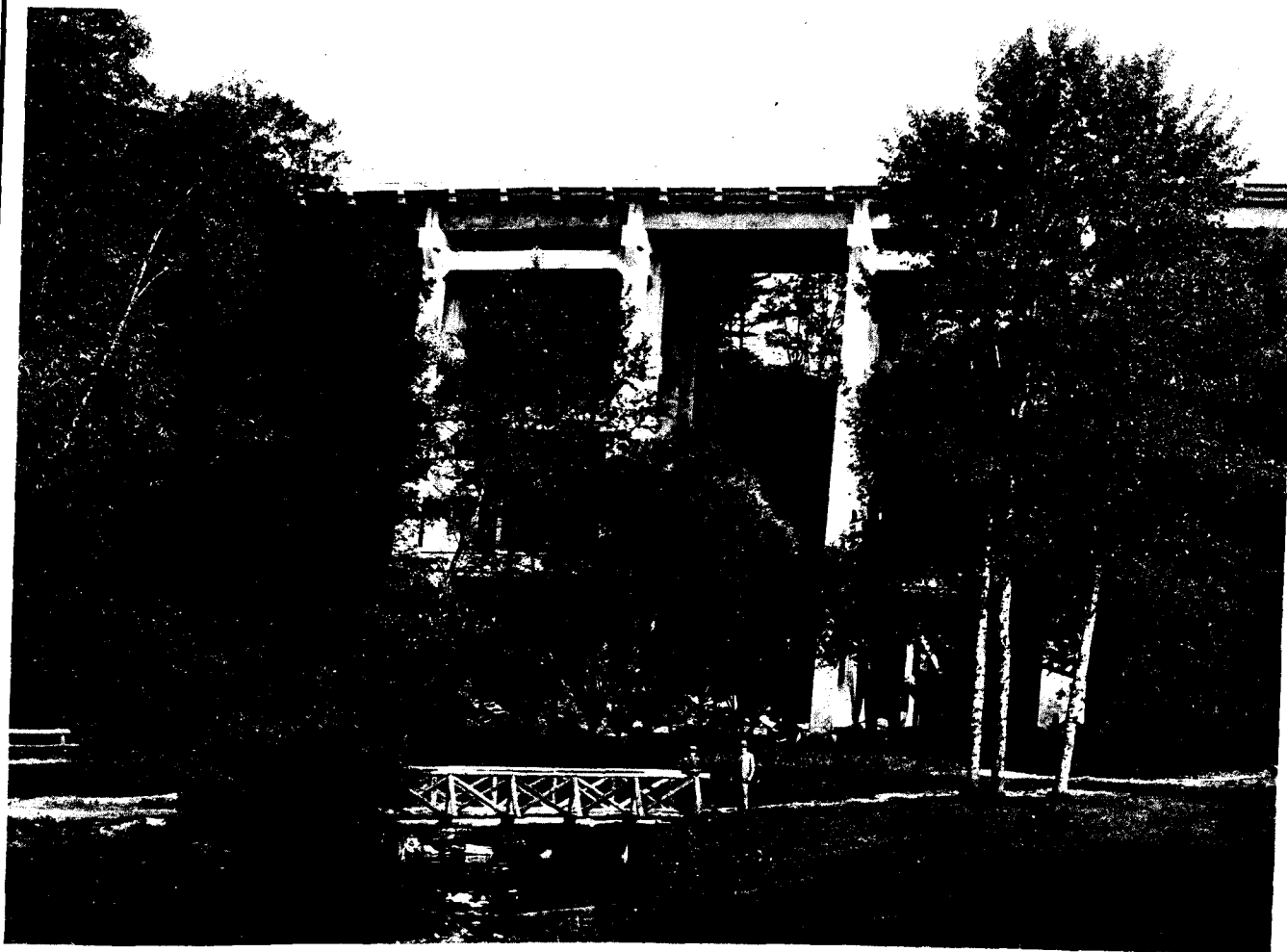


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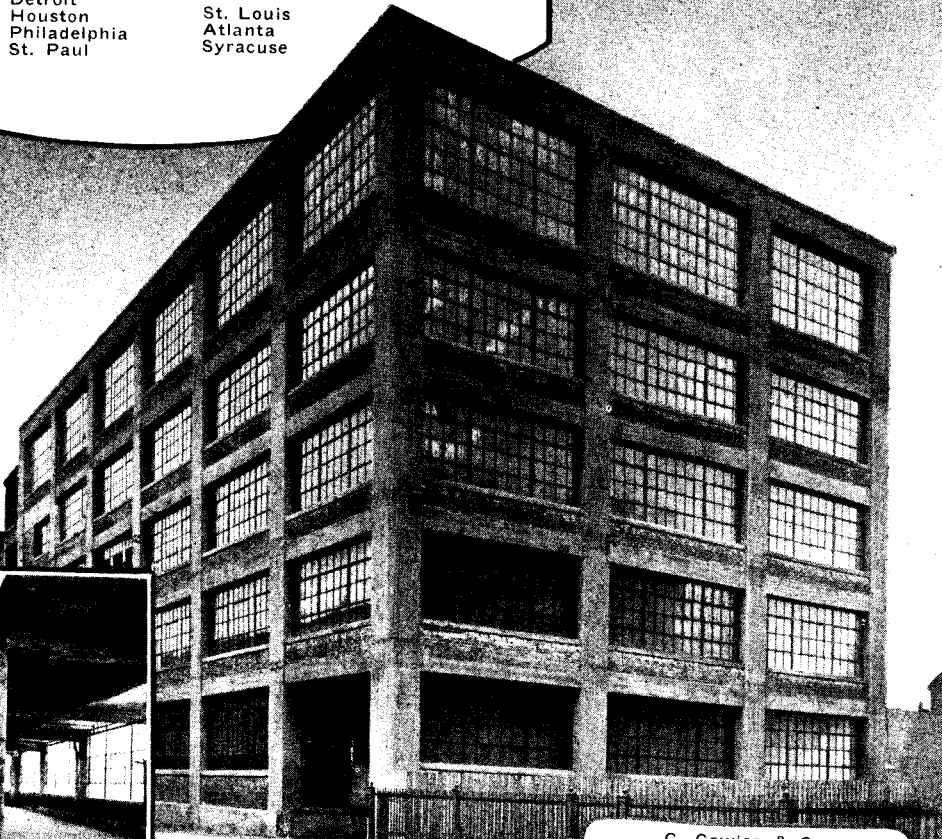
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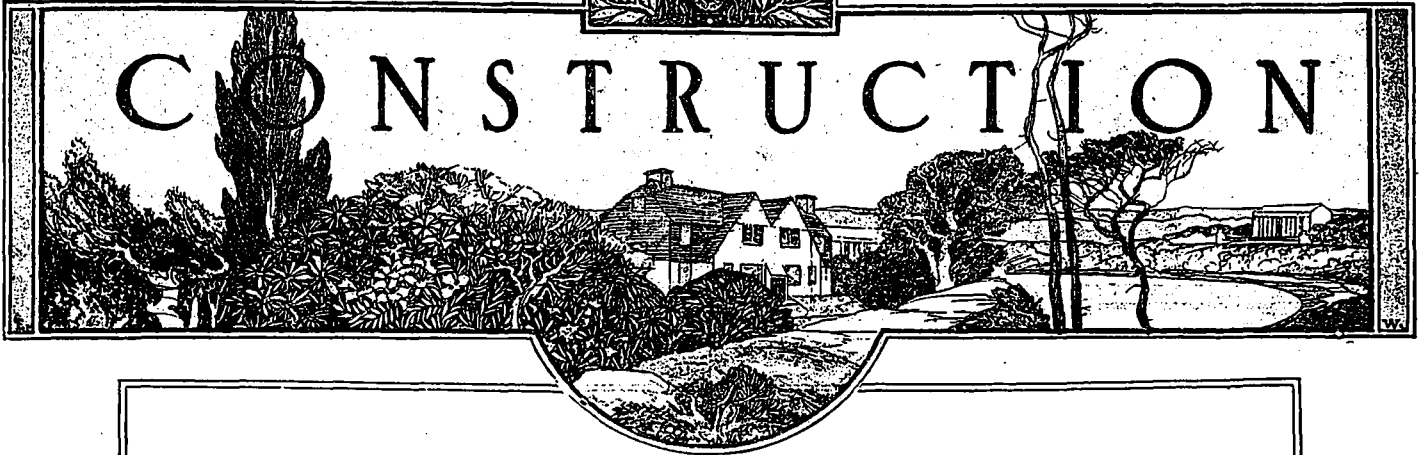
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CONSTRUCTION



October, 1918

Volume XI, No. 10

CONTENTS

ANTIQUE AND ART GALLERIES, B. M. & T. JENKINS, LIMITED, TORONTO	305
ORNAMENTAL PRODUCTS OF BRONZE AND IRON	313
By Richard V. Clark.	
ALGONQUIN HOTEL, ST. ANDREWS, N.B.	317
FIRE WASTE IN CANADA.	321
THE BUILDING INDUSTRY AND NATIONAL PROGRESS	326
FIVE DECADES OF HEATING AND VENTILATION	328
PROPOSED DOMINION GOVERNMENT OFFICE BUILDING	331
THE ARCHITECT AND THE MAN	332
PROFESSIONAL FERMENT	333
EDITORIAL	335
The Present Power of Industry.	
CONTRACTORS AND SUB-CONTRACTORS	336

Full Page Illustrations

ANTIQUE AND ART GALLERIES, B. M. & T. JENKINS, LIMITED, (Frontispiece)	304
ARTICLES OF FURNITURE DESIGNED BY JOHN M. LYLE, ARCHITECT... ..	310
NOTEWORTHY EXAMPLES OF RECENT DOMESTIC DESIGNS, LOS ANGELES, CALIFORNIA	324

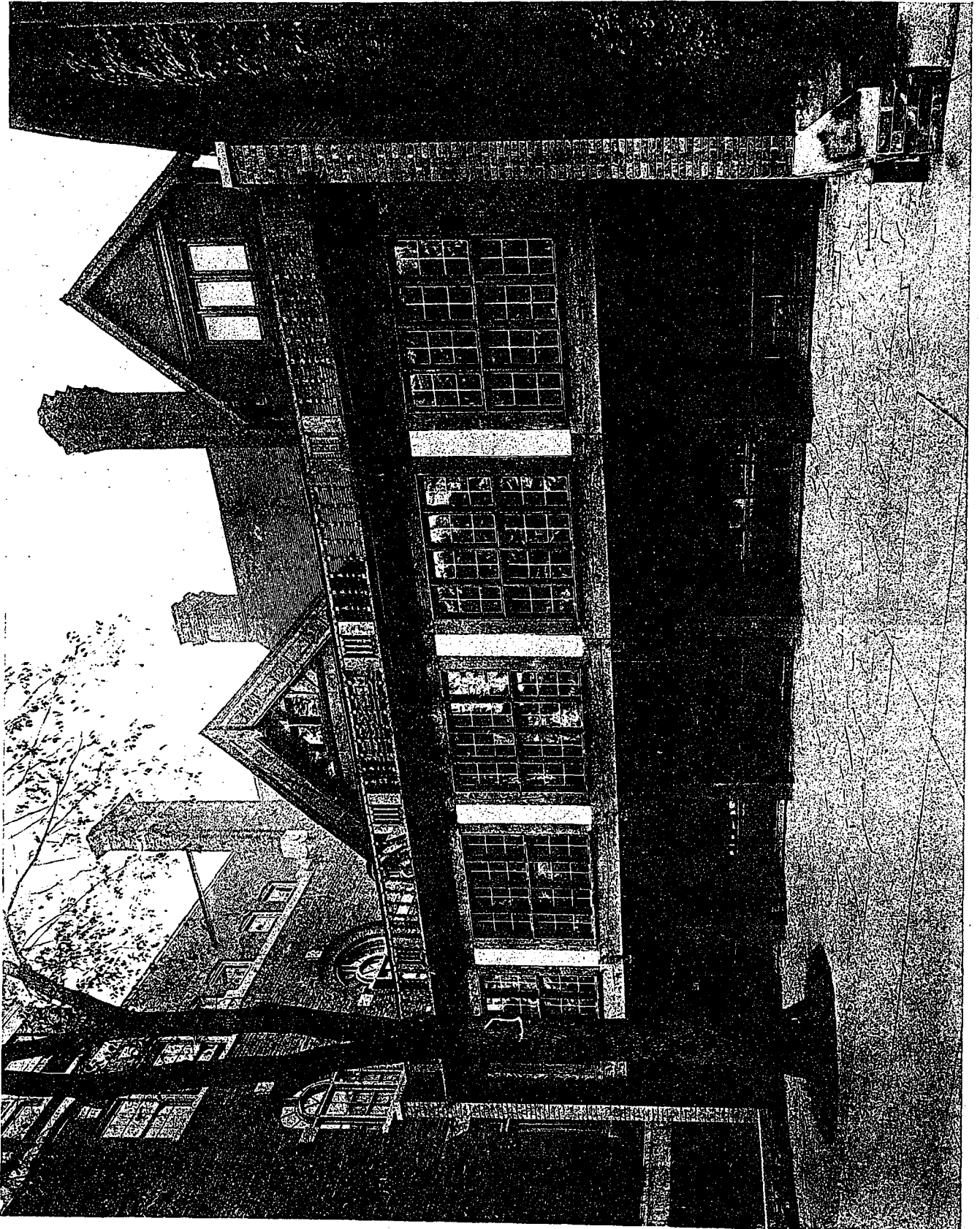
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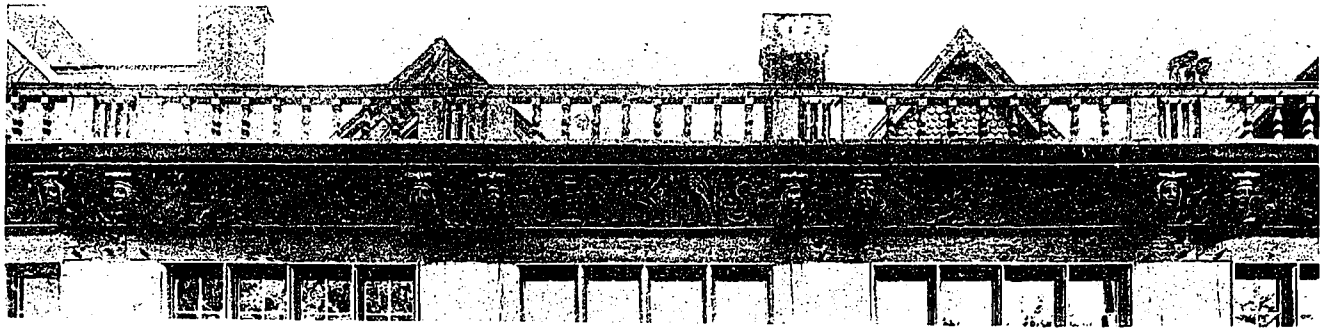
NEW YORK



SPROATT & ROLPH, ARCHITECTS.

ANTIQUE AND ART GALLERIES OF B. M. & T. JENKINS, LIMITED.

COLLEGE STREET ENTRANCE.



DETAIL OF WOOD CARVED CORNICE.

Antique and Art Galleries, B. M. & T. Jenkins, Ltd.

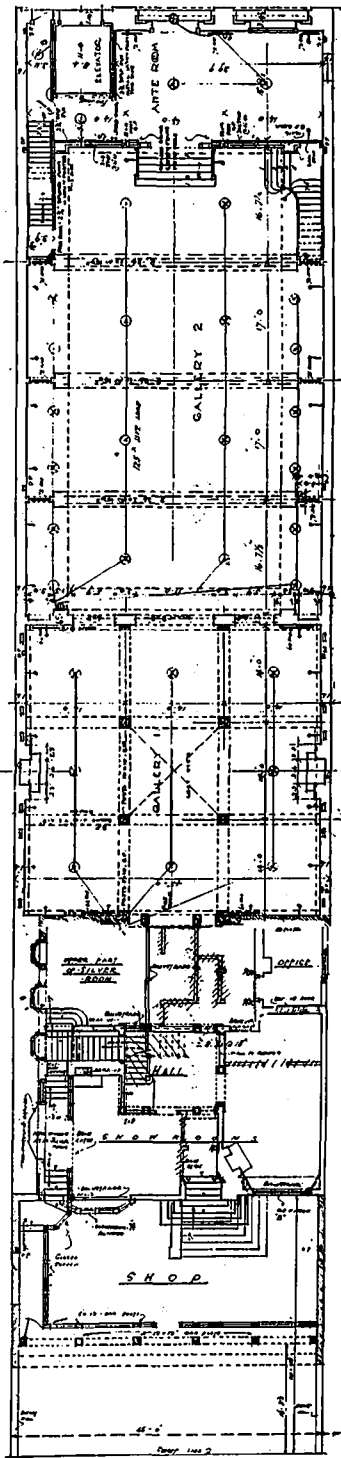
THE galleries of this firm extend from College to Grenville Street, Toronto, having frontages on both streets. An old house on the College Street side of the property, formerly the homestead of L. R. O'Brien, the artist, has been incorporated with the new buildings, but the block to the north on Grenville Street is entirely new.

The College Street front, of solid oak construction, is perhaps a rather startling contrast to the adjoining buildings, recalling as it does, the old world. Standing back from the street, with its paved forecourt of rough flagstone and the single tree, very happily left standing and adding to the picture, it reminds one possibly of some old wayside inn in England, or as a passer-by was heard to remark, "of the half timbered streets and rows of Chester."

Whether such reproductions of old-world methods is desirable in Canada, a country modern and new, is something which the owner must decide, and there are evidences indicating this preference in at least a number of instances. Maybe the experiment should not be tried too often, but to the artist's eye it can hardly fail to be a pleasant surprise, and it certainly seems in this particular case a fitting frame for the business carried on within it.

The carving in the cornice, more especially, is worthy of study as an example of Canadian wood-carving which has most successfully caught the spirit of the architect's sketches for the work.

The same character of design is also maintained within the new gallery, which stands in front of the old house on the street level. It is all of solid oak with a balustraded



GROUND FLOOR PLAN.

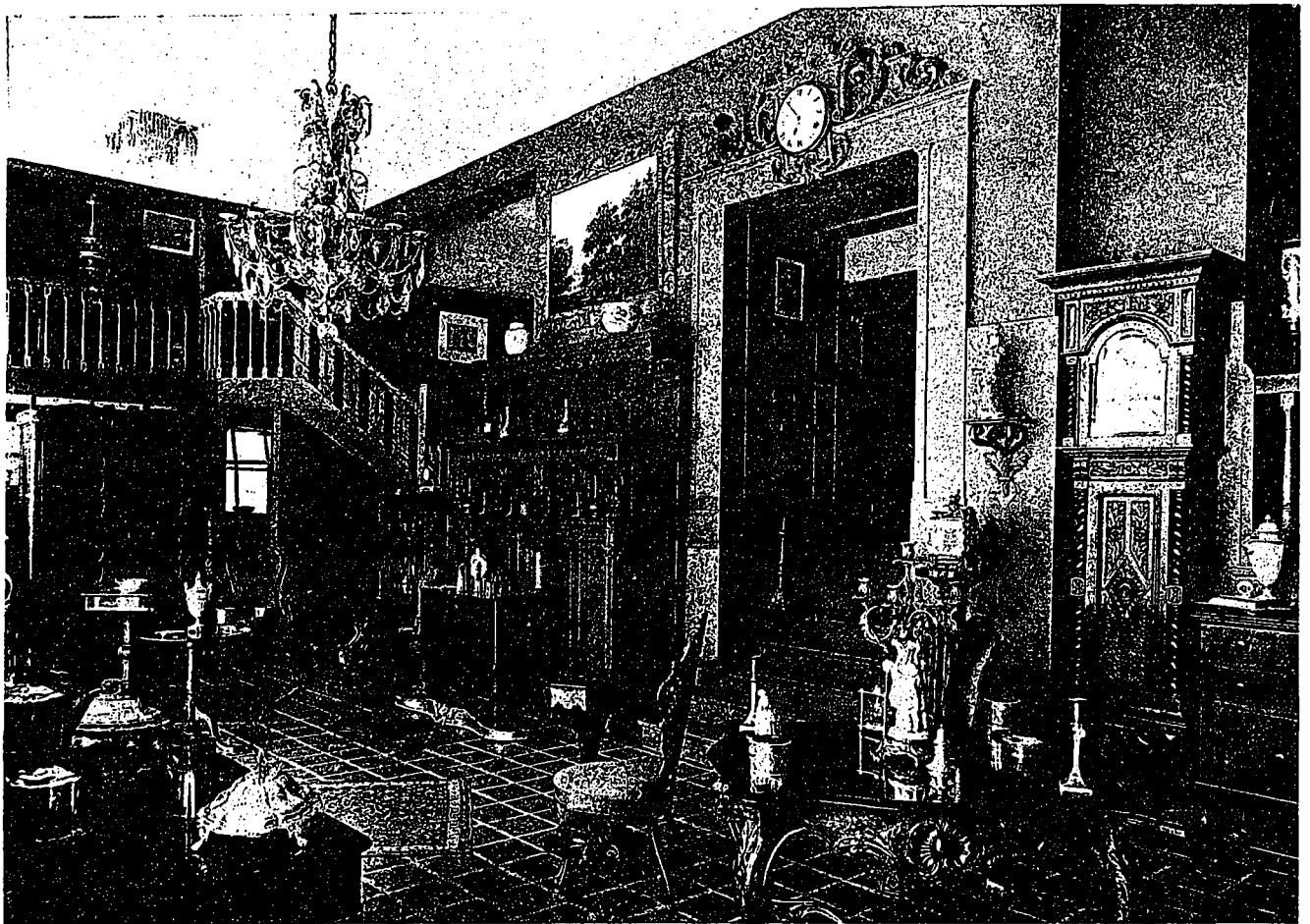
gallery round three sides and the floor paved with rich, red, quarry tile.

The windows in the front of the old house have been removed and openings formed which afford very effective vistas into show rooms on a higher level, the original first floor of the house. Here there has been very considerable reconstruction. The old staircases have been removed and a central hall formed from which views of all the galleries are obtained. From this hall a stair leads down to a kind of sunken room on the basement level, and visible over a balustrade from the floor above, making an effective place for the display of silver and such like and forming a vestibule to the strong room, or vault, with its massive doors.

Beyond the old house to the north, and on the same level, is a square gallery, top lighted, and then a long gallery reaching to the entrance from Grenville Street. This large gallery has a balcony at the sides and one end, for the display of pictures and smaller articles. Beneath the balcony, between the piers, are alcoves also well adapted for picture hanging and specially lighted for this purpose.

The design of these galleries is intentionally refined and unobtrusive, the intention being to form a setting for the wares displayed and to advantageously show their values. All the woodwork is oak, and it is intended, eventually, to decorate the plaster panel on the face of the piers and the soffits of the molded cast plaster beam casings on the ceilings, and also to fill the south window above the balcony with stained glass.

The large gallery is 100 x 50 feet,



VESTIBULE ENTRANCE FROM COLLEGE STREET.



VIEW THROUGH GALLERIES TOWARD GRENVILLE STREET.
 ANTIQUE AND ART GALLERIES OF B. M. & T. JENKINS, TORONTO.—SPROATT & ROLPH, ARCHITECTS.

and its spacious character is, perhaps, better described by stating that it is of a size large enough for assemblies and conventions, and was placed through the courtesy of the owners at the disposal of the Daughters of the Empire during their national gathering, held recently at Toronto. Directly above this large room, on the second floor, is another gallery, or show room, of the same size, and above this again two floors of stock rooms.

The top light over the central gallery previously referred to gives a perfect daylight diffusion, the result being arrived at only after considerable experimenting which finally led to the adoption of a semi-transparent glass having an almost imperceptible amber cast. In consequence of this oil and water color paintings and other articles into which coloring enters, are seen at their true tonal values.

A feature of the mechanical equipment is the concealed sprinkler system installed throughout the building, the sprinkler heads of which being set in plaster ornaments so as to produce a decorative rather than a disfiguring effect.

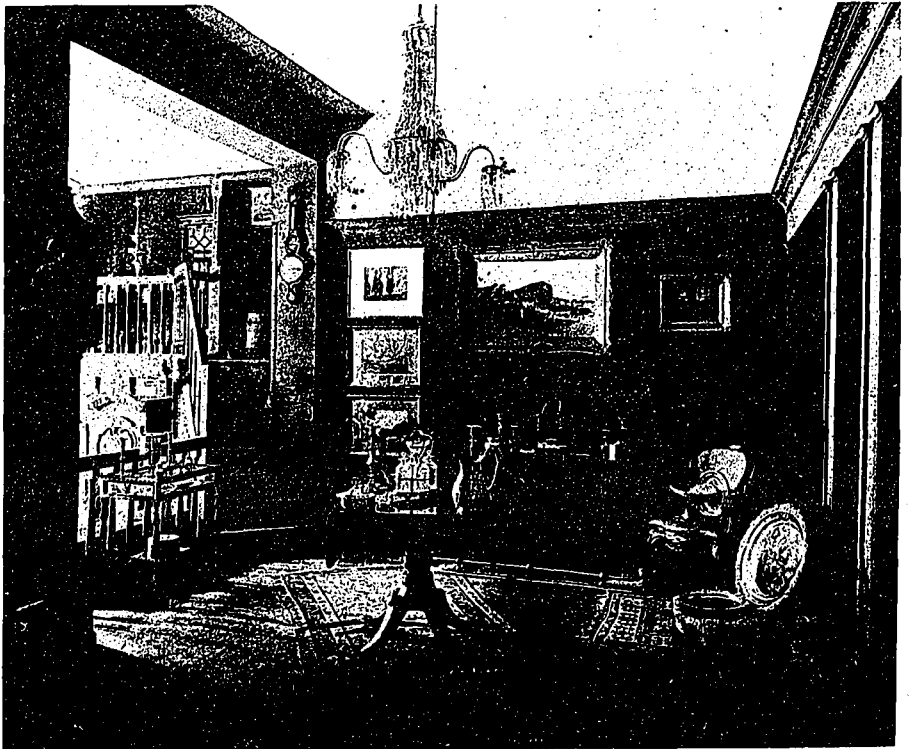
The building is ventilated by natural means, comprising mainly casement windows in recessed bays along the side of the building, which admits of an inflow of outside air in quantities which can be conveniently controlled and regulated.

On the northwest corner there is a large passenger and freight elevator with doors to Grenville Street. The Grenville Street elevation is entirely different to that on College Street, as modern as the later is old world. It is a brick design carried out with tapestry bricks worked in a color scheme over the whole front. The massing of the colors is quite remarkable, and was suggested by a sunset in oils by the late O. R. Jacobi, P.R.C.A., and produces a strikingly rich and harmonizing effect.

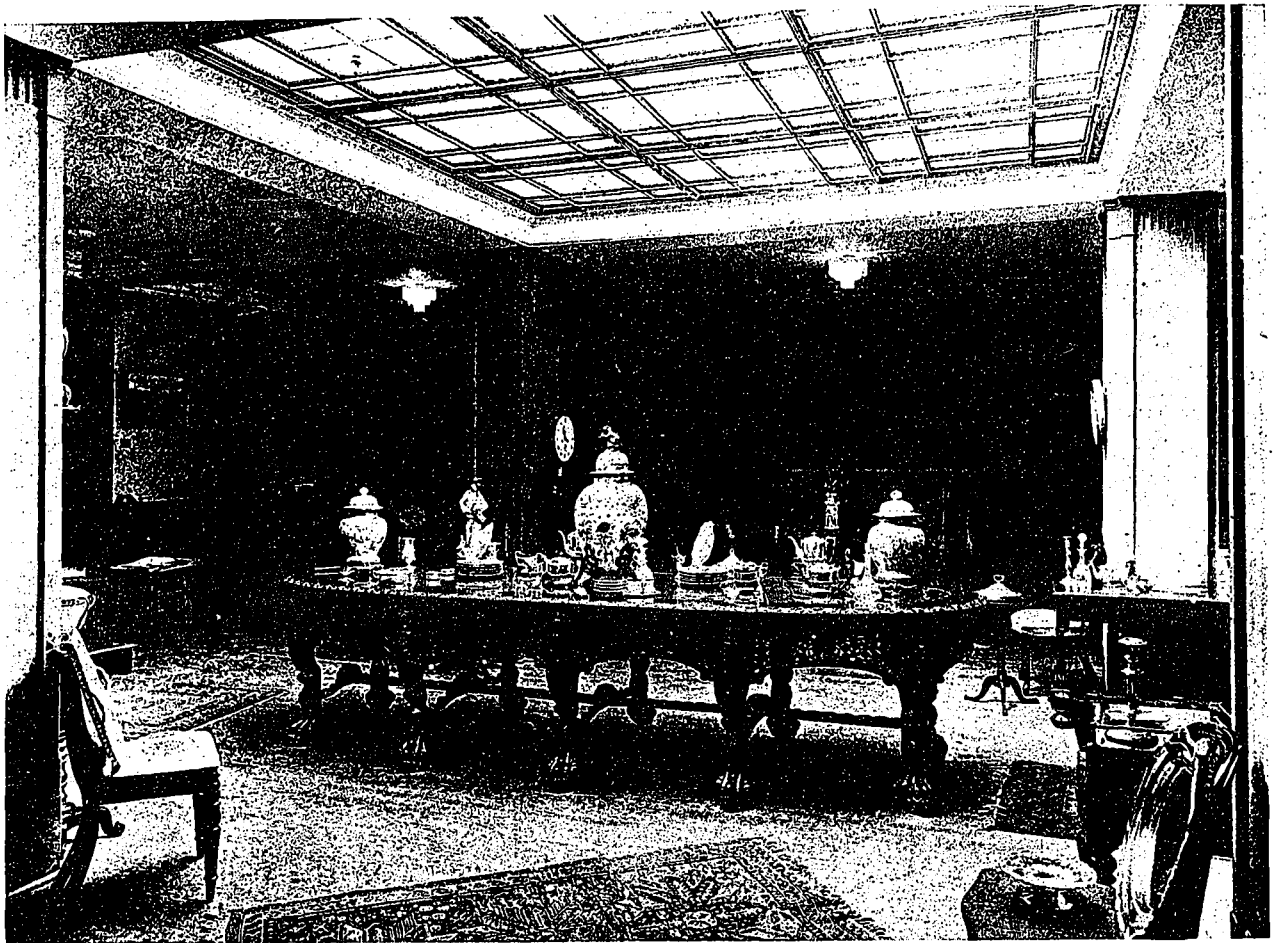
The timbers used in the Col-



GALLERY OVER VESTIBULE.



STAIRS TO VESTIBULE GALLERY.



CENTRAL GALLERY.



MAIN GALLERY, GRENVILLE STREET.

ANTIQUE AND ART GALLERIES OF B. M. & T. JENKINS, TORONTO.—SPROATT & ROLPH, ARCHITECTS.

lege Street front were taken from the hulk of an old vessel which laid for years at Toronto Island, and also from the hulk of a war vessel sunk in the St. Clair River at the siege of Detroit; thus giving a quaint and historical value to the construction of the building.

Skill Recognized in U.S. Housing Schemes

An evidence of the thoroughness with which the United States Government is dealing with industrial housing projects is seen in the appointments announced in the U. S. Official Bulletin, issue of September 3rd. The announcement which is authorized by the Department of Labor relates to appointments made by the Bureau of Industrial Housing and Transportation, in connection with the Bureau of Standards, Washington, D.C., and in reference to work to be carried out in several cities. In each case the Government recognizes the services of the architect, engineer and town planner, and evidently reason that the best results are to be obtained through the intelligent planning and collaboration of men who by training and experience should prove most competent to do the work.

The designated localities and the names of the appointees reads as follows:

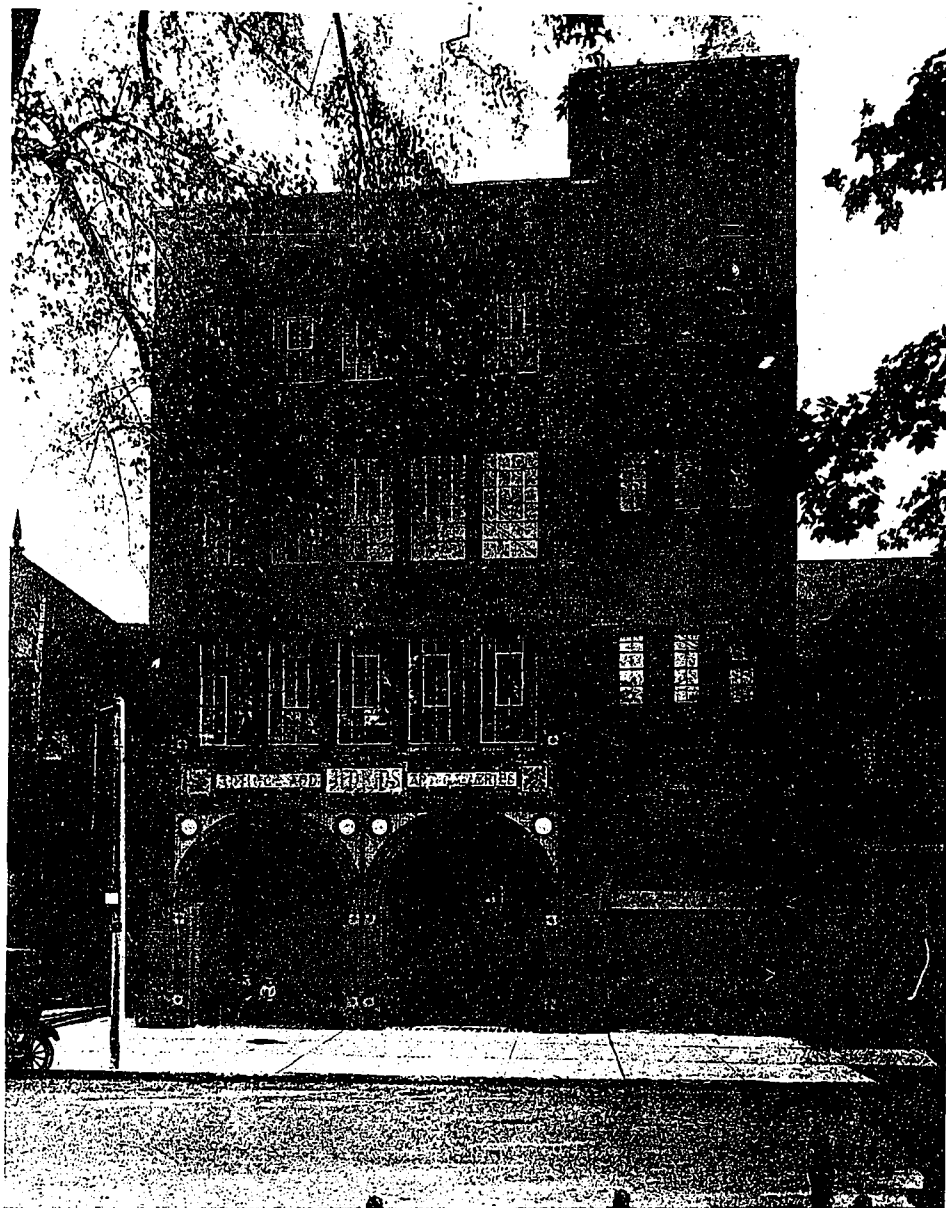
Bureau of Standards, Washington, D.C.; Architect, Donn & Deming, 808 Seventeenth Street, N.W., Washington, D.C.

Dayton, Ohio: Architect, Schenck & Williams, 908 Mutual Home Building, Dayton, Ohio; town planner, F. Vitaley, 527 Fifth avenue, New York City.

Eddystone, Pa.; Architects, Rankin, Kellogg & Crane, 1912, Walnut St., Philadelphia, Pa.; town planner, John Nolen, Harvard square, Cambridge, Mass.; engineer, Charles F. Mebus, 907 Land Title Building, Philadelphia, Pa.

Elizabeth, N.J.; Architect, Charles W. Oakley and Hugh Roberts, Associated, 1259 Clinton Place, Elizabeth, N. J., town planner, A. F. Brinkerhoff, 527 Fifth avenue, New York City; engineer, C. D. Pollock, Park Row Building, New York City.

Pensacola, Fla.: Architect, Favrot & Livaudais Title



ANTIQUE AND ART GALLERIES OF B. M. & T. JENKINS,—SPROATT & ROLPH, ARCHITECTS.

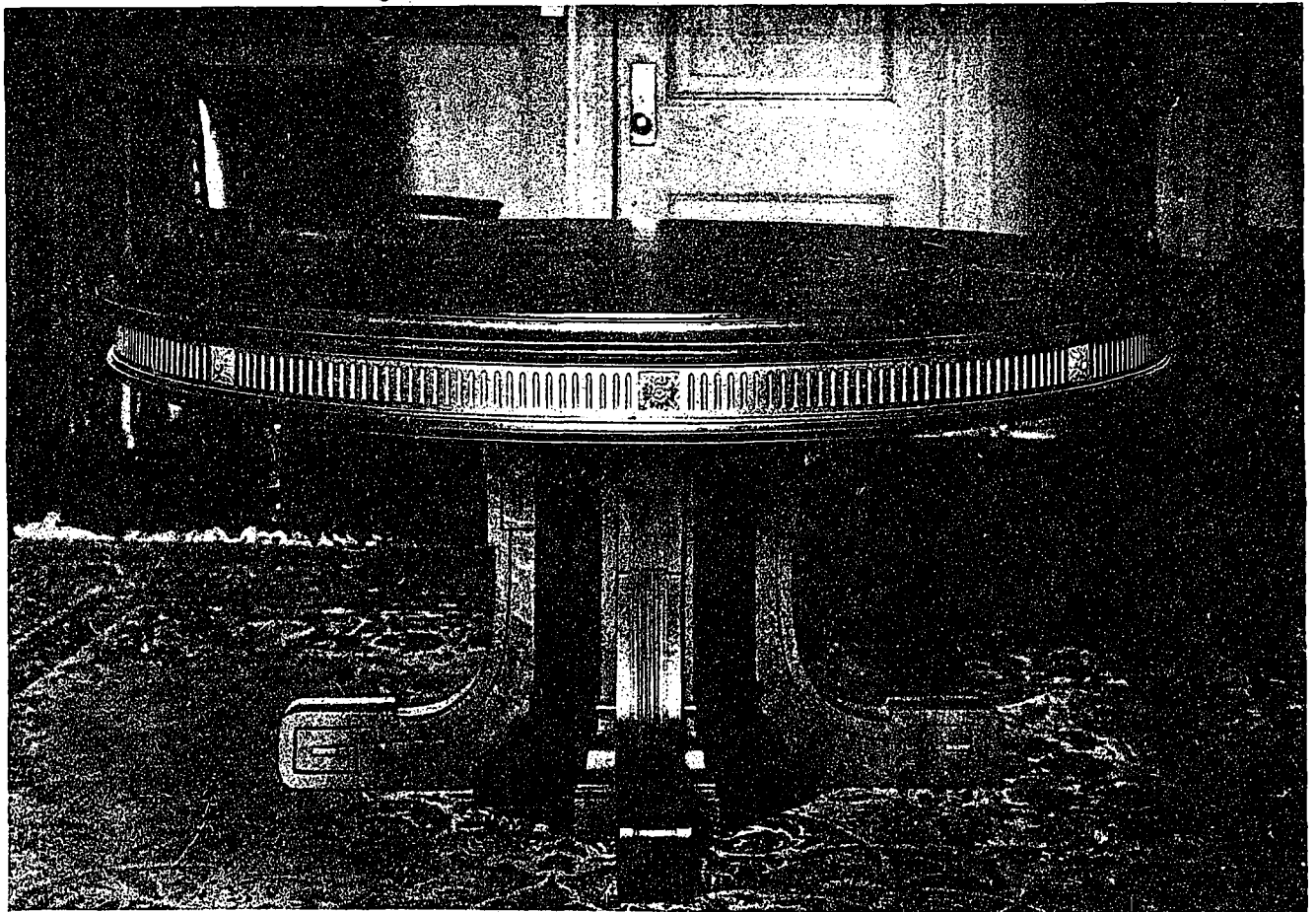
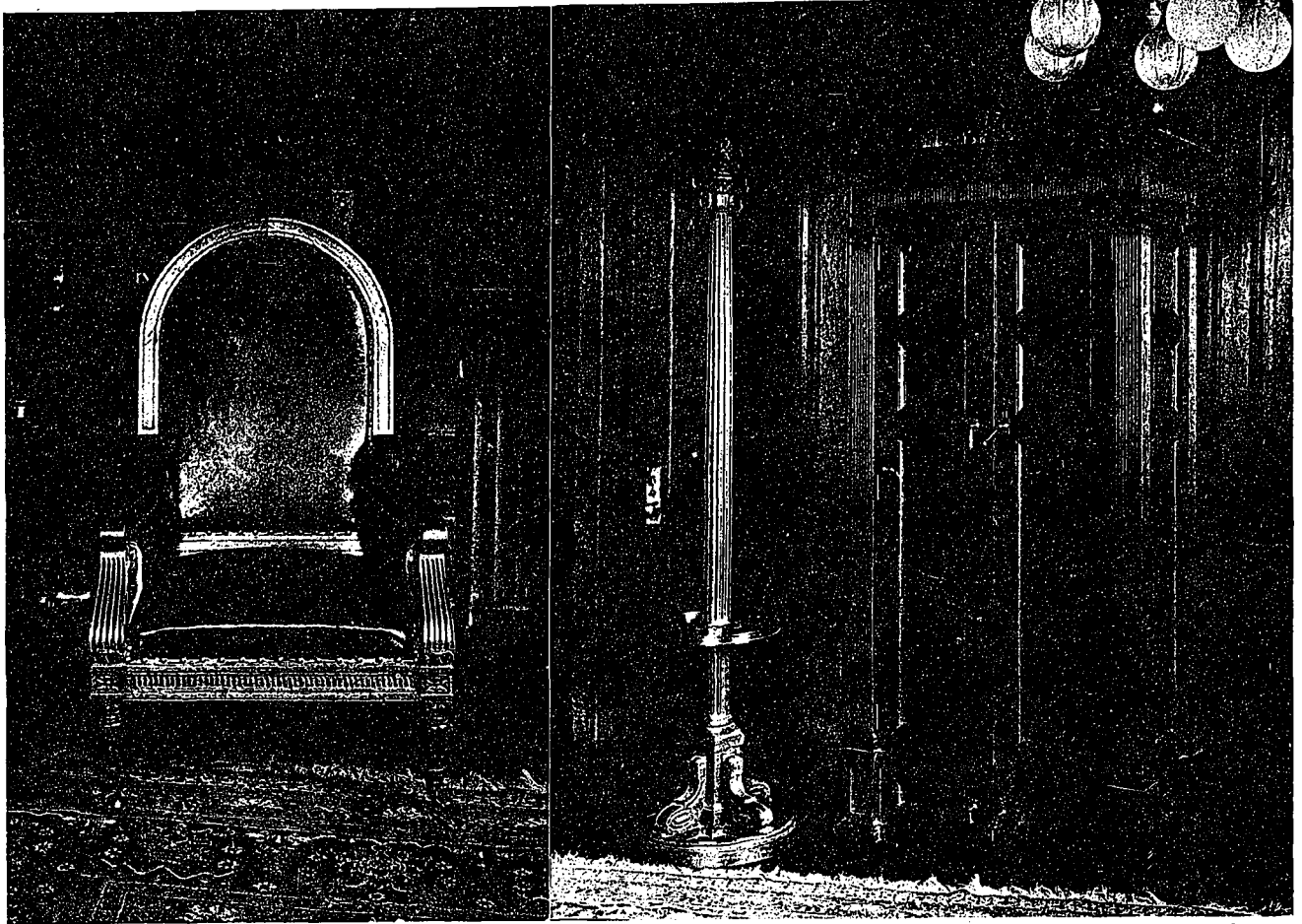
Grenville Street Entrance.

Guaranty Building, New Orleans, La.; town planner, Favrot & Livaudais, Title Guaranty Building, New Orleans, La.; engineer, Arthur Pew, Forsyth Building, Atlanta, Ga.

New Orleans, La.: Architect, Favrot & Livaudais, Title Guaranty Building, New Orleans, La.; Town planner, Favrot & Livaudais, Title Guaranty Building, New Orleans, La.; engineer, J. W. Billingsley, Interstate Bank Building, New Orleans, La.

Watervliet (Troy), N.Y.: Architect, Stanton P. Lee, 55 Third street, Troy, N.Y.; engineer, P. E. Green, engineering staff.

The above indicates a wide-awake administrative policy, aiming at successful accomplishment and achievement. It is certainly something which should commend itself to Dominion and provincial authorities, and such municipalities in Canada as are contemplating similar housing developments, just as soon as their present surveys are completed and that point is reached where a definite plan must be considered and the work actually carried out.



Red Oak Office Chair.

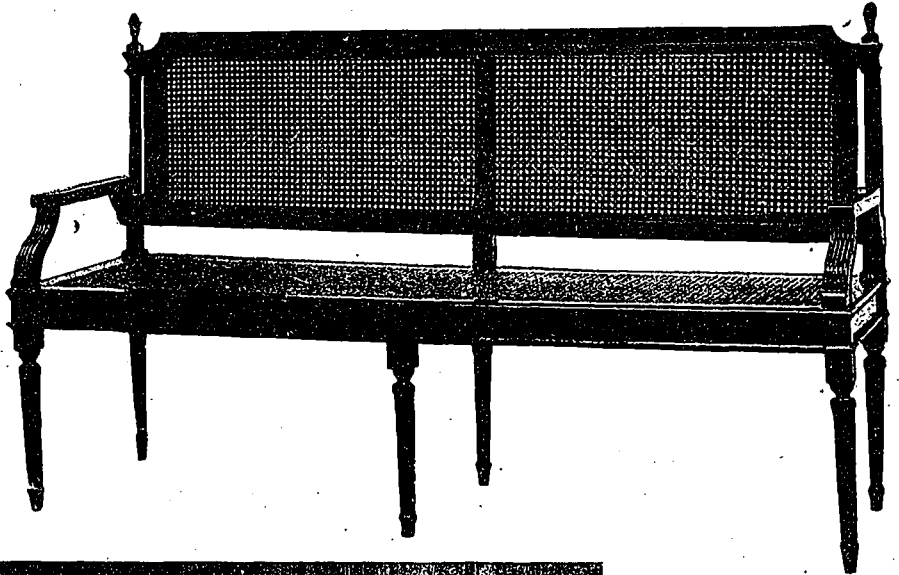
Board Room Table.

Hat Rack and Wardrobe.

Furniture in Office of Cawthra Mulock, Esq., Toronto. Designed by John M. Lyle, Architect.

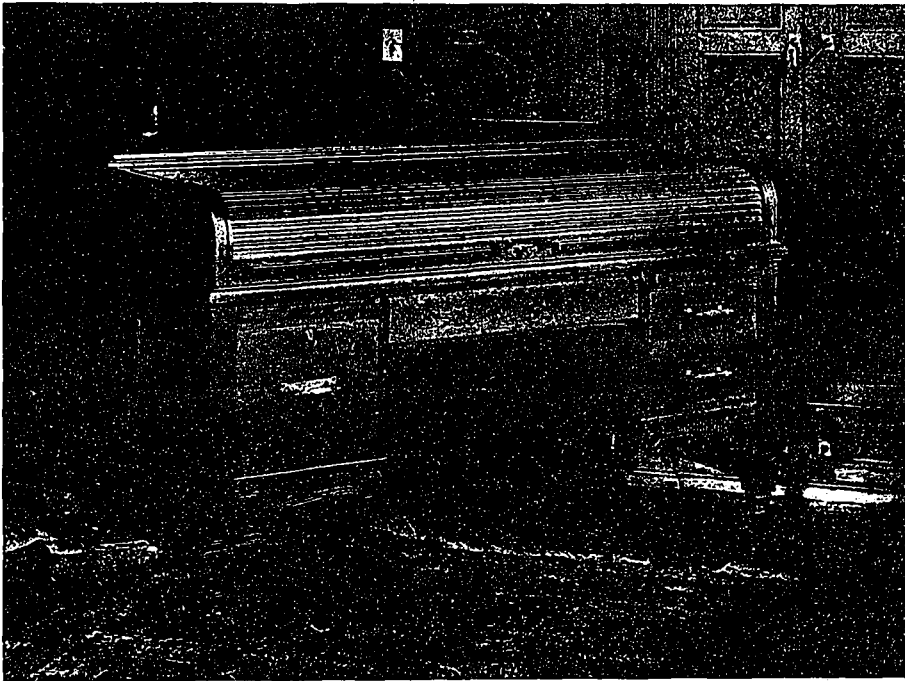
*Circassian Walnut
Settee, Rattan
Seat and Back,
Fluted Legs and
Arms.*

Office of Burton's,
Limited, Tailors,
Toronto.



*Red Oak Rolled-
Top Desk.*

Office of Cawthra
Mulock, Esq.
Toronto.

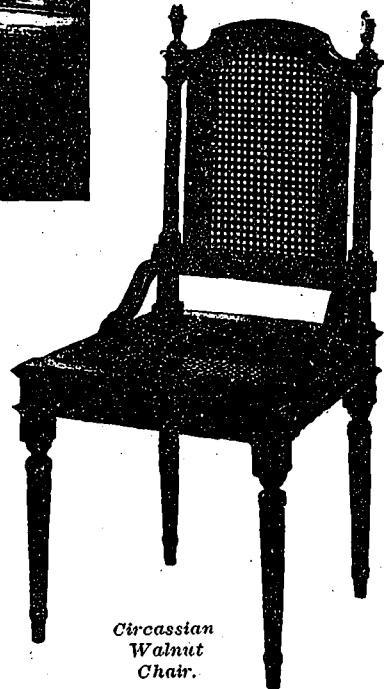


Equipped with
Specially Designed
Bronze Hardware.
Note Comfortable
Leg Space and
Sense of Cantilever
Support which
Consoles gives.



*Circassian Walnut Table,
Rotary Cut Veneer Top
in Panels Radiating to
centre, Fluted Frieze
and Legs.*

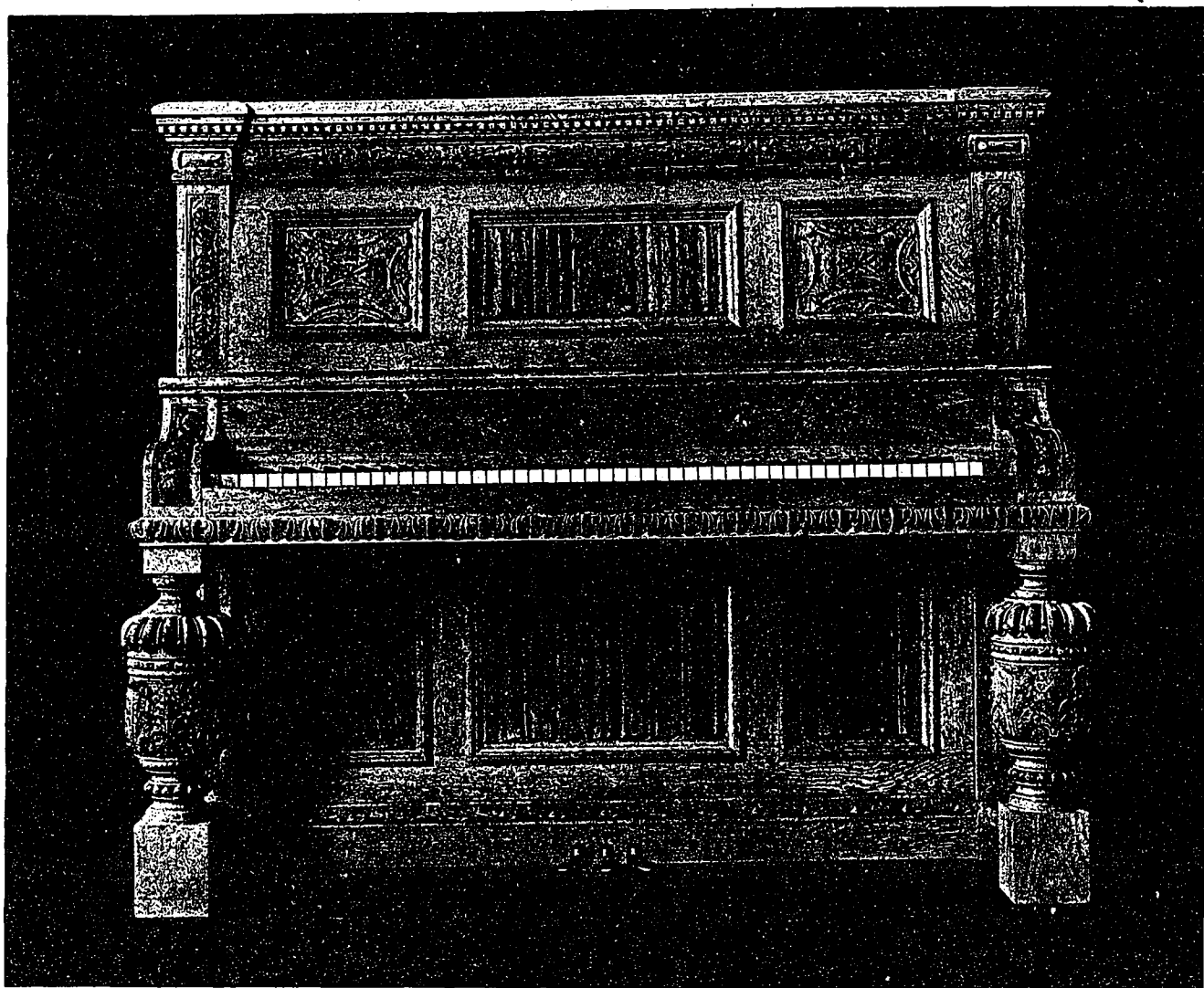
Office of Burton's, Limited, Tailors, Toronto.



*Circassian
Walnut
Chair.*

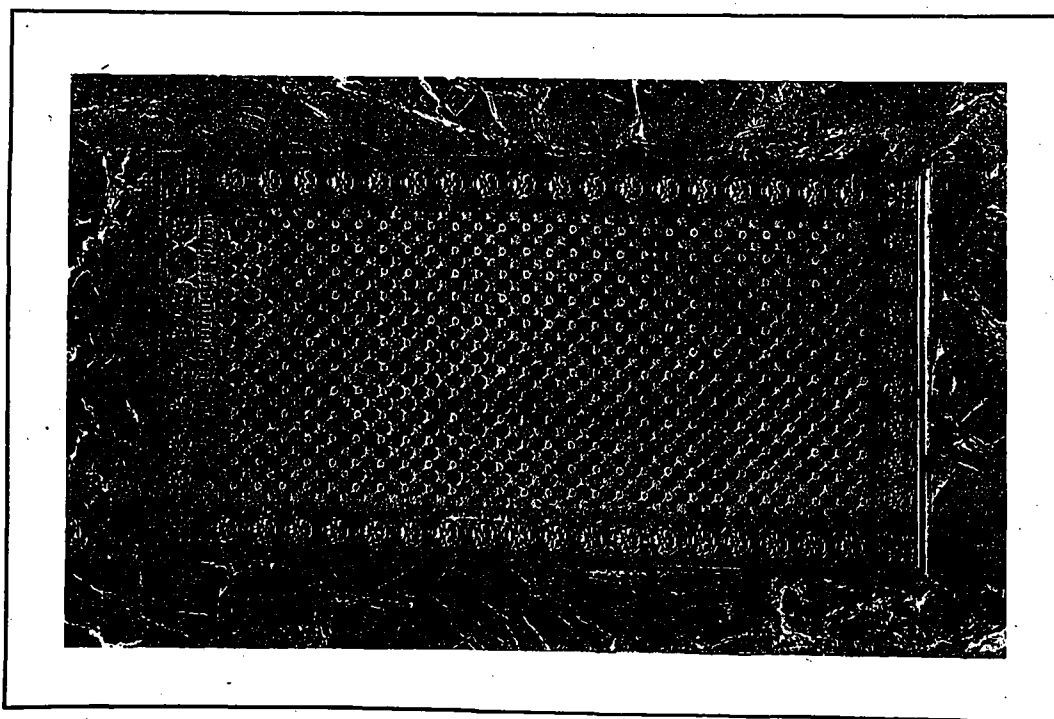
Articles of Furniture in Adapted Louis XVI. Style.

Designed by John M. Lyle, Architect.



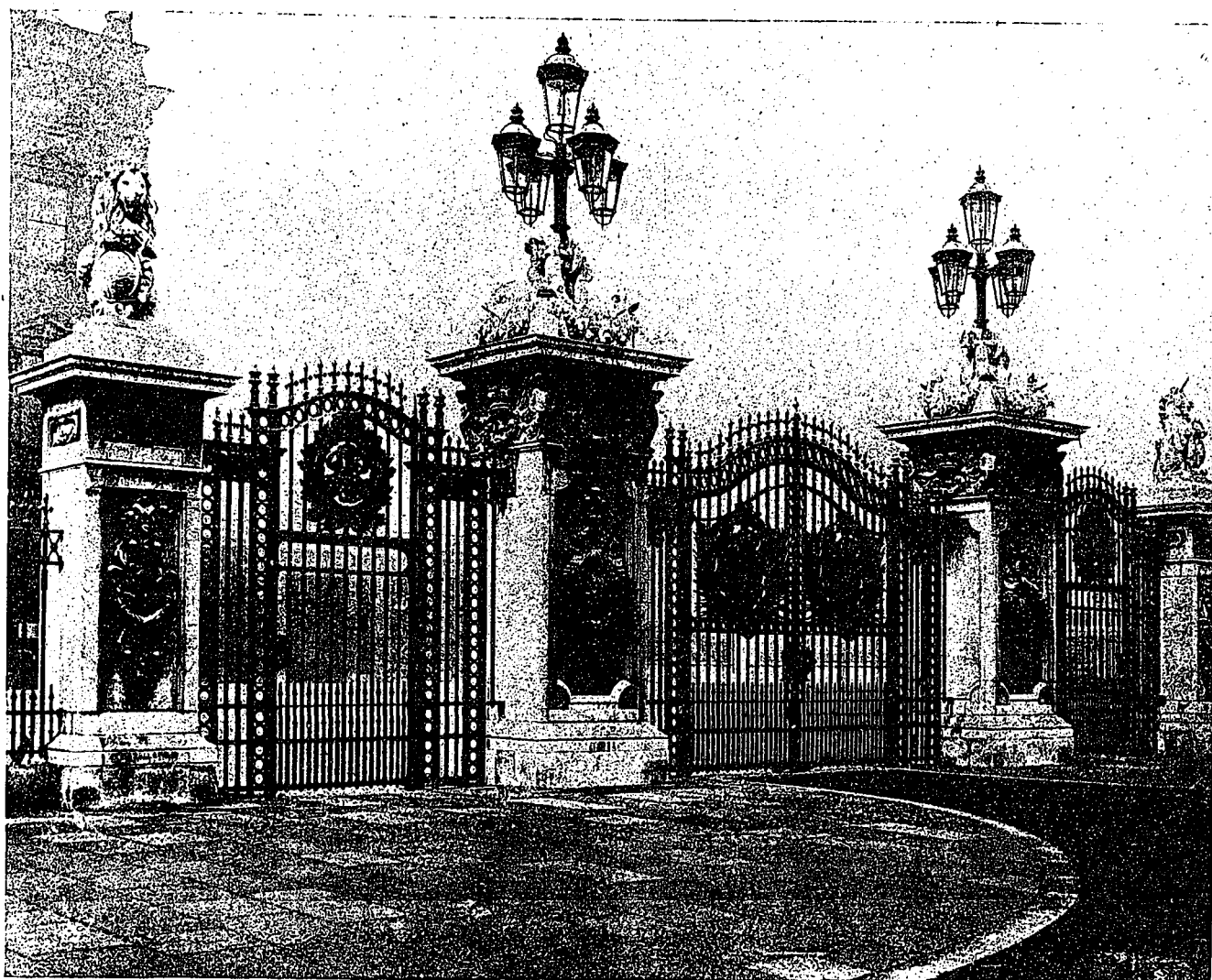
White Oak Piano in Adapted Jacobean Style.

Residence of W. R. Johnston, Esq., Toronto. Designed by John M. Lyle, Architect.



Bronze Radiator Grille.

Royal Alexandra Theatre, Toronto. John M. Lyle, Architect.



GATES OF BUCKINGHAM PALACE, AN IMPRESSIVE AND STATELY EXAMPLE OF ENGLISH WROUGHT IRON AND BRONZE WORK.

Ornamental Products of Bronze and Iron

By Richard V. Clark*

IT is impossible within the confined space of a short article to properly and adequately express the beautiful sentiment and mystic feeling which has been woven into the ornamental products of bronze and iron since the earliest days of history, right along the ages until our present day.

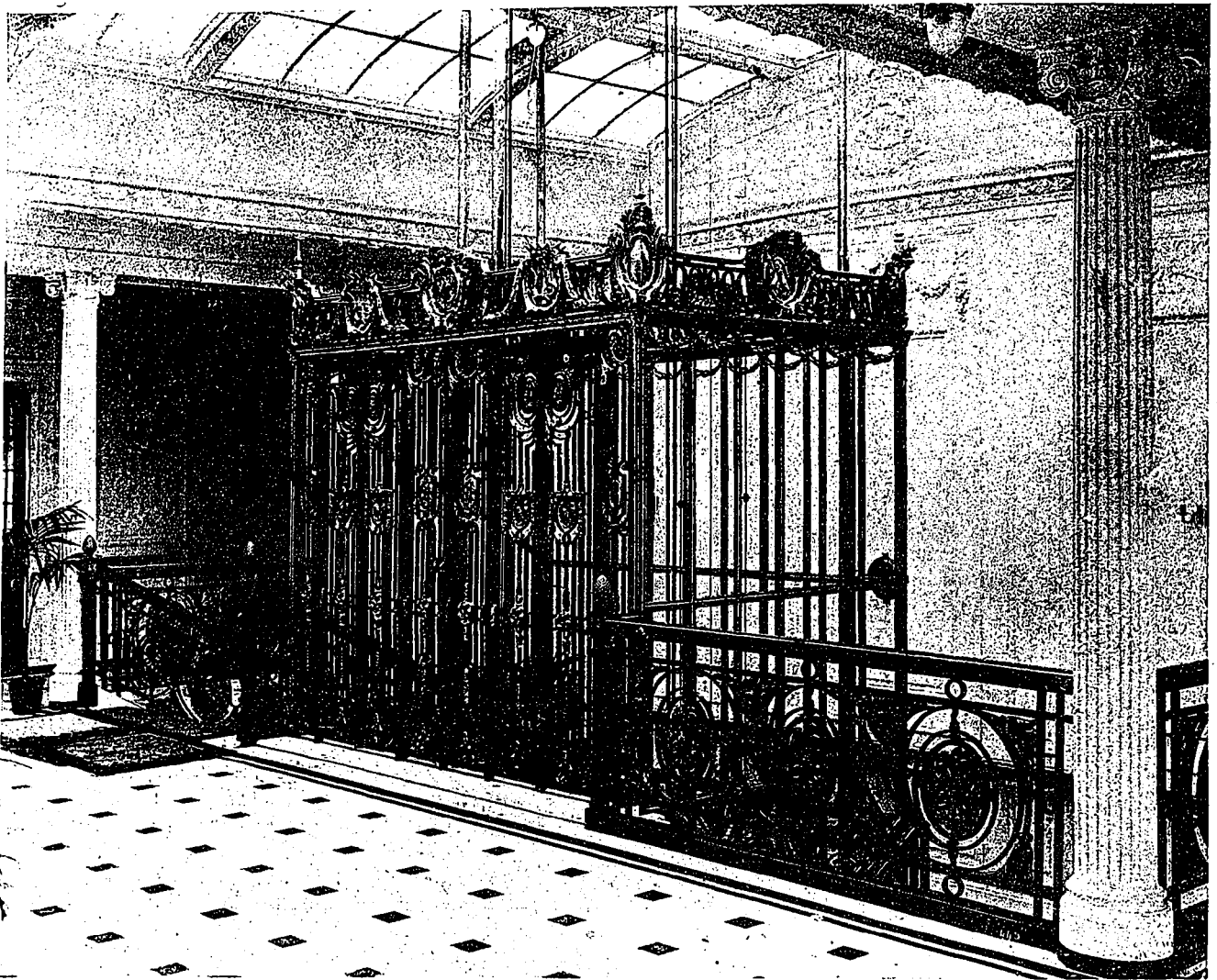
In the age when the Romans made history, and during that period when the Greeks were pre-eminent in power, the most beautiful productions of brass and bronze were made. These beautiful ornaments, with their translucent colors and delicately modelled textures, are still a mystery to us, for such men as Robert Austen, Sterling Lee, Christophe and Duval, themselves masters of the present day arts, have tried every possible means they know to solve the methods by which these beautiful products were made, but without success; the mystery is just as deep—just as profound—just as alluring as ever.

It is not, however, with the past art in bronze

and iron that I wish to dwell, but rather with the works of later years. During the present century the Japanese have certainly held sway as the greatest masters in producing beautiful and alluring things in metal. The glorious colorings which they obtain in lasting patina are in their way just as wonderful, though perhaps not so masterful as those of the ancient world. Their own particular way of casting bronzes known as "cera perduta," is perhaps some explanation of the delicacy of texture and beauty of line which they have wrought into those lovely statues and ornaments which resemble to perfection their local beauties of nature. Certain it is that although the foremost artists of Europe have endeavored to copy their Eastern genius in casting ornaments of bronze, they have yet much to learn before they can think to compare favorably with the works of the Eastern genii.

The process of cera perduta casting as used in England, I will endeavor to explain as briefly as possible. First, an ordinary piece mould or gelatine mould is made from the plaster model.

*Montreal Representative of the Dennis Wire and Iron Works Company, Limited, to whom we are indebted for the photographs illustrating this article.



ELEVATOR ENCLOSURE ON THE ILL-FATED "LUSITANIA—A RECENT PRODUCTION OF THE METAL WORKERS' ART IN IRON AND BRONZE, ENHANCED IN COLORING BY MERCURIAL GILDING.

Secondly, a wax casting is run from the mould, to which are attached the runners and gates for the flow of the metal, and vents for air or gases. Thirdly, it is cored and an external mould now covers the whole. It is then placed in a muffle or furnace, the wax melted out, and when the mould is dry the metal is poured in that replaced the wax model.

The founder's wax is made of Gambia, Italian, or native beeswax and resin, colored with vegetable matter or vermilion. The foregoing coloring substances volatilize and leave no residue. The Japanese employ a vegetable wax from the fruits of *rhus succedanea*. The method of obtaining the founder's casting in wax is by pouring the molten wax into a piece mould until such time as the desired thickness is obtained. Sometimes wax wrought by tempering with hot water or in a semi-melted state, is painted or brushed into the mould. Sometimes gelatine moulds are used for, say, two copies, although the shrinkage is a great risk. The coloring of the wax is important, as if some metallic pigment or earth color were employed it would cause a residue in melting out that would destroy the casting. Vegetable color or vermilion is generally em-

ployed, as they completely volatilize. Upon the founder's wax model are placed the jets and ingates, or openings, through which the metal is poured into the mould; the necessary outlets for the escape of the air and gases, and for running or melting out the wax, are moulded in pipe fashion, and lantern pins, as they are termed, are inserted to aid in keeping the core in position.

The loam is made of half brickdust and half plaster, but the intonaco is of powdered earthen drain-pipes, obtainable from Doulton, Lambeth. The Japanese employ clays of decomposed granite, obtained from the hills round Kioto or Osaka; they are extremely plastic, but not very refractory, as they contain considerable amounts of the alkalis. Clays are tempered by admixture with old fire bricks of fine and coarse powder. The core, which is one of the most important parts of the mould, may be hollow or solid; for figures it is generally solid. The Japanese core does not differ much from European cores, save in thickness. After the core is made and dried the object is modelled in way upon it. The artist in preparing this model uses all the resources of his skill, and if

the casting be successful, all the subtle and delicate touches of his hand will appear in imperishable bronze. Occasionally the Japanese employ paper for making moulds. Compressed, I am informed, it makes fine moulds, and the charcoal gives a good impression—very delicate when burnt—but this process is not general. The ancients employed lava for moulds, jewellery especially, the same as other Oriental nations employ tufa and stone. The founder's wax model is coated with a thin layer of the first intonaco, or fine clay; after drying, other layers are applied, until the crust is thick enough for the stronger

loam. The mixture of clays for the first layer of intonaco is very carefully prepared to prevent them from being melted by the molten metal. The formation of a fused crust on the casting, which is always difficult to remove, and destroys its surface, is obviated by this. The core and mould are dried slowly, the wax is melted out by means of a charcoal fire, by which both inside core and outside mould are heated, and the walls baked hard. The core and mould are heated by a charcoal fire generally to a red heat before the metal is poured in.

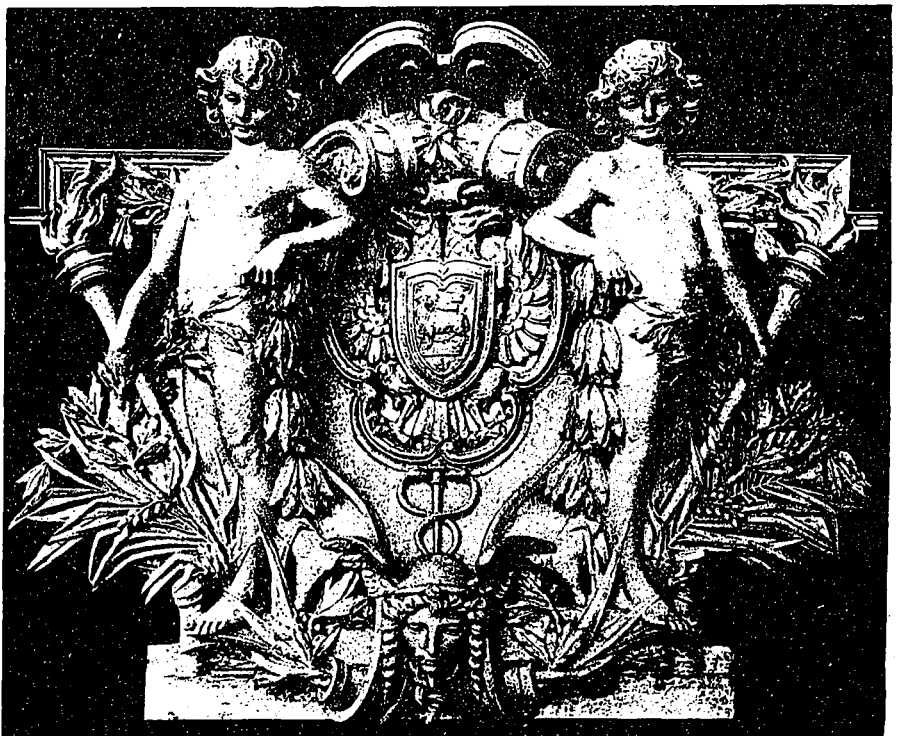
The methods generally used in France, England and the other countries of Europe are entirely different, the moulds being worked in sand, and many works of magnificence and splendor have been produced by this method. The modellers of France and Switzerland are wonderful beyond description for their fineness of line, and especially in those fascinating and delicate ornaments of the style which owe their birth to France. This is made manifest to every visitor to France. Study for a moment that glorious metal screen, the "Forecourt at the Palace of Stanislaus, Nancy," or the "Gilded Chandelere of the Petit Trianon in Paris," and you will forget that Paris is gay, or even that you are in France, for the glorious line and delicate detail, together with the soft patina of the finish to this work will enthuse you into believing that you live in an enchanted world, from which you eventually recede with a sigh of



CAST BRONZE FIGURES MODELLED FOR THE EAST END STAIRS OF THE "LUSITANIA."

regret. It is surprising how the English mind has opened itself to the study and production of works in bronze and iron during the last century.

Those of you who have stood in front of the Buckingham Palace gates in London, an illustration of which appears on page 313, must have been impressed with the stateliness and grandeur of these fine specimens of English work. Here bronze and iron have been combined and wrought to harmonize in an endearing combination. See the beautiful locket surrounded, with its supremely happy little groups of Amorini, whispering, it would seem, to each other stories of the artists who conceived and produced them. It is such works as these that cause a



MODEL FOR CARTOUCHE ON BALCONY RAILING, GENERAL BUILDING, ALDWYCH, ENGLAND.

serious thinker to realize how history is woven into imperishable memoriam by the hands of those wonderful men who write in metal, and whose pens are huge pieces of iron, copper and brass of unwieldy shapes and sizes. The fascination of this wonderful work has also travelled westward. Leaving England before the horrors of this devastating war had laid its destroying hand on those magnificent leviathans of the deep—had you travelled on that wonder boat, the "Lusitania," you would have been able to leave your stateroom and travel upwards in the iron and bronze enclosed elevator illustrated on page 314. Here again the clever combination of two totally different metals, iron and bronze, have proven majestically effective, especially so in that the ornaments have been enhanced in color by mercurial gilding, which gives to them the glowing effect of sunlit gold.

Approaching that great city of the Western world, New York, the traveller sees America's finest memorial of metal. Bartholdi's super effort, the Statue of Liberty, rises to a majestic height, which, though the gift of France, shows that our Western world appreciates in the highest degree the supreme efforts in the modern world of art. England cannot, to my knowledge, boast of such a wonderful statue to the glorification of Britannia, neither France to the memory of her old world glory, and we have to turn again to that little country of the East, Japan, to find its equal in size and weight. There these little men, with great minds and wonderful hands, have erected the statue of a seated figure, with a face 9 feet 4 inches in breadth, and stretching upward to a height of 53 feet. It is estimated that at least 450 tons of metal were used in casting this figure.

Before this present war, when prosperous times gave this Canada of ours many splendid new buildings, our architects did not lose sight of the effective possibilities of these metals, and many a beautiful building gives eloquent testimony to their well-studied thought and taste along the lines of metal ornamentation. When the war is over and peace terms are forgotten in the harmony of peaceful living, once again the mystic appeal of beautiful well wrought metal work will present itself to those lovers of beautiful things, which express in their soft colorings and delicate lines all the sentiment and seductive allurements of old world stories. There will be opportunities of showing those wealthy patrons of art that we too can weave stories and beat them into beautiful shapes; moulding thoughts of mystic loveliness into solid form of a rhythmic shapeliness, which shall in ages to come, when Father Time has touched them with his magic wand, take their place with those of the great Michael Angelo and others in the worn and beautiful gallery of antiquity.

The Question of Advertising

Now that the American Institute of Architects has agreed to recognize the right of its members to advertise, says "The Building News," of London, it will be interesting to watch the methods adopted to secure publicity. The permission, at any rate, shows a breaking away from the ultra-conservative attitude of conventionalism that has in America and here been detrimental to the progress of architecture in this country. It probably heralds other changes later of a more far-reaching effect, which will bring architects and architecture into prominence quite creditably, but much more effectively than some of the means proposed with that perfectly legitimate end in view. None of us, of course, wish to see the styles and methods of the patent medicine vendor or the big departmental stores followed; but, as a beginning, surely no more objection could be taken—say to the inclusion by the architect of his name and address in our own "Directory" pages than to the posting of his name on a building in course of erection under his superintendence?

Irish Marbles

A large variety of colored marbles exists in Ireland, varying from white to pink and dove and from green to black. The different colors are sometimes found intermingled, especially in Connemara serpentine, and some very striking specimens for decorative purposes have been quarried.

Many Irish marbles have been used in architectural work and have well stood the test of time. The use in exteriors of certain Irish marbles, which did not weather well, led to a general condemnation of all classes of Irish marble that was wholly undeserved. The demand for marbles is not, at this time, very great, but these marbles are again in favor in such cases where the cost of importation does not militate against them.

English Channel Tunnel Project Revived

One of the enterprises which will be taken up and carried to completion after the war will be a tunnel under the English Channel. Sir Arthur Fell, chairman of the House of Commons Channel Tunnel Committee, speaking at a recent meeting in London, explained the importance of such a railway between England and France. He thought it would be practicable for the line to run from London to Constantinople without break or change of cars. Eventually, he said, when normal conditions are restored, the line might be extended from London to Calcutta, to Capetown and Peking.



TERRACE, ALGONQUIN C.P.R., ST. ANDREWS, N.B.

BAROTT, BLACKADER & WEBSTER, ARCHTECTS.

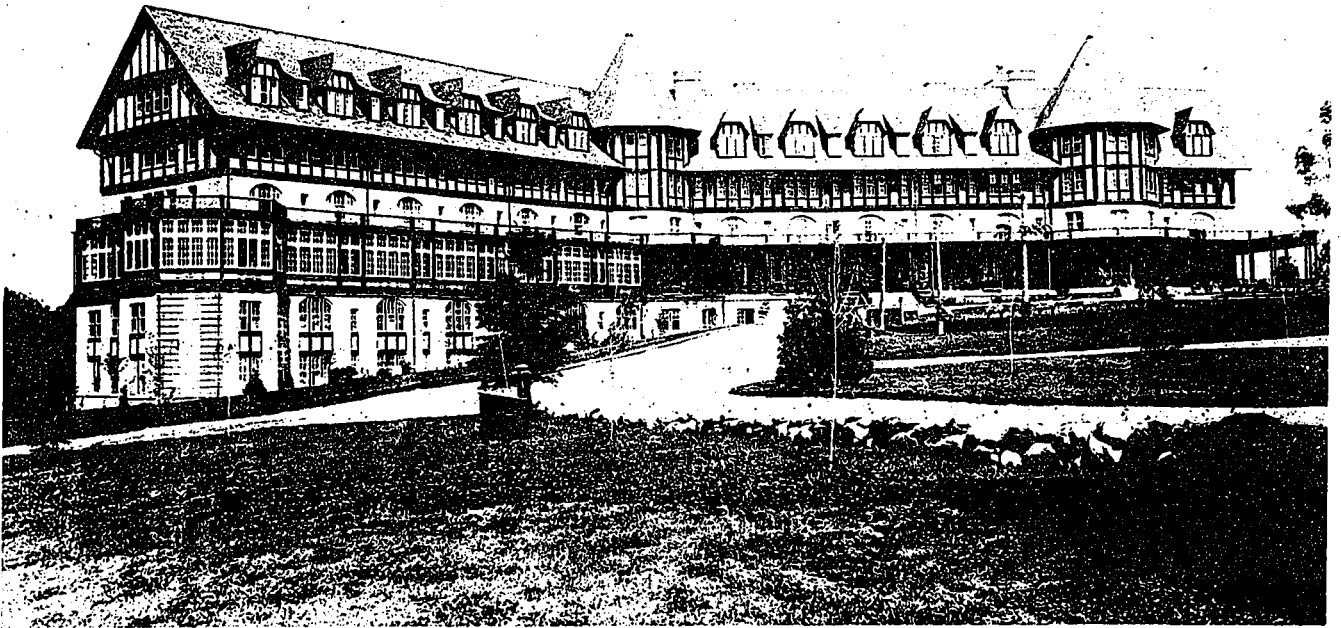
Algonquin Hotel, St. Andrews, N.B.

IT stands to the credit of the railway companies of Canada that they have not only provided the country with very excellent transportation facilities, but, that the hotels owned and controlled by them maintain a high standard of service and accommodation. These include in addition to some of the best hotels in various of the principal Canadian cities, a number of well-appointed summer hotels, of which the "Algonquin," at St. Andrews-by-the-Sea, is a noteworthy example. This building replaces the old Algonquin Hotel, a frame structure, which was destroyed by fire in 1914. In rebuilding at the time, the C.P.R., with its characteristic progressive policy, decided to erect a much improved type of structure, and had plans prepared accordingly by Messrs. Barott, Blackader & Webster, architects, Montreal, under the direction of D. H. Mapes, C.P.R. Engineer of Buildings, for the present modern hotel, which was completed in the following spring.

The hotel stands on a site covering 28,000 square feet, and is constructed almost entirely of reinforced concrete, hollow tile being utilized for all interior partitions. The upper part of the exterior introduces a half timber effect, done by embedding the boards directly into the con-

crete, and is finished above with dormer of alternating sizes set in a red slate roof. The building, consisting of four storeys and two basements, has over two hundred guest rooms, with maximum accommodations for three hundred and fifty persons. The basement contains servants' quarters, officers' quarters, helps' dining-room, bakery, laundry, men's lounge, female helps' common room, servery, etc. An open terrace is built over the front portion of the basement, and as a higher level is reached, a verandah is constructed along the front and one side of the building.

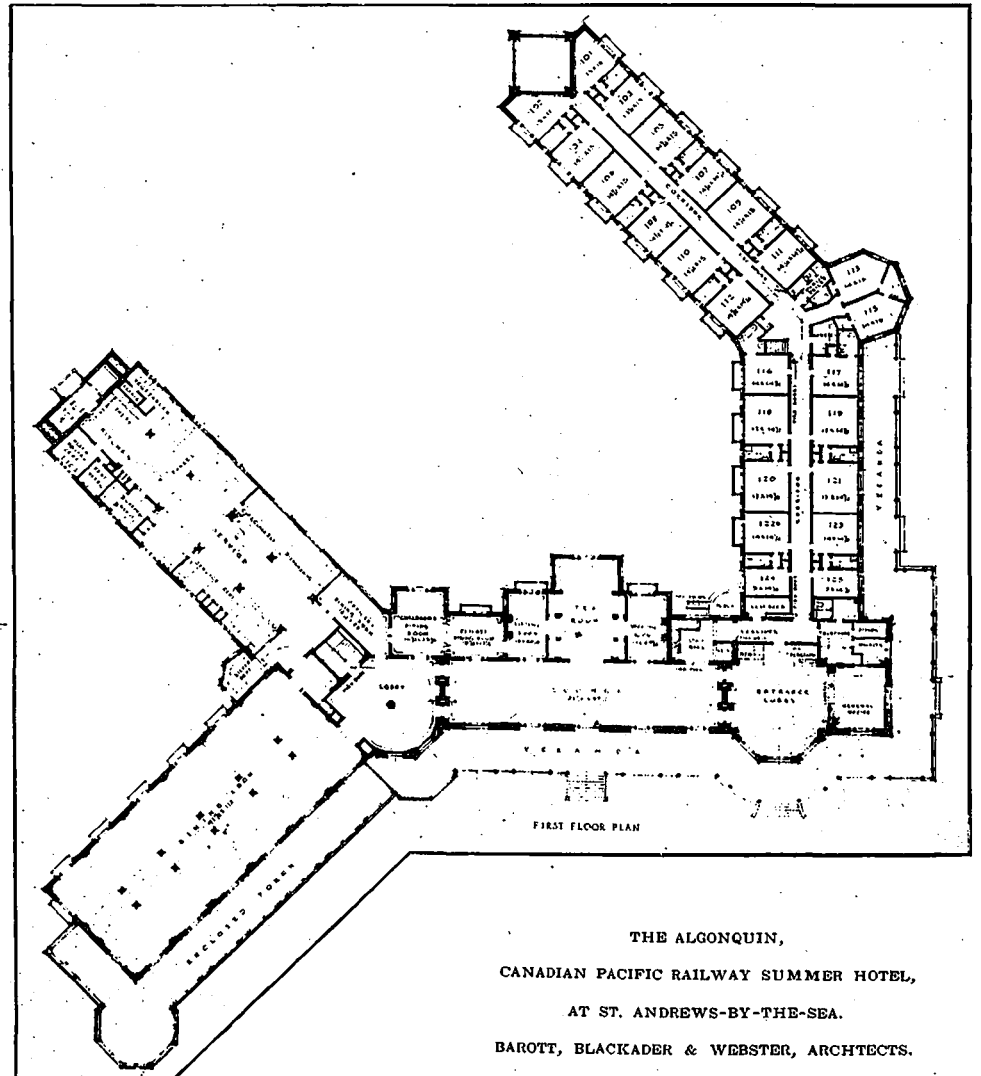
The first floor, entered from the verandah, is arranged so that the lobby is placed between the dining-room (41½ ft. x 112 ft.)—the largest room in the hotel—and the lounge (21½ ft. x 89½ ft.). These can also be entered from the terrace and verandah respectively. The drawing-room (27 ft. x 38½ ft.) leads off the lounge. Behind these rooms and facing the rear portion of the hotel, are children's dining-room, private dining-room, sitting-room, office, news stand, tourist agents' office, telephone booth, telegraph office, manager's office, smoking room, etc. The entire second and third floors, including the wings, are given up to bedrooms; ninety-seven

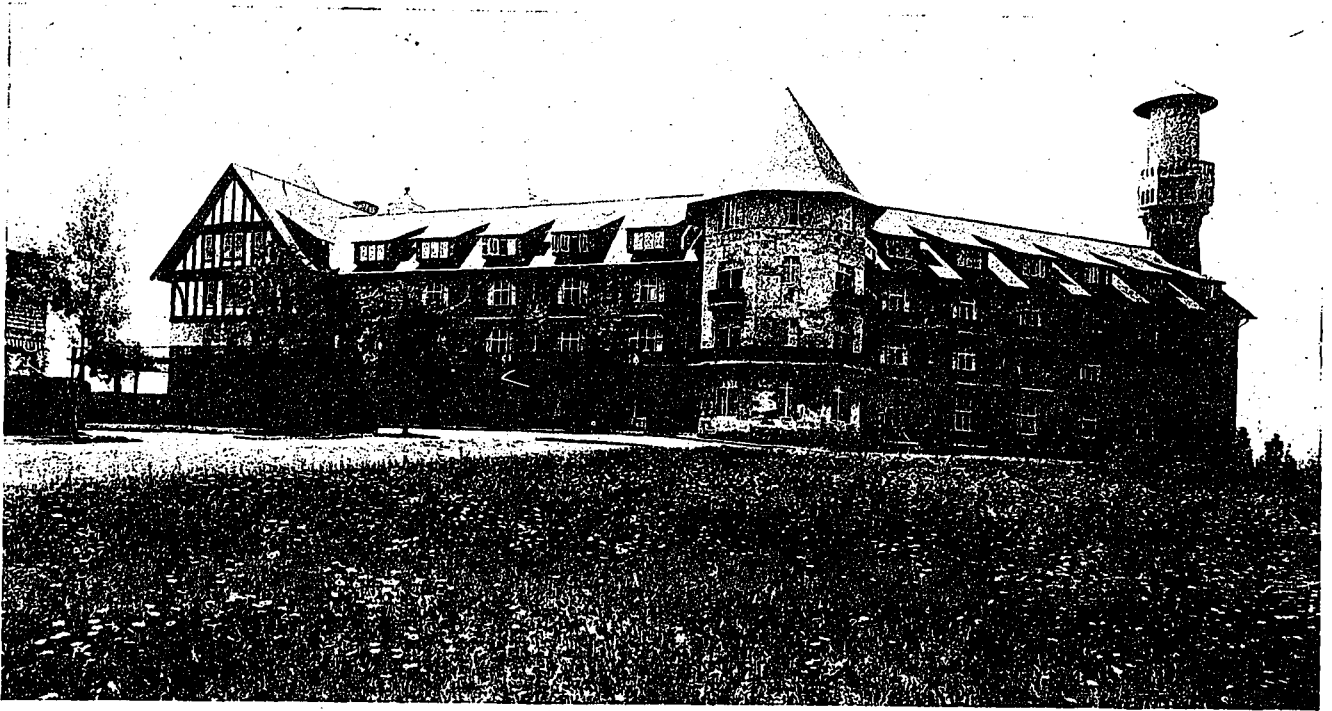


GENERAL EXTERIOR VIEW, ALGONQUIN HOTEL, ST. ANDREWS, N.B.

of these have private baths and twenty-two have private lavatories. In the attic, bedroom accommodation is also provided, while here is also situated the male helps' quarters, dormitory and common room. A boiler house is constructed about 300 feet from the main building, and is connected therewith by means of a tunnel. This contains three boilers and two generators for the purpose of providing electric light, power, heat and hot water, the refrigerating plant and laundry, as well as quarters for the engineers and laundry help.

The keynote of the furnishing is one of simplicity, as becomes a purely summer hotel. Most of the bedrooms and public rooms have hardwood floors. With the object of minimizing any risk of fire, fire walls and automatic fire doors have been provided, dividing each

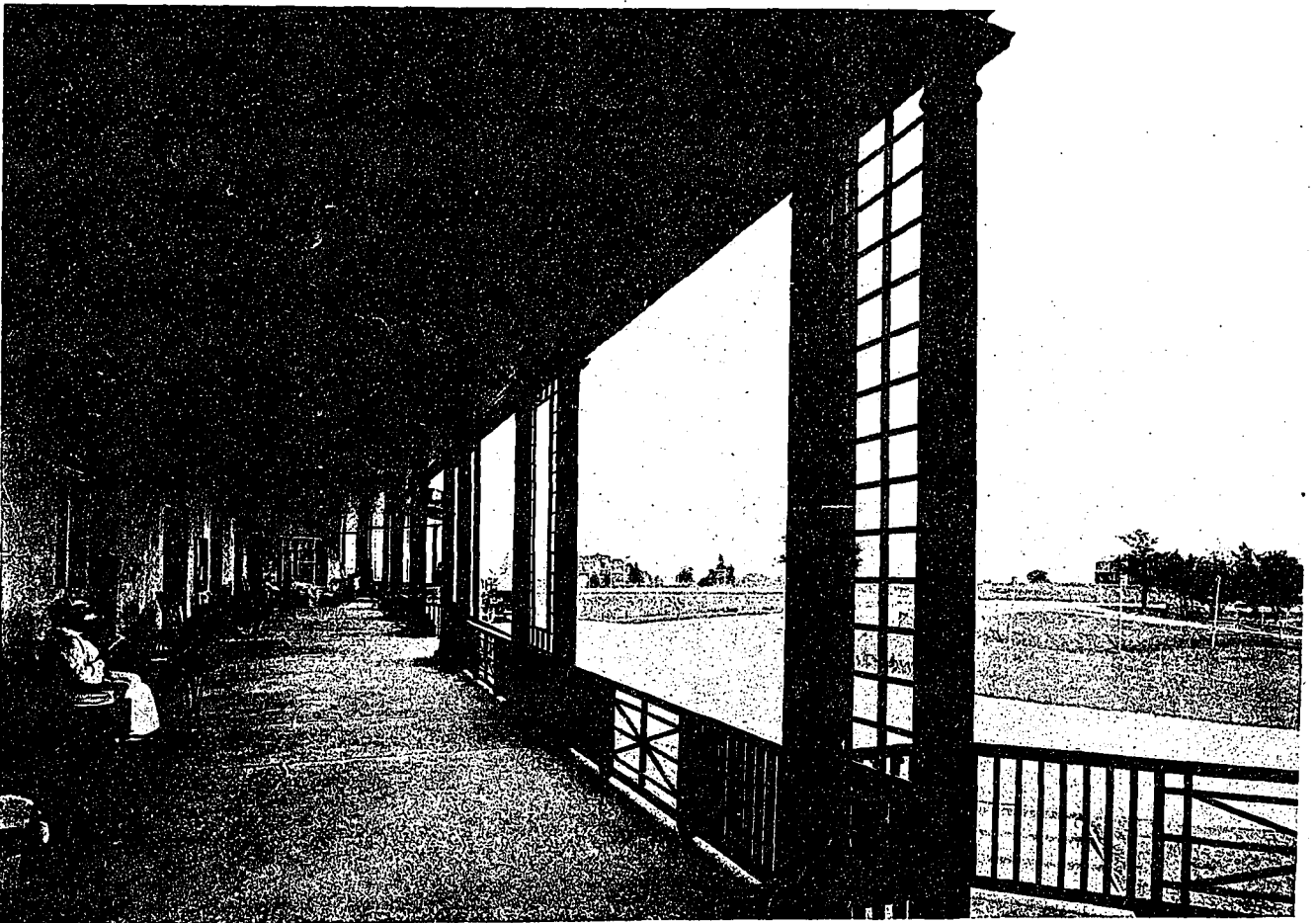




REAR VIEW, ALGONQUIN HOTEL, ST. ANDREWS, N.B.

floor into five sections, which can be isolated in case of an outbreak. Thus, on the first floor there are seven such doors, besides two rolling fire shutters, which operate automatically in event of fire.

Attached to the hotel is what is claimed to be one of the finest golf links in the world, with delightful natural bunkers. The length of the course is the regulation eighteen holes, most of which are longer than the ordinary run of



VIEW ALONG VERANDAH, ALGONQUIN HOTEL, ST. ANDREWS, N.B.



MUSIC ROOM, ALGONQUIN HOTEL, ST. ANDREWS, N.B.

holes. This gives it additional popularity, as it affords the golfer an opportunity for the frequent use of his brass in long driving.

These links and the general character of the

surrounding grounds form an attractive and picturesque setting, and affords a pleasant outlook from the spacious verandah along the front.

Both the comfortable and inviting character of the place are noticeable to a marked degree. The appointments are simple and in good taste, the general feeling is quiet and restful, and this, together with the natural recreation advantages it enjoys, makes it a much sought out place by an increasing number of better class patrons.

It is altogether carefully planned, built along sound and safe lines, and embodies in its equipment all features of convenience necessary to a thoroughly efficient hotel service, thus complying with that degree of modernity which the public has come to expect in the first-class summer hotel.



DINING ROOM, ALGONQUIN HOTEL, ST. ANDREWS, N.B.

Fire Waste in Canada

CERTAIN well directed efforts are at the present being made to acquaint the public with economic disadvantages which the annual fire waste in this country entails, and to obtain the co-operation and support of every community in reducing future losses of this kind to a minimum. One manifestation of this is "Fire Prevention Day" inaugurated on October 9th by the league recently formed for this purpose under the auspices of the Ontario Government, and which in the course of another year will in all likelihood spread its influence to other provinces. Another evidence is certain recommendations made at the recent Fire Chiefs' Convention, held at Toronto, which are based on observations gained through actual fire fighting experiences. Through means of propaganda it is hoped to curtail this national extravagance, and to obtain by legislative enactment effective remedial measures.

The plain facts are perhaps best stated in the recent summary compiled by J. Grove Smith for the Commission of Conservation, which we publish here in part. This summary, which appears in book form under the title of "Fire Waste in Canada," is by far the most valuable collection of facts on this particular subject yet published. It is not only comprehensive and informative, dealing with a wide array of statistics, but is a lucid and convincing statement of conditions which cannot wisely be ignored. The summary says:

SUMMARY OF CONCLUSIONS.

Fire waste in the Dominion of Canada constitutes a problem of paramount and far-reaching importance. Continuation of the present tremendous loss of property and life by fire cannot but vitally affect the economic future of the country. If, with the cessation of war in Europe, we are to enter successfully upon a period of rapid expansion, it is imperative that rational conservation go hand in hand with development. It is as necessary to conserve created wealth as it is to prevent the waste of natural resources. Nature in time may restore devastated forest areas, but only human toil can raise a new city from the ashes of the old. Re-creation arrests productive effort, and the replacement of values destroyed by fire absorbs energies that would otherwise be devoted to industrial and economic progress.

FIRE WASTE UNNECESSARY.

There is a growing recognition of the fact that fire waste is needless and that definite measures should be taken for its avoidance. Numerous individuals, municipal councils, boards of trade and other organizations throughout the Dominion urged the Commission of Conservation to investigate the problem. Accordingly, an investigation was begun and an attempt was made to gather into a well-rounded whole the experiences and technical knowledge of fire-prevention experts, and to apply it to existing conditions.

To the average citizen fire prevention implies a vaguely outlined means of curtailing fire waste by the simple expedient of preventing fires. How this desirable end is to be accomplished is not made clear. The well-informed go further and analyze the problem into at least five distinct factors, viz., (1) the engineering, (2) the underwriting, (3) the legislative, (4) the commercial, and (5) the individual. Co-ordination of these varied interests in united reformatory

endeavor is the first step in any programme designed to deal effectively with the question.

The following general conclusions reached by the investigator are the result of a statistical survey covering the entire Dominion and based to a large extent on replies received to a questionnaire sent to general managers of insurance companies, loss adjusters and other persons qualified to give an authoritative opinion.

GENERAL CONCLUSIONS.

The conclusions reached may be briefly summarized as follows:

1. That the annual loss of life and property by fire in Canada—the latter averaging \$2.73 per capita annually for the years 1912-1915—is greater per capita than in any other country in the world, and constitutes an enormous and increasing drain upon the resources of the Dominion, besides most seriously affecting the economic prosperity and general well-being of the people.

2. That such losses can be very materially reduced. This is clearly shown by the experience of European countries which have attacked the problem at its source.

3. That the loss by fire is chiefly ascribable to

(a) Carelessness due largely from a sense of security created by the present system of fire insurance.

(b) Faulty building construction.

(c) Arson.

(d) Lack of adequate fire prevention laws, such laws as exist being poorly enforced.

4. That, for immunity from the danger of fire losses the people of Canada are relying largely upon elaborate and expensive systems of fire-fighting and are giving too little attention to the prevention of fire.

5. That our fire departments, while among the best in the world, in both apparatus and personnel, are not preventing the steady growth of losses.

6. That the momentary indemnity provided by fire insurance does not restore the values destroyed, but merely distributes the loss, through the channels of commerce, over the whole people.

7. That the cost of fire insurance and fire prevention is, in a large measure, determined by the amount of the fire loss and cannot be expected to decrease except as the fire waste declines.

8. That, although the aggregate loss by fire constitutes a national problem, all fires are local in origin and are, therefore, locally preventable and controllable.

9. That property owners generally have not been sufficiently influenced by their own interests or the welfare of the country at large to use effective means to correct fire-waste conditions.

10. That existing legislation respecting the prevention of fire is inadequate and lacking in uniformity.

11. That such legislation is almost entirely confined to cities and more important towns, and that the dangers and hazards of fire in small communities and rural districts are without regulation or control, despite the occurrence of a large proportion of the fire waste in rural districts.

12. That the only possible solution of the national fire-waste problem lies in the adoption of compulsory measures which, by reducing to a minimum the fire hazards in all communities and properties, will prevent the occurrence of fires.

13. That, owing to the failure of local authorities to deal adequately with the situation, the Provincial Governments should undertake the removal of a burden imposed upon the whole people and should safeguard the lives and property which, in the final analysis, constitute the true wealth of the country.

FIRE WASTE IN GENERAL.

The summary goes on to point out that:

"The Dominion of Canada, since Confederation, has suffered direct loss from fire to the extent of over \$350,000,000, exclusive of forest losses. To this sum must be added the cost of public and private protection, \$150,000,000, and the amount of insurance premiums paid in excess of indemnity returned, \$197,000,000. These figures in the aggregate re-

present the direct fire cost to the Dominion and show that, during the last half century, the ravages of fire have taxed the people of Canada to the extent of nearly \$700,000,000. The indirect cost involves interrupted business relationships, loss of earnings by employees, loss to property owners through vacancy of dwellings caused by removal of tenants to seek work elsewhere, loss to municipalities from destruction of taxable values and, most important of all, the loss of human lives. These costs, even regarded solely in their economic effects, are beyond the power of figures adequately to represent.

FIRE WASTE IN FOREIGN COUNTRIES.

Were the enormous fire losses of Canada unavoidable, speculation and attempts at reform would be futile. That the condition is capable of improvement, however, is evidenced by reference to the losses of other countries. Special reports gathered by the National Board of Fire Underwriters of the United States show that the average per capita loss in fourteen European countries during the period of 1912-1915 was \$0.71, and in the United States \$2.26. For the same years, the average loss in fifty-six Canadian cities amounted to \$2.96 per capita. The respective returns for each country are shown in the following table:

Country	No. of cities reporting				Fire loss per capita				Average
	1912	1913	1914	1915	1912	1913	1914	1915	
CANADA	56	56	56	56	2.74	3.22	3.38	2.49	\$2.96
United States	300	298	298	333	2.55	2.25	2.32	1.94	2.26
Philippine	—	1	1	1	—	4.41	1.28	1.00	2.23
Islands	—	3	1	3	0.49	0.36	5.35	1.62	1.95
Scotland	—	1	1	1	—	2.30	0.15	3.13	1.86
Spain	—	1	1	1	—	—	1.77	—	1.77
South Africa	—	1	—	—	—	0.69	1.36	—	1.02
Belgium	1	1	1	1	0.84	0.39	1.19	0.95	0.97
Russia	2	2	1	1	0.84	0.49	0.63	1.02	0.74
France	6	5	3	3	0.34	—	—	—	0.69
Hawaii	—	1	—	—	—	0.69	—	—	0.69
England	12	14	9	8	0.54	0.33	0.67	1.03	0.64
Norway	1	1	1	1	0.69	0.32	0.48	0.72	0.55
Italy	3	1	5	3	0.90	0.25	0.37	0.62	0.53
Japan	—	3	10	—	—	0.59	0.44	—	0.51
Ireland	2	2	2	2	0.57	0.28	0.39	0.55	0.45
Chile	—	1	—	—	—	0.30	—	—	0.58
Sweden	1	1	1	1	0.13	0.74	0.54	0.29	0.42
Austria	4	4	4	—	0.30	0.25	0.42	—	0.32
Germany	9	3	4	2	0.20	0.28	0.17	0.49	0.28
Switzerland	1	1	1	—	0.04	0.15	0.19	—	0.13
Netherlands	—	2	1	1	0.12	0.11	0.07	0.14	0.11
Average annual loss per capita:									
United States and Canada									\$2.61
European countries									0.71
All other countries									1.13

According to this record the average losses in Canada are approximately four times the losses in Europe. As the comparison is confined to the more important cities, where fire protection is provided, it does not represent general conditions.

Statistics gathered from a number of European and Canadian towns of less than 4,000 population show that the loss for the years 1910 to 1914, inclusive, was sixteen times greater in Canada. This striking difference may be accounted for largely by our excessive exposure losses and the fact that towns in Canada have a much greater property value per capita subject to fire. Many important industries are situated in small places in Canada. These often provide the sole reason for the existence of a town and, in the event of their destruction, the per capita loss of that particular town is increased out of all proportion to the normal average of the country. A somewhat similar qualification should accompany any attempt to compare the loss records of Canadian and foreign cities. The fact that values at risk are approximately four times greater per capita in Canada than in Europe obviously leads to the conclusion that the same fire causes will, in all probability, produce losses four times as great. This provides no excuse for the extent of our fire loss, but it is an essential factor that is apt to be overlooked in making the comparison.

In connection with a table showing the number of fire alarms per thousand population and losses per capita in the largest cities of the world, and which, in the case of the principal Canadian cities, shows a per capita loss ranging from \$1.60 to \$12.60, the summary says:

In Canada, taken as a whole, the number of fires has increased much more rapidly than the population. For instance, the city of Toronto had 385 alarms in 1890, 746 in 1900, 1,267 alarms in 1910 and 2,080 alarms in 1916, an increase in the twenty-six years of 440 per cent. Toronto, in this respect, is representative of practically every other municipality in the Dominion. Fires have also increased in frequency of recent years in such European cities as London, Berlin and

Paris, due, no doubt, to the complexities of modern life, but the number has remained practically stationary in the smaller European towns.

The striking contrasts between the losses, frequency and extent of fires in European countries as compared with Canada are due to differences in the regulation and control of these three prime factors of fire waste. The immediate effects of this control are most clearly shown in

- (1) The general character of the buildings.
- (2) The laws governing the conduct of the people.
- (3) The viewpoint and civic responsibility of the individual.

1. CHARACTER OF BUILDINGS.—The chief structural conditions that operate to effect a small fire loss in Europe are the general use of non-combustible materials, the restricted height and area of buildings in cities, and the stringent requirements of building codes. With the exception of Norway, Sweden and Russia, where wood construction is prevalent, practically all European countries prohibit the erection of frame buildings within municipal areas. Very few wooden buildings exist even in rural districts, and whole communities of inflammable structures, such as are common in Canada, are unknown. This condition is primarily due to the relatively high cost of lumber in Europe and the intangible influence of older civilizations, which make for permanence. The authorities have realized the necessity of good construction, so that, on the average, buildings are much less inflammable than in Canada. Anomalous as it may appear, the more fire resisting all buildings are, the less fire-resisting does any particular building need to be. What is known as modern fire-proof construction is far from common in Europe. Few buildings are comparable with the steel and tile or concrete structures erected in Canada during recent years. They have not been found necessary, because internal fires are few and the external hazard due to exposure is practically negligible. In a city composed of buildings which, although not fire-proof, are comparatively non-combustible, the danger of fire is much less than it is in a city having a large amount of inflammable construction and a few scattered fire-proof buildings.

In Canada, the most costly and extensive fires have invariably been caused by the poor average of building construction in the areas affected. It is estimated that only one in every 1,200 buildings in Canada is in any sense fire-resisting and that 69 per cent. of the total number are of frame construction. Despite advances in the price of lumber in recent years, 47 per cent. of all the buildings erected during 1912-1915 were built of wood. No harsh indictment of the Canadian people is justified by these facts. Timber has always been abundant, more adaptable and less costly than other materials. Pioneer settlements have become villages and villages have become towns in a brief period of time. The demand for new buildings has been urgent and development has taken place with little definite planning or foresight. In all Canadian cities, community problems incidental to industrial growth have, at some time, forced the transition of residential streets into mercantile districts. There has been no guarantee of permanence and no means of anticipating future developments. Consequently, it has been to the economic interest of the individual to build cheaply and temporarily, to burn, if necessary, and build again.

There is no immediately effective remedy applicable to structural conditions in Canada. The worst feature will gradually disappear as lumber becomes relatively more expensive and the existing buildings are destroyed or torn down to be replaced by a better type. Municipal building legislation, such as is in force in most Canadian cities, does not adequately deal with the situation. Frame construction is usually prohibited in small congested business areas, but, in adjacent districts, the poorest type of buildings is permitted. As the cities expand, these districts, in turn, become congested areas and form an insuperable barrier to any real progress. To effect reform and to approach European standards, in even a measurable degree, the only logical plan appears to be the enactment of legislation in each province to regulate and control all building construction in accordance with known standards of structural safety.

While better construction and climatic conditions account largely for the insignificance of the fire losses in Europe as compared with those in Canada, another potent factor is to be found in the laws governing the conduct of the people. European laws punish carelessness, protect the community from its results, rigidly investigate the cause of fires and enforce severe penalties for negligence and criminality. Profit from the burning of property is made practically impossible.

In France, . . . a tenant is held responsible for all loss occurring through a fire breaking out in the premises he occupies, unless he can prove that the fire was not occasioned by his neglect or fault. In the case of a fire due to a defect in the building, the landlord is responsible to the tenants and others suffering loss thereby; the landlord, in

turn, can sue the architect, builders or others to whom the fault for the defect is traced. They are also liable to the penalties provided for by the laws and regulations which have been violated.

Space does not permit of anything more than a passing reference to the mass of related evidence and tables. Suffice it to say that a thoroughness is shown which omits no data necessary to the completeness of the volume in laying the facts fully before the reader.

BUILDING CONSTRUCTION AND FIRE PREVENTION.

Efficient building construction constitutes the foundation of successful fire prevention. The extensive and indiscriminate use of wood for structural purposes is regarded by many competent authorities as the largest single factor contributing to the excessive fire waste in Canada. Of approximately 2,000,000 buildings throughout the Dominion, less than one-tenth of one per cent. has been built with proper consideration of fire safety. In the cities and towns from which statistics are available, almost 70 per cent. of the construction is frame, the majority of brick buildings are structurally defective or inadequately protected, and only one in every 1,200 is even nominally fireproof. With such conditions prevailing it must be recognized that the enforcement of measures regulating future construction, cannot immediately effect any substantial reduction in the volume of fire waste. There are sufficient combustible buildings in Canada to maintain the present rate of loss for many years. Upon the average, fire occurs every year in one out of every 80 buildings in cities and towns. Fire prevention is concerned, therefore, not only with the erection of new buildings, but with what is of equal or even greater importance—correction of the worst faults in existing buildings.

BUILDING CONSTRUCTION AS AFFECTING FIRE LOSSES.

Buildings, in relation to fire loss, are contributory rather than causative. Comparatively few fires other than those originating from defective chimneys and shingle roofs, are primarily occasioned by poor structural conditions. The assertion that fires are more numerous in Canada than in Europe because of the greater prevalence of wooden buildings is not strictly in accordance with the facts. Were the frequency of fires thus affected by construction, the numerical ratio to population in Canadian cities should have decreased of recent years. Since 1890, practically all the more important cities have enacted measures prohibiting frame buildings and shingle roofs within at least a portion of their areas. Despite the progressive structural betterment thereby effected, the number of fires in these places has shown no appreciable decline.

While buildings are seldom the original cause of fires, their physical characteristics largely determine the extent and destructiveness of every fire. The value of brick construction in confining fires to the buildings immediately involved is demonstrated by the record of exposure losses in Canada. Of 1,379 fires spreading to two or more buildings, approximately 80 per cent. originated in frame buildings. Analysis shows, further, that losses due to exposure were proportionately least in the places where better construction prevails.

STRUCTURAL CONDITIONS IN FOREIGN COUNTRIES.

Comparison of fire losses and of structural conditions in Canada and Europe leads to the conclusion that a radical change in building methods is fundamental to the curtailment of Canada's fire loss. Serious fires in Europe are exceptional occurrences and conflagrations are almost unknown. The fire departments in the principal European cities are certainly no better than ours and, in the smaller places, comparison would be ludicrous. Their greater immunity from destructive fires is, undoubtedly, due in large measure to superior construction. Frame buildings are practically non-existent in the larger cities.

INEFFICIENT BUILDING METHODS.

A candid inquiry into present-day building methods in Canada leads to the conclusion that we are decidedly lacking in that thoroughness which might properly be expected, especially in buildings involving considerable cost. Our unwarranted haste and consequent carelessness, our neglect of proper supervision and our system of contracting whereby the date of completion of a building is made the factor of greatest importance, all militate against efficient and permanent work. Unquestionably the majority of buildings in

cities are constructed with thoroughness as regards structural safety, but there is ample testimony that few are capable of withstanding a sudden attack of fire. The responsibility for these conditions may be equally divided between the owners, architects, contractors, and public authorities. Speculation and the desire for large returns by investors have been the cause of much poor construction in Canada. Efficient building construction requires time. The modern "rush" contract deliberately invites slighted work on the part of the builder, and scant supervision on the part of the architect. Under pressure of time, the architect is sometimes obliged to pass mediocre work rather than delay completion, and this knowledge is too often taken advantage of by the contractor. Following recent fires, buildings, hitherto assumed to be of first-class construction, have been found with hollow masonry walls filled with broken bricks, floor arches chopped away for the purpose of applying ceiling finish, curtain walls laid with insufficient mortar and tile column coverings fractured for the admission of pipes and wires.

Regarding these things the average building owner is not only ignorant but indifferent. Dependence is placed upon insurance to take care of any fire loss that may result, and in this manner the burden is shifted upon the community. Every year Canadians pay millions of dollars for the maintenance of fire departments, and other millions to insurance companies to be used in indemnifying losses which are to a large extent unnecessary. If only one-half of the money so expended during the last quarter of a century had been used in the proper structural development of our cities and towns, the fire loss in Canada would be merely a fraction of what it is to-day.

BUILDINGS AS INVESTMENTS.

One of the most important phases involved in the question of building construction is that of cost. The first consideration should be security, the second, earning capacity, and the third, continuity of earnings. By disregarding these underlying principles, investment in buildings is purely speculative. Before purchasing land upon which a building is to be erected, months are spent in investigating titles and values but double the expenditure is often made upon the structure without enquiry save as to its arrangement, convenience and appearance. Security is entirely ignored in dealing with the one factor subject to possible destruction by fire and to certain deterioration by age.

From the standpoint of the individual owner, there can be little doubt that a first-class structure affords a superior investment. The capital expenditure may be greater but, after a number of years, the building will represent practically as valuable an asset as when it was erected. On the other hand, a smaller initial investment in a poor building demands constant and increasing outlays for repairs that add nothing to the actual value of the property.

INFLUENCE OF ARCHITECTS.

Architects and contractors can exert a tremendous influence towards the elimination of fire waste. In the past, it has sometimes been deplored that the building profession has given little encouragement to fire-prevention movements. "Safety Engineering," June, 1917, points out the responsibility of architects in this respect as follows:

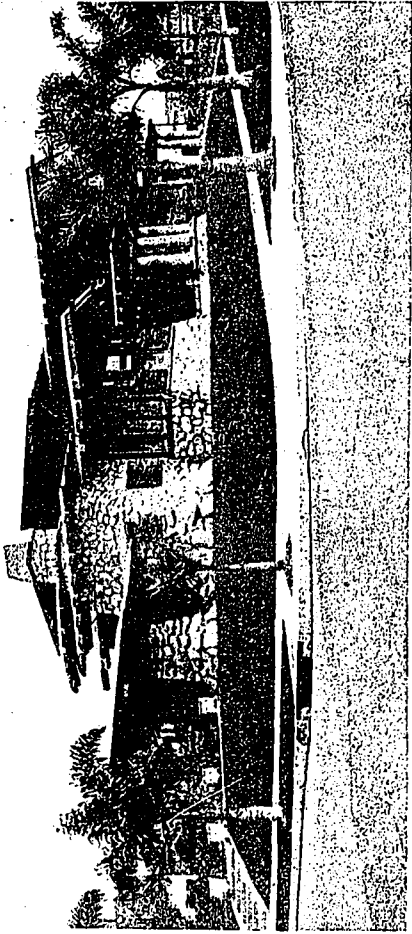
"The architect's duty lies in specifying, advocating and insisting upon fire-resistive construction. The enormous proportions of fire waste in America is a distinct reflection upon American architects. It indicts them as creators of dangerous conditions. Some 9,000 lives are sacrificed each year to fire. What have the architects to say to this? The architect's advice is sought in planning a building. He should under all circumstances, insist upon construction which will not add to the ash heap and appalling loss of life. If the architects would see their duty aright as creators of buildings, it is to them above all that we must look for a reduction of our annual fire waste. The architectural profession, if it will, can render great service to the country and remove from the profession the accusing finger of being a primary cause of the tremendous fire waste."

LICENSING ARCHITECTS.

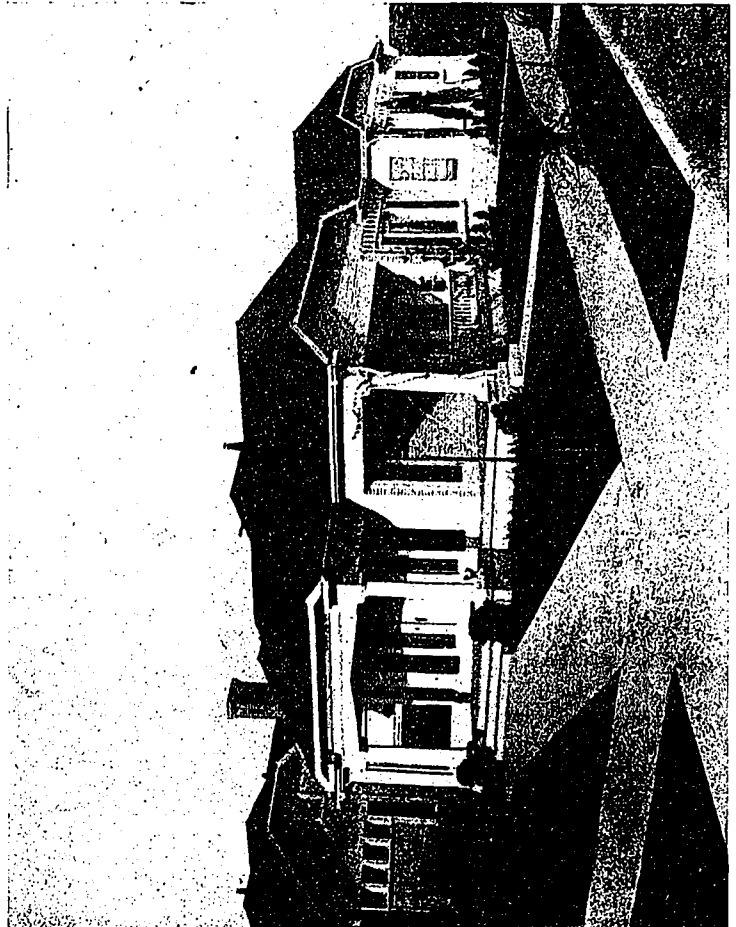
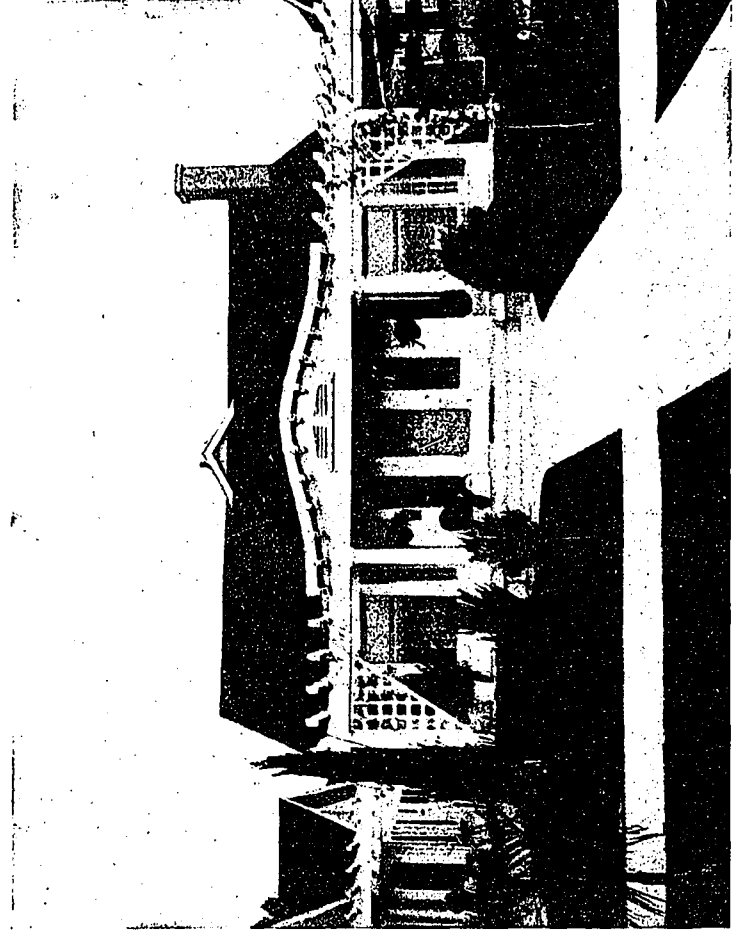
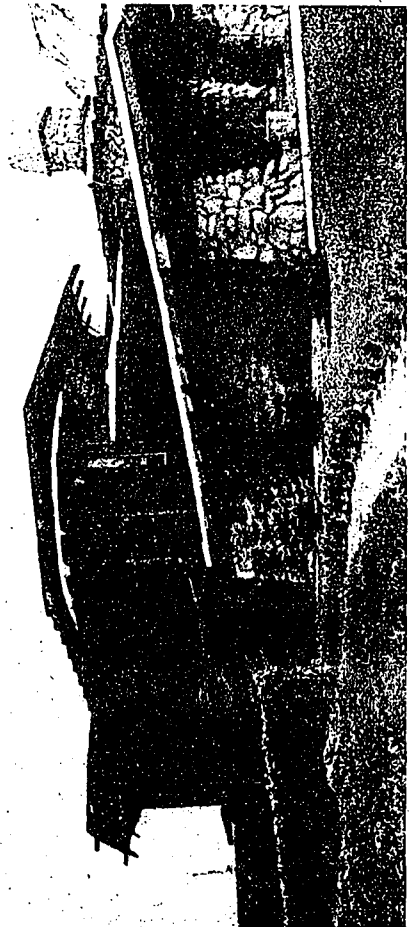
There is an obvious need for the more general employment of technically competent persons in the planning and erection of buildings in Canada. Pseudo-architects and speculative builders are a menace to life and credit yet flourish without restraint. Very few employers of architects can judge of their technical qualifications by an interview. These can only be revealed empirically and too often the employer pays dearly for the demonstration. In the United States and in Canada, the question of licensing architects has been frequently raised, but with indifferent success both in the

(Concluded on page 336.)

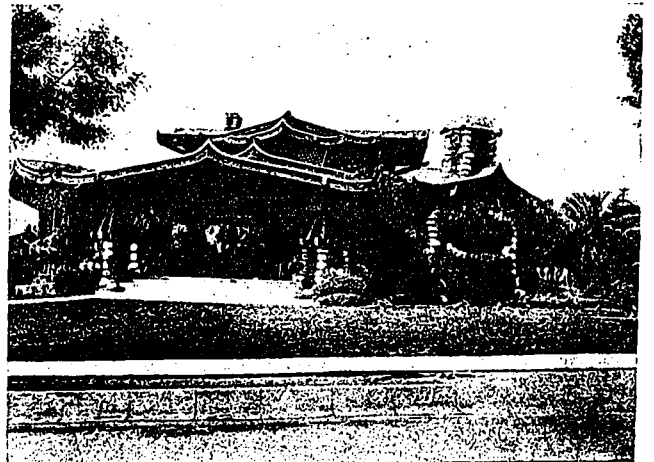
CONSTRUCTION



AN EXAMPLE OF JAPANESE ARCHITECTURE ON WILTSHIRE BOULEVARD, LOS ANGELES. PHOTOGRAPHED FROM TWO VIEWPOINTS.



TYPES OF MODERN CALIFORNIA BUNGALOWS BUILT AT LOS ANGELES DURING THE CURRENT YEAR.



DIVERSIFIED DESIGN AS SEEN IN RECENT DOMESTIC WORK AT LOS ANGELES, CALIFORNIA.

The Building Industry and National Progress

Efficiently organized, the National Federation of Building Industries in the United States, already in the short period of its existence, has resolved itself into an energetic and progressive body having the support of a large membership behind its purposes and views. Of a character somewhat similar to the proposed Canadian association, it demonstrates what can possibly be accomplished in this country if the proposed Ottawa conference turns out as successful as anticipated. Having aims which are both patriotic and protective, it offers to place at the disposal of the authorities at Washington the combined experience of its members in all matters which relate to Government war measures, at the same time seeking a fair degree of recognition and consideration from the Government in all matters affecting the building industry.

BUILDING INDUSTRY AN ORGANISM AND NATIONAL FACILITY.

Conditions in both countries being identical to a marked degree as regards the industries involved, the statement recently issued by the executive of the association in the United States, outlining its objects and activities, is not only of interest, but offers certain considerations which apply with relative importance to the building fraternity here. The statement referred to makes out a very excellent case for the interests it represents. Stress is laid on the importance of the industry and the place it occupies in the economic development of the country. It points to the fact that many do not realize that the building industry is an industry, an organism, and a national facility, but look upon its many branches as independent industries in themselves. Pursuing this thought further, it adds that it becomes apparent upon reflection that shingles are of no use without nails, and that bricks are of no use without mortar. It points out that "it is useless to release fuel for the manufacture of one product without releasing fuel for the manufacture of other products in proper proportion. Every structure requires for its completion many component parts, for the want of the least conspicuous of which the completion of the work is delayed and made impossible. A structure is, in fact, an assembly of materials and products produced chiefly in large quantities mainly by highly capitalized and highly specialized manufacturing concerns."

Briefly enumerating the number whose work relates to building development, including the many architects and engineers engaged in designing and superintendence, the number of organized builders' exchanges composed of con-

tractors and material dealers, the various associations of manufacturers of lumber, cement, clay products, heating apparatus, paint and the like, it urges that all must work together for speedy and economical construction, bringing their efforts into unison in the accomplishment of any object in view.

ADVANTAGES OF A MUTUAL CHARACTER.

In reference to the present and prospective national conditions, the attitude of the Federation is indicated in suggestions made by its executive to the War Industries Board to the effect that "the Federation of Building Industries, as a single great national unit, might serve a most valuable and important purpose to the national administration, as a self-governing instrumentality, possessing understanding of the country's requirements, and having efficiency for their execution, if a definite point of contact between the necessary governmental agencies and the building industry can be established.

"Information as to the needs and purposes of the government could be thus most readily transferred to the industry, and information as to facilities and needs of the industry could with equal facility be placed at the disposal of the government and practical and efficient working conditions thus assured."

In this connection it is pointed out that the Federation, through its executive and War Service Committee, is both willing and prepared to act, if desirable, as advisers or specialists to the government, from the point of view of the industries involved, as well as a clearing house for the accumulating of information and of the problems of the industry itself. Through the many organizations federated into this national association and through the large number of experienced, responsible and dependable men connected with it, it is felt that actual facts and information essential to the government could be gathered more promptly, completely and reliably than in any other way.

UNINTERRUPTED BUILDING ESSENTIAL TO NATIONAL DEVELOPMENT.

The importance which is attached to the building industry in relation to national development is stated as follows:

"During the time when the production of the nation is being burned up, thrown into scrap heaps, or consumed as food, it may not be amiss to make provision for the morrow by the speeding up of production of materials whenever this can be done without interference with the war programme.

"Building does not lock up funds, but trans-

fers them from one hand to another. Material from the raw is raised in the form of structure which can be taxed and on which money can be borrowed. It earns its own upkeep and replacement beside the return which the capital would be earning if it were being 'saved.' Rent is the first cost of all necessities and civil construction must continue if we would mitigate the increased cost of living.

"Few who are not close to the industry realize how large a proportion of their neighbors are wholly or partly engaged in building. The number is so great that to hold any considerable number of them marking time would strain the resources of tradesmen, landlords and many others in every community of the country—weakening the people as taxpayers, bond buyers and as contributors to Red Cross and other relief funds.

"Labor must be permitted to exchange sufficient of its wage for what it requires to keep it in contentment, and it may be well for the nation's immediate and ultimate welfare that this wage should be exchanged for homes and permanent buildings, rather than for the glass beads of petty luxury which involve importations and a corresponding depletion of our gold reserve.

"In the final analysis the nation must embark, consciously or unconsciously, on a policy of integration or disintegration; its action must be either constructive or non-constructive. We must create new wealth and maintain a broad basis of taxation, or allow our wealth to be consumed, living on our principal rather than on our income.

"When building stops in any community, that community begins to run down at the heel in its housing for residents and business. In war as in peace, depreciation is constant—there is the real estate scrap heap and there is the fire loss. Even stationary population must have new dwellings and other common types of structures or the community will suffer in health and morals from overcrowding, defective sanitation and a general delapidation at home and at work. It is already apparent that the need, especially for dwellings, has in many parts of the country seriously overrun the supply.

"Not the least important reason for sanctioning civil construction, when, where and as war needs permit, is that national interest requires the preservation of the industry as a national facility. The merchant marine was allowed to disintegrate, and we encountered the necessity of creating and manning a fleet under pressure and at the highest cost, and taxing the money out of the income of the people. The efficiency of the railroads likewise declined with a somewhat similar result. The people paid. War needs come first, but we should do what we can

to prevent the breaking down of an entire industry, and the disintegration of its now efficient plants and of its forces of skilled artisans which must be constantly available, not only to give our people necessary living facilities, but to be always in readiness for war work and for the reconstruction period to follow the war.

"The policy we suggest would tend to keep in being and in progress the arts and occupations related to the provision of shelter and to rear in normal course of events a generation of personnel trained to those callings, interested in particular enterprises through which the industry works, and devoted, by ambition and sentiment to the pursuit of building construction. Otherwise the reconstruction of the industry will be slow after its products have been increasing in demand for years and there will result a serious increase in rental charges, which have already been materially increased through shortage of supply."

Sacred Road Memorial in France

Already the French Government has decided on a memorial that will worthily represent to the ages to come the grandeur and the horror of the present world war. It is to take the form, says the "American Architect," of a "sacred road" stretching 400 miles, from the coast of Flanders to far Alsace, along the line on which for four years and more the contending hosts have faced each other in grim battle.

Planted on each side with forest trees, the memorial road is to grow year by year, century by century, into an undying and perpetual monument which nature herself shall raise in everlasting commemoration of the war.

In the woods at either side the men who have given up their lives for humanity will be buried. Within this long and narrow woodland belt will be preserved a memorial and a lesson to the generations to come.

Already active preparations are being made for the commencement of the scheme. By direction of the French Government, aided by the co-operation of patriotic societies and individuals, a million young trees have been collected, and when peace at last comes to the world this "sacred road" will spring quickly into being.

Half-a-Million for New Schools

The Toronto Board of Education proposes an expenditure of \$500,000 in connection with new schools. It has been decided that more accommodation must be provided, and next year's council will be asked to authorize the sum necessary for the contemplated improvements.

Five Decades of Heating and Ventilation

IN a review of the advances made in the art of heating and ventilation, contributed by Werner Nygren, C.E., to "Record and Guide," Mr. Nygren says, among other things:

Air is the oldest of the three mediums used as heat carriers. Before water and steam were even thought of for this purpose, hot air or furnace heat was introduced and distributed in about the same manner as is done with the furnace-heating systems of the present time.

In the natural order of things, the first steam and water heating systems were of a home-made order. At the outset or pioneer period of the modern heating, there was not only the lack of the present-day knowledge gained by experience, but also the uncertainty of what material was best suited for pipes, heaters and boilers. The piping used was mostly made up of a bulb-jointed cast-iron pipe, with caulked joints, assembled in about the same manner as our present cast-iron drain piping. Radiating surface was also made up in this manner, and the boilers were either made specially for each installation according to the designer's own notion, or else such available types of boilers as were then in use for operating steam engines were selected for this duty.

One of the earliest improvements was the introduction of the wrought-iron pipe assembled by screw joints and flanger and the use of wrought-iron pipe coils. A further step towards refinement was made by the invention of the radiator, which first made its appearance in the early fifties. Quite unlike most other innovations, the radiator in its earlier form was so efficient that but a very slight increase has been possible in all these years.

Indirect heating, like the direct method, was first accomplished with pipe coils. Indirect radiators made of cast-iron came into use about 1860. The original pattern, known as the "pin" pattern indirect radiator, is still being manufactured and used in competition with numerous other types of more recent design.

SECTIONAL CAST-IRON BOILERS FIRST MADE ABOUT 1850.

The first sectional cast-iron boiler of the type at present used for steam and hot water heating was made about 1850, but did not come into general use until in the early sixties. This has no reference to the power boilers of the sectional water-tube type which were conceived prior to the year 1800, but were not widely used until some time later, and were of but little merit un-

til in the sixties, when they began to develop along the lines of their present-day form.

LITTLE CHANGE BETWEEN 1860 AND 1888.

During the time that elapsed between the introduction of radiators, sectional boilers and other specialties which gave the steam heat its present character and until about 1888, the demand for this form of heat was greatly increased without any noteworthy changes in its application, except that exhaust steam more and more came into use. At the end of this period, however, something happened which gave steam heating new impetus and added prestige, viz., the invention of automatic heat control and the introduction of specialties for vacuum heating a few years later.

THE ADVANCE OF VACUUM HEATING.

Vacuum heating, which first appeared in the early nineties, came very rapidly into use in steam-heated buildings, equipped with power plants, because it provided an effective method for distributing the exhaust steam for heating without undue back pressure on engines, pumps, etc.

While the basic patents of the system remained in force, the appliances used in connection therewith were sold to the trade, together with licenses for operation of the systems in the buildings for which they were bought. Lately, and since these patents have expired, the appliances are sold without any operating rights, and incidentally with greater competition and much less claim for economy in operation than formerly was the case. This is not intended to imply that the use of vacuum as an agency for induced steam circulation that reduces back pressure is not fraught with a certain economy, or that this economy has been reduced by the influence of competition. On the contrary, the latest appliances of the older systems now in existence are more efficient than ever.

RETURN LINE AND AIR LINE SYSTEMS.

From the very beginning there have been two types of vacuum systems in use. One of these systems, known as the return-line system, is used very extensively at the present time. The function of this system is to expel both air and water of condensation through an automatic return valve attached to the outlet of each radiator and heat source of the heating apparatus. This valve discriminates between the steam which is to be retained and the water and air which are to be expelled. In this system the entire return piping is under suction from a

pump which maintains a vacuum as needed and pumps the condensation water and air to a separating tank, whence the water is then returned for boiler feed. A modification of the vacuum return-line system is what is commonly known as the open return-line system, which differs principally in that the water of condensation and the air with it are discharged by gravity directly to the separating tank, the vacuum pump being omitted.

The other vacuum system, which also is in use at present, is known as the air-line vacuum system. The function of this system is to expel air from each radiator and heat source served by the heating system through an automatic air valve which discriminates between steam and air. The vacuum, which in this system is confined only to the air lines, was first produced by a steam ejector discharging the air to the atmosphere. Laterly, however, this system is as frequently operated by vacuum pump as ejector. The air-line vacuum system is best suited for one-pipe heating systems, although it is occasionally used also in connection with two-pipe systems. The vacuum return-line system, however, is only applied in connection with two-pipe systems.

MECHANICAL VENTILATION OF BUILDINGS.

Little was done towards the application of mechanical ventilating until recent years, although it appears from old records that ventilating fans of crude form were in use more than 250 years ago for ventilating mines. Up to about 1870 fans were used mainly for special industrial processes, and, with few exceptions, the ventilating of buildings as we know it today was either ignored or made to depend upon natural air movement secured by physical properties of the atmosphere.

When consideration was first directed to the application of mechanical means of ventilation, the largest and most prominent places of assembly naturally received the first attention. To begin with, however, the use of mechanical devices was usually an afterthought and resorted to after the buildings were completed and when it had been found by bitter experience that the more primitive methods of ventilating by heated shafts and chimneys could not produce satisfactory atmospheric conditions.

The House of Commons in England affords one of the earliest European examples of this kind. After many attempted improvements of the ventilation of this building the idea of moving the air by mechanical means was finally conceived in 1736 and a centrifugal fan was installed, which remained in service until 1820.

Another and more recent case was the U.S. Custom House in Boston. Bids for mechanical ventilating apparatus for this building were

advertised for in 1846 after the building had been erected. The apparatus then installed incorporated a steam-driven fan, which was, perhaps, the first of its kind in this country.

The next fan installation appears to have been that in the Utica, N.Y., Insane Asylum. After this mechanical ventilating apparatus came into use more rapidly, until the present stage of development has been reached.

Fans of the present type did not come into general use until in the seventies when the self-contained steel-encased fan was put on the market for ventilating purposes. The introduction of this type fan, together with the development of the steam-tempering coil and the improved method of operating ventilating fans with steam engines driving directly on the fan shafts, gave the fan practice a new character. In later years electric motors have gradually taken the lead over steam engines for the operation of ventilating fans, on account of their greater convenience in operation and attendance, and because motors lend themselves more readily for installations in out-of-way places than steam engines, besides which they can be made to operate practically without any noise or vibration, which is usually essential in ventilating work.

In our modern buildings space conditions must be carefully considered and conserved in order to find room for all the appliances and machinery that goes to make up the mechanical equipment. This situation has crowded out the cone fan as a supply blower in favor of its own offspring, the steel-encased centrifugal fan. For the same reason it has also been superseded as an exhaust fan by fans of more suitable types.

For exhausting air, both the so-called disc (or propeller) fan and the centrifugal fan are used. The former has gradually gained in favor on account of the comparatively little power this fan uses when handling air at low velocities, as is the case with most of the present-day exhaust systems. It also offers less hindrance to the escape of the air by natural draft when not operated; a valuable feature in exhaust systems terminating at the roof, which is the case in most installations.

The origin of the principle on which the disc fan is founded dates back to the time of the ancient Archimedes screw. At the present time there are several forms of disc fans which are variously used for exhausting air, for producing air currents, for fanning effect and as local ventilators set in the wall openings. The disc type fan is, however, but very seldom used as a blower fan, inasmuch as it is incapable of creating the higher pressures usually encountered in air-supply systems.

DEVELOPMENT OF MULTIBLADE FANS.

The blast wheel of the original steel-encased centrifugal fan was of the paddle-wheel type.

The more compact "multi-blade" type of fan wheel which came into use in 1908, made the fan housing less bulky, an advantage that was quickly appreciated and soon made this newer type fan very popular.

Apart from the various other improvements that have been made from time to time, the following new features might be mentioned: The cooling of indoor atmosphere by refrigeration, well water and water spray; the introduction of the air washer for cleansing the air and the invention of the steam humidifier and the automatic control of both temperature and humidity.

CHEESE CLOTH SCREENS AND AIR WASHERS.

The old method of filtering air through cheese cloth is still in use for screening out dust and other mechanical impurities. The common practice about thirty years ago was to make up this filtering medium in form of bags, but the more modern method is to stretch the cheese cloth on vertical frames set in V-shaped holders, thus securing the requisite filter area in a more compact form.

The air washer as applied to ventilation work came into use about 1900. The steam humidifier, together with the automatic humidity control by the humidostat, appeared two or three years before. The steam humidifiers now in use are of two types, one causing the evaporation of water from a pan placed in the air passage by means of a steam coil in the water, and the other releasing low-pressure steam directly to the air through perforated nozzles covered with lamp wick material.

MASONRY AIR DUCTS.

The old method of conducting air for ventilation through masonry ducts and flues formed in the building construction is but seldom resorted to at present. Ducts and flues made of galvanized iron are instead used for this purpose, because of their greater efficiency, due to decreased friction, decreased air leakage and increased cleanliness.

PIPE COVERINGS.

The precautions which had to be taken against undue heat losses and disagreeable effects from the hot pipes, flues, etc., have brought into use various forms of non-conducting covering. Among the first materials used for this purpose was hair felt, a covering material which consisted of cow's hair, and which, when carefully applied, provided a very efficient non-conductor. It was found, however, to have one very serious defect,—*i.e.*, under the action of heat vermin bred rapidly in this material. Its use as an insulating material for hot surfaces is therefore now limited mostly to temporary covering of pipes during building construction operations. The modern covering, both for pipes and other hot surfaces, is mostly made of mineral sub-

stances, such as asbestos, magnesia, diatomaceous earth, etc. Covering for pipes and fittings is made up in sectional form and canvas jacketed, whereas covering for other purposes is usually made in blocks or sheets for convenient application, and either finished off with plastic cement or encased in canvas, glued or sewed on.

The matter of non-conducting covering is given very careful consideration in present-day practice, as it is realized that proper protection in this respect has an important bearing, not only on the economy of operation of heating and ventilating apparatus, but also on the results to be accomplished.

SLOW DEVELOPMENT OF SCIENCE OF HEATING.

From the scientific aspect a great deal of valuable information has been gathered during the evolution of the heating and ventilating practice. The science on this subject did not develop very rapidly, however. Its path was beset with conflicting theories and whims which had to be eliminated before data of scientific and practical character would be accepted. Some very simple facts and theories were literally dragged forth from obscurity by repeated failures in obtaining uniform results, because of the fact that physical laws had been overlooked.

A striking example of this is the old method of sizing radiators on the cubic foot basis. For a very long time the simple and obvious theory that the heat requirements of a room are in direct proportion to the room exposure was lost sight of, and until this theory was applied it was customary to allot heat in direct proportion to the cubic contents with an arbitrary allowance for extra severe conditions. This method occasionally and repeatedly resulted in huge failures, but is still used to some extent.

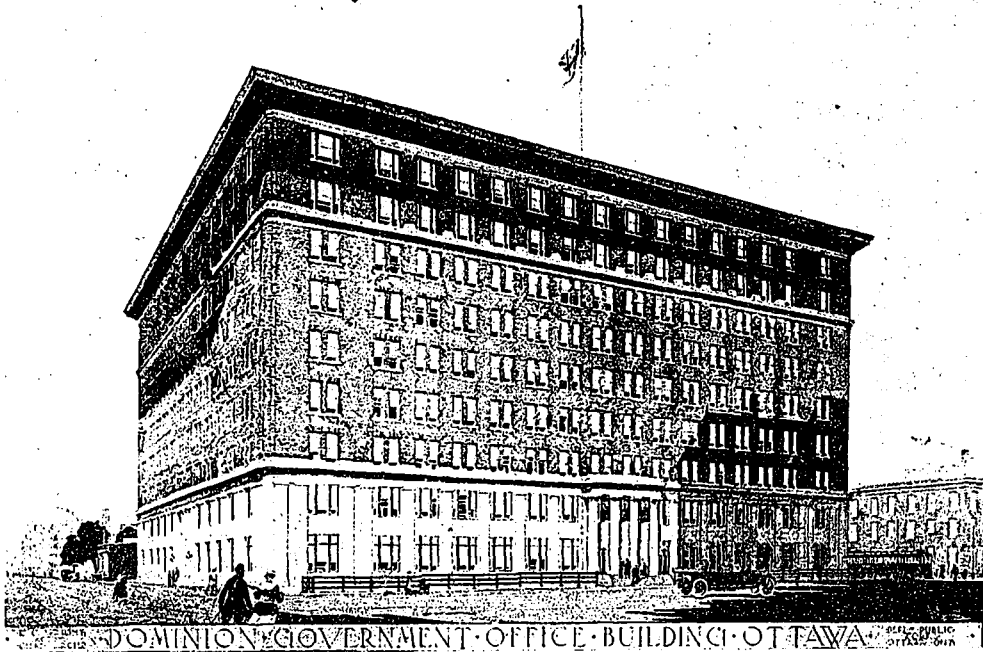
A Greek Natural Cement

Greece and the neighboring territories use only a limited amount of manufactured cement, all of which is imported, but obtains their chief supply from the volcanic island of Santorini, in the Aegean Sea, which produces a natural cement called "Portselena." Mixed in certain proportion with sand and lime, this natural product is an excellent substitute for the manufactured article. Portselena has been used for many centuries and is still being used throughout the Near East for bridges, harbor works, breakwaters, forts, lighthouses, etc., in the Mediterranean, the Black Sea, and the Adriatic. With it the Venetians constructed the great fort of Monemvasia and Nauplia, the then Gibraltar of the eastern Mediterranean, the foundations of which are in the sea, intact and immovable up to now after many centuries. The forts of Crete and those of the Dardanelles are also built with Portselana.

Government Office Building, Ottawa

The new Government Office Building now being erected at Ottawa, is intended to house under one roof the various departmental staffs at present scattered throughout the city, and thus ensure the more speedy and convenient transaction of Government business. It has been designed and planned along the commercial lines of a modern office building, and will embody a most economical type of construction throughout. The framework will be of skeleton steel construction encased in concrete and carried on steel columns from the foundation rock. The floors will be of reinforced concrete with

provision has also been made for fire escape stairs inside the building, running from the basement to the roof; also for two stand pipes with hose attachment on each floor. The general equipment, including the various staff lavatories, will be modern and sanitary in character, and a vacuum cleaning system will be installed for cleaning the offices, corridors and halls. Steam will be employed to heat the structure, a vacuum steam-heating plant being utilized for this purpose. The ventilation will be accomplished by two large plenum fans, air washers, etc., placed in the basement with a system of



DOMINION GOVERNMENT OFFICE BUILDING, OTTAWA, FOR WHICH THE CONTRACT WAS RECENTLY LET.

mastic finish, and the partitions will be of gypsum blocks. Granite will be used to approximately the ground floor level, with two stories of limestone above, the remaining stories being a light tapestry brick with stone trimmings and backed with twelve-inch hollow tile.

Entrance to the building will be obtained from O'Connor, Queen and Albert streets, through vestibules to the elevator halls, from which corridors on the several floors give access to the various offices. The main entrance halls on the ground floor will have marble dadoes and marble mosaic floors, all other halls and corridors having terrazzo floors with a seven-foot cement dado finished with white vitrolite enamel.

There will be three batteries of elevators of two cars each, providing one battery at each of the three entrances, which will ensure speedy distribution to all offices throughout. Ample

fresh air ducts giving fresh air to the corridors throughout.

The building was designed by the Chief Architect's staff of the Department of Public Works, Ottawa. It will be nine stories above the sidewalk level, and will cost, according to the contract price, slightly over a million dollars.

Loosening Rusty Wood Screws

Wood screws that have become so badly rusted that they cannot be moved by ordinary means may be loosened by applying a hot soldering iron or poker to the heads. The expansion and contraction caused by the application of the hot iron and its subsequent withdrawal will usually loosen them enough so they may be removed with a screwdriver.

The Architect As a Man

(Reprinted from the "Architect and Contract Reporter," London.)

We are passing through a great crisis in the history of the human race, but whatever the duration of the war may be, we know that an era of peace will follow in which the activities of mankind will resume their customary channels or seek new ones. No class in the whole of the community has suffered so much during the war as the architectural profession, and, as all but a small fraction of their work has been stopped, most architects have had to seek means for bridging over a long period of forced inactivity. We are told that good often arises out of that which is evil, and the temporary stoppage of their work has made many architects wonder whether there is not a means of establishing their future position on surer foundations than those on which it has rested in the past, and if this can be done the war may very well have been, from a local and specialized standpoint, a blessing in disguise.

We have heard much discussion as to the means to be adopted for educating the public in the value of architecture, but as charity is said to begin at home, it is clear that the architect to lead and guide the public must possess the quality which we usually describe as "personality," and, moreover, must be quick to see and recognize what it is the public is likely to place value upon.

The invention of paper created a fundamental change in the architect's position, and, while it supplied him with a ready means of conveying his ideas, it also divorced him from much personal connection with building and with the men who carried it out. Instead of the architect or master-builder directing everything on the spot, it became possible for him to work in one place while the building he designed was erected in another. It thus tended to make him a solitary being, living apart from his fellows, and concentrating his attention on the products of his imagination and their presentation on paper. And in proportion as fresh energy, thought and skill have been directed to the acquisition of greater facility of delineation, there has been a tendency to eliminate close intercourse with clients and employers. Yet when all is said and done, the finest architectural drawing often fails to have the same meaning or charm for the public as a slight water-color sketch. The architectural drawing was practically non-existent in the Middle Ages, and few examples, and those crude parodies of what would be now called architectural drawings, have come down to us from that time, while in the later era of Wren the architectural draughts made as compared with those of to-

day are little more than explanatory diagrams, and only in the eighteenth century did the architect begin to express himself fully on paper. The master-builder of the past may be depicted as directing workmen, the architect of to-day—like the poet—often sits in solitude, burning the midnight oil and communing with his own thoughts. There is thus a tendency to live out of the world to which we all belong, and to lose touch and sympathy with our fellows. The danger of doing so is apparent, for the architect, though his work may be the noblest of all arts, is at every step bound up with most practical considerations and limitations, and of all men can least afford to ignore practical issues and the financial aspects of life.

The scriptural injunction that we should be all things to all men applies to him, and the ignorance or disregard of the broad interests which sway mankind is, we are convinced, at the root of many architects' failure. It is necessary first of all to be a good citizen, understanding and mixing with one's fellows, and then on this basis building up the technical knowledge and skill which must be mastered and possessed if we want to serve the public and in serving them benefit ourselves. We must know our work thoroughly, but this does not imply that we must ourselves be able to do every part of it; but we must be capable of taking a fair and thorough survey of the whole and see that everything is efficiently carried out by ourselves or by others. The personal pride and delight which many men feel in doing everything "with their own hands" sometimes blinds them to the fact that they are neglecting other and more essential work which might bring them into touch with the public. More than this, the man who learns to work with others helps to build up a school inspired with similar ideas, and more nearly approximates to the old conditions under which some of the greatest work has been done, though we know the names of few individual designers of 300 years ago.

The broader knowledge which we have alluded to and which many architects are deficient in is the understanding of such questions as the finance of building, the commercial and legal aspects which touch it at every side, and the crucial knowledge which would enable them to make the best use of a given site. But even such special knowledge, though a qualification for the architect who serves the public, will not necessarily bring clients to his door unless it is combined with the wider general knowledge and sympathy which make a man popular and interesting to his fellows. We must sadly admit

that it is not the great gifts and qualities of men which make them general favorites so much as the possession of that tact which prevents them from boring others, and the sympathy and quickness of mind which is necessary if they wish to follow the thoughts of others and to meet them on their own mental ground. The architect who attends a building committee meeting resolved to put his own special views before his clients may frequently meet with defeat, while another who is quick at understanding and gaging the personal equation of his fellow-men will obtain the result he wishes for with little effort. To be a good listener is good, but to be a good listener because one has nothing to say is not enough, and the architect who would be successful should be able to hold his own in any society and to take part in a discussion at the fitting time. It should be borne in mind that the world being what it is, most of us are made happier by being with those who appreciate and like us, rather than those who try to impress us with their ability, and many men have made great positions for themselves mainly because they possess a spirit of camaraderie, tact and good nature. Mankind is, in fact, not strenuously on the lookout for merit, but chiefly asks that a man should in the first place be a good companion, and in the second competent and discreet. And the essence of discretion is to be able to avoid the corners of others.

We believe the architects of the new area, if they are to succeed and to effect the "education of the public," should resemble the "surveyors" of the seventeenth and eighteenth centuries, men of the world and masters of affairs, able to understand the standpoint of the society in which they live, and will not be pale and anaemic enthusiasts living in a self-contained temple of art and somewhat despising the average run of their fellows. For do what we may, and think what we will, we are part and parcel of the sum of humanity on whose support we are dependent, and whose wants and tendencies we should study and associate ourselves with. All the work of all the schools and all systems of tuition will be valueless for the architect who has neglected the broader foundations which he, in common with men of other callings, should build upon. Not only is the proper study of mankind man, but it is the essential groundwork for everything else.

No single problem in our life stands by itself; thus housing and economics are interlocked and relative, while question of finance will determine and limit almost every building scheme. Our commercial future, bringing with it building or stagnation, is dependent on the relations of capital and labor, on tariffs and other political issues.

This being so it is necessary for the architect

to study and understand more than his own work in order that he may have his proper weight as a citizen and fit himself to play the part of a man of the world.

The man who overestimates the value of what he does is living in a fool's paradise, often with dangerous results to himself, and close and exclusive absorption in one field of study tends to render us oblivious of broad and important issues which may be paramount in the estimation of clients.

Professional Ferment

The following is taken from an article by Wm. Phillip Comstock, which was published a short time back in the "Architect and Builder" (U.S.A.). It has since appeared in several other architectural contemporaries, and deals pertinently with a condition which is not wholly without evidence here in Canada:

There are, even in this day and hour, architects who have business of considerable volume on their boards, and many of our contractors can hardly be said to be starving for lack of work. Yet the architects as a body, and with them many in the construction industries, view the present situation with concern, and well they may.

Building construction methods are in a period of mutation; new species bid fair to be created, and the old order is on the wane. Not that this condition is a sudden development—as some may think—for the odor of it has been in the air for many moons. Building conditions, like a huge structure founded in a quagmire, have courted disaster until with a precipitation of an earthquake, they are now suddenly engulfed, and the architectural profession, with many of its satellites, finds itself floundering—and wondering why.

The world war is the immediate cause of this cataclysm, and, as usual, the immediate cause receives the blame, though the structure has long been showing dangerous settlement cracks caused by the improper foundations laid down in the past. Good foundations are a necessity in all good building, and the architect knows this better than anyone else, yet in his very life-work has he neglected the precepts he has made to others.

With lofty thoughts and stilted ethics he has strode along without an appreciation of the progress about him, ever changing, searching, specializing. Business—life—is a continuous revolution. New precepts rule, to be superseded by even other newer precepts. The professional practice of architecture has not kept pace, and is therefore doomed. It must be reborn from the ashes of the past, even as the legendary phoenix.

Art—architecture is the culmination of all arts—is undying. Architecture is inherent in the human race; the desire for it cannot be destroyed, and it will rise with a spirit of victory above all sordidness. This idealism is immortal. It is the soul of the phoenix, which shall inspire the new body of a rejuvenated professional practice.

All have not been blind. Some—many even—have seen the light and remodelled their course to meet the modern trend. These are the successful architects and busy builders of to-day who have met the demands of current development, and from them won a deserved return. Chance or accident has not been an element in their progress, which has been based on the sound business principle of true service for value received.

The famed architects of antiquity were master-builders. They designed freely and wrought wonderfully with the clay in their hands. They lived in the heyday of the artisan and craftsman; they were the leaders who rose above their fellows by the sheer might of their gifted prowess. Times have changed.

This is the age of standardization, machine-made quantity production, rule by the multitude, not by the few, and yet our art lives on and reaches ever higher levels of attainment. Let our architects read the signs of the times and rise to new pinnacles based on our modern productiveness.

When our country went to war there was a sudden and enormous demand for construction on a vast scale; the Quartermaster's Corps of the army had to provide housing for the new armies; extensive additions were necessary to existing manufacturing plants, and even greater new factories were built over night, as it were; office and executive buildings of great extent were demanded to house the ever-extending executive departments of the Government; housing for operatives became a crying need in our great industrial centres; construction on a vast scale was necessary to meet the needs of our colossal new war machine, to build our ships; and supply the materials of war.

To make possible this accomplishment, in all its ramifications, vast to the extent of being almost incomprehensible, the organization of our Government departments was extended manifold; the personnel increased with a rapidity which was marvellous, and an organization of professional talent created which to-day, after a year of war, is perfected and efficient in a remarkable degree. What is the status of this organization? How is it made up? And how was it possible for the Government in its hour of need to immediately get assistance?

It was the trained engineers of the country who became the technical advisers of the Gov-

ernment on planning, design and construction, utilization of existing facilities to the utmost, expansion of them and creation of new utilities. It was our trained engineers, already well organized in our great building construction firms into harmonious working units, companies, even regiments, who were ready in the hour of need to do the deed.

Professionally, as such, our architects have not been a factor in the greatest building emergency the country ever saw. Individually, to many the greatest praise is due. They have donned the uniform, striven at home and fought abroad, and given of their best in ability, effort, and resourcefulness. But as a profession, in the oft-vaunted position of autocrats of the building industry, they have been wanting. And the reason is not beyond discernment; it is an inheritance from the past; architectural practice has not kept pace with the times.

The need of federation in the building industry as a war-time need has been met. Why not face the truth squarely and hold a conference to reorganize the outworn system of professional practice?

The after-war period in the building industry will be a time of great enterprise and expansion. In this the architect should play a prominent part, but his days of autocracy are over, and his success will depend on his ability to cooperate, not to dictate. Now, when the architect secures a job, he calls on the foundation builder to figure his footings, he depends on the steel contractor to design the structural members, he depends on the plumbing contractor to draw up his plumbing lay-out, he expects the electrical contractor—but why go on?—and when the building is finished he zealously, often belligerently, demands exclusive credit for its entire design and construction.

The day for this is past—and why? The architect has been losing business. Others who build better, more efficiently, and more economically under the name of architectural or engineering contracting firms have taken the work from him, and they work on the principle of cooperation, not autocracy.

Roman Ruins in Southern France

Wilfred P. Mustard, Professor of Latin in Johns Hopkins University, delivered an address recently at Toronto under the auspices of the Women's Association of the Bloor Street Presbyterian Church. His subject was Roman Ruins in Southern France, of which he made an intimate study during several years' residence there. The address, which was illustrated by slides, dealt chiefly with the ruins in the historic cities. Professor Mustard referred to the palace of the Popes at Avignon, and mentioned the fact that it is now fitted up as a hospital for the Allied soldiers.

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The Present Power of Industry

Canada has just had the most successful industrial and commercial year in her history. There has been a greater expenditure in keeping the wheels of industry going than ever before, and according to bank statements, more money saved by the working class, due to high wages, than at any previous time. The very satisfactory condition of affairs which have existed during the past twelve months is altogether attributable to the successful Victory Loan raised a year ago, which has not only enabled Canada to finance her own needs as well as the credits in this country of Great Britain, but which also supplied a surplus sufficient to provide needed funds for provincial government, municipalities and corporation requirements.

A continuance of this prosperity which has grown out of the war, as well as the necessity

of meeting our own direct responsibilities in connection with same, makes it imperative that the forthcoming Victory Loan must not only be fully taken up, but should be, as on the previous occasion, well over-subscribed.

Just what the last bond issue meant to the country during the past year has been very ably set forth by Mr. E. R. Wood, the well-known financier. The statement which he has given out shows the extent of the huge benefits derived. For the farmer, the loan was able to finance the only purchaser who could buy his excess products, namely, Great Britain. In the fiscal year of 1915 the farmers of the Dominion exported animal produce and agricultural products valued at \$209,000,000. For the fiscal year ended March 31st, 1918, they exported no less than \$740,000,000 worth of their output, the largest agricultural export from this country on record.

For the manufacturer the Victory Loan continued to give the best export market he had ever possessed. Canada's manufacturers during the fiscal year ended March 31st, 1915, exported \$85,000,000 worth of merchandising. That period included eight months of the war. For the twelve months ended March, 1918, they have exported \$636,000,000 worth of merchandising, an increase in three years of \$551,000,000, 648 per cent. It is interesting to note in connection with these exports, Mr. Wood points out, that since the loan was raised, approximately \$20,000,000 per month has been advanced to the Imperial Munitions Board at Ottawa for the purchases of Great Britain in this country. There have also been expended approximately \$20,000,000 a month for other war purposes in Canada, including large purchases of farm products. This is a monthly total of \$40,000,000, or during the seven months from December, 1917, to June, 1918, a sum of \$280,000,000.

Further facts introduced in this connection are as follows: War contracts have been given to 950 manufacturers, and in July of this year 400 manufacturers were in actual contract relations with the Imperial Munitions Board at Ottawa.

Up to June, 1918, Canadian manufacturers have produced over 60,000,000 shells; 20,000,000 fuses, 74,000,000 pounds of powder and 50,000,000 pounds of high explosives.

Of the 1,654,000 tons of steel used, 1,400,000 tons were produced in Canada.

Contracts have been let in Canada for 90 steamships with an aggregate dead weight tonnage of 375,000 tons. These orders have a value of \$71,000,000.

National war plants have been established at a cost of \$15,000,000, for the manufacture of powder, high explosives, forgings and aeroplanes; while large quantities of fir and spruce

are being purchased by the Imperial Munitions Board, which now has 67 logging camps in operation.

In addition to this, the United States Government has placed large orders for various products with the manufacturers in this country, including a contract for 75 millimeter shells, which are now being delivered at the rate of 225,000 per week, with the number steadily increasing.

The above is very convincing as to Canada's unprecedented industrial growth. While the building industry has not fully shared in this great prosperity, it has participated to a degree, and will eventually benefit to a far greater extent as a direct result. A large portion of the Victory Bonds held by individuals will, as the material market normally rights itself, be the negotiable means whereby much building will be done, both in the interim period and when the time of maturity for these bonds arrives.

Consequently the necessity of taking as many of new Victory Bonds as possible cannot be urged too strongly on the part of every citizen of the Dominion. To do so is to help stabilize the industries of the country and to make a thoroughly sound investment on a patriotic basis. Canada rose magnificently to the task on the previous occasion. That she will fail in the present necessity is anything but a likelihood. Let every person do his duty and the loan will be over-subscribed. The slogan, "Buy Bonds to Your Utmost" is a good one, and is something which imperatively should not go unheeded.

Fire Waste in Canada

(Continued from page 323.)

United States and Canada. In some States, Illinois for instance, registration and licensing by the legislature, after an examination by a technical board, is compulsory.

Regarding the standardization and testing of structural materials and devices, the summary devotes a chapter of twenty pages to this subject, and states that no material in present commercial use is "fireproof," and that in view of the popular misconception attached thereto, the term "fire-resisting" is the better word to employ. This chapter collects a large amount of generally useful information in reference to the production and importance of various material and equipment as based on laboratory tests and practical structural applications.

Other chapters are devoted to private fire protection, municipal fire protection, fire insurance as affecting fire waste, and appendices on notable conflagrations in Canada, the need of provincial legislation governing building construction, fire prevention in Germany, and much other valuable data.

Dates for Builders' Conference Changed

The conference to be held at Ottawa for the organization of the proposed Canadian Building Industries has been postponed until November 26, 27, 28. The intention was to hold this meeting at an earlier date, but the gathering has been deferred to the time mentioned in order to more fully complete the preliminary arrangements and to insure the meeting being a success in every way. Present indications are that the conference will be largely attended, and that representative contractors, builders and supply men from all parts of the Dominion will be present.

BIG INTERESTS UNITE.

The W. J. Crouch Company, Incorporated, and Rowson, Drew & Clydesdale, Inc., two prominent United States firms, announce the amalgamation of their respective organizations. All trading and manufacturing operations will hereafter be conducted under the name of Rowson, Drew & Clydesdale, Inc., with general offices at 68 William street, New York. In the future the name of "Couch Steel" will be linked with the well known products of the concern under whose name the joint interests of the two companies will be perpetuated.

Mr. P. G. Donald, President of Rowson, Drew & Clydesdale, Inc., will continue in this office, while Mr. I. Smullyan, President of the W. J. Crouch Company, Incorporated, will act as managing director of the new firm.

Elaborate plans have been made for the further development and expansion of the company's engineering division in order to cope with the wholly unprecedented demand for their gravity runways, portable elevator conveyors and other labor saving devices. These plans will be carried out under the personal direction of Mr. John J. Smart, Secretary and Assistant General Manager of the W. J. Crouch Company, Incorporated.

CONTRACTORS and SUB-CONTRACTORS

As Supplied by the Architects of Buildings
Featured in This Issue.

ALGONQUIN HOTEL, ST. ANDREWS, N.B.

Cement, Canada Cement Company.
Electric Fixtures, Robert Mitchell Company.
Elevators, Otis Fensom Company.
Hollow Tile, National Fireproofing Company.
Kitchen Equipment, Gurney-Massey.
General Contractor, P. Lyall & Son Construction Co.
Plumbing Fixtures, Jas. Robertson Company.
Plumbing Fixtures, T. Robertson.
Plumbing Fixtures, Cluff Brothers.
Paints, Sherwin-Williams.
Refrigerator System, Linde Canadian & Jewett Refrigerator Co.
Roofing, McFarlane-Douglas Company.

ANTIQUÉ AND ART GALLERIES OF B. M. & T. JENKINS, LIMITED.

Brick, Sun Brick Company.
Carpentry, A. Weller & Company.
Decorating, Murray-Kay, Limited.
Electrical Work, Hudson Electrical Company.
Elevators, Otis Fensom Company.
Heating, W. J. McGuire, Limited.
Masonry, W. Hughes.
Plumbing, W. J. McGuire, Limited.
Roofing, H. Williams & Company.
Plastering, Hoidge & Company.
Painting and Glazing, A. E. Phillips.
Sprinklers, General Fire Extinguisher Company.
Steel Doors, A. B. Ormsby, Limited.
Steel Work, McGregor and McIntyre.
Terra Cotta, Atlanta Terra Cotta Company.
Steel Frames, Trussed Concrete Steel Company.
Wood Carving, McCormick & Carroll.