless hand.

So far this has been the case, and no better indication of the national attitude could be found than in the opposition offered to the project of damming the St. Lawrence at the Long Sault Rapids near Cornwall. These rapids represent one of the greatest heritages belonging to Eastern Ontario and without a doubt will some day be to this part of the province what Niagara Falls is at the present time to Western Ontario.

The Canadian people may well feel satisfied with the careful safeguarding of their rights in this instance. American capitalists were trying by every means to obtain a concession whose benefits to themselves would make the proverbial lion's share seem but a mere flea bite.

The interests seeking these privilege wished to develop more power at this point than the Waterways Treaty will permit being taken at Niagara. At the same time the major part of this power was for the consumption of our neighbors to the south.

For similar privileges the Niagara companies are now paying the Ontario Government nearly \$300,000 annually while the power rights of the St. Lawrence were to be given without the least remuneration. Canadians who in the near future will have this power available for their own use have here a strong object lesson, and it will aid the Commission by the additional interest and support it brings to this important cause. The Canadians of the future who will lead the young nation in its march of industry will review with appreciation the efforts of to-day for the preservation of what are at present simply dormant assets.

The question of forest and mineral preservation are also among the topics receiving attention, and here as well present and future generations will see the beneficial results.

The Commission may rest assured that its best efforts will only be opposed by those interested in grabbing for a privileged few that which should be the property of the entire nation. It may also be assured that it has the undivided support of the right thinking people of the land.

An Ideal House Show.

EXHIBITIONS of many characters have been held in Madison Square Garden, New York, but the most unique that has yet been established is that of the "Ideal House Show." Every nook and corner of the Garden contain some exhibit of a house in miniature. There are to be found there, colonial dwellings of concrete; Edison houses poured from moulds in double quick time; bungalows erected while you wait; cottages surrounded by pretty gardens; and extensive mansions overlooking an expansive sea and sound. All these have been erected in the most ideal form, under the supervision of the best architects and the direction of the most expert contractors, and have been furnished by the most skilful interior decorators.

We make note of this extraordinary exposition, not because it is the result of the effort of real estate dealers, but because we do believe that efforts of this nature tend to promote the better taste of the general public in the matter of residential design and home furnishing. It is something which could be advantageously duplicated in Canada, for instance at the National Exhibition held annually at Toronto, where it could be viewed by hundreds of thousands of visitors, and prove an attraction both profitable and instructive.

CURRENT TOPICS

IT IS EXPECTED THAT THE SITE for the British Columbia University will be selected sometime during the coming summer. Five of the foremost educationalists in Canada have been asked by the Minister of Education to act as the commission authorized by statute to decide on a suitable location. The names of the commissioners will be made known as soon as those invited have signified their acceptance.

* * *

ARCHITECTS ARE INVITED by the Ontario Government to prepare competitive plans for the new Government House to be erected at Toronto on Bloor street east. Two prizes of \$1,000 and \$500 respectively are offered for the most acceptable designs submitted. The time set for the close of the competition is July 15, and all designs and plans must be in the hands of Hon. Dr. Reaume, Minister of Public Works, by noon on that date.

* * *

TENDERS FOR THE CONSTRUCTION of the Quebec Bridge, according to an Ottawa despatch, will be called for shortly. Specifications for the structure are now practically completed, and several of the most prominent bridge building concerns in the world, whose representatives have been familiarizing themselves with the plans and details of construction during the past two months, will bid on the work.

* * *

WHILE THE MERITS of hollow cement blocks were practically unknown in Scotland two years ago, this material gives promise of being extensively adopted. Since that time, it is estimated that the amount invested in buildings of this type in or near Glasgow, is over \$150,000. These structures are principally residential buildings such as tenement houses, cottages and villas, and some of them are most interesting in design and architectural treatment.

* * *

AUSTRALIAN HARDWOODS will in all probability be introduced in Canada before long for street paving, wharf and bridge building. At least Canadian Trade Commissioner D. H. Ross, at Melbourne, in a recent report, states that several inquiries have been received from interests in the Dominion regarding hardwoods suitable for such purposes. The principal hardwoods of that ability. Only recently 2,000 tons were purchased for country are said to be unequalled for strength and durability to Rotterdam, while specifications have but lately been received in Melbourne for supplies of hardwood required for the Bremerton, U.S.A. dry docks.

* * *

THE ARCHITECTURAL FIRM of Michie and Dowler, Calgary, has been dissolved, and Mr. Dowler has engaged in partnership with Mr. G. M. Lang, C.E. The new firm will be known as Lang and Dowler, with offices in suite 6, Alexander corner, over Molsons Bank. Mr. Lang is an associated member of the Canadian Society of Civil Engineers, and was for several years in the engineering department of the C. P. R. Mr. Dowler is a registered member of the Alberta Association of Architects, and together with his former business associate, has been connected with the erection of a large number of the more important business buildings in Calgary.

THE ST. ANDREW'S RAPIDS DAM described in the April *CONSTRUCTION* was opened for traffic early in May, when the steamer "Alberta" made the trip from Winnipeg to Selkirk. The benefits that this work will bring to Winnipeg were made apparent by the fact that the first steamer to use the locks was on its way to Lake Winnipeg for a cargo of wood. The fuel problem is a vital one to all western cities and especially so to a rapidly-growing city such as Winnipeg. Now that the tremendous wood supplies in the Northern part of the province of Manitoba are accessible by an all-water route to the provincial capital, the fuel problem should be greatly relieved.

* * *

A VIADUCT SCHEME whereby it is proposed to abolish the numerous grade crossings on the Grand Trunk line between Montreal and St. Henri stations, was one of the important matters which recently came up before the Board of Railway Commissioners for consideration. According to the outline of the project only such grade levels as are absolutely necessary for switching purposes will be retained. The viaduct, which will be approximately four miles in length, is estimated to cost \$3,000,000, of which amount \$2,000,000 will be contributed by the city of Montreal. Plans for the structures are now being prepared by the engineering staff of the Grand Trunk Company, under the supervision of Chief Engineer Kelly, and it is expected that working drawings will be ready the first of August.

* * *

THE THIRD ANNUAL GENERAL ASSEMBLY of the Royal Architectural Institute of Canada will be held at Winnipeg from 24th to 27th of August inclusive. At the present time a very interesting programme is in course of preparation, and a complete list of the subject matter and business to be dealt with will be sent to members of the profession early in July. In that it is the desire to make this meeting as representative as possible in every way, every Canadian architect, whether a member of the Royal Institute or not, is cordially invited to attend and participate in the daily sessions and enjoy the entertainments to be provided. Arrangements are being made with the railway companies for reduced transportation rates for those who wish to take advantage of the trip. This will offer members of the profession and their friends an exceptional opportunity to visit the Western Metropolis, and the Winnipeg architects have promised to make the occasion one long to be remembered.

* * *

IT IS CLAIMED FOR AUCKLAND, New Zealand, that it enjoys the remarkable distinction of having the largest reinforced concrete bridge in the world, known as the Grafton Bridge, spanning a canyon in the environs of that city. The bridge consists of one central span with two approaches, of which the western is of two spans of 35 feet, and four of 75 feet, and the eastern is of three spans, two being of 83 feet and one of 42 feet. The bearing plates for the girders are fixed on the piers, with ample room for expansion. The two main piers completing the approaches stand 100 feet, and are cylindrical, the walls being from 12 inches to 8 inches in thickness. On the top, or head of the pier, curved cantilever brackets carry the footpaths over the piers, and serve to embellish the pier heads. The piers are really built on three walls, and between the walls sit abutments, being entirely independent of the piers. Into the abutments is fixed a thrust plate or steel grillage set to an angle normal through the line of thrust, and upon this plate rests a hinge supporting the whole arch. The arch span is 350 feet and is three-hinged. It consists of two ribs ranging from 6 feet at the abutment to 9 feet, 6 inches, graduating to 5 feet at the crown. These huge ribs are tied together by beams, which act also as wind braces.

MANAGER OF CITY is the unique appointment made by the city of Port Arthur, where J. A. Antonisen has been promoted from the position of city engineer to the full charge of all the city's utilities. Under his control will be the lighting, telephone, waterworks and steel railways of the city. In these departments he will have charge of both construction and maintenance, with as complete authority as the general manager of any large corporation. In this position he will act in a legislative capacity only, and his previous duties, which have been of an executive nature, will be attended to by a special department. The experiment will be keenly watched by all interested in municipal government.

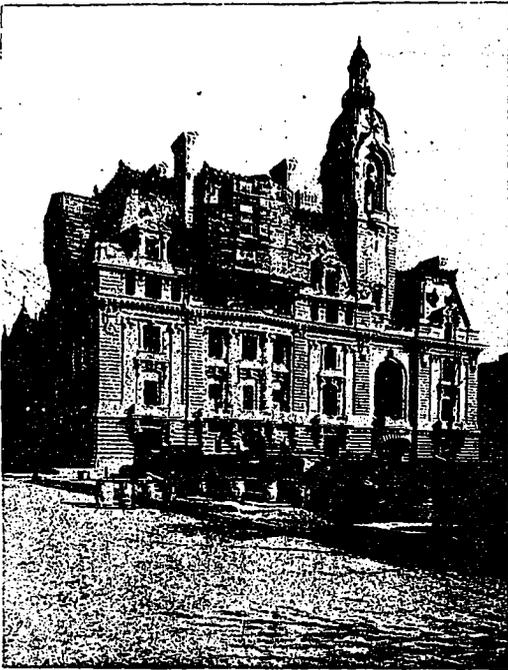
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THE FIRST PLAIN CONCRETE ARCH, says Rock Products, was built at Fontainebleau Forest, France. This bridge is known as the Grand Maitre bridge and was completed in 1869. It is of the one-span type, being 115 feet in length, and is not reinforced. The first attempt in plain concrete arch construction in the United States was the 31-foot span built in Prospect Park, Brooklyn, completed in 1871. The earliest knowledge of reinforcement being used was in France, sometime in 1885; however, the first concrete bridge reinforced with iron, built in the United States, was constructed in Golden Gate Park, San Francisco, completed in August, 1889. This form of construction has developed past the experimental stage and is now the representative of the highest art of modern bridge construction. It is adapted to railway bridges, owing to the fact that its solidity and entire lack of joints render it free from the excessive vibration often experienced in steel structures. In riding over a structure built of concrete it is pleasing to the passengers to note the absence of the familiar roar which is always to be endured in passing over a steel bridge. One of the longest spans in concrete bridge construction is the 280-foot span of the new Rock River bridge in Cleveland. The proposed New York City bridge is designed for a span of 724 feet. The large spans show the rapid development in the use of reinforced concrete as a bridge-building material.

* * *

A FAMINE IN BUILDING MATERIALS is now being experienced at Winnipeg, where the scarcity of structural products is far more pronounced than at any other time within the past six years. Common brick has gone up four dollars a thousand, timber and dimension lumber is quoted at two dollars higher, and shingles are also away up in price. Good common brick at any price is almost absent from the market. The total supply manufactured by local yards has been exhausted, and it is only from outside sources that brick may be obtained. Freight rates and added handling expense are responsible for the increase from \$11 to \$15 a thousand in cost. In season, common brick sells for ten dollars a thousand, but during the spring months the regular price is \$11. The brick imported from several western points is of an inferior quality, and not suitable for heavy structures. A number of contractors are now holding up work on apartment blocks to secure satisfactory materials and prices. All tenders submitted for work are now based on the high cost of material, with a rider that if the architect will wait until after the first of the month the work will be done much cheaper.

The advance in the cost of lumber is said to be due to the difficulty in getting shipments from the coast, where a goodly percentage of material used in Winnipeg is hewn and dressed. Lumber prices on the Coast are also going up in the same proportion that they have advanced here. Cement is seventy-five cents per barrel higher than last year. Even this necessity is not over-plentiful, and by the time deliveries are made for all the orders in hand, there may be a shortage in it also. Contractors are estimating a hold-up of three weeks on big jobs as a result of the increase in the prices of materials.



Senator Clark's \$7,000,000 Mansion on Fifth Avenue, New York.

OF ALL RECENT WORK in residential design, none perhaps has excited more attention among members of the profession, or has brought forth more adverse criticism, from an architectural standpoint, than the \$7,000,000 home erected by Senator Clark, of Montana, on Fifth avenue, New York. This costly mansion, so purely classic in parts, and so decidedly hybrid in its general treatment, is universally condemned by students of design as a rank architectural perversion. Governmental, ecclesiastical and residential in appearance at one and the same time, this striking domicile suggests nothing in its outline as to purpose for which it is intended to serve. To the uninitiated, it is an "enigma," and to those who know, a "mistaken conception of grandeur." As regards its interior appointments, complete information is lacking. Suffice it to say that the house contains one hundred and twenty rooms; thirty baths (one Turkish); three elevators; an extensive telephone system; one of the biggest organs in the world; a Chinese lounging room for Oriental guests; a mammoth reception hall and ball room; seven pianos; a million dollars' worth of rugs; pictures and paintings valued at \$2,000,000; twenty-two bedrooms; six sun rooms; two roof gardens; one six-ton ice plant, and three 275 h.p. steam boilers. In this connection, the following poem entitled "Senator Copper of Tonopah Ditch," penned by Will. Irwin for COLLIER'S WEEKLY, is appropriately humorous:

"Senator Copper of Tonopah Ditch,
Made a clean billion in minin' and sich,
Hiked for Nco York, where his money he blew,
Buildin' a palace on Fift' Avenoo.
"How," sez the Senator, "can I look proudest?
Build me a house that'll holler the loudest—
None o' yer slab-sided, plain mausoleums—
Give me the treasures of art and museums;
Build it new fangled,
Scalloped and angled,
Fine, like a weddin' cake garnished with pills;
Gents, do your dooty—
Trot out yer beauty,
Give me my money's worth—I'll pay the bills."

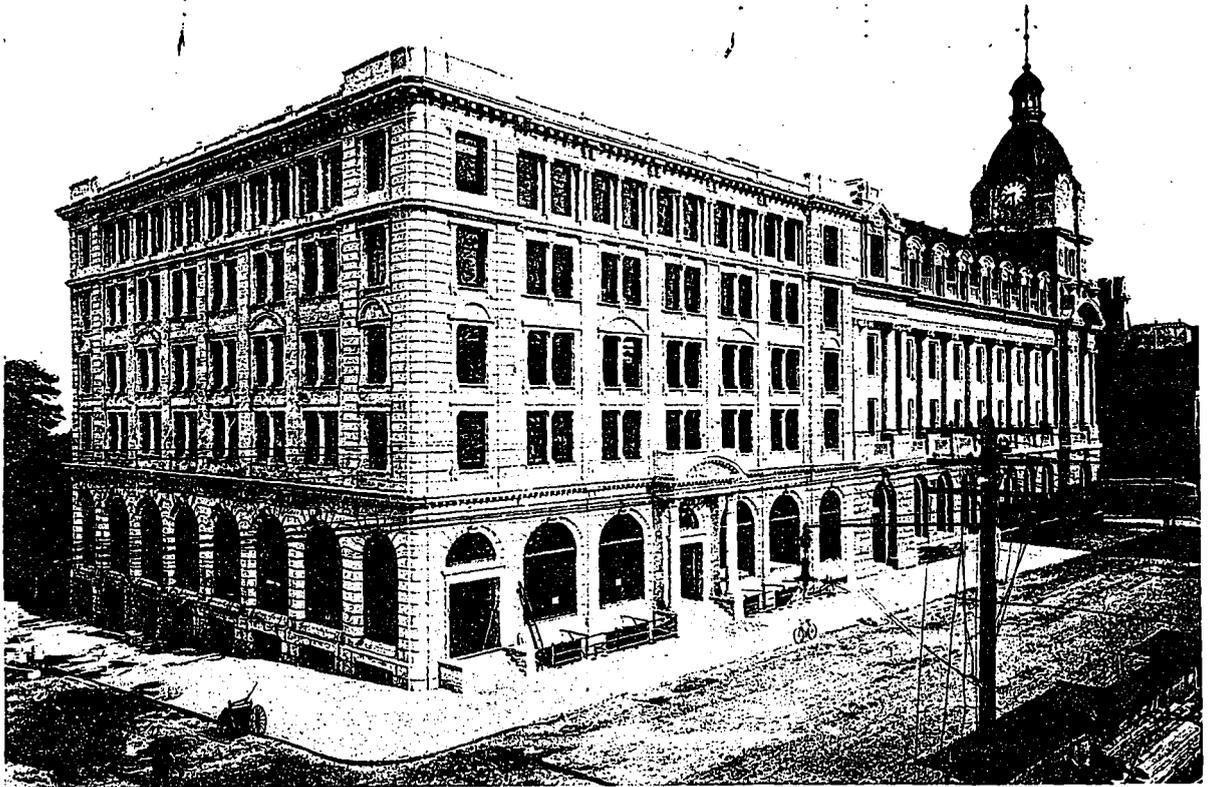
"Forty-eight architects came to consult,
Drawin' up plans for a splendid result;
If the old Senator wanted to pay,
They'd give 'im art with a capital A.
Every style from the Greeks to the Hindoos,
Dago front porches and Siamese windows,
Japanese cupolas fightin' with Russian,
Walls Senegambian, Turkish and Prussian;
Pillars Ionic,
Eaves Babylonic,
Doors cut in scallops, resemblin' a shell;
Roof wuz Egyptian,
Gables caniptian,
Whole grand effect, when completed, wuz—hell!

"When them there architects finished in style,
Forty-nine sculptors waltzed into the pile,
Swingin' their chisels in circles and lines,
Carvin' the stonework in fancy designs;
Some favored animals—tigers and snakes;
Some favored cookery—doughnuts and cakes,
Till the whole mansion wuz crusted with ornaments.
Cellar to garret with hammam adornments—
Lettuce and onions,
Cupids and bunions,
Fowls o' the air and the fish o' the deep,
Mermaids and dragons,
Horses and wagons—
Isn't no wonder the neighbors can't sleep!

"Senator Copper, with pard'nable pride,
Showed the grand house where he planned to abide;
Full of emotion, he scarcely could speak;
'Can't find its like in Noo York—it's uneeek;
See the variety, size and alignment,
Showin' the owner has wealth and refinement,
Showin' he's one o' the tonier classes—
Who can help seein' my house when he passes?
Windows that stare at you,
Statoos that swear at you,
Steeple and weather-vanes pointin' aloof;
Nuthin' can beat it—
Just to complete it
Guess I'll stick gold-leaf all over the roof."

THE MAGNIFICENT NEW MARBLE PALACE of the International Union of American Republics—within a stone's throw of the White House, Washington, was recently dedicated in the name of universal peace. With its splendid location at the edge of Potomac Park and the White House, its imposing marble facade, its quaint Spanish patio, and elaborately furnished hall of the republics, the new building, the gift of Mr. Carnegie, won the admiration of all the distinguished company that passed within the bronze-grilled portals, at the dedication exercises, at which President Taft and Mr. Carnegie headed the receiving party. The ceremonies were attended by special and diplomatic representatives of the various nations forming the union.

ARGENTINA IS ANNUALLY BUILDING more miles of railway than any other South American Country. The Rosario-Puerto Belgrano Railway, which crosses the province of Buenos Aires and connects two growing trade centres, will undoubtedly be a profitable and an important line, and its success will entail the investment of much additional capital. Various rumors of German lines have been circulated, and it is not at all improbable that some of them will be built within the next five years, while the prospective opening of the Transcontinental Railway, connecting Valparaiso and Buenos Aires, will undoubtedly stimulate competition to the extent of building a rival line within the next five years, which will result in greater annual increases in the mileage of Argentine railways.



The new Winch Building, Corner Hastings and Howe Streets, Vancouver, B.C. A Handsome and Substantial Commercial Structure Recently Erected in the Centre of the City's Business District. It is Designed to Carry Two Additional Storeys and is of Fireproof Construction Throughout. On the Other Corners of this Intersection are to be Built Three Ten Storey Office Buildings, One of Which is Now Well Under Way. Hooper and Watkins, Architects.

VANCOUVER AND VICTORIA BUILDINGS.—Representative Work of British Columbia Architect, Showing Some of the More Important Public, Commercial and Ecclesiastical Structures Erected in the Pacific Coast Cities.

BRITISH COLUMBIA, to the many Easterners, who have not as yet had an opportunity to visit the Pacific Coast, is still a country of many distances. They view it only through a mental perspective, formed by vague impressions regarding its fertile soil, delightful climate, rich resources and wonderful growth—and yet without any definite knowledge as to its real progress and development. Perhaps the best and most positive proof of the remarkable advance made by this province within the past few years, is found in the many splendid buildings erected in its more important towns and cities. In this connection we are illustrating a number of Vancouver and Victoria buildings, representing some of the more recent work of Architect Thos. Hooper, who has an extensive practice in both cities, believing that these structures in a way

will enable our readers, as far as British Columbia is concerned, to fairly judge the whole by the abstract, and thus obtain a reliable idea of the substantial strides, commercial and otherwise, which that section of the country is making. Mr. Hooper is well known on the Pacific Coast as a designer of public and commercial buildings, and he has to his credit several of the largest and more important structures of either type erected within the past few years in these two cities.

Prominent among his more recent work is the new Winch Building, a handsome seven-story office structure situated in Vancouver, at the corner of Hastings and Howe streets. The exterior of the building is carried out entirely in British Columbia granite, and the architectural treatment is a free adaptation of the Renaissance style, with the general lines as far as

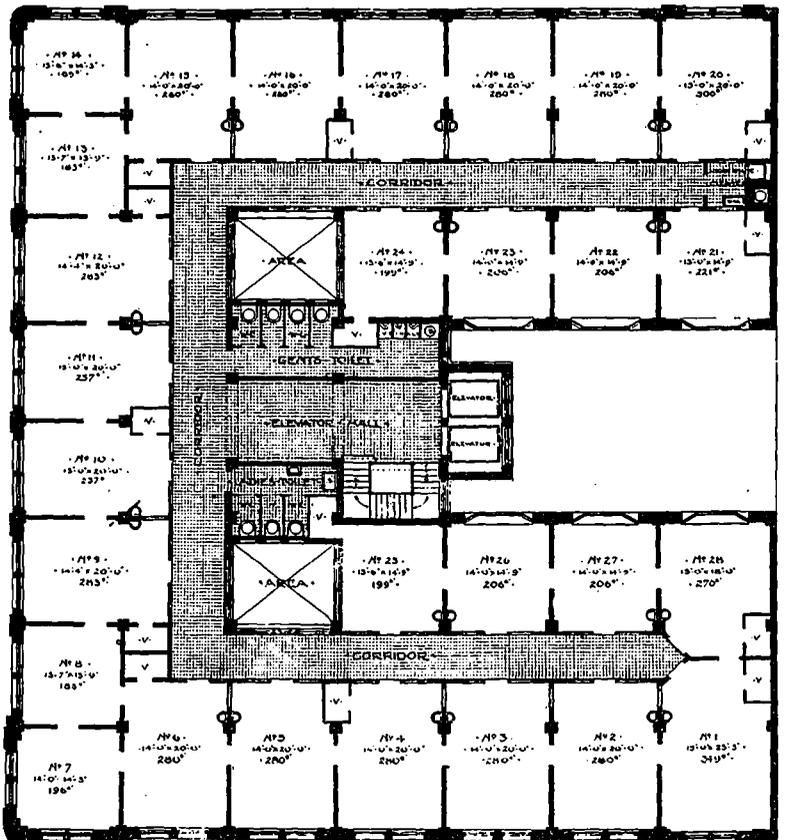
consistent, conforming to those of the new Federal Post Office, which adjoins it on Hastings street. In construction, the building is of a most modern and substantial character, the frame being of steel encased in concrete, the partitions of hollow tile, and the floors of reinforced concrete—thus bringing its physical features well within the meaning of the term "fire-proof," as it is understood.

The main entrance, flanked by two large monolith columns, leads into a barrel vaulted corridor, thirteen feet wide, which extends practically the entire depth of the building. This is finished in stucco relief work, and marble dado and pilasters, the floor being of tile. There are two large and six smaller offices on the main floor, the principal one of which, situated to the right of the entrance, being occupied by the owner of the premises. It is a handsomely finished interior, with

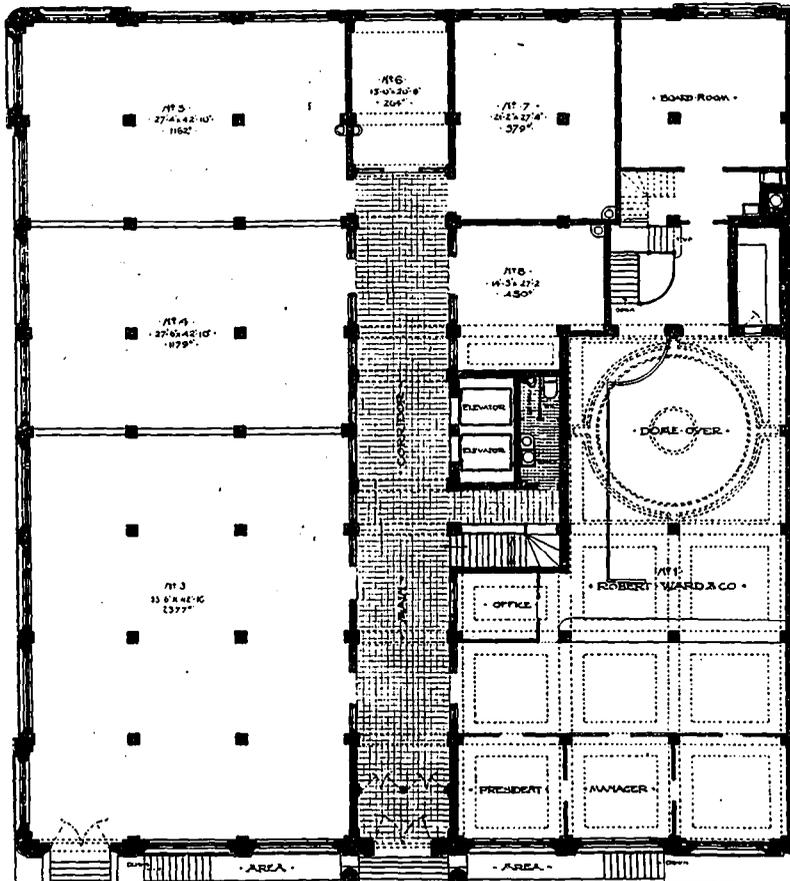
mahogany panelled walls, and a deep plastered beamed ceiling, containing a large dome of stained glass, allegorically depicting the life and resources of British Columbia. At the rear is a board room and vaults, and a staircase leading to the mezzanine floor, which provides toilet and storage accommodations, and to the safe deposit vaults in the basement.

The upper floors are served by two centrally located high speed elevators, and the stairs throughout are of concrete with marble treads and rises. There are twenty-eight offices on each floor, all of which are arranged so as to have an abundance of outside light. The finish throughout is of oak. Every room is provided with enamelled basin and running water, and over half of the offices have modern fireproof vaults. The general lavatory and toilet rooms are designed along approved lines, the floor being tile, the fittings porcelain, and the partitions of marble. The upper corridors are also tiled, both on the floor and the walls, which are dadoed to the height of four feet.

A large vacuum cleaner with two outlets is installed on each floor, and the heating is done by low pressure steam system. In the basement are large offices and a wide corridor, besides a safe deposit vault, elevator machinery, rooms, toilets and boiler room, where are two boilers.



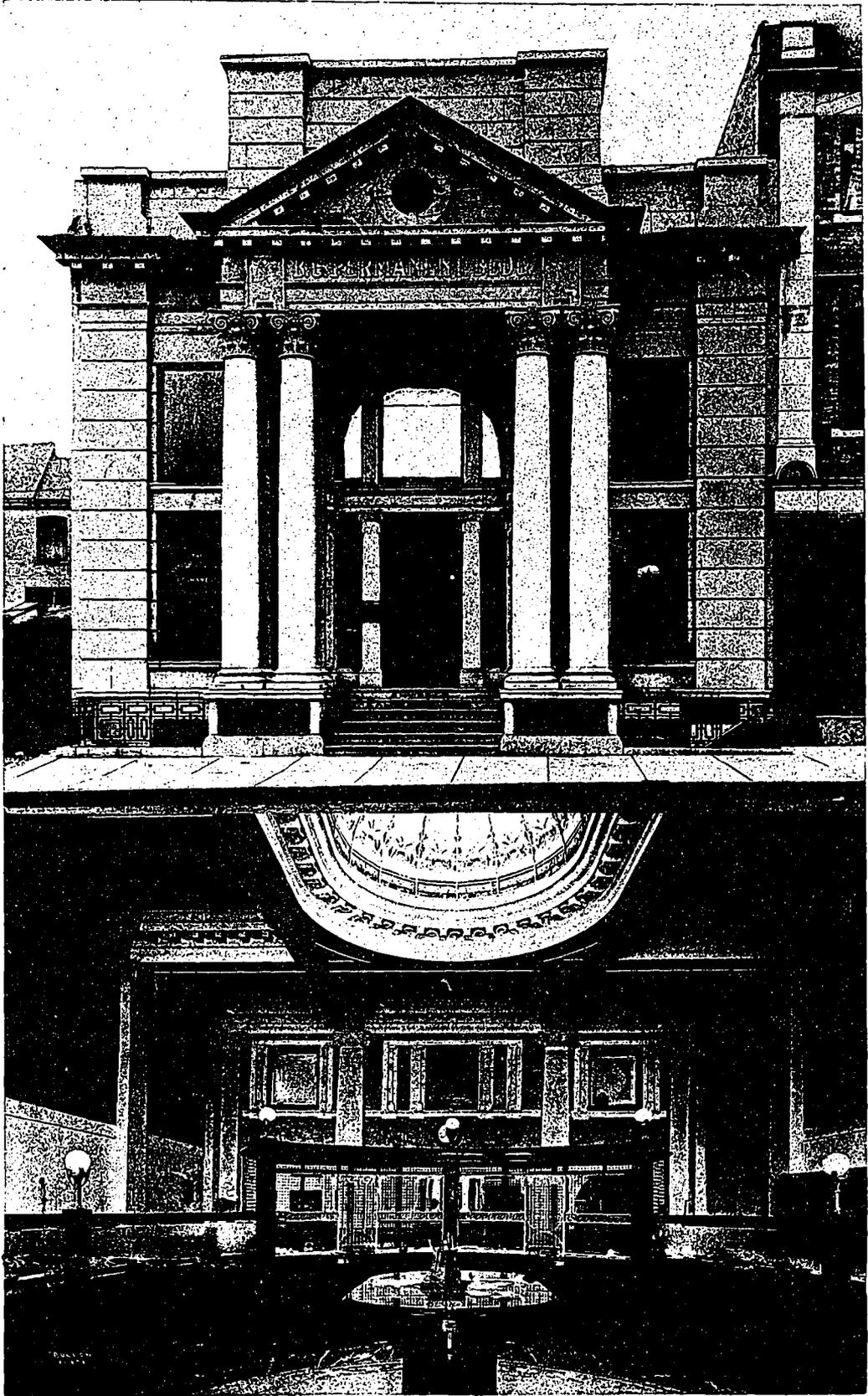
Typical Office Floor Plan, new Winch Building, Corner of Hastings and Howe Streets, Vancouver, B.C. Hooper and Watkins, Architects.



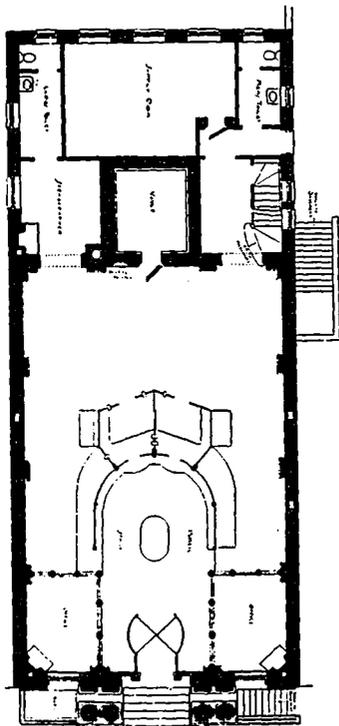
Ground Floor Plan, new Winch Building, Corner of Hastings and Howe Streets, Vancouver, B.C. Hooper and Watkins, Architects.

Eventually the height of the structure is to be increased by two additional stories, the steel work and walls being designed with this object in view. The cost of the building complete was \$383,000.

Another imposing structure designed by Mr. Hooper, is the Dominion Stock and Bond Company's new building (see illustration on page 73) now in process of erection on the corner opposite the Winch Building. This is to be a ten-story structure, covering a ground area of 104 by 120 feet, and it is to be used entirely for office purposes. In construction it will be similar to the building just mentioned, being of steel, concrete and hollow tile, with granite exterior walls. A colonnade formed by huge monolith pillars, will extend along the lower portion of the building on both streets, and this treatment will be repeated in a measure in the upper part of the structure where twinned semi-circular pilasters will rise between the windows from the ninth floor line to a richly-detailed cornice. Entrance to the interior will be by spacious corridors carried out in stucco relief-work, marble and tile, and leading to a central hall giving access to four high speed elevators and fireproof staircase communicating with the upper floors. The heating of the building will be done by a low pressure steam system and the appointments throughout will be of a most modern type. In this connec-



Exterior and Interior Views, Head Office of the B. C. Permanent Loan and Savings Company on Pender Street. An Interesting Small Structure of Ionic Design, Situated on the Principal Thoroughfare of Vancouver's Financial District. The Manager's Office and Board Room are Located on the Mezzanine Floor over the Vault and the Supply Room at the Rear of the Banking Floor. (See Floor Plan on next page.) Thos. Hooper, Architect.



Floor Plan, B. C. Permanent Loan and Saving Company, Pender Street, Vancouver, B.C. Thos. Hooper, Architect.

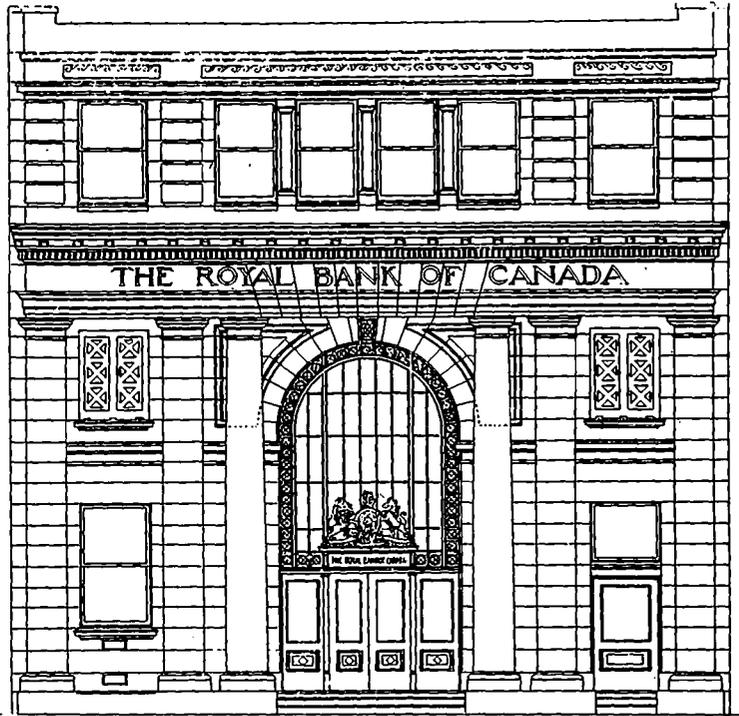
tion, it might be mentioned that two other structures of similar height and for similar purposes, are at present projected to be built this year on the two other corners of this intersection—a fact which gives an excellent idea of the growing importance and rapid development of Vancouver as a commercial centre, and the prominence it is assuming as one of the most progressive cities in the Dominion.

Noteworthy among Vancouver's banking houses is the head office of the British Columbia Permanent Loan and Saving Company—an interesting Ionic structure located on Pender street in the heart of the financial district. In the construction of this building, a delicately veined sand stone is used for the exterior walls, the frame work is of steel, and the appointments in general of a fireproof nature: Most of the ground floor space is occupied by a large banking room, having a tile floor and rich mahogany fixtures with bronze metal teller's cage. The high wainscoting and the pilasters are of marble and the pilasters are of scabbling and the ceiling, which is deeply coffered with enriched plastic beams, contains an elliptical dome of stained glass situated over the public space. The manager's office and board room are situated on the mezzanine floor at the rear. These rooms are handsomely finished in hardwood, and have stained glass domes and fireplace. The space directly beneath them is taken up by the vault, supply room and lavatory facilities; and the basement, which is

the full size of the building, is occupied by the agents' office space, and a hot water heating plant. The cost of the building complete was \$43,000.

The two other business structures illustrated are the Loo Building and the new Bower Block. The former is located at the corner of Hastings and Abbott Streets. It is of mill construction with solid masonry wall, faced with pressed brick, and was erected at a cost of \$93,000. There are seven spacious stores on the

ing the various rooms are of the metal lath and metal stud type, plastered with cement to a thickness of two inches; and all parts of the structural steel work throughout the building, are protected by concrete casing. Concrete is also used for the curtain walls and floor system; the latter, with the exception of the corridors and toilets which are tiled, being surfaced with battle-ship linoleum on a cement base. In order that all offices may have plenty of outside light,

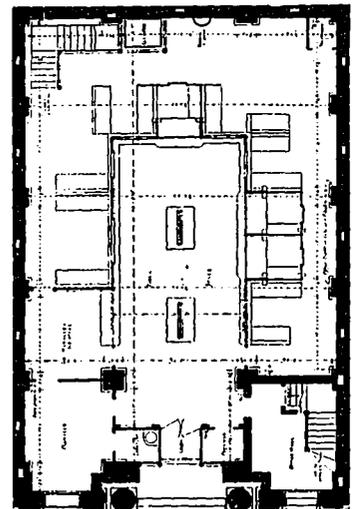


Front Elevation, Recently Erected Premises of the Royal Bank of Canada on Government Street, Victoria, B.C. This Front is Executed Entirely in a Rich Native Granite, Even unto the Latticed Windows, Which are Cut Through Three-Inch Stone Slabs. Thos. Hooper, Architect.

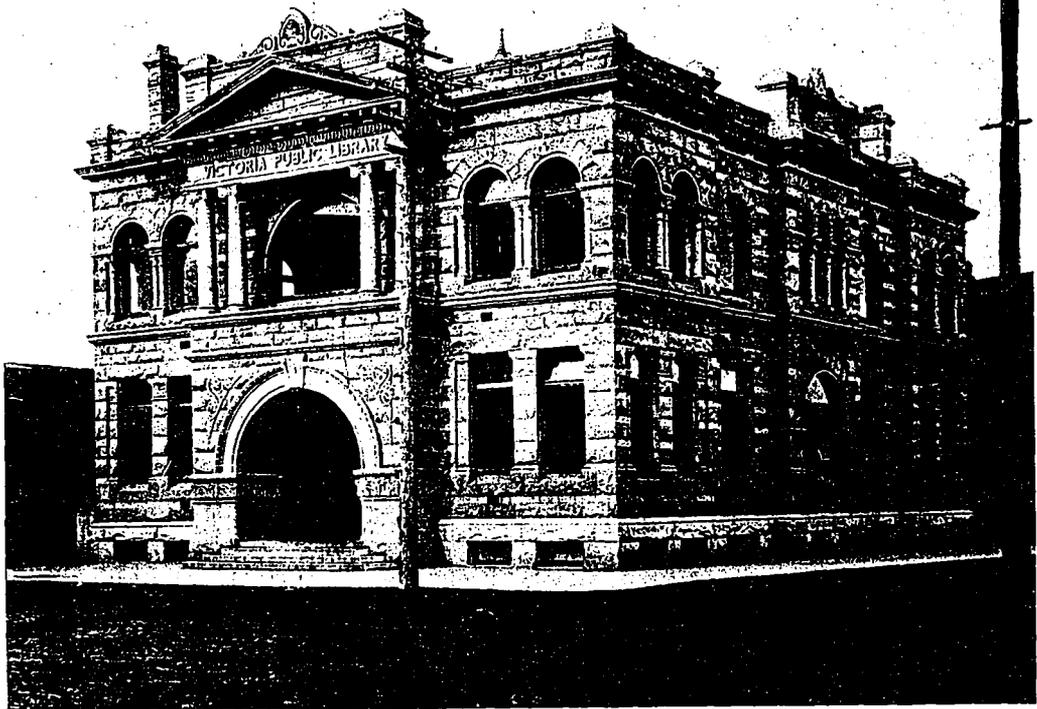
ground floor and twenty-three offices on each of the four upper floors, besides ample vault and lavatory accommodations. In addition there is a large basement with street entrances well suited to business purposes. The upper floors are served by two high speed elevators, and the offices are arranged so as to obtain the maximum degree of outside light. The building is heated by hot water, the lighting is by electricity, and the appointments in general have been most carefully considered.

The Bower Block is a large store and office building at the present time in course of construction on Granville Street, one of the busy trade arteries of the city. The facade is faced with a blue Bedford limestone, carried on steel framework, and the architectural treatment is such as to impart to the structure a feeling of dignity and solidity. There are fifteen offices, finished with oak trim, on each floor, to which access is obtained by a modern elevator service. The partitions divid-

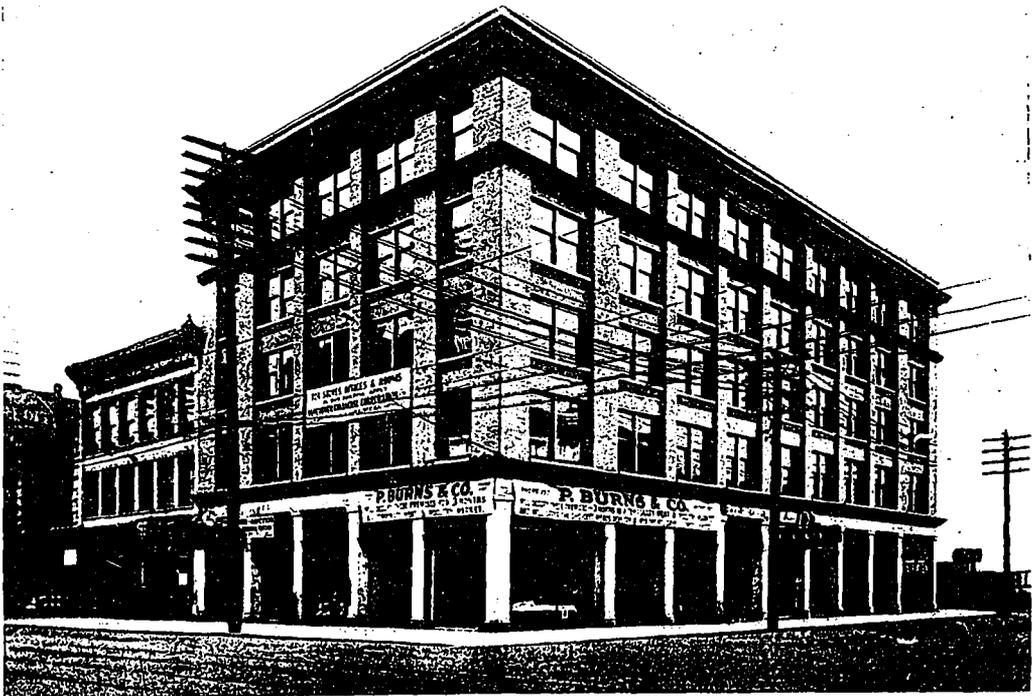
a light area with windows of metal sash and wire glass, is provided on either side. Steam for heating pur-



Ground Floor Plan, Royal Bank of Canada Building, Government Street, Victoria, B.C. Thos. Hooper, Architect.

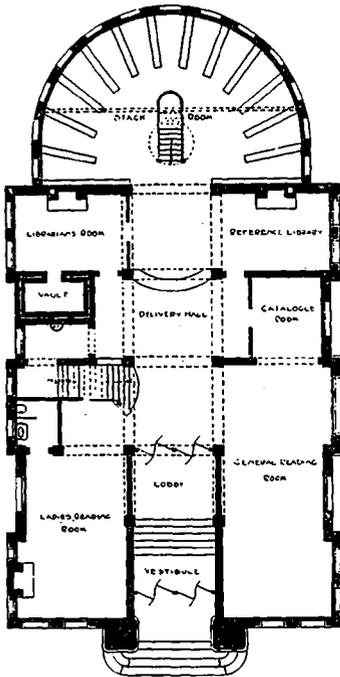


Public Library Building, Victoria, B.C. A Substantially Built Structure, Having British Columbia Granite Exterior Walls. Thos. Hooper, Architect.



Loo Building, Corner Hastings and Abbott Streets, Vancouver, B.C. The Ground Floor Contains Seven Spacious Stores, and the Upper Floors Twenty-Three Offices Each, with Ample Lavatory and Vault Accommodations. All Rooms are Exceptionally Well Lighted and the Upper Floors are Served by Two High Speed Elevators. Thos. Hooper, Architect.

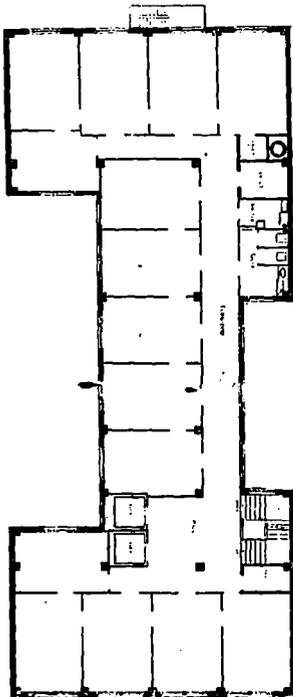
poses will be supplied by a low pressure system; the electric wiring will



Ground Floor Plan, Public Library Building, Victoria, B.C., Showing General Lay-Out of the Interior and Arrangement of Stack Room. Thos. Hooper, Architect.

be installed in a conduit; and among other features of the equipment, there will be a modern vacuum system for cleaning purposes, installed on each floor.

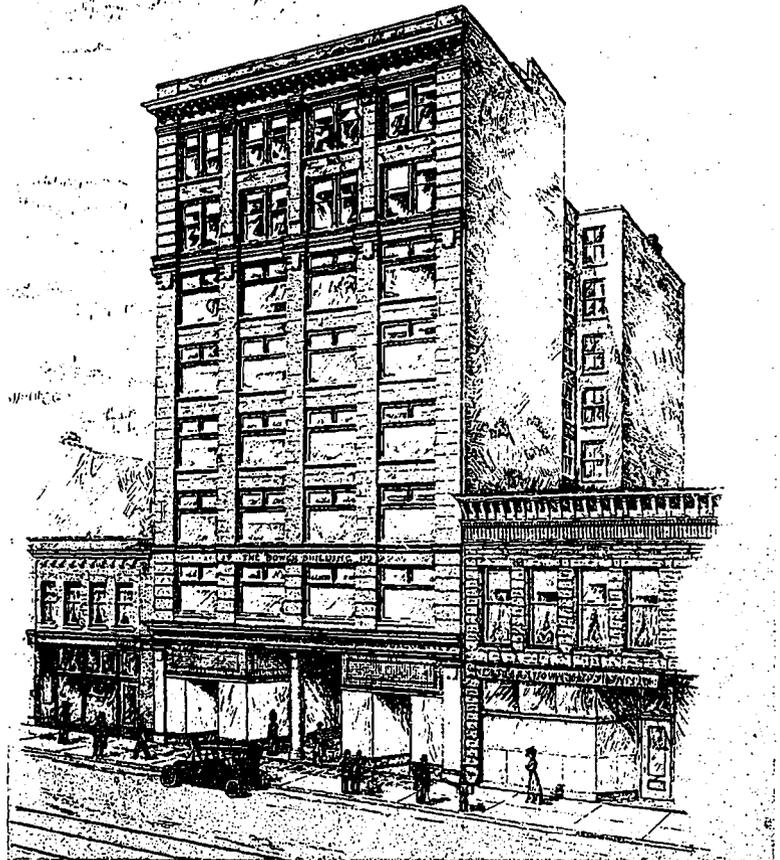
The three Victoria buildings, designed by Mr. Hooper, which are shown in the accompanying illustrations,



Typical Office Floor Plan, Bower Building, Now Being Built on Granville Street, Vancouver, B.C. Thos. Hooper, Architect.

fittingly bespeak the splendid progress of this rapidly-growing city, and give an excellent idea of the substantial character of buildings which are being erected in the capital of British Columbia. The Public Library building, which is a substantial, two-story and basement, granite structure, is both dignified in design and practical in plan. The interior is exceptionally well arranged, being such as to enable the librarian and his assistants to command a full view of the entire first floor. The vestibule and entrance lobby is flanked on either side by spacious reading rooms. Back of the lobby is the delivery space, with staircase, vault and li-

when its completion is eventually carried out, which will be in the near future, the institution it will house can feel justly proud. The front is of cut granite, and the entrance, which is recessed, has two large columns on either side. Over the doorway is a bronze cast of the Royal Coat of Arms and above this, spanning the width of the entrance, is a wrought iron arched window which rises to the base of the lower cornice. A feature of the stone work is two high placed latticed windows, which were cut through three-inch stone slabs. The side and back walls of the building are of brick supporting large box girders which carry the upper floor. The banking room



The Bower Building, an Eight Story Fireproof Store and Office Structure now in Course of Erection on Granville Street, Vancouver, B.C. The Frame Work of the Building is of Steel Encased in Concrete—this Latter Material Also Being Used for the Curtain Walls—While the Front is Faced with Bedford Indiana Limestone of a Blue Tone. Thos. Hooper, Architect.

brarian's office on one side, and a catalogue room and reference room on the other. A novel feature of the plan is the stack room, which is semi-circular in shape, and has book-cases arranged to conform accordingly. On the upper floor are several good sized rooms, equally as well arranged, and in the basement there is ample storage space and a modern heating plant.

The Royal Bank of Canada's new building is the most recent addition to the banking houses of Victoria, and

rises twenty-five feet in height, and has a large stained glass elliptical dome set in a richly plastered ceiling. The walls are pilastered and panelled to a height of ten feet in mahogany to match the bank fixtures, and the floor throughout is surfaced with terrazo. To the left of the entrance is the manager's suite, and at the rear of the floor is a small book elevator which runs to the basement, where two large vaults, lavatories, locker rooms and boiler compartments are located. The upper floor, which has



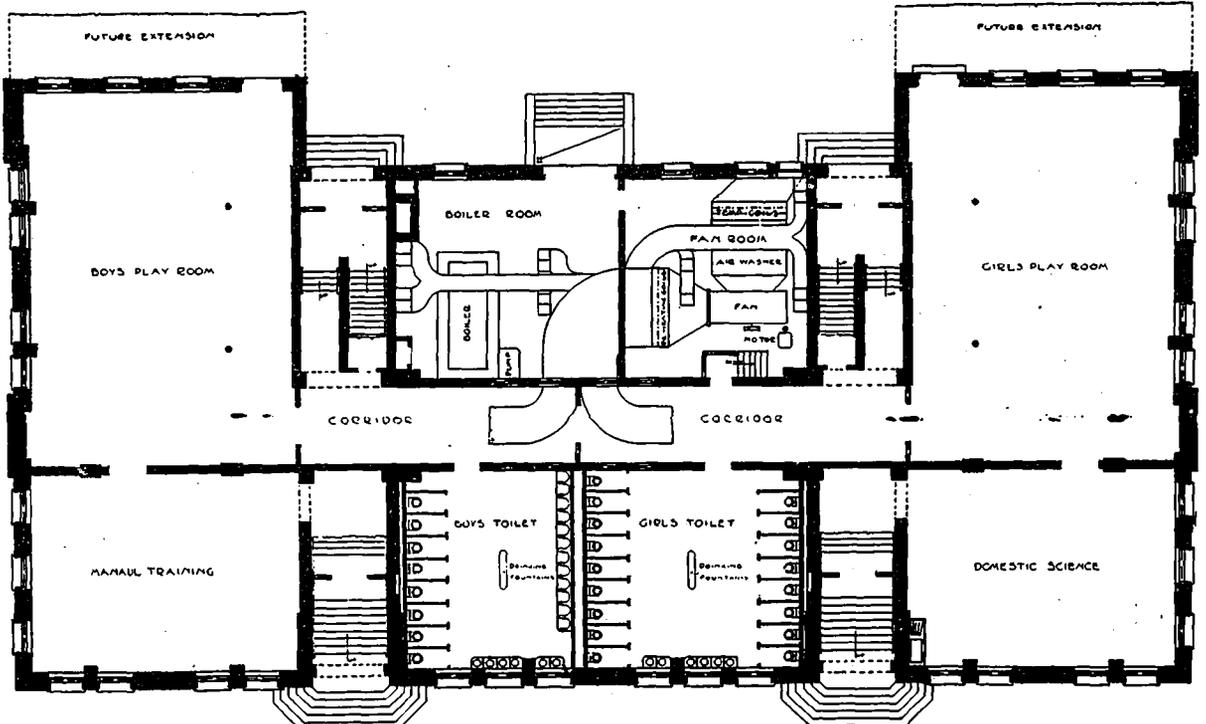
The George Jay School, Now Being Built by the Board of Education at Victoria, B.C. In the Plan and Construction of This Building the Essentials of School Hygiene and the Safety of the Scholars Have Been Thoroughly Considered. The Exterior Walls are of Concrete and Pressed Brick, the Interior Dividing Walls and Partitions of Brick and Hollow Tile; and the Beams, Floors, Roof and Stairs of Reinforced Concrete. Thos. Hooper, Architect.

a separate street entrance, contains seven offices, each equipped with separate lavatories, and two general toilet rooms. The estimated cost of the building is \$44,000.

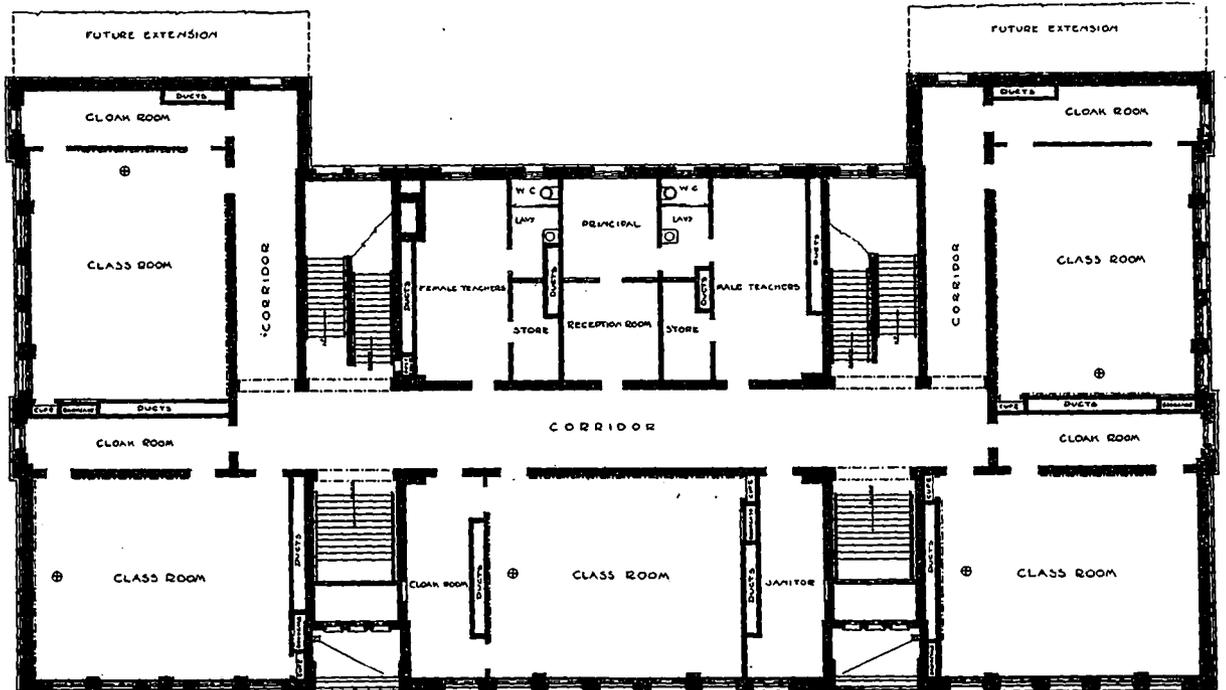
In the George Jay School, which the Board of Education has well under way at the present time, Victoria will have a building which is eminently superior in more ways than one, to a large number of similar structures that have been erected

within recent date, in many of the more congested parts of the eastern section of the Dominion. This building shows a proper appreciation on the part of the School Trustees, as regards "merit of investment," and both in plan and construction it has many features that can be advantageously studied by other municipalities which have like problems confronting them. Not only has the element of fireproofing been fully taken into ac-

count, but the essentials of school hygiene have been broadly considered as well. The design of the building itself is especially worthy of note, as is also the arrangement of the entrances, which depart somewhat from the plan generally adopted. The foundations, floor system and stairs are of reinforced concrete, the partitions of brick and hollow tile, and the exterior walls are of clayburn pressed brick. On the ground floor are five



Basement Plan, George Jay School, now being Built at Victoria, B.C. Note the Large Play Rooms and the Direct Staircase Arrangement Giving Access to the Upper Floors and the Outside. Thos. Hooper, Architect.



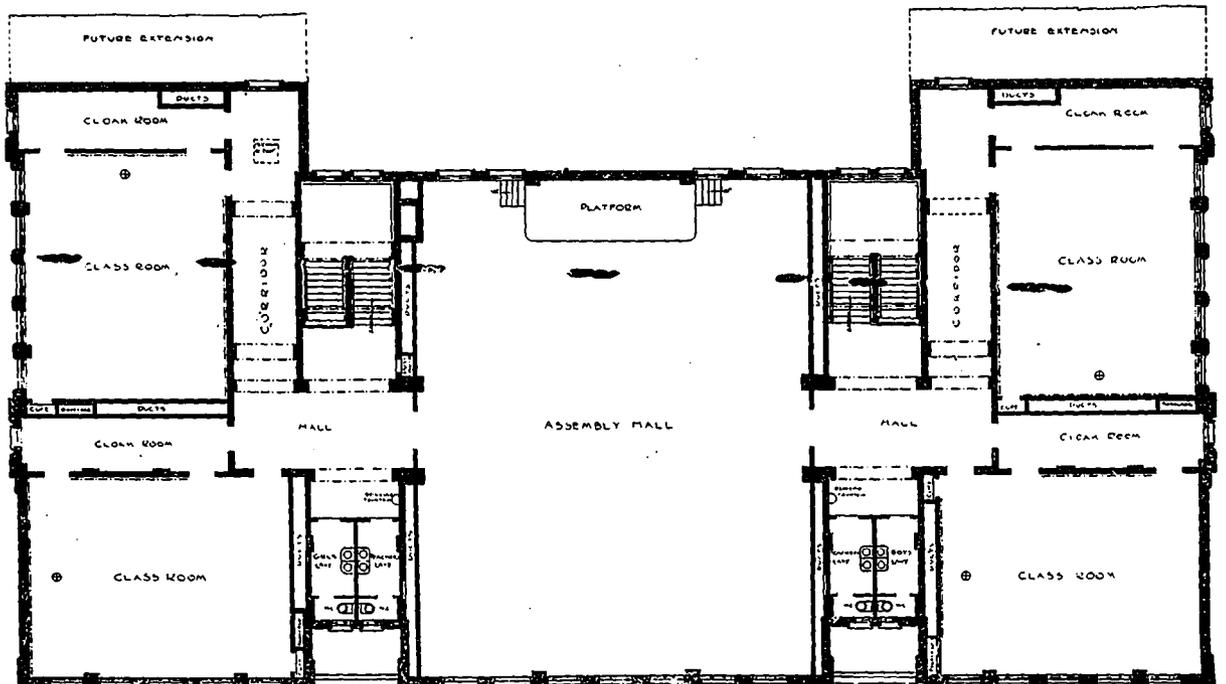
Ground Floor Plan, George Jay School, Now Being Built at Victoria, B.C., Showing the General Disposition of the Class Rooms, and Location of Principal's Office and Accommodations for the Teaching Staff. Thos. Hooper, Architect.

large class rooms with ample wardrobe accommodation, the principal's offices, and two rooms for the teaching staff. The second floor contains four additional class rooms, four modernly equipped lavatories, and a spacious assembly hall which takes up the entire central portion of the floor. This auditorium opens onto hallways on either side, giving access to the staircases which are most direct in their arrangement, thus making it possible for this portion of the build-

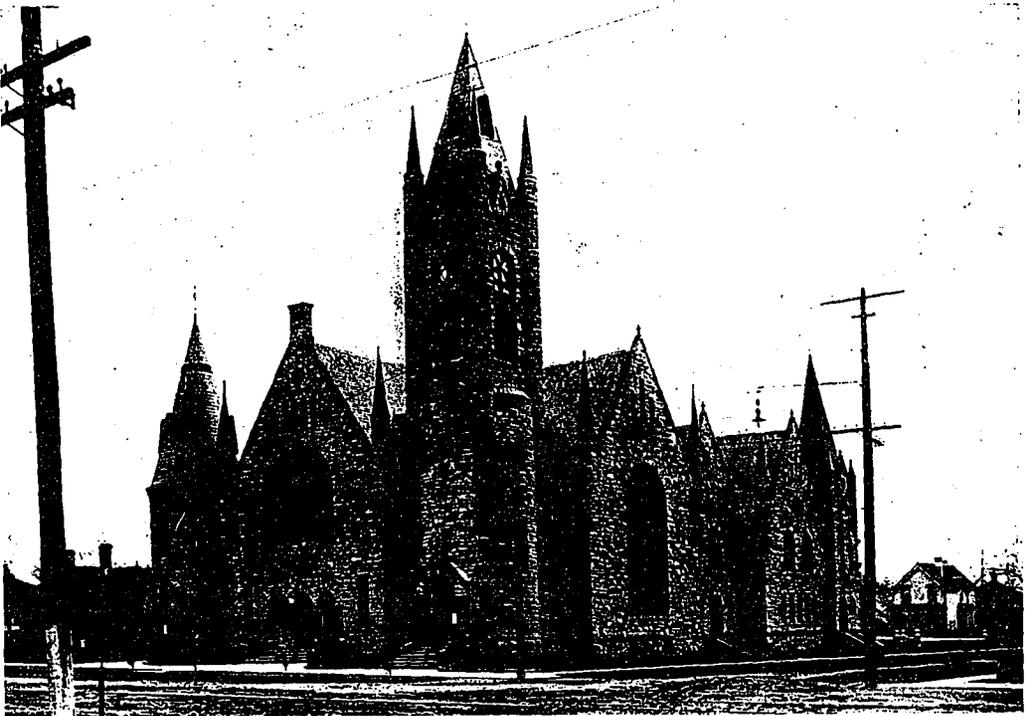
ing to be quickly emptied. The Manual Training and Domestic Science departments are located in the basement, where large separate play rooms and splendidly equipped toilets for either sex are also to be found. The boiler-room and fan system are located in the rear, and the heating is done by humidified air, warmed over steam coils, the temperature being regulated by thermostats in each room.

Although Mr. Hooper's work relates principally to commercial and

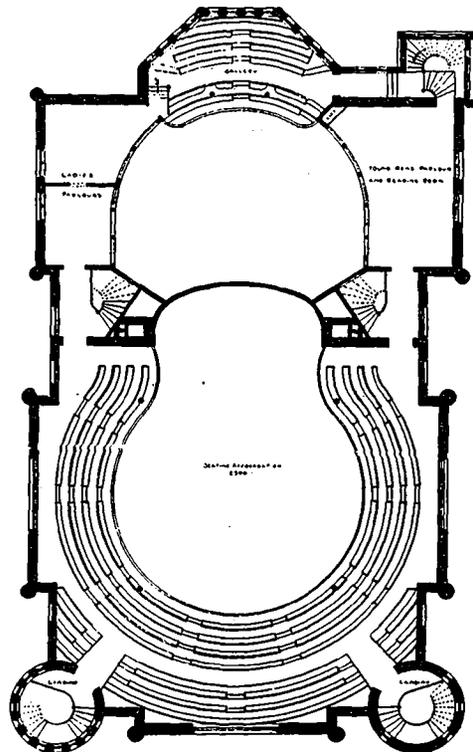
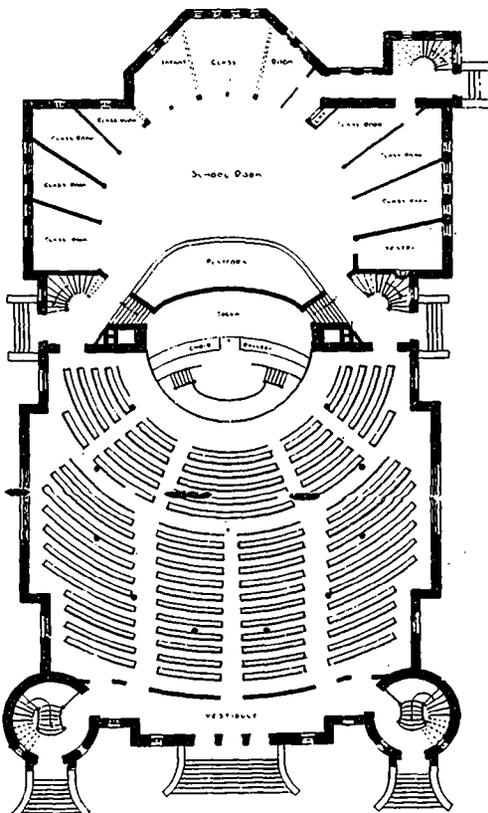
public buildings, he has designed several of the more important ecclesiastical edifices erected recently in the Pacific Coast district. One of his most notable efforts in this respect is the Metropolitan Methodist Church on Pandora Avenue, Vancouver—an imposing structure which provides seating accommodation for 2,500 worshippers. The walls are of granite rubblework and at the intersection of the two main facades, the main tower rises to a considerable height



First Floor Plan, George Jay School, Now Being Built at Victoria, B.C. Note the Spacious Dimensions of Assembly Hall, and Cloak Room and Lavatory Arrangements. Thos. Hooper, Architect.



Metropolitan Methodist Church, Pandora Avenue, Vancouver, B.C. An Imposing Ecclesiastical Edifice Capable of Seating 2,500 Worshippers. Thos. Hooper, Architect.



Ground and Upper Floor Plans, Metropolitan Methodist Church, Vancouver, B.C. Note the Unusual Arrangement of the Sunday School Rooms, and the Arrangement of the Side Entrances, which Serves both This Portion of the Building and the Large Auditorium. Thos. Hooper, Architect.

above the roof of the structure. Entrance to the vestibule is obtained through a triple arched doorway, and through two entrances, at either corner, which also gives access to the

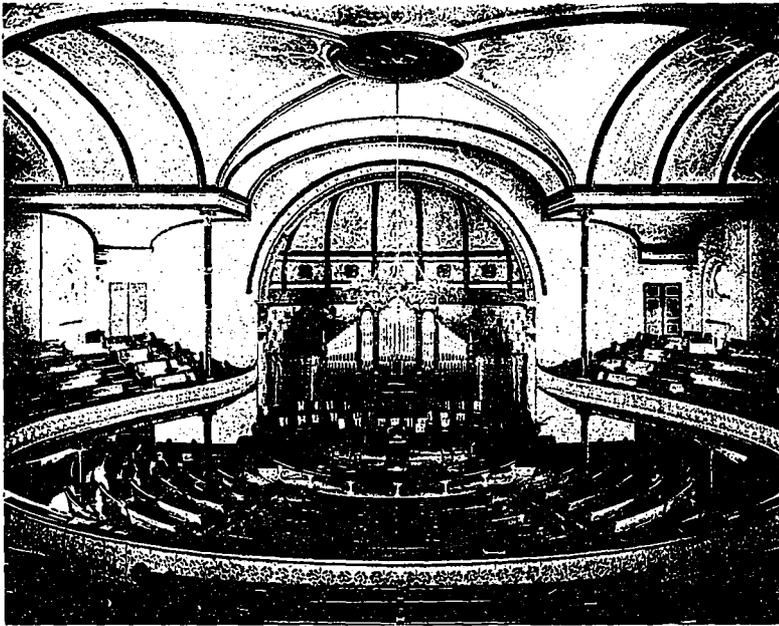
throughout are modern in character.

The residence of Mr. George Snyder, is one of Victoria's many interesting stone and shingle homes, a mode of construction, in fact, which is

its decorative scheme and character of the furnishings.

REGISTRATION OF ENGINEERS.

LICENSING CIVIL ENGINEERS is contemplated in a bill introduced in the New York Assembly by Mr. Edward J. L. Raldiris, an engineer member of that body. The bill was referred to the committee on public education, which has already held two hearings on it. If passed, says *ENGINEERING RECORD*, it will require all engineers who practice engineering in the State after January 1st, 1911, to be licensed; which will be done by examination or by presenting satisfactory proof of ability, under which latter method engineers now engaged in practice will be licensed, as it is not the aim of the author of the bill to affect those engaged in engineering work when it goes into effect. "Mr. Raldiris states that the purpose of his measure is to give the engineer the same standing in the community as the physician and the lawyer, by raising the standard of those licensed to practice civil engineering, and making it a misdemeanor to practice without a license. An examination of the bill shows that it probably has not had the benefit of adverse criticism before being presented, as it can be very much improved in some places where the exact purpose of the requirements is not at all apparent. For example, an

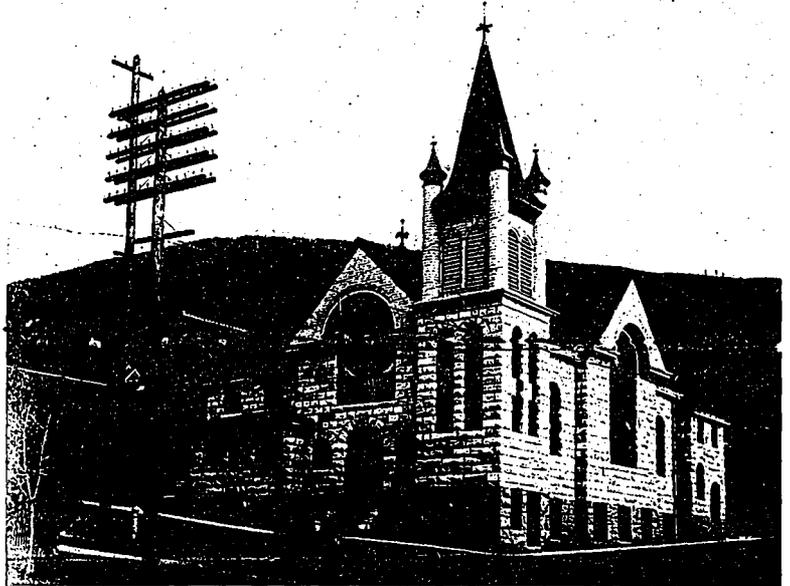


View of Auditorium, Metropolitan Methodist Church, Vancouver, B.C., Showing the General Architectural Treatment of the Interior. Thos. Hooper, Architect.

staircase leading to the balcony floor. The auditorium, which has large traceried windows, is exceptionally well lighted and an unobstructed view of the pulpit and choir can be obtained from any part of the building. A feature of the plan is the unusual arrangement of the Sunday School room, which is situated at the rear of the auditorium. This can be entered from the two doors giving access to the auditorium at either side of the building, or through an entrance at the rear. The second floor provides two ladies' parlors and a young men's reading-room, while the basement contains several additional rooms for church and social purposes.

A smaller building of this character, by the same author, is the Trinity Methodist Church, Nelson, B. C. This structure costs \$25,000, and it is built of a white marble, which is found in abundance in that locality. The auditorium, which is splendidly lighted by large stained-glass windows, has a low vaulted ceiling, traced with plastic moulds; and the walls are panelled with British Columbia fir, beautifully grained and finished. There is a good-sized gallery, and additional seating accommodation, if necessary, can be provided by utilizing the Sunday School, which is divided from the auditorium by rolling partitions. In the basement of the structure are several large class rooms, banquet hall, kitchen, etc. Heating is supplied by a fan system, and the appointments

quite prevalent in domestic work in the extreme West. Two interior views of this residence, are illustrated, one showing the entrance hall, and the other the dining-room. The hallway, with its fireplace, wall panelling and



Trinity Methodist Church, Nelson, B.C., Built of Local White Marble and Erected at a cost of \$25,000. Thos. Hooper, Architect.

wood ceiling, is especially interesting, while the dining-room shows a most pleasing consideration both in

engineer is defined as a "practitioner of engineering," and the practice of engineering is defined as follows: 'A



Perspective View of Ten Story Fireproof Office Building now in Process of Erection at the Corner of Hastings and Howe Streets, Vancouver, for the Dominion Stock and Bond Company. It will be of Steel Frame Construction Encased in Concrete, with Granite Exterior Walls. Thos. Hooper, Architect.

person practices engineering within the meaning of this article, except as hereinafter stated, who holds himself out as being able to design, construct, and care for public works, such as roads, bridges, canals, railways, aqueducts, drainage works, waterworks, river and harbor improvements, military engineering work, foundations, irrigation works, structural steel works, triangulation and topographical layouts or plans of cities, street improvements, and the engineering inspection thereof.' The meaning of 'except as hereinafter stated,' is not evident from anything in a subsequent section of the bill, and the definition quoted gives everything stated in the bill regarding the character of the work it is proposed to control. But it is self-evident that the language of the bill will not prevent engineering work from being intrusted to anybody who does not hold himself out as being able to design, construct and care for public works. This objection can be overcome by a change in language so that there shall be no uncertainty as to what is meant. Another grave objection to the bill is its partial uncertainty as to what shall be the status of subordinates occupying places without legal responsibility. This point caused considerable discussion some two years ago when the licensing of architects in Illinois was under consideration, and there

was a strong feeling that all assistants above the grade of junior draftsmen should be licensed. It was finally decided, however, that the objects desired would be fully attained by making the law apply only to those who occupied positions of legal responsi-

bility, and the operation of the law for more than ten years has confirmed the wisdom of this view. It might be added that the presentation of this bill without any prior discussion of it by the American Society of Civil Engineers robs it of authority as a professional measure."

REINFORCED CONCRETE has just made its appearance in Palestine, and is calling forth much interest and curiosity from natives, especially masons. When the German Emperor and Empress visited Jerusalem in 1898 a carriage road from the northern suburbs up and along the ridge of Mount Scopus to the summit of the Mount of Olives was built for them by the Turkish Government. From the top of Mount Scopus there is an extensive view. Jerusalem lies near by, below to the west, and to the east the Dead Sea appears only a few miles off, while it is over 20 miles, and beyond it and the Jordan valley extends the range of Moab. It was this sight that impressed the Empress, and on her return to Germany a large sum was collected for building the sanitorium in this place, which has just been opened. In this building concrete has been used in a different manner from that in general use. The sanitorium proper is two stories high, with a basement under a part, and is built around a large open court. The living rooms, etc., form two sides and the north end, while the south end is occupied by the church and the lofty bell tower. The apses are toward the south, it being the first Lutheran church in which the apses do not face east.



Residence of Mr. George Snyder, Victoria, B.C. An attractive Dwelling House of Frame and Stone Construction—a Combination of Materials Which is Quite Common in Residential Work Throughout the Extreme Western Section. Thos. Hooper, Architect.



Hallway, Residence of Mr. George Snyder, Victoria, B.C. Showing Detail of Staircase, Wall Panelling and Beamed Ceiling. Thos. Hooper, Architect.



Dining Room, Residence of Mr. George Snyder, Victoria, B.C., Showing Decorative Treatment of Ceiling and General Character of the Furnishings and Hangings. Thos. Hooper, Architect.



-An attractive reinforced concrete residence with a red tile roof and a picturesque setting. Milton Dana Morrill, Architect.

INEXPENSIVE HOMES OF REINFORCED CONCRETE.—Substantially and Hygienically Planned Small Dwelling Structures in Which the Artistic and Economic Use of Concrete is Fully Demonstrated.—Sections Cast in Steel Moulds of Standard Dimensions.

By MILTON DANA MORRILL

WHAT ARCHITECTURAL STYLE are we developing to day?

The Greeks developed the lintel type of architecture, following the natural shapes and sizes of available stone. The Romans built mostly in brick, and developed the arch as a natural form for their material. What new type and style will be developed through the use of reinforced concrete? There must be a concrete style. We have already worked out the structural forms which seem best suited to the material, and possibly the best concrete buildings have been designed by engineers, as they have followed the simplest and most logical shapes, and have not been hampered by architectural precedent.

We architects are so wedded to traditional forms such as cornices, columns and arches, that we are likely to employ these in positions where they serve a decorative rather than a constructive function. Is there any reason why structures cannot be designed in the simplest and most natural forms for concrete, and still be beautiful in proportion, line, and color? Cannot honest construction be made decorative and beautiful without requiring a masque of false architectural detail or an imitation in material? It has seemed to me that in cement work we have been designing in styles suited for wood or brick, and constructing in concrete with shapes unsuited and unnatural to the material in hand. This has, of course, made work difficult and expensive.

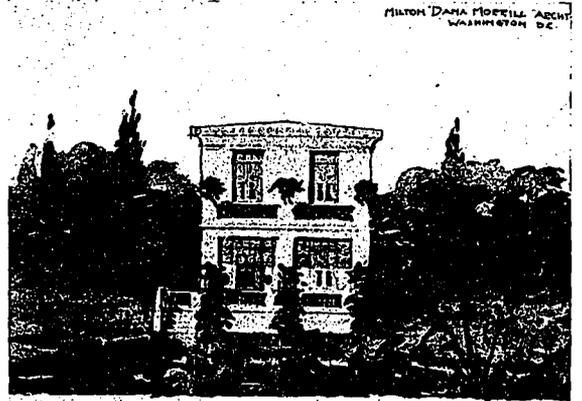
In my work on inexpensive homes, economy compelled me to put out of mind all architectural development, and to go back to first principles and to primitive habitations. Houses as well as other structures need not be expensive to be beautiful. Good taste, proportion, and a good selection of materials and color are only necessary. The most costly buildings in this country are often the worst

from an architectural and esthetic standpoint. Our early Colonial homes are beautiful, why? (They are built of inexpensive material). Their simplicity and good taste are the open secrets of their beauty.

While the design of the small house would not seem such a great problem, it presents more difficulty than larger plans, for economy is of the first importance, although, conveniences, beauty and stability cannot be sacrificed.

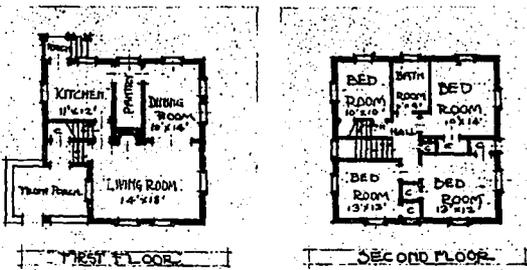
In literature the statement of a fact in the shortest, most concise, and simple form takes careful study of elimination; and so, to reduce expense without losing modern convenience and comfort, is the essence of scientific planning. It has been endeavored to combine in the following designs the convenience of the apartment with the light, air, privacy, and consequent health of the country. Passages and halls have been eliminated, leaving all space available for occupation. All rooms have light on two sides. One chimney must serve, and convenience and economy in house work is of first importance. The science of living has been given but little study, and many of us consider ourselves so busy that we can economize in labor. But in our homes there is a great waste of effort and energy through unstudied plan. Upon reviewing the problem of housing, I found that a box house was by far the most economic form, which could be constructed enclosing a given space, as this form requires the least wall area. The box is also the most rigid and substantial, as is illustrated, by those of paste board in daily use, while of a fragile and flimsy material, these become firm and substantial when reinforced at the corners.

The idea of a boxed-shaped house is not attractive to us, but why cannot this form be made beautiful? We see carved and decorated jewelry cabinets, which are exquisite. Why can we not design attractive homes within

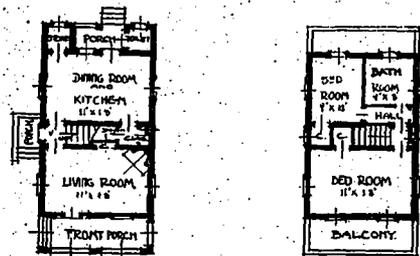


MILTON DANA MORRILL, ARCHT.
WASHINGTON, D.C.

STUDY FOR FIVE-ROOM HOUSE



Design for a Seven Room Concrete House. This special type of house was awarded first prize at the last International Congress on Prevention of Tuberculosis. An attractive feature is the roof-garden, which can be divided off into out-door bedrooms by movable screens. Milton Dana Morrill, Architect.

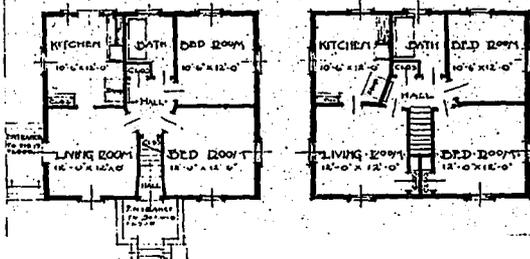


Study for a Five-Room House, showing an extremely simple yet attractive design and interior arrangement. Milton Dana Morrill, Designer.



A TWO-STORY
CONCRETE FLAT

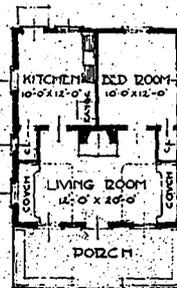
MILTON DANA MORRILL



A Two-Storey Two-Family Concrete House, which is one of a group of ninety houses to be built by the Octavia Hill Association of Philadelphia. The contractors estimate the cost of these houses at \$300 per room. Milton Dana Morrill, Architect.



PERSPECTIVE SKETCH
OF A WORKMAN'S
THREE ROOM COTTAGE



MILTON DANA MORRILL
ARCHITECT
405 COR CORAN BLDG
WASHINGTON,
D.C.

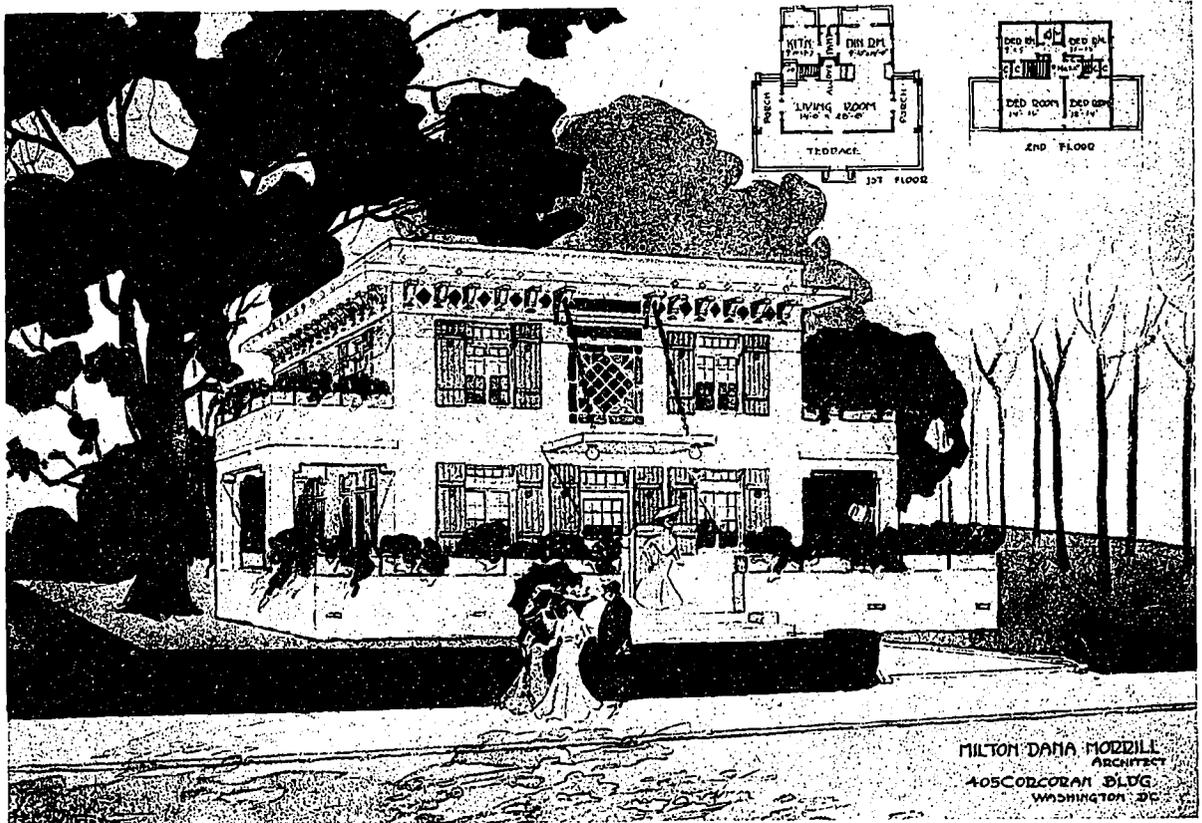
Perspective Sketch and Floor Plan for a Three-Room Workman's Cottage. Note the large living room with alcoves at each end fitted with couches. These can be transformed into bedrooms by sliding curtains. The chimney of the fireplace also serves the kitchen, and a shower bath can be installed in one of the closet spaces if so desired. Milton Dana Morrill, Designer.

similar lines, being guided more by the law of common sense, fitness and beauty, rather than by precedent, in following an architectural style, which at best cannot be suited in structural forms so changed? Everything in daily use has been standardized, books are of uniform size, bookcases are arranged in unit sections and the same has been done with thousands of articles about us, and the principle of standard forms has reduced cost and labor to a tremendous degree, and improved quality. Why cannot this same principle be applied to houses and homes.

If standard homes can be built to advantage at wholesale, how important it is that these should be perfect in architecture and in plans. In all our cities contractors are building rows upon rows of houses, and in the majority of cases plans are not furnished by leading architects but are bought from the man who will make them at the cheapest price. Contractors will employ the best doctor they can find for their families, but in these building operations the best architects are cut out because

we have the design, and if we follow our diagrams in setting up our steel moulds, the building is bound to come out right. One of the plans is so arranged that it can be built in sections almost as a bookcase is put up, being complete in four, five, six and seven room houses and arranged so that any number of rooms up to twelve can be made or added with no alteration. For a group of these houses the fire places, stairway, sinks, ice-boxes, etc., are of a standard type and steel moulds are made for these. To make an attractive mantel it is only necessary to lock together the standard moulds and pour the material; the whole being made at a quarter the cost of our less substantial wood fixtures.

In the preparation of these plans the designer has endeavored to invent homes where the habitant of the tenement can afford to live, and where he and his family can enjoy two of the greatest gifts of God—good health and sun shine. It is now realized that our hospitals can only relieve and prevent the communication of disease. They cannot stamp it out, and if future generations are



Design for a six room all-concrete house to be constructed by the Mount Hope Finishing Company near Fall River, Mass. Note the general architectural effect produced by simple lines and good proportions. The inlaid work over the entrance is of marble, and this together with simple window shutters and flower boxes serves to effect a most pleasing contrast with the white wall. Milton Dana Morrill, Architect.

they cannot compete with unstudied and inferior work, and the public must see and live in these buildings which are not beautiful, and sometimes even offending to the eye. I believe that all our cities should have art commissions who would pass upon designs for fitness of appearance just as our health department demand sanitary plans.

There are certain limitations to the economic use of concrete and we might as well recognize these and design our work accordingly. When we come to intricate detail and curved surfaces, concrete work becomes difficult, on account of the necessary moulds. Simple straight lines are ideal for this work and after all they make the simplest and most attractive buildings.

I have adopted in all plans standard unit dimensions, so that drawings are reduced to mould diagrams, after

to improve mentally, morally and physically, our people must live in healthy homes, and the city tenement cannot furnish these.

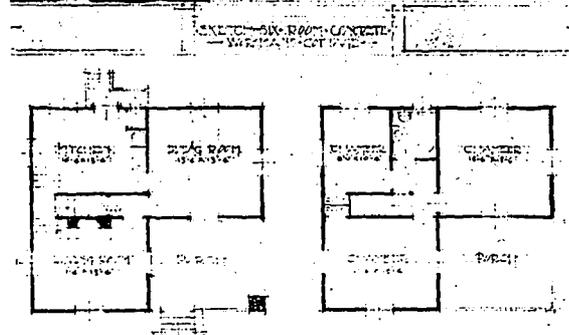
A few years ago the expense of travel and time consumed made it imperative that the laboring classes should live near their work, but improved transportation and low fare have now increased the residence zone to many miles around our larger cities and high land values and consequent high rents have reversed conditions so that it is imperative that only inexpensive land shall be occupied for habitation.

The accompanying designs are almost primitive in their simplicity but would not this simplicity add, rather than detract from their appearance, and would not a group of these buildings with their white walls, flower-boxes, and inlaid marble block ornaments make a striking

contrast to the usual inexpensive homes. There is a great mental and physical improvement brought about through clean and beautiful homes and a pride awakened which enters the entire life of the tenement. In the dark, unwholesome tenement there is little incentive for cleanliness in habits or in life and a marked advance has been noted by a change to sanitary and attractive surroundings.

Plans have been prepared for a group of two story, three-room apartment buildings, for the Octavia Hill Association of Philadelphia, Pa. The kitchen fixtures, sinks, ice-box and closets, which are to be of cement cast in steel moulds, occupying one end of the living room, so that by light washable curtains these can be screened when not in use. The bath rooms are interlocking in plan, so that no space is lost. The contractor's estimate in concrete was \$900.00 per apartment, or \$300.00 per room, fire-proof, and sanitary. In brick \$1,100.00. These can rent for \$8.00 or \$10.00 per month. The group will comprise ninety buildings.

One design presents a three-room house. The large living room extending across the front with alcoves at



Design for a Six-Room Workman's Cottage. An Attractive Small Dwelling House With a Well Disposed Interior Arrangement. Note the Direct Surfacing of the Exterior and the Interesting Window Treatment. The Porch and Balcony Arrangement is also Worthy of Note. Milton Dana Morrill, Architect.

each end fitted with couches and arranged by sliding curtains so that these may be transformed into bedrooms, an attractive open fire place is directly opposite the entrance, the chimney also serving for kitchen range. A shower bath can be placed in one of the closet spaces. Another plan is for a four-room one-story house, without bath. This plan, as well as the former, is intended to accommodate the family who now inhabits a two or three room tenement. This house could rent for four or five dollars per month.

Still another presents a plan for a two family house, the four-room apartment on the first floor opens on an attractive side porch. The upstairs apartments open on a front porch and separate entrance, each apartment has a bath.

Plans have also been prepared for quite a group of the five and seven-room type, to be constructed by the Mount Hope Finishing Company near Fall River, Mass. In these houses every room has windows on at least two sides and all are arranged in such a way that they can

be built as double houses or in block where land value prohibits the detached home.

While single homes can be constructed along the lines of these designs, the great economy obtained by wholesale building makes it desirable to construct in groups so that they can be almost entirely machine made. Just as in our clothing, tailor-made suits can only be afforded by those whose salaries warrant it, so in our homes, the especially designed and built house, is only within the reach of a comparative few.

A competition for sanitary inexpensive workman's homes was held at the late International Congress on Prevention of Tuberculosis when this especial type of house was awarded the first gold medal. The following are a few of the special, and for the most part, new features which have been incorporated in the design: The coal is hoisted by a simple chain block, attached to a swinging davit and is dumped through a hole in the roof to a large pocket, from which it feeds by gravity into the fire box of stove, the ashes falling into a pit and being removed from an outside door. This is simply the application of the equipment of large plants to the home. This stove combines in one compact fixture, cooking range, house and hot water heater, and gas stove. The garbage is placed in a cast-iron chamber in smoke flue, and after drying is dumped into a fire-box by damper. Fire places in each room have flues about the smokestack forming a natural ventilation. The ice-box, which is filled from the outside, is arranged for use as a fresh-air closet, doing away with use of ice except in hot weather. This is also arranged to be flushed. The roof is of open cellular construction, and cool in summer.

An attractive feature of the house is the roof garden and sunroom, forming out-of-door bedrooms, divided by use of movable screens. Window boxes form an inexpensive and at the same time artistic decoration. We cast our walls for two-story buildings 6 inches in thickness, and you can realize how far a cubic yard goes in this thickness. With the steel moulds we expect to place this for \$5.00 per yard, so that a wall (the side of a room) 9 feet by 12 feet, will cost but \$10.00.

When the "Model House" was first shown there were many skeptics as to the practicability of the scheme, and I thought that the best plan was to construct a house along these lines, as an ocular demonstration is the only way to definitely prove a project of this kind. This house, which is in Brantwood, Maryland, near Washington, has very little wood except the window sash and doors. The walls are 8 inches in thickness, the floors are 4 1-2 inch slabs, reinforced in both directions.

The moulds were of wood made in standard sections, and one carload of Portland cement sufficed for construction. To thoroughly clean a room, a hose is used, the cement floors being graded to plugged tile spouts, discharging on the lawn. An enclosure for the garbage pail is left under the wash tub which has an outside screen door for ventilation and removal. This is arranged also to be flushed out. A small wood strip is laid in the border so that rugs or carpet can be tacked in place, if desired. All corners are coved, and all fixtures are bracketed from the wall, which leaves no places for the shelter of dust or vermin and facilitates in cleaning.

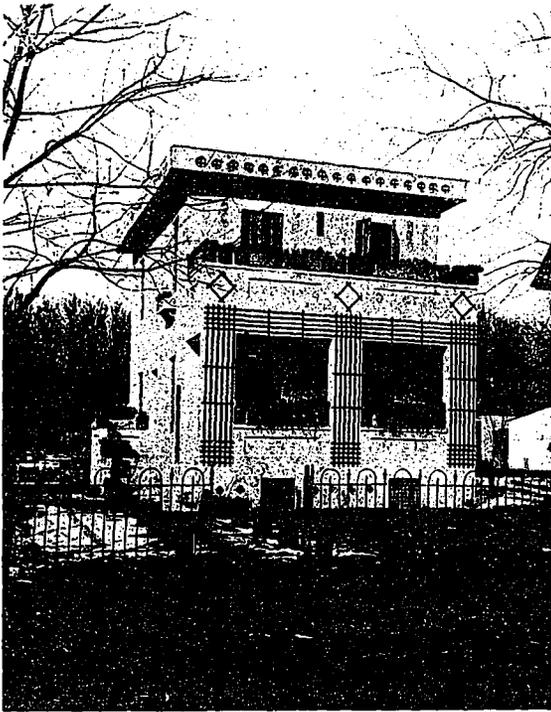
The possible omission in insurance and repairs, and their general indestructible character, would make this type of building especially suitable for rented houses. The waste heat from the kitchen range warms the house through circulation of hot water, the heating system being built to be cut off by an inside fire box in the summer months. All fixtures such as kitchen sinks and wash-tubs, lavatory and bath tubs are cast in concrete, and given a very smooth cement finish. For the water supply a concrete tank is built in the top of the bath room, which is filled from a small force pump at the kitchen sink. In some of my plans I have graded the roof to a sand box filter connecting with the tank, so that rain water may

also be stored and used. The windows are of a case-ment type, swinging out, with no trim, but with a stencil

ket, the screen being locked to the sash so when the sash is moved the screen follows, closing the opening.

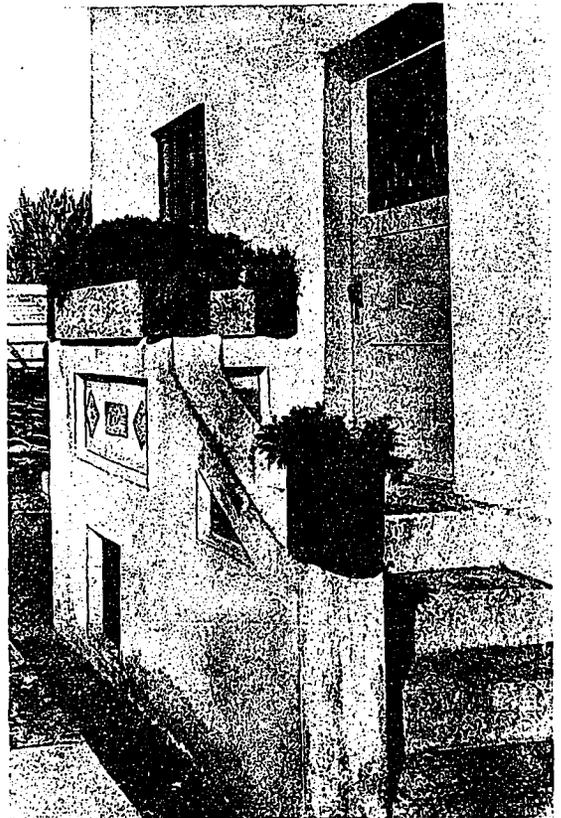
The building has no exterior ornamentation, as the flowers, and vines in the window boxes give the best of decoration and color. Why do we have flowers and ornaments of stone when we can have genuine flowers and ornaments which are much more beautiful and decorative. These flower boxes, (of course they are of concrete), now contain small cedar trees which we gathered near the site, and the vines are the wild honey-suckle, which grows in such fragrant tangles all about.

It is difficult to base an estimate of cost on construction of this first house, since the moulds and the superintendent's time have been charged against it, but it is safe to estimate that these houses can be built at between two hundred and three hundred dollars per room. In the construction of concrete houses, I have found that in some light work, the cost of lumber and carpentry labor for moulds, was three-fourth the total cost. It was nec-



Two-Storey Concrete House erected at Brantwood, Maryland. The walls are 8 inches in thickness and the floors are 4½ inch slabs reinforced in both directions. This was the first house constructed with standard section moulds, and it was built to demonstrate the possibilities of reinforced concrete in low priced, sanitary, fireproof residences. Milton Dana Morrill, Architect.

border, sash being hinged to simple metal strips, which form a weather-tight joint. In some buildings my plan contemplates a window sliding sideways into a wall poc-

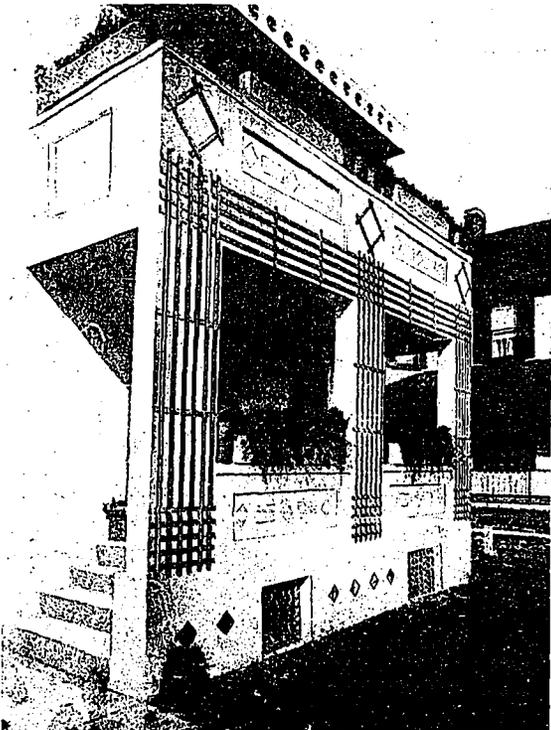


Side Entrance, Concrete Residence at Brantwood, Maryland. Milton Dana Morrill, Architect.

essary that this expense should be reduced or eliminated, if we were to build in this material.

I searched the market in this connection, for a standard sectional steel mould equipment and found several good types, but none exactly suiting my requirements. The simple equipment involved many months' experimental work, and should, I believe, do much to reduce the cost of concrete construction, since it practically eliminates carpentry and lumber waste.

The mould plates are pressed from 12-gauge sheet steel into flanged sections 24 inches square. Upon the completion of the footing course the plates are locked to the cement spacing blocks, furnishing a trough, into which the mix is poured. The cement spacing blocks are of course left in the wall and the plates are locked to these by a key, which is afterwards removed. Wherever four corners join a cuff engages, wedges the plates



Detail of Porch, Concrete Residence at Brantwood, Maryland. Milton Dana Morrill, Architect.

together, and draws them to perfect alignment on the inside. The whole stands very rigid and firm when erected, and in experimental work I have not found it difficult to keep the work plumb, as the corners join evenly and render the alignment true.

The plates are two tiers in height, each tier being clamped together in series, and attached by a hinged rod so that the lower tier is unlocked and swung to its new position on top and locked, there being few loose parts to fall. The whole equipment for house construction has only ten different parts, and as it costs about



Side entrance, concrete residence at Brantwood, Maryland. Milton Dana Morrill, Architect.

\$800.00, and can be used indefinitely, the cost per house is not great. Wood fillers are arranged to take up odd dimensions.

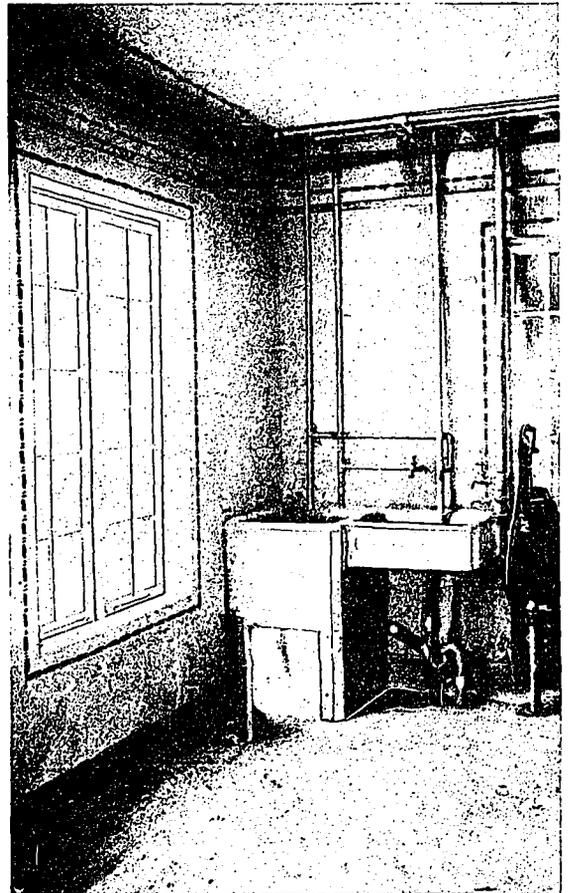
Several small sections of walls have been built with this equipment, patents for which are now pending and within two weeks I expect to start on the first work, for which a full equipment is now being finished.

These plates are locked together in the same way for the floors, the spacing blocks here give the exact thickness of slab, and reinforcement rods are placed and accurately secured to these blocks by bending a heavy wire, which is cast in each block with end protruding for this purpose. To give a smooth and even surface floor, a wet mix is poured in, and the plates are slid in place on top and locked to spacing blocks, and wedged down until the surplus mix is squeezed out in front. This should do away largely with expensive labor in cement finishing. For the

floors, cement spacing blocks are cast with projecting flanges so that they will give considerable support to the slab and reinforcement, and permit the lower plates to be removed after three days. A post is wedged and blocked up under each spacer giving supports only 24 inches apart.

Upon experiment I found that a slight ridge or pattern at the joining of the mould plates and spacing blocks was found to appear slightly different in color. I have treated this as wall decoration, and with the rosette cast on the spacing blocks, an extremely interesting pattern is formed, and it is possible to leave the wall without further finish inside or out, unless a brush coating is applied to give a more uniform color, and as a safeguard against dampness. As the plates are cleaned and greased each time they are raised, and as the concrete is a very wet mix, an extremely smooth surface is obtainable, requiring no plaster, the economy is, I believe, apparent.

At Virginia Highlands, twelve minutes out of Washington, we are just starting a group of houses, a few will be of brick, but the majority will be of cement. We have



View of Kitchen, Concrete House at Brentwood, Maryland. This interior can be cleaned with a hose, the cement floor being graded to Tile Spouts, discharging on the Lawn. The Enclosure for Garbage Pail under Concrete Sink has an Outside Screen Door for Ventilation and the Removal of Garbage. This is also arranged to be Ejected Out. Milton Dana Morrill, Architect.

purchased this beautiful tract on the heights just south of Arlington, overlooking Washington, and we are forming a stock company to develop and sell land and in connection with this, will erect a number of these houses.

Good cinder concrete gives ample strength for walls of these houses, and we are using the waste from manufacturing plants nearby. It is possible in this work to take the material which has been thrown away as useless, and make something useful and beautiful with it.

CONCRETE BLOCK CONSTRUCTION.*—What It Means to Canada in the Erection of Safe and Permanent Buildings.—Dominion Should Profit by Mistakes Made in Neighboring Country.—Proper Way to Reduce Fire Loss is by Preventing It. By J. AUGUSTINE SMITH

THE DEVELOPMENT OF CANADA carries with it tremendous potential possibilities in every direction. In this development, I know of no one factor that will be of greater real benefit to you than concrete block. When I speak of the "concrete block," I do not mean the poor, cheap, porous cement block you see frequently, but rather the well-made, dense, sound, impervious stone, that is of first-class quality, and meets every requirement; the product that secures the unqualified approval of the architect and builder.

The statement that the concrete block is destined to play so important a part in your affairs may be questioned by those who have given this subject but casual thought or observation. Let us, therefore, give some consideration to this subject.

In the first place, I take it, your history of development will very closely resemble the methods, means, and characteristics of the development and growth of the United States, when our great West was being peopled. Great colonies poured in, habitations were rudely and hastily erected, with all the waste and destruction consequent upon the necessity of providing living quarters quickly. In such a rush, the great desire was to build as cheaply as possible, without regard to economy, or the real necessity for the promotion of safety. The result was, a wooden building era, which has cost us millions upon tens of millions of dollars, hundreds upon thousands of lives, and has given us a character of building which has proven extraordinarily costly, and has threatened in a serious way the prosperity of our country. Indeed, it is this phase of the question that I want to bring strongly before you, and upon which I want you to give serious consideration.

In our history, the greatest drain we have had upon our resources is our constant and extraordinary loss by fire. This is due to our loose and insecure methods of building construction. We have built of wood, sufficient for to-day only, and without regard to permanence. Our experience in this respect should be preventive of your making the same mistake.

Most people who are unaware of the extraordinary loss suffer each year by fire. This matter is now receiving the careful and earnest thought of our people. The United States Government have lately established, under the Department of the Interior, Structural Materials Testing Laboratories at St. Louis, for the purpose of determining the character of all structural materials, as well as their fire resistive properties.

As illustrating the importance of this investigation, I may call your attention to the fact that the fire loss in the United States, including not only property destroyed, but the maintenance of fire departments, payments of insurance premiums, so-called preventive agencies and other incidentals, amounted to over five hundred million dollars in 1906, or over 80 per cent. of the value of the total new building construction. This is equivalent to an annual tax of over six dollars per capita. By comparison, in six of the large European countries, the fire loss averaged only thirty-three cents per capita, and this in spite of the fact that the appliances and facilities for fighting fires in the United States are greatly superior to those in European countries.

The advantage shown in the fire losses of other countries is due to the more extended use of building materials which are more or less fireproof.

The laboratories above referred to have carried on a series of tests to prove the relative value of structural materials in resisting fire, and the report of these series

of tests carried on has just been issued by the Government, and it shows conclusively the extraordinary value of concrete blocks in this regard.

A short time ago, I saw a very able article in one of the magazines, which went on to say that the proper way to reduce the loss by fire was to prevent it. A wiser statement never was made. Canada, therefore, has it within her own province to recommend and devise methods for the prevention of the tremendous drain caused by fire losses such as we have experienced on our side.

Let me show you a little more clearly just what the United States suffers annually from this one cause of waste. The annual fire expense in our country, as I have said, has reached, in some years, the enormous sum of five hundred million dollars, with a death list of seven thousand persons. This property loss represents a loss that does not include the loss of profits to the business man who has been burned out for the time, he is out of business.

In foreign countries, there is an average loss of less than one fire per year to every thousand of population, while in the United States, we have four and a half fires per year for each thousand population. Natural conditions are, however, conspiring to bring about a change in this regard. The increased cost of combustible building materials has made us look for something else, and this has called public attention to the extraordinary fire resistive qualities of concrete.

An active movement has been started to secure fireproof construction, especially in our public buildings. Today there is scarcely a city of any size where there is not a strong sentiment in favor of fireproof construction for all public or semi-public buildings. How little has been accomplished, however, is shown from the fact that with some twelve million buildings in the United States, there are only eight thousand which are even so-called fireproof, while, in all probability, two thousand will cover the number which are actually fireproof.

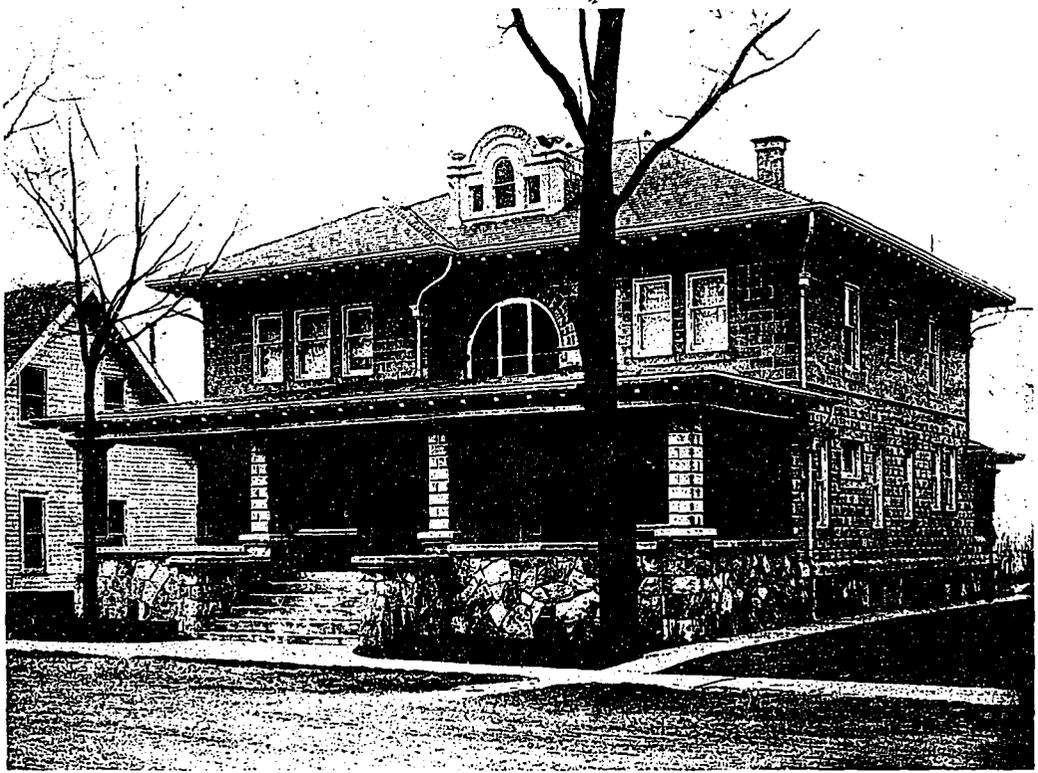
While the largest proportion of our fires occur in dwellings, yet there is an average weekly destruction of three theatres, three public halls, twelve churches, two hospitals, two asylums, two colleges, twenty-six hotels, three department stores, six apartment houses, two jails, and sixteen hundred dwellings.

The press, usually alert and active in all our great reforms, has taken up this question of loss and waste by fire, and is doing effective work in calling the attention of the public to the necessity for better construction. This agitation has, in a measure, accelerated the manufacture of building materials that are best calculated to form the greatest resistance to fire. This is most noticeable in the case of Portland cement and cement products, and particularly in the rapid development and use of concrete blocks and reinforced concrete.

This subject of fire loss means much to Canada. Your country is growing, and growing fast. It is incumbent upon you to develop the means by which you will prevent making such economic mistakes as we have made.

The first requisite is to see that a proper, fair building by-law, of an intelligent character, is passed in each of your cities and towns. Do not attempt, however, to build your by-laws on some of the silly ordinances which have been passed in the United States. In passing some of these ordinances which I refer to, influences were at

*Paper read before the Second Annual Convention of the Canadian Cement and Concrete Association at London, Ont.



Residence of A. H. Brown, Leesburg, Indiana. Built of Bevel and Plain Cement Blocks. Note the Arched Window over the Verandah, and the Perfect Adjustment of the Material at all Wall Openings. Cosmo C. Elwood, Architect.



Residence of Dr. Dickerson, McComb, Mississippi. An attractive Dwelling Structure in which the Walls are Constructed of Plain Concrete Blocks with Bevel Block Trimmings.

work to favor certain forms of building materials, to the exclusion of others. Indeed, in a certain notorious case, the mayor of a great city was hastily summoned from his vacation in the mountains to veto a city ordinance that had incorporated in it a provision which would effectually prevent the use of certain building materials to the exclusive benefit of certain other materials. The mayor vetoed this ordinance, demanded that fair provision be incorporated in the measure that would make for the safety and protection of the people in their right, and at the same time secure equity and fairness for all.

Then, too, it sometimes happens that the ignorance of the extraordinary character of concrete in strength, has led the makers of some of these ordinances to require an excessive width of wall for ordinary building purposes.

It is clearly recognized on our side that an 8-inch concrete wall, whether it be of monolithic or hollow block construction, is sufficient for all buildings up to two storeys in height. Indeed, the common practice is to permit the substitution of an 8-inch block or monolithic wall, where 10-inch or 12-inch brick walls are specified.

The extraordinary, inherent, compressive strength of the material makes this good practice. There is reason in all things, and I sincerely hope Canadians will see to it that they do not go to the opposite extreme, in seeking to secure permanence of construction. It is easy to waste money in excessive requirements, just as it is to err in not taking sufficient precaution to secure the best results. When due regard to the common factors of safety necessary to produce permanence is taken, anything more than that is an extravagance.

I, therefore, hope that in drawing your by-laws, and in seeking to secure what I strongly recommend, i.e., safety and permanence of construction, due consideration will be given to provisions that will protect the builder as well as the public.

The peculiarly fitting character of concrete to Canadian resources is well known. It is a fact, I believe, that while you have extraordinarily fine forests and splendid deposits of stone in certain sections, there is a wide section of your country that is devoid of structural materials, but which is blessed with gravel and sand of a splendid character. Moreover, that you have deposits of limestone and marl that make it possible for you to produce cement in unlimited quantities.

This means you have at hand everything necessary for the production of concrete of the highest grade, that will enable you to build with great saving to yourselves, and at the same time secure absolutely fireproof structures at low ratios of cost.

Moreover, I believe Canada is to be congratulated because of the fact that, in the development of the concrete business, the manufacture of concrete blocks has not been productive of the extraordinary amount of poor work so frequently seen in the United States; in other words, you have been a little slower to take hold, but your disposition is to produce good work. With us, a lot of small people engaged in this industry in the beginning, without proper financial means to carry the business on, and without the proper business training to make it a success.

This condition is being rapidly changed, however, and now people of large means, thorough business training, and with qualifications fitting them to carry on this industry in the best possible way, are now engaging in the manufacture of concrete stone, with the result we see evidences on every side of the adoption of concrete in this form in the building of large structures, and in its use in combination with reinforced concrete and steel building operations.

What has happened on our side will happen with you. You have this distinct advantage, however, your patent laws are a little better enforced than ours, which has prevented the influx of cheap, crude machinery for the production of concrete blocks, and I have no hesitation in saying to you that the cement block, properly made, will

be one of the greatest economic assets you will have in your building operations in Canada.

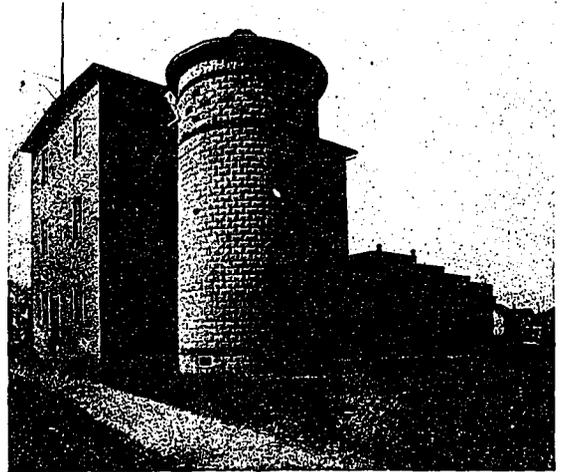
I take it, also, in Canada, fewer mistakes have been made than with us, for it has been remarked to me many times that the business is in a position to develop naturally, along the most approved lines, with machinery and appliances convenient to do the very best work possible.

I therefore say with confidence, that the development of the concrete block business in your country should be coincident with your prosperity and development. Good concrete blocks cannot be produced without proper methods of manufacture, and it is essentially necessary that careful supervision and scrutiny be exercised by your public officials to see that this material is made worthy to be used in all kinds of construction.

The saving to be made, by reason of the use of cement blocks, is extraordinary. Without any hesitation whatever, therefore, I say you will not only save millions and millions of dollars in the first cost of construction, but you will add to this constantly, by reason of the permanence of your buildings, and their fire-resisting quality.

Of all the drains and wastes you may be threatened with, there is none that is so vital, so useless, and so easily preventable as that of fire. An ounce of prevention, in this regard, is easily worth ten pounds of cure.

Concrete blocks are now being produced of the most artistic and beautiful kinds. The development of this industry has gone forward until architects and builders have come to realize that concrete in unit form is destined to play a very important part in all future construction

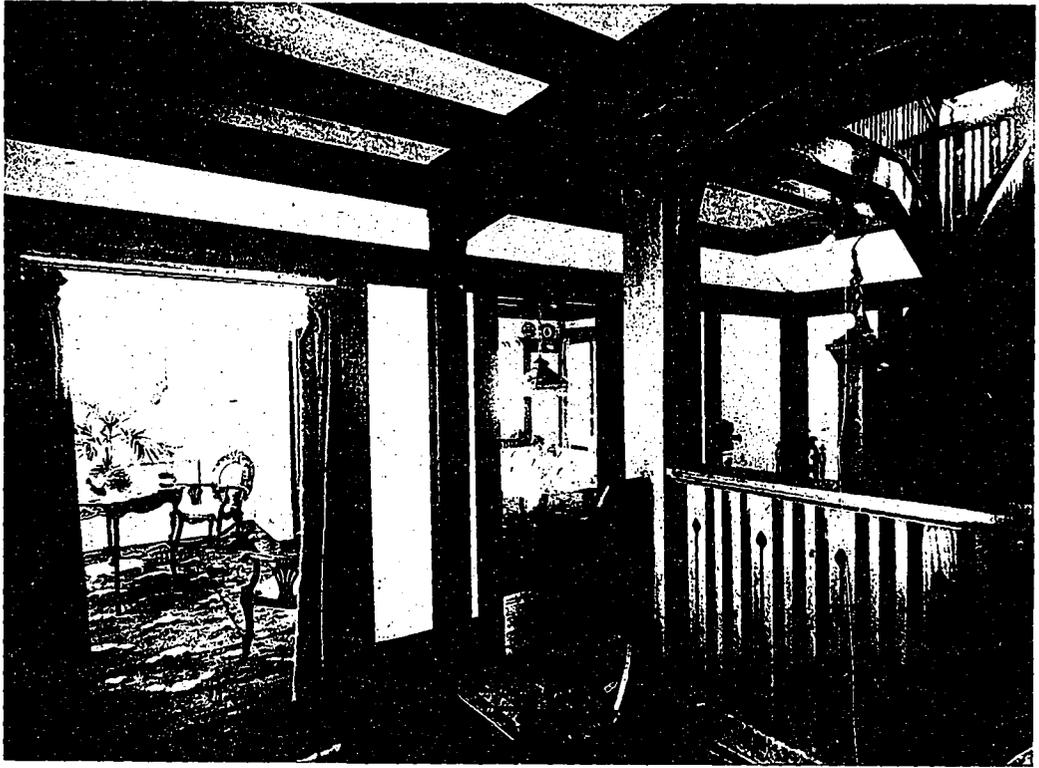


Grain Bin Erected at Marlon City, Michigan. Type of Building in which Concrete Block Construction, Owing to its Durable and Fireproof Qualities, is Being Extensively Employed.

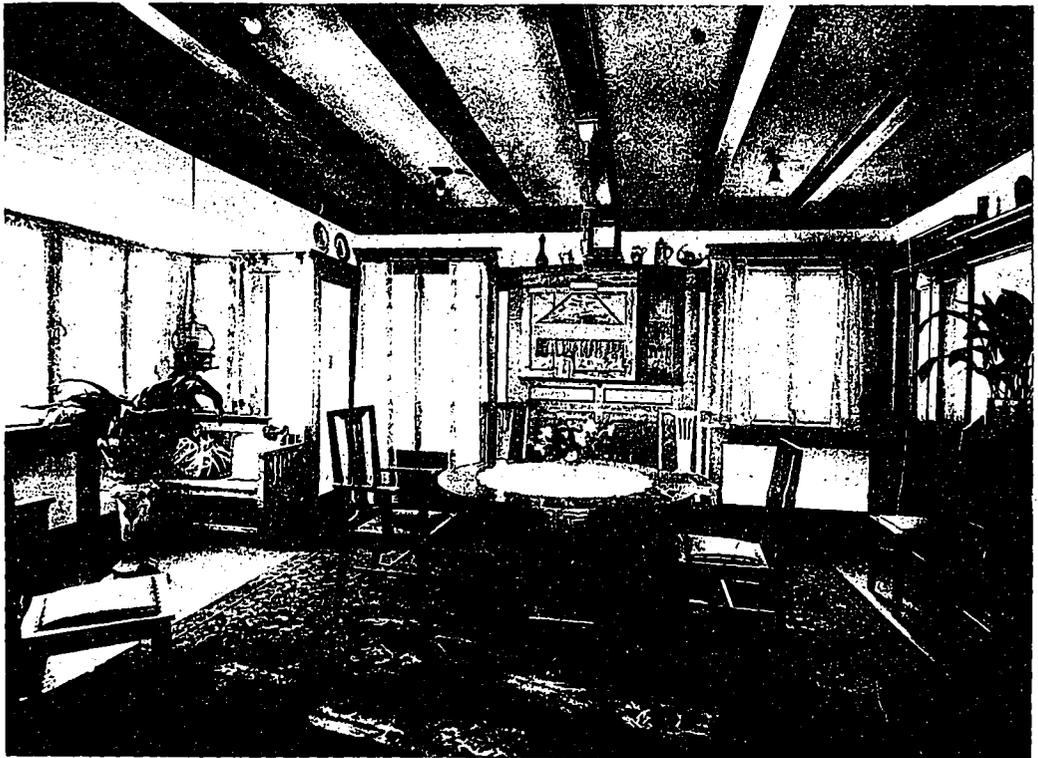
work. Under a process lately developed, blocks are now made that are absolutely impermeable to moisture, dense, sound, and durable as time itself. Blocks are made with faces of granite, marble, limestone, and other effects, as well as being produced in a variety of colors that lend themselves easily to any scheme of color decoration.

Indeed, the development of the concrete block has reached that point that one of our great millionaires in the United States is building a country residence constructed entirely of blocks, that will be one of the finest and most palatial country seats in the United States. To give you some idea of what he is doing, I may say he has already built a massive residence for himself, a large cow-barn, piggery, dairy and power house, and purposes building in all sixteen residences, twelve large barns, four 50-foot silos, a power house, chicken houses, and other buildings, as well as four miles of concrete fence, which will take in all more than one million concrete blocks. In this work alone more than twenty million bricks will

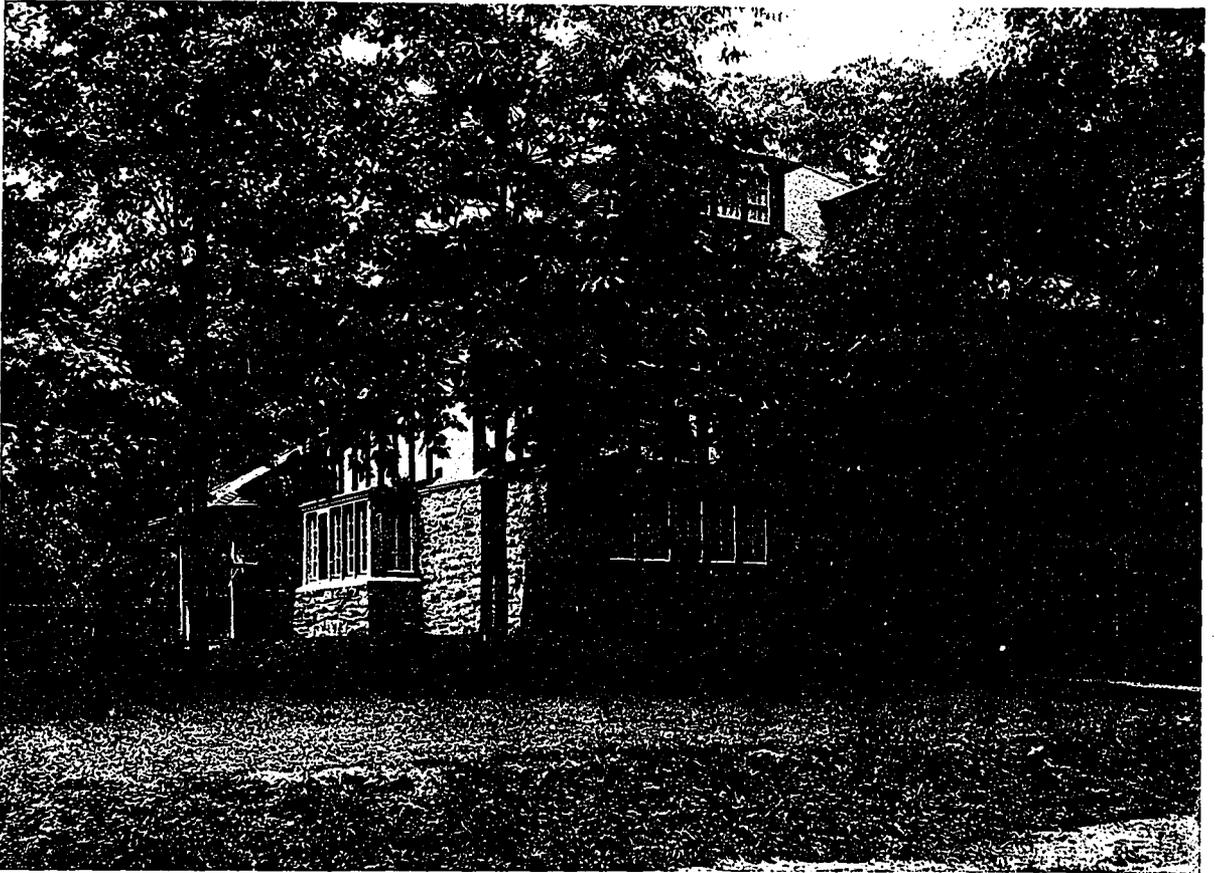
(Concluded on page 86.)



Entrance Hall, Residence of G. E. Bryant, Castle Frank Crescent, Toronto, Showing the Lower and Upper Staircase and the open Arrangement of the Interior. Messrs. Chadwick and Beckett, Architects.



Dining Room, Residence of G. E. Bryant, Castle Frank Crescent, Toronto. Note the Proportions and General Treatment of this Interior, together with the Built-in Buffet and Large Comfortable Seats in the Bay-Window projection. Messrs. Chadwick and Beckett, Architects.



Interesting Stone and Half-Timbered Residence of Mr. G. E. Bryant, Castle Frank Crescent, Toronto. Messrs. Chadwick and Beckett, Architects.

RESIDENCE OF MR. G. E. BRYANT, TORONTO.—An Attractive “Rosedale” Dwelling Structure with an Interesting Natural Setting.—Built of Stone and Half-Timbered Construction.—Description of Its Plan, Color Scheme and Interior Features.

FROM A RESIDENTIAL STANDPOINT, Toronto is essentially brick. Journey in what direction one will, houses of this construction are greatly in the preponderance. It is only within the past few years that stone work as the principal material in domestic wall construction has to any extent put in its appearance, and even with the more pronounced development that has recently taken place in this direction, the scarcity of homes of this type still renders them more of an abstract quantity than otherwise.

What is lacking in number, however, is perhaps more than offset in quality, as most of these houses are both noteworthy in design and carefully considered in construction, the workmanship in fact comparing most favorably with the beautiful and substantial character of masonry found in other parts where this latter material is more extensively employed.

Several attractive residential structures in which the use of stone work is seen to advantage, have lately been erected in Castle Frank Crescent in the east-end of Rosedale. Notable among these is the interesting home of Mr. G. E. Bryant, illustrated in this instance. This dwelling is a south fronting house situated on large terrace grounds, which give the owner a delightful view of the ravine and the natural scenery with which this suburb abounds.

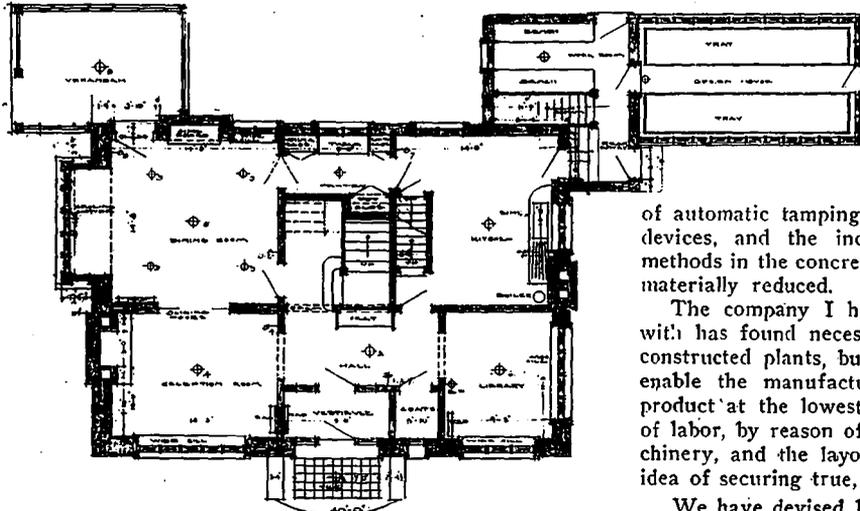
The walls of the house are of Credit Valley rubble masonry for the lower storey with half timber work and

stucco plaster above, and the color scheme of cream, greys, browns and terra cotta, together with the rough surface of the stone and the red tile stain of the shingle roof, forms a combination which blends exquisitely with the dense foliage of the trees and other like advantages that the site provides. The buttresses at the corners of the lower walls emphasize their sturdiness of construction, while interesting small windows and modest dormers gives the house that charm of simplicity so greatly to be admired in structures of residential design.

Passing through the entrance, with its direct projecting hood, one enters the vestibule and the hallway, which is rather open in its arrangement. There are two open doorways connecting with the reception room and dining room, and an interestingly designed staircase, leading to the second floor. This interior is finished in Georgia Pine stained in Flemish Oak, with strapped dado walls and a heavy beamed ceiling. Adjoining the vestibule is a coat room, while to the right of the hall is the library which is well lighted by east and south windows.

The reception room, which is finished in hard wall plaster and has a large open fireplace, is connected by sliding doors with the dining room, which is situated at the rear. This latter room is especially well proportioned, and intensely homelike in its architectural treatment, a feature of the general scheme being the built-in side-board, and the large seats which are placed at either side of the bay window projection. The woodwork here is

similar in finish to that of the hall and library; the ceiling is beamed and the walls are dadoed with broad straps extending up to the plate rail, which is placed at a height of seven feet. A richly pannelled door opens into the pantry having built-in china closets and serving table) which

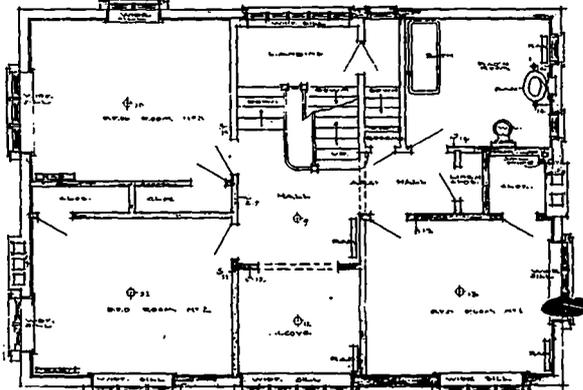


Ground Floor Plan, Residence of G. E. Bryant, Castle Frank Crescent, Toronto. Messrs. Chadwick and Beckett, Architects.

occupies the space at the rear of the staircase. This brings the dining room and kitchen consequently together, and at the same time, keeps the latter well apart from the rest of the house. Off the kitchen is an entry for tradesmen, and a passage to the workshop and large green house, which is carried out in the shape of a projecting wing at the northwest corner.

The second floor provides three large bed rooms, an alcove and a modernly-equipped bathroom of spacious dimension. All bedrooms have roomy clothes closets, and a cheerful scheme of decoration. In addition to these are two unfinished attic rooms which are adapted to storage purposes.

A special feature in connection with the house is a



First Floor Plan, Residence of G. E. Bryant, Castle Frank Crescent, Toronto. Messrs. Chadwick and Beckett, Architects.

formal Dutch garden which the architects, Messrs. Chadwick and Beckett, have planned as part of the general scheme. This garden is situated at the rear and can be reached from either the green house or the spacious verandah off the dining room.

RECENT ADVICES FROM EDMONTON state that two companies with heavy financial backing have been organized to exploit the sandstone deposits in Entwistle, situated in that electoral district. The stone is said to be of an excellent quality for building purposes, and it is understood that quarries will be established in the near future to operate the property.

CONCRETE BLOCK CONSTRUCTION.—By J. Augustine Smith.—Continued from Page 83.

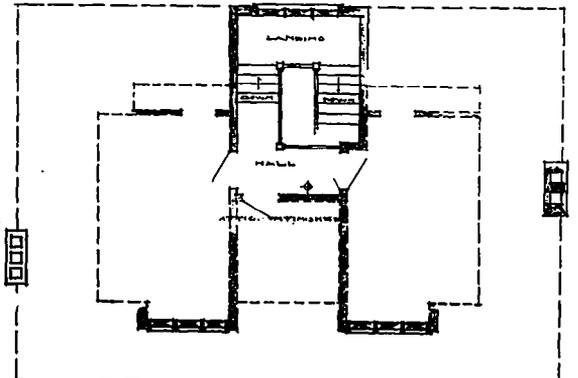
be displaced. This will give you an idea of the manner in which concrete blocks are now being used on our side.

Now, as to the comparative cost of good concrete block construction as against other forms, I stated to you in a paper I read before your convention last year, some of the costs which this form of construction made possible. Since that time, in the development of automatic tamping machinery, loading and trowelling devices, and the incorporation of modern, up-to-date methods in the concrete block plant, these costs have been materially reduced.

The company I have the honor of being connected with has found necessary the development of modernly constructed plants, built upon economical lines, that will enable the manufacturer to produce his manufactured product at the lowest possible cost of manufacture and of labor, by reason of the perfect installation of his machinery, and the layout of the plant, designed with the idea of securing true, economic results.

We have devised 120 different types of plants for the manufacturer to select from, ranging from the automatically equipped plant, in which everything is done by machinery, down to the one-machine, one-man plant, in which everything is done by hand.

Moreover, we have carried along a series of tests to demonstrate the necessity for a proper grading and selec-



Attic Plan, Residence of G. E. Bryant, Castle Frank Crescent, Toronto. Messrs. Chadwick and Beckett, Architects.

tion of the aggregate used. This is a very important item, so important, indeed, that we strongly urge the assaying and rectification of the aggregate used in manufacturing blocks, so as to secure the greatest possible saving in the cement necessary to bind the whole into a concrete mass.

Furthermore, we have found it necessary to go into a series of tests that will demonstrate the exact amount of water necessary to use to produce the best results, and we have found some astonishing features in the tests so far carried on. It will require about eighteen months to complete this investigation, and I feel I can say we will be prepared at the end of that time to give to the concrete world results that will prove of great benefit to the manufacturer of concrete blocks.

In closing, I wish to say that the development of this industry in Canada is a very vital subject with you, particularly in the development of the business on proper and rational lines. If this is done, I believe you will agree with me, in the course of the next few years, it will represent a material advantage to you in the saving and economies it will secure in the use of the concrete block as a building material.

RURAL SCHOOL BUILDINGS IN ENGLAND.—Paper Giving Detailed Statement of Investigation Recently Conducted by Several English County Councils, Read Before the British Society of Architects.

THERE IS NO TYPE of building that is more grossly neglected in both design and construction than the average Canadian rural school building. The agriculturalist, even in our so-called premier province, Ontario, looks upon the country school as a necessary evil. He, as a rule, believes that he has made a great sacrifice for the benefit of the community and his posterity by depriving himself of the help of his sons and daughters on the farm by sending them to school during the winter season. He cannot see why a school teacher should get a greater salary than his hired man. In fact in his mind the school "marm" does not earn as much as a good hired man, in that the school teacher only works nine months in the year, five days in the week and only six hours in the day. So much so has this underestimation of the importance of the services of the country school teacher become imbedded in the mind of the farmer that the Provincial Department of Education of Ontario found it necessary to enact a law placing a minimum upon the salary that should be paid to teachers of rural schools.

The same lack of appreciation of the importance of public school training, this same parsimonious attitude of the farmer toward the employment of competent teachers is shamefully apparent in the character of buildings provided for rural school accommodation.

The impecunious conditions imposed upon rural school boards, together with the penurious manner in which they have been accustomed to conduct the affairs pertaining to public school education in their several individual school sections has resulted in the erection of school buildings notable for their lack of every essential in design, equipment and sanitation. The rural school officials as a rule know little or nothing about school design, and the country carpenter usually employed to plan and erect such buildings in most cases knows less.

The school, when completed, is not one which the members of the community hope to look upon with pride, but is viewed as an expensive luxury forced upon them by conditions with which they are not in sympathy and it may be said that our schools do not fail to show plainly the conditions under which they were erected.

These unfortunate conditions will never be changed until the rural school boards are awakened to the fullness of their responsibilities, by the pressure of public opinion, or until the Government undertakes to enact such regulations governing the design, construction and equipment of rural schools. It is only when some such movement occurs that the necessity for the employment of competent school architects will be established in the untrained mind of the rural school officials. It is, however, gratifying to note that some of the larger towns and villages are commencing to realize the necessity for the employment of trained men to design their schools. Now and again we find towns advertising for architectural services, and although the conditions named in the programme are often such as to preclude all possibility of the employment of any self-respecting architect, it, nevertheless, marks a step in the proper direction.

That designing of a rural school building requires more than ordinary experience gained in the general practice of architecture, is shown conclusively in a paper recently read before the Society of Architects, London, Eng., by G. Topham Forrest, architect to the Northumberland Education Committee.

After the passing of the Education Act of 1902, most of the County Councils throughout England had exhaustive surveys made of all the school buildings within their

administrative area, including all the non-provided schools of every denomination, so as to form some idea as to how the buildings stood with regard to sanitation, water supply, heating, lighting, ventilation, planning, and state of repair generally.

This work was of a very large order, and one which entailed a very considerable amount of labor. Very exhaustive reports were drawn up by county architects and others, and as Mr. Forrest assisted at that time in the compilation of reports, embodying detailed inspections of nearly 1,000 of these buildings, his views on this particular subject are of considerable interest to all those concerned with school design and equipment. The conditions prevalent in many of the rural schools in England in regard to sanitation, heating and ventilation, plan and equipment, as outlined by Mr. Forrest are common to most of our Canadian rural schools.

His suggestions as offered in the following excerpts from his paper will be of value to school architects and will further prove beyond all possibility of doubt that the successful designing of rural schools is not the work of the village carpenter but rather a study for the thoroughly trained and experienced architect.

Sanitation. System of Closets in Schools.

In fifty per cent. of rural schools the form of closet in most use is either an open or closed midden privy. These are usually situated in localities having no water supply, or public drainage system. Some of these middens are cleaned out monthly, others half yearly, and many are not cleaned out for periods extending over twelve months. The result of this is that in many schools the effluvia penetrate the school according to the direction of the wind; these privies consequently become abominations.

The tub, pan or pail closet is an improvement on the very insanitary and unwholesome midden privy. Covered midden privies, and open midden privies ought to be condemned as utterly unfit for the purpose. I have always considered these middens abominations, although they are still looked upon with favor by many rural authorities, probably because they require less looking after.

For all practical purposes, and especially for the sake of cleanliness, the pail or tub is the best type of closet, if it can be cleaned out every few days. In urban districts this can be managed; but in rural districts someone ought to be made responsible, otherwise the nuisance is not mitigated.

Dealing with schools situated in districts having a public water supply, but no main drainage, where water closets were used, the problem of disposal is generally solved by the use of the cesspool. Into this cesspool is taken the crude sewage and the effluvia from the urinals. Cesspools have still to be resorted to under certain conditions, but they are at all times a nuisance, and as lavatory waste has to be treated as soil drainage, they soon become filled and the contents have to be continually pumped out. The more perfect systems of sewage disposal are difficult to apply on a small scale, but the modern bacterial method of purification by septic or sewage disposal tanks is advisable for larger schools erected under adverse conditions of public sewage disposal, and if the initial outlay is a little greater the cleanliness of the system will amply compensate for the expenditure. I would strongly advise the use of septic tanks.

In coming to the last class of closets, viz., those on the water carriage system, what are known as trough closets have their disadvantages. Forms of connected

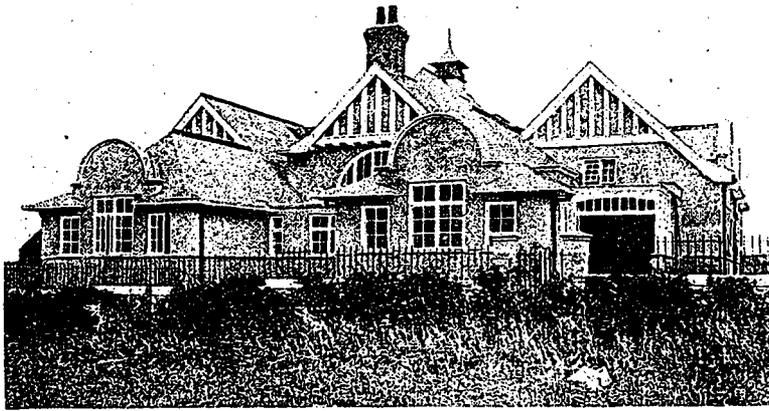
closets are, however, trapped from each other by water standing in the pipe between. These are technically known as latrines, and are emptied by a syphon discharge. This is a great improvement upon the trough closet, but this system also has its disadvantages, in so far as many children can use the closet before the automatic flusher goes off. I have been the means of in-

There can be no doubt that in most of the rural districts unprofessional labour, is largely employed, chiefly for the sake of economy. The village carpenter has been responsible for all sorts of alterations and additions to buildings; and the construction of drains has been left to the agricultural labourer. The laying down of a proper and efficient drainage system to all our schools in need of such is a large undertaking.

I have always favored a large hall to schools of 300 and upwards. My argument in favor of its use being that it materially helps the ventilation of the classrooms during the winter months, on account of the comparatively small area architects are limited to at the present time in the designing of these rooms.

The hall can always be freshly ventilated and the glass screens between it and the classrooms should be made with opening sashes so that the air can be drawn into the classrooms. Assembly halls act as large air wells to the various classrooms, more especially if one side has an external wall well supplied with large windows, which should be made to open. The exact shaft in the ceiling should also be under control. The temperature can be kept lower than that of the classrooms by having a separate circuit from the boiler. The argument in favor of ventilating classrooms

through the central hall is that fresh warmed air is admitted through both sides of the room over the radiators in the outside walls of the classroom, and through the screen dividing the room from the hall. If the ventilation and temperature of the hall such as above described were properly regulated, the ventilation of the classroom would be materially helped, especially in the winter months when it is impossible to open the windows, and when the fresh air openings behind the radiators are entirely deficient for the needs of the full class.



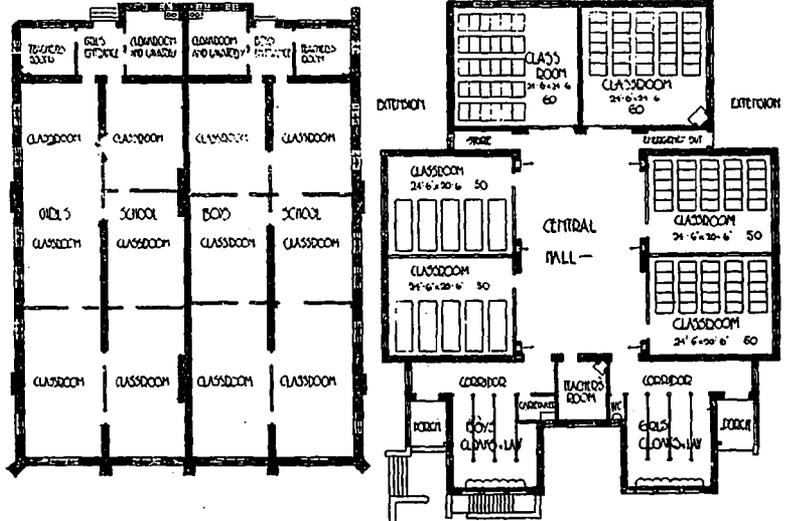
School House built at Westerhope, Eng., by the Northumberland County Council. Note the general architectural treatment, so decidedly in contrast with the average rural school building in Canada.

roducing into the schools throughout the County of Northumberland a type of closet very similar to those used for lunatic asylums. This closet is especially adapted for children, being narrow and elongated in shape. The elongation of the basin means less soiling of the back, and giving a very satisfactory flush with two gallons of water. The inspection cap is large enough to admit of easy access in case of chokage, but there is less temptation to put articles into this form of closet. The cistern is easy to pull, and the smallest child can set up the flush. I must admit that I dreaded somewhat the introduction of this variety, on account of the children forgetting to pull the handle after use; but the result was entirely satisfactory, and has been most encouraging.

Far too little attention is given as a rule to the construction of urinals. Speaking generally, they consist of either an open channel, or a primitive sort of trough, without any proper lining or divisions. Some are flushed by rain water conducted usually in an iron pipe from the rain eaves, others are flushed in a perfunctory sort of way by hand, but by far the greatest number has no arrangement whatever for cleaning purposes, nor have they any system of flushing.

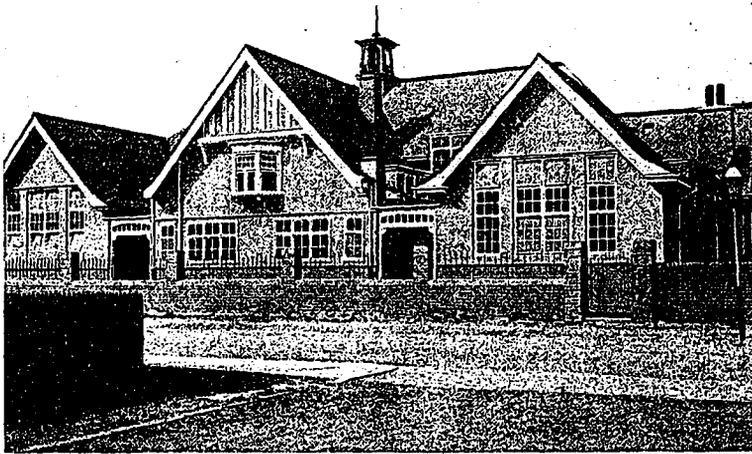
School urinals should be properly divided and made of some impervious material, non-absorbent, with a lining of cement, or better still, enamelled fireclay, with an adequate supply of water for flushing purposes. Slate should never be used unless treated with coal tar to prevent absorption and scribbling by the children.

With regard to soil drainage and drainage work generally, experience has taught that the system of entrusting the construction of drains to odd labourers with intermittent supervision is fraught with evil consequences.



Type of School now obsolete in England, and plan of the Northumberland County Council School at Westerhope. A comparison of these plans gives an excellent idea of the vast improvement both in arrangement and hygienic advantages that has been made in the construction of English rural school buildings.

Another advantage of the central hall are that the glazed screens between it and the classrooms help considerably in the lighting of these rooms. The light from this side is shaded, leaving the chief source of illumination from the left. By doing away with the central hall and substituting a low corridor, as is done in some



School House, built by the Northumberland County Council at Newbiggin-by-Sea. An attractively designed small structure with interesting gables, effective window grouping, and well-placed entrances.

schools, so as to get the opposite walls of classrooms external walls with windows in each wall, there is always considerable risk of the lighting from the right being too strong for the scholars.

Cloakrooms.

All cloakrooms should be near entrances and have cross ventilation. 12 in. apart for cloakhooks is allowed in secondary schools, and 6 in. in elementary schools. If 12 in. is reasonable distance for the garments of the well-fed, surely 6 in. is too little for the poorer and less-cared-for children. Reform here again is necessary. Mats and scrapers should always be placed immediately inside cloakrooms, so as to prevent as much dust as possible getting into the school. Mosaic floors, if properly laid, are the best, but ordinary cement concrete is quite satisfactory and much cheaper.

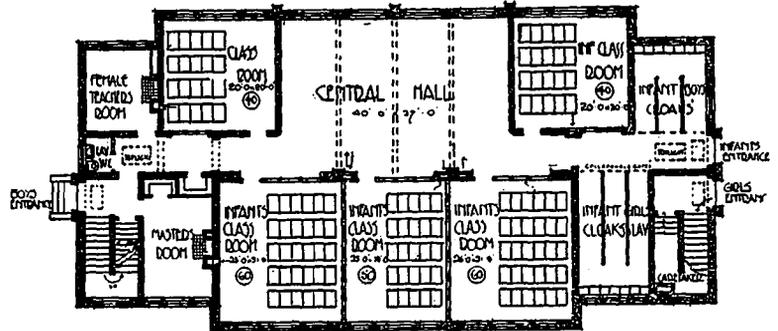
Classrooms

In planning a school, attention should be concentrated first and foremost upon the arrangements of the classrooms. As regards size of classrooms, the tendency now is to reduce these as much as possible. It is very common to find schools with all the classrooms the same size, say to accommodate 60, and I venture to think this is a mistake. Rooms should be planned so that the children can be seated in the best manner for being taught. The rooms must be grouped compactly and conveniently so as to secure proper organiza-

tion and supervision. It is very important to remember that the accommodation of every room depends not merely on its area, but also on the lighting, the shape of the room and the position of the doors. Rooms should be planned as nearly approximating a square as possible. In England glazed bricks or tiles have up to the present time been the most suitable material for dados on account of the small upkeep in the way of maintenance, but now some authorities on school work have stepped forward and protested very strongly against the use of glazed surfaces for classroom walls. The reflected light on their surfaces may have something to do with it, and being non-porous may not be considered hygienic for crowded rooms; but this is a matter of opinion, and personally I favor glazed bricks or tiles.

Warming and Ventilation.

In most of the old familiar schools in England of the L shape type, the ordinary fireplace is still one of the most common means of heating. It is of course cheerful and healthy, on account of the ventilation insured by it, and it is surprising what a number of schools are solely dependent upon these open fires for getting rid of the foul air. This form of heating, however, cannot be regarded as sufficient. Uniform warmth



Ground floor plan, Newburn Hall, built by the Northumberland County Council. Note the large central hall and position of the entrances.

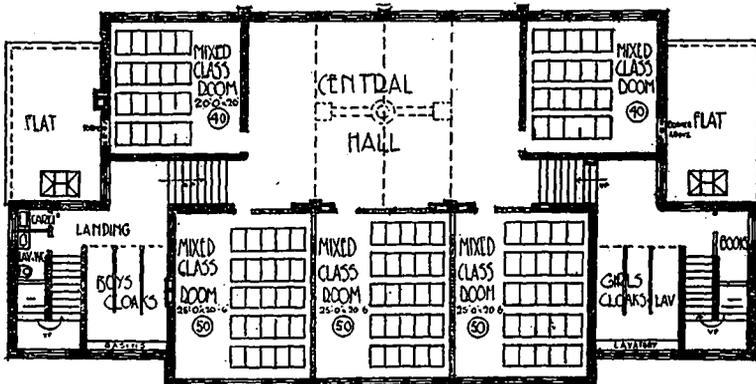
can never be obtained in a room heated by fires only. A great evil of the open fire is the current of cold air continually passing along the floor level causing cold feet to the children. If open fires have to be put in, the following points should be attended to:-

- (1) Firebrick should be used instead of iron.
- (2) The fireplace should be narrower with the back leaning forward.
- (3) The space beneath the fire should be closed.

Ventilating grates are useful if no provision has been made for warming the cold air, as they have great warming power and good control of combustion.

Stoves.

If stoves are not properly constructed, they are a very dangerous form of heating. Stove flue pipes are very often constructed in the worst possible way, the flue stack running up inside the room, instead of being taken horizontally through the wall at the level of the stove and then carried up the outside of the wall. The joints of the flue pipes



First floor plan, Newburn Hall, which follows out the arrangement worked out in the lower hall, thus providing adequate corridor space and a convenient staircase arrangement.

are often very slack, the metal itself pervious with time and wear, emitting into the room products of combustion that must be and are detrimental to the health of the scholars and teachers. Ventilating stoves give very satisfactory results, but here again care in fixing is necessary.

High and Low Pressure Hot Water.

Heating by hot water constitutes one of the best and simplest means of warming schools. The low pressure system is more prevalent, which has one great feature in its favor, namely, its adaptability to any method of ventilation. The practice of arranging hot water pipes in channels below the floor with perforated iron gratings at the floor line, was commonly met with, but should be condemned. It is dangerous, tends to uncleanness, and there is always a great loss of heating power.

In laying down low pressure installation care must be taken to see that the basement heating cellar is properly drained, and that the same is not flooded after a heavy rain. Where the sewer is too shallow to take away the water, a system of low pressure heating has been adopted, having the boiler on the ground floor level.

In most rural schools the elementary principles of ventilation were entirely absent. Take for example a school where the only means of ventilation is the open fireplace and window, in some instances, and the windows only in others. The supply of fresh air has been found to be deficient. The exhaled organic matter has made the badly ventilated rooms very offensive. The fresh air to a classroom should never be admitted through a single inlet, but should be relatively distributed to ensure proper diffusion. Fresh air inlets should not be used, the whole area of the classroom window should be made to open. The window openings should be large and regulated by means of rod gearing. At the end of every hour or at every change of class, the whole window should be thrown open and the air in the room will be rendered quite fresh in less than five minutes. Never open windows by means of fasteners, attached to cords, if it can possibly be avoided, for in less than a month from the time they are fixed they will get out of repair, so much so that the teacher will cease to struggle with them, and consequently the windows will remain shut during the various changes of lessons. Rod gearing properly controlled and attached to the whole of the opening sashes, even although it is a little disfiguring and a trifle costly, is an admirable arrangement and one in which the teacher never forgets to carry out his duty of ventilating his room at the proper times.

Outlet Ventilation.

It is an undoubted fact that in many schools the smoke flues from the fireplaces formed the only means of outlet ventilation, the windows in most cases acting as inlets. In addition to the fireplaces, there are two methods usually adopted to carry away the foul air. The first method consists of perforated openings into a false roof without any proper ridge exhaust ventilation to carry the foul emanations away (a deadly practice but exceedingly common). The second method consists of outlet openings in the ceiling of similar description as the first method, but with a communicating shaft from these openings to the external air, and provided at the ridge level with some form of exhaust ventilator or revolving cowl. For the first method of getting rid of the foul air, no condemnation is too severe. The space between the false roof and the ceiling becomes an air chamber, and is usually allowed to become exceedingly dirty. Air drawn into these, therefore, can scarcely escape contamination, and this air is very often breathed over and over again. The second method is satisfactory, provided of course, that sufficient air is given to the outlets. Twenty square feet should be the total area for inlets and outlets to an ordinary classroom.

Artificial Ventilation.

As there is such a great difference of opinion on this form of ventilation, and so much has been written for

and against it, each school should be treated on its merits. Country schools usually of one storey only have been referred to, and if it were attempted to mechanically ventilate such schools serious trouble would be encountered on the score of expense. It is well, however, to know how much air is needed in a school and how to furnish this by exact mechanical means.

In dealing with the ventilation of a school, the three main points to consider are:—

- (1) *Area of floor to be provided for every scholar.*
- (2) *Cubic capacity of the room.*
- (3) *Number of cubic feet per minute which must be brought in and then exhausted for each scholar.*

Lighting.

The principal causes of darkness in the schools revealed by investigation are: insufficient size of windows; windows wrongly placed, *i. e.*, in a corner; lighting area insufficient; classrooms too narrow to give a sufficient angle of light; further extensions built regardless of position; trees obstructing the light; mullions too heavy, so that shadows were cast; panes of glass too small.

The following questions, if attended to might be beneficial in remedying defective lighting, especially in schools already built:—

- (1) *Can children get direct light from the sky by means of windows?*
- (2) *Is the ratio of window glass to floor surface sufficient?*
- (3) *Are the windows on the left hand of the scholars?*
- (4) *Is the color of the walls or the ceilings too dark?*
- (5) *Have the desks been arranged in accordance with the best possible lighting?*

In selecting a site for a school, high ground should be chosen, as it affords more light on account of the height of obstructions being reduced, and it also gives freer play to the sunlight. In building a school, it must always be assumed that the building is to be lighted on all four sides and enough land secured so that the distance from obstructions is sufficient. Windows should always be as large as possible, and the sashes should be glazed with clear glass.

The best light for a classroom comes from the upper part of the windows, windows should therefore extend as far towards the ceiling as possible. In the older schools it is not unusual to find two or three feet of wall space between the window head and ceiling.

With regard to the internal coloring of schools, the plastering of a building should diffuse the light, and should, therefore, be tinted some very light color, almost white. Walls should be colored with very light tints of buff and green.

Artificial Lighting.

In all rural schools, where no supply of gas is obtainable, some form or other of oil lamps must be used. Great care should be taken that a tight-fitting wick is used. Many of the oil lamps, especially the more expensive kinds have their reservoir placed in cup-shaped sconces fitting very loosely to allow of their ready removal. This constitutes a source of danger. Gas lighting by common burners has been practically superseded by the introduction of incandescent mantles, with good results. As regards hygiene, electric light possesses many advantages over gas, but the cost of maintaining is about 50 per cent. higher. There is now, however, on the market a new metallic film lamp in place of the ordinary incandescent, which is claimed will effect a very great saving in the consumption of current.

Folding Partitions.

In supervising the fixing of folding partitions, there should be no large objectionable trough or channel or any unsightly iron straps, and where a trough or channel is used, such a channel must on no account be cut out of
(Concluded on page 94.)

MACHINERY AND TRADE

NEW PREMISES OF MUSSENS, LIMITED.

THE WELL KNOWN FIRM of Mussen, Limited, Montreal, have moved from their old offices at the corner of Victoria Square to a large five-storey building on the opposite side of St. James street. Within the past few years the business of this concern has experienced such a marked expansion as to render the old premises entirely inadequate, and make it imperative for the company to secure larger quarters. In their new building they not only have splendid office accommodation for their constantly increasing staff, but two unusually well appointed floors, arranged solely for display purposes, which gives prospective purchasers a most excellent opportunity to examine their vast line of machinery, equipment and sup-



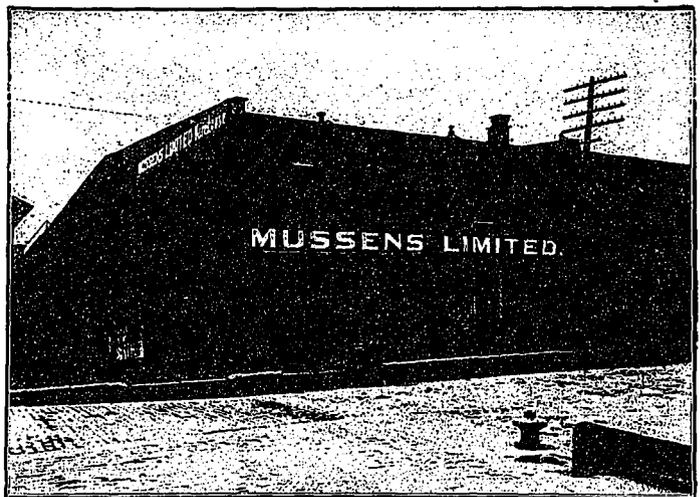
New Home of Mussen Limited, St. James Street, Montreal.

plies. A cut of the company's new building is illustrated herewith, as is also their warehouse, which is exceptionally well equipped for the handling of heavy machinery. The warehouse, which has a capacity for one hundred carloads of stock, has a wide driveway running clear through the building with street openings at either end. This building is most desirably located, being near the railway and navigation lines, thus enabling the company to make shipment in a prompt and ready manner. Mussen, Limited, now have branch offices and warehouses in Cobalt, Winnipeg and Vancouver, and also offices in Toronto and Calgary. From a small beginning this firm has become the largest concern of its kind in the Dominion. Their principal lines are machinery and supplies for rail-

ways, mines, contractors, municipalities and machine shops; and they maintain a well equipped engineering department which looks after the designing, supplying and erecting of complete plants for various purposes, such as quarrying, mining, etc. The company's latest move is but another indication of this firm's rapid and steady growth—a growth which has resulted from reliable and efficient business methods which have characterized this company's business dealings from its inception, and has won for it a most enviable reputation.

FIRE PROTECTION.

FIRE IS ACKNOWLEDGED to be the most destructive of all agencies, and the protection of buildings against its destroying power is a very vital issue to-day. During the year 1909, Canada suffered a loss due to fire of \$18,905,000, and a total loss of life of 219. A loss due to fire of over \$51,000 per day, or, looking at it in another way, a loss of \$2.70 each for every man, woman and child in Canada, must make one pause and consider whether he



Warehouses of Mussen Limited, Montreal.

is doing his utmost to obtain the most efficient fire protection available.

Modern fireproof buildings of steel, brick and cement are practically perfect inasmuch as they are immune from destruction by fire, but the contents certainly do not enjoy that advantage. If the buildings are not fireproof, there is the double danger of fire and the double loss in case the worst happens. It is very evident, on consideration, that there is something lacking in the safeguarding of property and lives. Fireproof buildings and civic fire protection do not satisfy.

The unit which is necessary to complete protection, and which is missing in the great majority of cases, is known as the Sprinkler System. This system of Sprinklers, consists of a graduated series of pipes running through all parts of the building, with outlets spaced in such a way that each covers an area 10 feet square. The pipes are supplied with water from the city mains or from large tanks placed at an elevation at least as high as the roof of the building. In some cases they are supplied by both main and tank. To the outlets are attached the sprinklers. A temperature of about 165 Fahrenheit, melts

the nipple, releasing the water. The pressure of the stream acts on the sprinkler head, causing it to throw a heavy shower of water in all directions through a radius of five feet. The volume of water is sufficient to extinguish any incipient fire and effectually prevent conflagration. Each sprinkler acts independently of the others, so that unnecessary damage, due to the water, is avoided. Valves are conveniently situated so that the stream may be closed off when the fire is overcome. It must not be omitted that, at the same moment in which the sprinkler is released and the stream starts to play, by means of an electrically operated system, an alarm is given to the nearest fire-hall, and the fire department is at once on hand to lend assistance if it be necessary. The system is at once practical, effectual and thorough.

An objection often made to the use of sprinklers is that, situated as they are on the ceilings of the rooms, they are unsightly. There are no grounds for this objection whatever. In the case of new buildings, the pipes may be totally concealed, and the small outlet heads arranged so as to fit in with the architect's decorative scheme. As an instance of successful installation in a building which had been completed, take the case of Ryrle Bros.' "Diamond Hall," at the corner of Yonge and Adelaide streets, Toronto. Here the only parts visible are the sprinkler heads, and they do not at all disfigure the ornamental ceiling. Just now the Holt Renfrew Company's building, corner of Yonge and Adelaide streets, which is being remodelled, is being equipped with sprinklers. Both of these installations are the work of the General Fire Equipment Company, who have been most successful in protecting buildings against fire in this way.

There is another phase of the situation to be viewed. Besides the immunity from fire loss, which the system affords, there is a decreased insurance rate. This item is one of no mean account. The insurance underwriters make great reductions in rates in cases of buildings containing the system. An average reduction of at least 50 per cent. and reaching as high as 70 per cent. gives an idea of the advantage: It is in fact an investment.

Consider a specific case. An owner has been paying 2½ per cent. on a risk of \$400,000, and he has the sprinkler system installed. The rate is dropped to 1 per cent. and he effects a saving of \$6,000 yearly on an investment of, say, \$15,000 to \$20,000, which is a very profitable rate of interest on the cost of installation. The rate is determined, of course, by the occupancy and the value of the stock carried in the building.

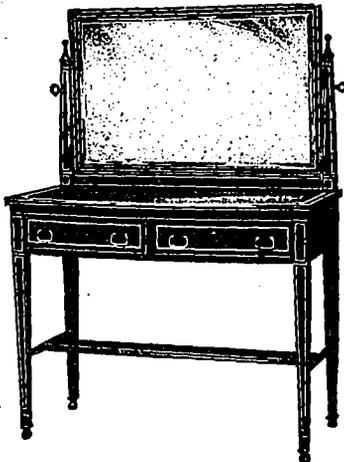
When one reasons that the system of automatic fire protection which has just been outlined, is a practically perfect safeguard, is an excellent investment from the insurance rate standpoint, and in no manner detracts from the decorative effect of the building, he realizes that he requires the Sprinkler System.

The General Fire Equipment Company has given thorough satisfaction in all their work. They cause no inconvenience or annoyance when putting the system in a building which has been erected some time. A copy of letters attesting to the efficiency of their sprinklers will be gladly sent to anyone interested, upon application to the company's offices at 72 Queen street east, Toronto.

EADIE-DOUGLAS, LIMITED, prominent among dealers in building materials and specialties in Canada, have just removed to their new premises at 12-14 University street, Montreal. The building has been entirely remodelled throughout, and is ideal in arrangement to meet this firm's rapidly growing requirements. The ground floor front is finished in Burmantofts Marma Terra Cotta, giving a striking exterior effect. The ground floor, which is spacious and handsomely decorated, contains a large show room and offices for the salesmen. The show room is well adapted to exhibit the superior products handled by the firm. The two upper stories contain roomy, well fitted, and well lighted offices, part of which will be occupied by the concern themselves. Other firms having offices in the building are The Terrano Flooring Company of Canada, Limited, the Insulyte Company, Limited, and the Dominion Fireproofing Company, Limited.

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THE STANDARD IDEAL Company, manufacturers of "Alexandra ware" and other high grade porcelain enameled plumbing products, have moved their Montreal office and sale department from 128 Craig street west to 155 Notre Dame street west. The new premises afford splendid advantages for display purposes, and the accommodations in general are admirably adapted to the company's rapidly growing requirements. Montreal architects and other customers on telephoning this firm will avoid delays by asking for Main 7499.

RURAL SCHOOL BUILDINGS IN ENGLAND.

—Continued from Page 90.

the wood floor of the school room, but a straight board must be put down in direct line of partition with blocks, through which the maker of the screen must cut his own groove.

Essentials of Design.

There are many other discrepancies in rural school design and construction not mentioned above, but progress must be made step by step, and while more thought should be given the real essentials of school design, it must be admitted that any aspirations which architects have in this direction would be very much aided, if the public who are their clients, could be got to think and see more justly about the essential qualities of the design of schools. Why should the expenditure on school buildings be cut down to a minimum of cost per head, and why should the cry always be for bare utilitarianism?

At the age of six, when the average child first goes to school, practically everything he sees is new and interesting and worthy of deep consideration. His brain gets no rest from the time he wakes to the time he goes

to sleep at night, surely then, schools ought to be things of beauty. Educational buildings must always furnish a most imposing factor in the social structure of a community. In England one sixth of the entire population is enrolled as pupils in elementary schools. It is obvious, therefore, that the institutions designed for the training of these to whom the destiny of the nation is to be trusted, should be safeguarded at every possible point.

THE SHIPYARDS AT ESQUIMALT, B. C., owned by Bullen Bros., are reported to have been sold to an English Syndicate, which will greatly enlarge the present facilities, and increase the size of the dry docks to accommodate naval and merchantmen vessels of the largest type. It is understood that the purchase was made following the decision of the Government to establish a Canadian navy, and that the company anticipated tendering on the construction of vessels of this character.

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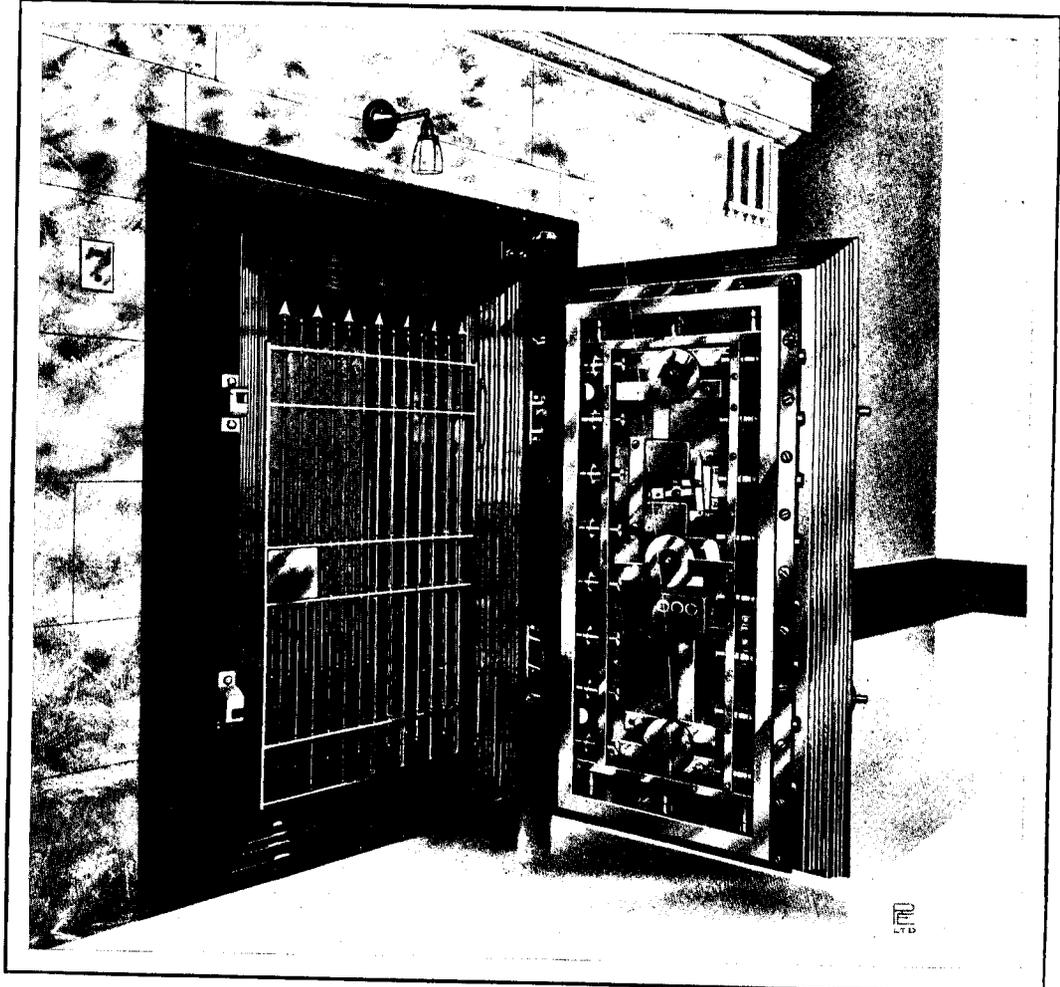


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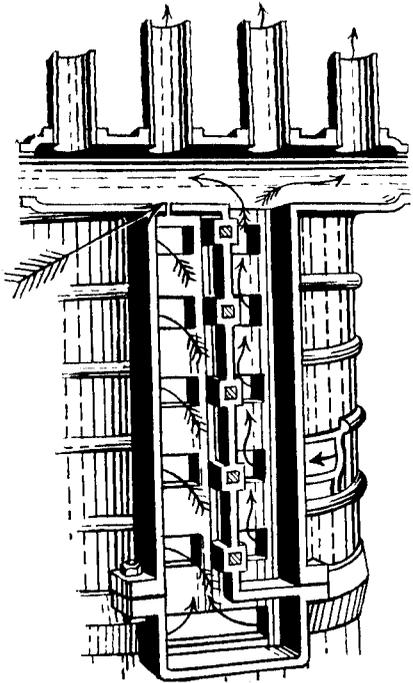
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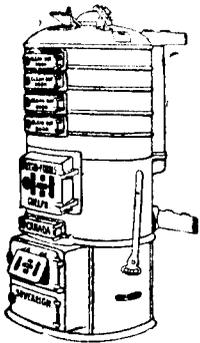


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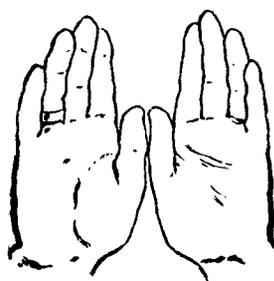
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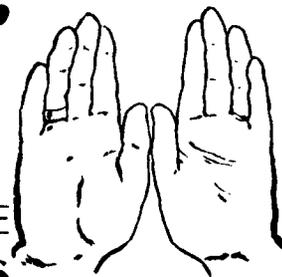
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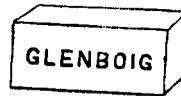
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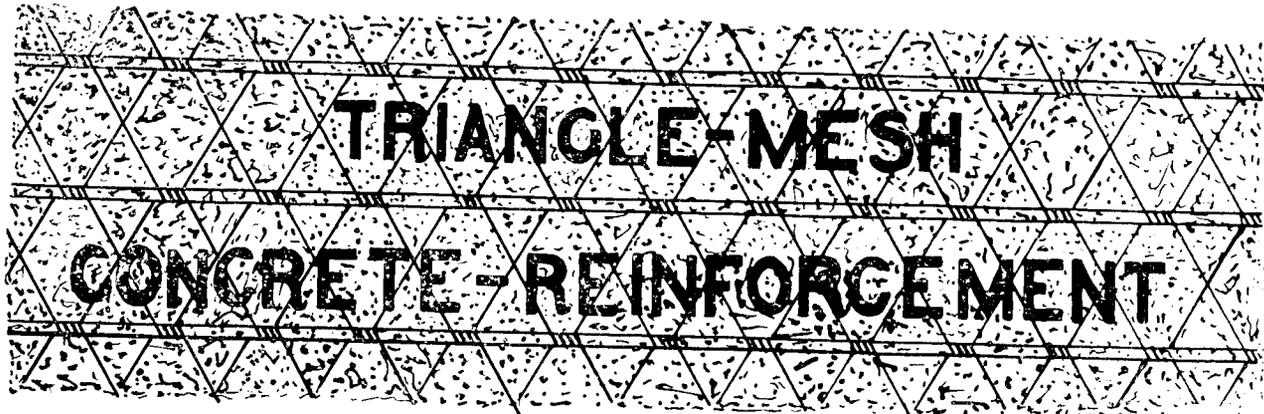
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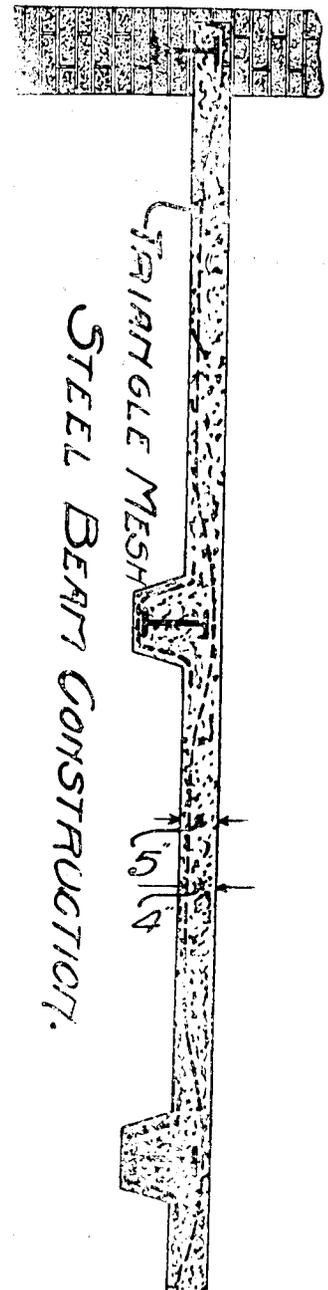
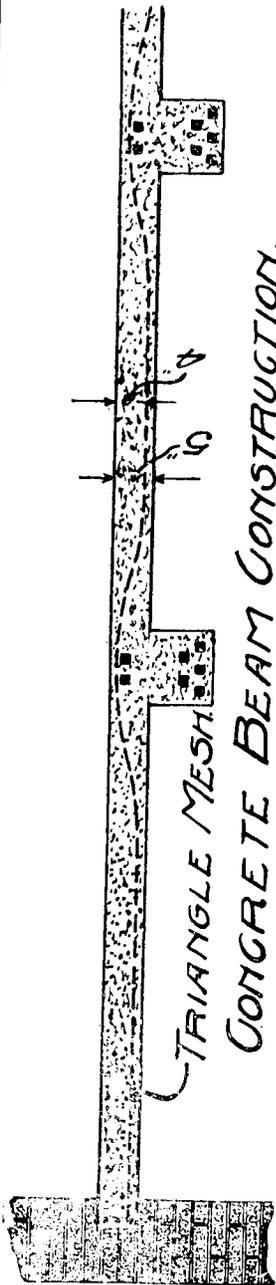
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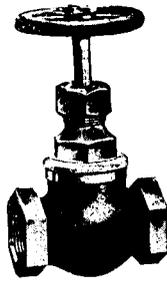
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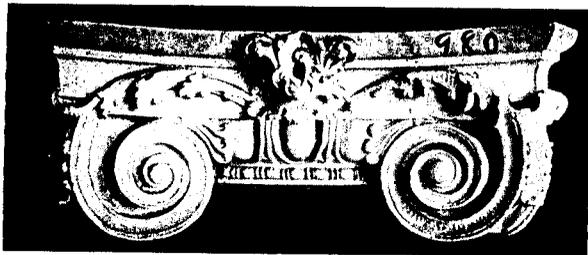
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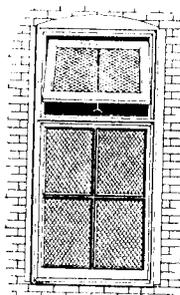
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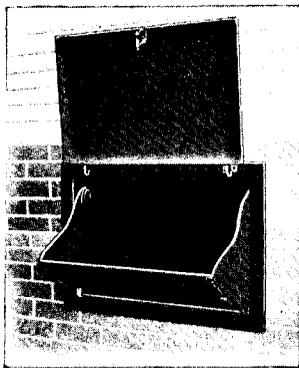
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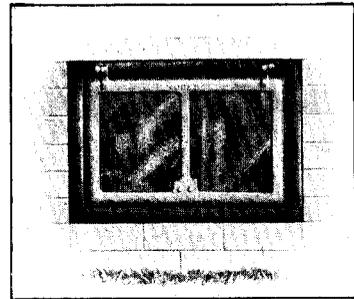
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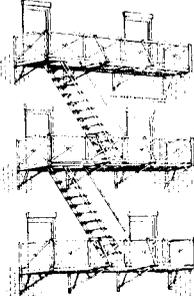
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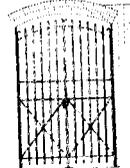
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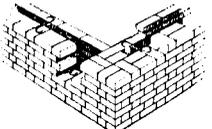
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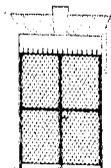
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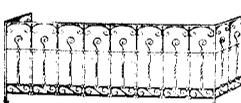
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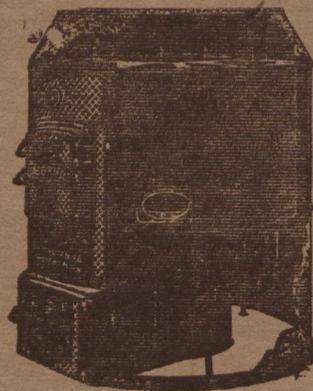
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